EXCHANGE RATE, NET EXPORT AND ECONOMIC GROWTH IN EAST AFRICAN COUNTRIES: PANEL DATA ANALYSIS

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A THESIS SUBMITTED TO THE DEVELOPMENT OF ECONOMICS,COLLEGE OF BUSINESS AND ECONOMICS,SCHOOL OF POST GRADUATE STUDIES OF WOLKITE UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FORTHE DEGREE OF MASTER OF SCIENCE (MSC.) IN ECONOMICS,SPECIALIZATION ONDEVELOPMENT ECONOMICS

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UNDER THE GUIDANCE OF

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Statement ofDeclaration

I,AmsaluBichinuAyalew, hereby declare that this thesis entitled ***"Exchange Rate, Net Export and Economic Growth in East African Countries By Panel Data Analysis",***has been carried out by me under the guidance and supervision of BadassaWoltegji (PhD) And Mr.AbebeMengesha (MSc.) and submitted by me for the award of thedegree of Master of Science in Economics of Wolkite university.The thesis is originalwork and it hasn't been presented for the award of any other Degree, Diploma, Fellowship orother similar titles of any other university or institution.

Researcher NameDate Signature

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Statement ofCertification

This is to certify that the thesis entities ***"Exchange Rate,Net Export and Economic Growth in East Africancountries By Panel Data Analysis"*** submitted to Wolkite University for the award of the Degree ofMaster of Science in economic development and is a record of valuable research work carriedout by Mr.AmsaluBichinuAyalew, under our guidance and supervision.Therefore we hereby declare that no part of this thesis has been submitted to any other universityor institutions for the award of any degree of diploma.

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Statement ofApproval Sheet

This is to certify that the thesis entitled **"Exchange Rate, Net Export and Economic Growth in East African Country by Panel Data Analysis"** undertaken by AmsaluBichinuAyalew for the partial fulfilment ofdegree of Master of Science in Economics at Wolkite University, to the best ofmy knowledge, is an original work and is suitable for submission for the reward of the MSc.Degree in Economics is approved for the degree of Master of Science in development economics.

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List of Acronyms and Abbreviations

ADF Augmented Dickey-Fuller

AR Autoregression

BOP Balance of Payment

BRM Bickerdike-Robinson-Metzler

CAGR Compound Annual Growth Rates

CPI Consumer Price Index

DF Dickey-Fuller Test

DSP Differenced stationary process

EAC East African Community

EXElasticity of Export

FDI Foreign Direct Investment

FTA Free Trade Area

GDP Gross Domestic Product

GNI Gross National Income

HDM HarrodDomarr Model

IMF International Monetary Fund

LDCs less Developing Countries

ML Marshall-Lerner

NX Net Export of the Nation (Export Surplus or Trade Surplus)

NER Nominal Exchange Rate Represents

PPP Purchasing Power Parity

RER Real Exchange Rate

SSA Sub-Saharan African

UNCTAD United Nations Conference on Trade and Development

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Abstract

This paper examines an empirical investigation of exchange rate, net export and economic growth in east African countries. The study fully employing a strongly balanced panel data the period from 2000 to 2015/2016.The data set is collected from NBE, IMF and WB. The study employed Random effect model as confirmed by Hausman test.The study found that net export; real exchange rate, trade openness and expenditure of government are positive and significantly explained economic growth.The empirical investigation of in this study indicates that both exchange rate and net export are equally important and the advance issue of determining economic growth.The estimation result suggested that, a depreciation of exchange rate and the improvement of net export were improves economic growth and all types of import and exports, a result that is statistically significant and consistent with the standard economic theory. The policy recommendation of these countries should take emphasis and give more attention to improve more advancements of manufacturing product rather to devaluate exchange rate.

Keywords: *Exchange Rate, Net Export, Economic Growth, Random effect estimation tequnique, and EastAfrican Country.*

CHAPTER ONE

1.INTRODUCTION

1.1. Backgroundof the Study

Now a day, the developments of world economies position of financial systems is a leader of exchange market and net export. In an open economy, exchange rate and net export is considered as one of the major component of economic growth of domestic product and national product. An increase in the growth capacity of an economy is to produce goods and services compared from one period of time to another and it measures by real exchange rate and nominal exchange rate which include devaluation of currency which are adjusted and control of inflation and which leads increases both exchange rate and net export (Demirden and Pastine, 2015).

The growth of economy has been often used as deciding factors for the strength to develop its membership into groups are influential and significant in east African countries. The fact based on this macroeconomic variable of exchange rate, net export and economic growth is very important and that shows the diverse channels to achieve economic growth and development. A prominent channel is activated through international trade on exchange rate and net export across the country. This is true for developing countries and that raises the questions whether exchange rate of currency devaluation or net export enhancement promotes or come over economic growth are still controversial debates (Ajan, 2017).

Exchange rate fluctuations influence on economic activity through both real and financial channels. The conventional channel with effects on the real economy operates through net exports. This channel is well known and standard in open economy. The financial channel of exchange rates is fewer standards compared to the net exports channel, but has become more important with the greater integration of the global financial system in recent years. Crucially, the financial channel of exchange rate fluctuations often operates in the opposite direction relative to the net exports channel (Catherine, 2017).

The key empirical regularity at the heart of the financial channel of exchange rates is the empirical association between the depreciation of an international funding currency and the greater borrowing of currency. The regularity may have several driverson demandforexchange rate of dollar credit for borrowers andsupply of exchange rate of dollar

credit by lenders. In terms of the demand of importor dollar credit, a borrower who had borrowed in dollars to finance domestic real estate assets would see a strengthening of the balance sheet due to the depreciation of the money. An exporting firm with exchange rate of dollar receivables or an asset manager with big one denominated assets but with domestic currency commitments would hedge currency risk more aggressively when the currencyof exchange rate is expected to depreciate more (Hyun, 2017).

The mechanism through which international transaction of exchange rate and net export is affectedthe movement of economic development.This is a positive said to continue and brings aworthytriangular circle of increased exchange rate, rising net export, and economic growth.So just, this beneficial effect of exchange rate, net export growth and economic development seems to be supported by the empirical evidence (Milton, 2017).

In an open economy, overseas net export and exchange rate policies are the most important macroeconomic indicators of growth and development. The effect of foreign exchange rates on imports and exports is directly affects the success of policy design in terms of a reduction in the foreign trade deficit. The exchange rate is considered as a tool for the regulation of net export, which affects national income and welfare of a nation development. The size on the effects of changes in exchange rates is critical information for trade balance and exchange rate policymakers. The transformation of national currency into another, thus it can facilitate international trade between countries and allows comparison of prices of goods at the same in different countries (Awokuse and Fantu, 2012).

An exchange rate has directed renewed attention to the effects of devaluation on the net export of manufacturing goods and services. Net export is a difference between the value of goods and services exported out of a country and the value of goods and services imported into the country. Exchange rate and net export is a sensitive current issue thatinvolving more than one country normally which requires the conversion of a currency to another currency and import-export of goods and services respectively.Balance of trade is the official term of net export that makes up the stability of outflows(Mishkin, 2007).

The bearing of exchange rates can be different in the long term compared to the short term time period due to the slow adjustment of the trade quantity to the new exchange rate level. It also entails short-term fluctuations in the exchange rates as measured by their absolute percentage changes. In line with this, devaluation of the currency of exchange rate, the net

export expected to deteriorate first due to increase the import value in terms of domestic currency and sticky prices. Subsequently, the volume of export is increase and the volume of import is decrease, when they adjusting for the new exchange rate and the improvement net export is increase and then recover economic growth (Ohno and Anette, 2010).

There are two situations in which flexible exchange rates may be described as too unstable. First, exchange rates can be fully consistent with fundamental economic variables, such as relative prices, and macroeconomic policies, while still responding excessively to shocks to those variables before adjusting gradually to new equilibrium levels. Second, flexible exchange rates may be too volatileif they are primarily influenced by factors unrelated to fundamental economic variables. Inthis case, exchange rate movements would be largely unpredictable. Furthermore, the short-term independence of exchange rates from fundamentalvariables can lead to long-term exchange rate misalignment explosiveness could also have animpact on economic growth (Frenkel and Goldsten, 2012).

Most developing country economies reside in the enormous trading activities that must be undertaken using the currencies of their major trading partners. Hence, understanding the exchange rate arrangements of East African countries is a crucial importance especially given the fact that it influences a country's fiscal and monetary policies. It related on these economic facts, different research centre indicates many of developing East African countries is depreciating their currency toward trading partner of exchange rate and net export. However, there could not see the improvement in exchange rate and net export upgrading and the reason why this is still unclear, mainly intended to clarify the reason behind exchange rate and net export(Meniago, 2017).

In fact, majority of East African countries experienced substantial depreciation in their exchange rates since the come around. One could undeniably substantiate that East African countries economies have undergone global economic changes that have exerted considerable pressure on their currencies, which in turn negatively affected their trading activities. Consequently, the investigation of the effect of exchange rate changes on net export has received a lot of attention in recent years, even though there is still substantial disparity among scholars over the exact direction of the impact. Economic theory suggests that, the devaluation of a currency is likely improving a nation's net export of trade (Rincon, 2012).

1.2. Statement of the problem

Many of East African Countries have been experiencing trade deficits and weak exchange rate in their practice of the economy. One of the reasons for such problem is the poor economic integration and exchange rate strategies adopted in their economic reforms and usually depend on certain specific primary product for their exports, and import a lot of the industrial and manufactured goods and hence which leads to incurs huge trade deficit in their economy. However, the problem is that, this major component may contribute depressingly into gross domestic product, when payments to the rest of the world greater than receiving from the rest of the world. This likely to deficit of net exports and exchange rate deteriorates, which is commonly faced most of the developed and developing countries (Moses, 2013).

The policy makerrationalists'is considered as an instrument to correct net exportand exchange ratedepressing problems in East African Country. When the exchange rate is flexible, real appreciation is due to appreciation of the nominal exchange rate and when the exchange rate is fixed, the real appreciation is to rise in inflation after the money supply increases. Real appreciation that undermines the competitiveness of the country widens of current account deficit and increases vulnerability to a financial crisis. In this case, a stronger exchange rate tends to stimulate an appreciation in the exchange rate. This is because with higher economic growth, the country is likely to seen an increase in interest rate. Also higher economic growth tends to the basisof greater confidence in the economy (Combes, 2010)

The effective exchange rate is a key component of macroeconomic policy. There's strong evidence that overvaluation is bad for economic growth and balance of tradeachievement. However, some more limited evidence thatundervaluation may be beneficial for economic growth of developingcountries.The implementations of economic policy with the purpose of improving exchange rate and trade stability that promotes its economic development of the country. Stabilityof trade asserts on the devaluation of currency which plays a vital role in improving exchange rate and net export of a country while the empirical finding showed ambiguous result. If the trade is open, it could be hinder to the exports of goods in short run but exports might increase in the long run while putting low level of imports is deterioration in exports if the imports of goods are an input for production of export goods (Elif, 2014).

Devaluation of exchange rate reflects the existence of serious macroeconomic problems on economic fundamentals that reflects weaknesses of currency the government that is devaluing its currency.Using standard economic reasoning and rationales of devaluation of currency, the country has been overcome with high inflation rates means that the purchasing power of currency has been decreased(Pinto, 2012).

On the side of Mohammadet al. (2015), attempt to examine the relationship between exchange rate and economic growth proxy by real gross domestic product in Bangladesh for a period from 1973 to2013 by using time series econometric technique. The empirical results showthat there is a significant positive correlation between exchange rate and economicgrowth. Theresults also advocate the presence of long-run equilibrium relationshipbetween exchange rate and economic growth. This is evidenced from Granger's Causality Test thatthere is a bi-directional causality runs through exchange rate to economic growth and economic growthto exchange rate.

The impact of exchange rate devaluation on major east Africancountries trade balance using the panel co-integration and panel group fully modified least square estimation technique from1990-2014. Whether exchange rate devaluation improves or worsens trade balance has been at the centre of literature debateover time with varying empirical evidences for developed and developing nation. The results indicate that there exist a longrun stationary relationship between trade balance and its determinant foreign and domestic income, nominal exchange rate asemployed in the study(Kediret al. 2017).

Regarding the desirable degree of foreign exchange ratepolicies hasbeen persisting for decades. Markets are able to effectivelyachieve optimum efficacy and maximize welfare output when operatedwithout distortions. This research was determining the impact of exchange rates on imports and to investigate theimpact of exchange rates on exports of economically developing countries.Many studies have indicated that policies touching on exchange rates closelyaffect the international trade of a country. As a result,there is co-integrated relationship between effective exchange rates andexports-imports of emerging countriesin the long run (Elif, et al. 2014).

Theimportance of trade as an engine ofgrowth is well established. Empiricalliterature shows that the growth impactof exports is much stronger when theexport basket is vertically andhorizontally diversified. This paper aimsto assess the role of the real exchangerate in

enhancing export supply andpromoting export diversification inEthiopia and Tanzania.The empiricalresults suggest that, while overvaluationis harmful to exports, undervaluation ofthe real exchange rate boosts exportsupply as well as export diversification.A high rate of growth in exports isassociated with periods of undervaluedcurrencies. In fact, both theories and evidences are diverging and still the researchers are not reaching the ultimate decision is one gap to fill the study.

The main point of analysis that put clear research gap are: **(i)** Majority of studies were done for country specific cases and they used time series analysis. In this case, where it is difficult to make conclusion and inference of exchange rate and net export and its relationship on dependent variable and bidirectional effect for cross country analysis. In this study, it will be better to add net export and use of panel data is very well and fills the paper gaps and it reaches the ultimate decision. **(ii)** No previous work exists by this award in the recent time and well done by panel data analysis **(iii).**The relationship of exchange and net export, there is a blurred thought and a clear weight not vividly shown whether exchange rate or net export is leaning or slanting towards economic growth which explained in the empirical review **(iv)** The methodology taken into account and variables incorporated in the econometric model for further analysis based on the expected the results is also another area of disparity among these researchers. Thus, this paper tries to address and fill the gap by taking into account the above noted issues and investigates exchange rate, net export and economic growth for eight east African countries the period from 2000-2015/2016 using by panel data analysis.

1.3. Research Questions

From the details of the study, the following specific key questions and issues are raised:

- What is the trend of exchange rate, net export and economic growth in selectedEast African countries?
- What is the outcome of net export on economic growth in selectedEast Africa country?
- What is the effect of exchange rate on economic growth inselectedEast Africa country?

1.4. Objective of the Study

1.4.1. General objective of the study

The main objective of this study is to investigate the effect of exchange rate and net export on economic growth in East African country.

1.4.2. Specific objective of the study

The specific objectives the study isto attempt:

- To see the trends of exchange rate, net export and economic growth in stated East African country.
- To investigate the outcome of net export on economic growth in East Africa country.
- To examine the effect of exchangerate oneconomic growth in East Africa country.

1.5. Hypothesis of the study

The initial study and different preceding researches on this region shows that the relationship between exchange rate and net export on economic growth would be positive or negative. The relationship between exchange rate and net export on economic growth are the following hypothesis is defined. The hypotheses to be testing in this study are:

First, regarding the relationship of variables;

H_0: Exchange rate and net export has no motivation to improve economic growth.

Ha: Exchange rate and net export has amotivation to improve economic growth.

Second, regarding the natureof panel data from;

H_0: Random effect model is appropriate and

H_a: Random effect model is not appropriate

Third, regarding to the variety of tests for unit roots or stationary of panel datasets;

H_0: Each time series contains a unit root.

H_a: Each time series is stationary.

1.6. Significance of the study

This study is very important for the current situation. Because it shows that the recent activities for determining exchange rate and net export performance on economic growth basically in East African countries. It also confirmations some directions for policy makers to come up with appropriate policy to develop the sector so as to expand the performance of exchange rate and net export on economic growth in the region.

1.7.Scope and Delimitation of the Study

The study is limited to investigate the relationship between exchange rate, net export and economic growth from destination of country i at time t. For a period from (2000 to 2015/2016) and the annual panel data of eight east African Countries are used.

1.8. Organization of the Paper

The rest of this paper is organized as follows. The first chapter assesses the issues to be investigated and the driving force behind making a study on the back ground of the study concerned. Chapter two is consists of review of the relevant theoretical and empirical literature findings or studies are discussed. Chapter three is designed to provide detail study concerning the methodology part and model specification used in this study.In the fourth chapter, descriptive statistics and analysis of results was presented. Finally in fifth chapter, conclusion and summary of results was discussed.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. Theoretical Literature Review

This chapter is organized as three main parts; the first part deals with theoretical literatures about definition and brief reviewof different literatureof exchange rate and net export. The second part deals with economic growth structure and performance of developing countries. The third part contains review of empirical literature on different countries experience in selected east Africa.

2.1.1. Theory of Exchange Rate Regimes

Exchange Rate refers to the price paid in one currency to acquire the one unit of foreign currency or the foreign currency received to sell one unit of home currency. There are many factors that determine the currency exchange rate, which are basically the macro economic factors. A currency can depreciate or appreciate against other currency largely due the changes in these economic factors. The exchange rate of countries can be determined either by the country's monetary authority or supply and demand depending on the exchange rate on the country peruses (Jeffrey et al., 2008).

The theory of exchange rate is a very important device in affecting the economic well-being. It has a vital role in country level of trade which in turn is very critical in a free market economy at which the domestic currency may be converted into sold for a foreign currency such as the United States dollar.According to Alamet al. (2012)reviews in the field of economics and even the academic circles have argued that exchange rates should be determined freely by the mechanism of supply and demand. In other words, markets should determine the optimal level of exchange rates (Ahmed et al., 2012).

Exchange rate of currency devaluation which occur either in fixed or managed floating exchange rate and the government has some rights over controlling the foreign exchange market. An increase in the exchange rate refers to the appreciation or revaluation of the domestic currency and reflects an increase in the value of the domestic currency. According to Burstein et al. (2010) exploresdepreciation of currency occurs only in free floating

exchange rate and the government never decide about the value of domestic currency which is fully decided by the market's demand and supply (Jaimovich et al., 2009).

2.1.2.System of Exchange Rate

An exchange rate is the price of one nation's currency in terms of another nation's currency. The structure implemented by the monetary authority of each country in order to establish the exchange rate of their domestic currency in the foreign exchange market. According to their degree of flexibility, the distinction amid these exchange rate structures is commonly made between fixed exchange rate, intermediate exchange rate and flexible exchange rate.

2.1.2.1. Fixed Exchange RateSystem

A fixed exchange rate system is a system where governments determine exchange rates and make necessary adjustments in their economies to maintain these rates. Fixed exchange rate is the rate which is officially fixed by the government or monetary authority and not determined by market forces. In this system, foreign central banks stand ready to buy and sell their currencies at a fixed price.

Eichengreen et al. (2008) develops a historical review of the literature onreal exchange rate and growth, focusing attention on possible channels through which the real exchange rate might have an impact onlong-run economic growth. The author argues in favour of a more depreciated real exchange rate as long as this is not associated with higher exchange rate volatility. The combination of a depreciated realexchange rate and low volatility is regarded as a favourable combination for developing and emerging economies, where a more dynamic export sector is usually an important part of the process for achieving higher and sustained economic growth rates.

A typical kind of this system was used under Gold Standard System in which each country committed itself to convert freely its currency into gold at a fixed price. This system promotes international trade and investment provides discipline for macroeconomic performance and encourages international cooperation. The exchange rate system committed to maintain a fixed domestic currency either to a foreign currency, a currency basket or any other tangible measure of value. Fixed exchange rates are those that have direct convertibility towards another currency. In case of a separate currency also known as a currency board arrangement the domestic currency is backed one to one by foreign reserves (NBE, 2009).

2.1.2.2. Flexible Exchange Rate

Flexible exchange rateis the most common exchange rate systems in today world. However, since central banks frequently intervene to avoid excessive appreciation or depreciation, these systems are often called managed float or a dirty float. In a free floating exchange rate system, the total pressure in the foreign exchange market is reflected in observed changes in exchange rate. Under the floating rate system, a fall in the market price (the exchange rate value) of a currency is called a depreciation of that currency, a rise is an appreciation. In a freely floating exchange rate system, the demand for and the supply of foreign currency determine exchange rate and no government intervention is found (Pugelet al.,2006).

Much central bank practice managed floating whereby they intervene in the foreignexchange market by leaning against the wind. To do so, a central bank sells foreign exchange when the exchange rate is going up thereby dampening its rise, and buys when it is going down. The motive is to reduce the variability in the exchange rate. In other words, if a currency is freely floating, its exchange rate is allowed to vary against other currencies and is determined by the forces of demand and supply (Jeffrey et al., 2008).

2.1.2. 3. Intermediate Exchange Rate

An intermediate exchange rate helps monetary authorities to set the rate in line with the economic fundamentals which may be different from the one set by the market. These seek to combine stability and flexibility by applying a rule based system for adjustment of the par value. According to Adesolaet al. (2013) the regime may be criticized for not being as certain as the fixed exchange rate regime in eliminating uncertainties and providing discipline and not as fast as the floating regime in adjusting economic shocks. Crawling pegs, crawling bands, horizontal bands, and target zones are ordinarily referred to as intermediate exchange rate. The optimal exchange rate policies must be aimed at cooling real exchange rate that maintains internal and external balance in an economy (Taiwo et al.,2013)

Internal balance here is defined in terms of the level of economic activities consistent with satisfactory control of inflation and full employment of resources. External balance on the other hand is defined in term of payment equilibrium sustainable current account deficit finance in a lasting basis of expected capital flow. Thedistribution in the real exchange rate most probably leads to instability in both external and internal balance. Exchange rate can be

nominal or real each with its own relevance for economic analysis. According to Burdaet al. (2012) the nominal exchange rate (NER) is the value of foreign currency expressed in terms of the domestic currency and the real exchange rate is the cost of foreign goods and services expressed in terms of domestic goods and services. The real exchange rate is the nominal exchange rate adjusted by the domestic and foreign price levels, and is thus a measure of a countries relative competitiveness (Wyplosz et al., 2012).

$$RER = (NER \times DP)/FP \quad (2.1)$$

The real exchange rate is defined in both internal and external terms in this study. This is possible when the domestic price level (Pd) of the country is heavily weighted by non-tradable (if it is measured by the index of consumer price) and the foreign price level (Pf) of is heavily weighted by tradable goods (if it is measured by the index of wholesale price) is the focusing are present researcher (Herberger et al., 2003).

2.1.3. Exchange Rate and Purchasing Power Parity

The basic concept underlying the PPP theory is that arbitrage forces were leads to the equalization of goods prices internationally once the prices of goods are measured in the same currency. The effects of rationing in a one-sector model of a small open economy with no inventories, immobile workers, tradable goods, prices determined on the world market (so that purchasing power parity (Jovanovic et al., 2013).

$$P = E \times P^* \quad (2.2)$$

Where P and P* denote the general price level in the home and foreign country price and E is the nominal exchange rate, and fixed exchange rates.

2.1.4. Exchange Rate and Net Export

Net export is usually measured as the difference between receipts for the value of a country's total exports of goods and expenditure and the value of its total imports of a nation during a specific period of time and it calculate a country's aggregate expenditures or GDP in an open economy. Increase in government expenditure has positive impacts on exchange rate and economic growth. When a country has a weak currency, its exports are more competitive or cheaper in international markets helping make net exports positive. When a country has a

strong currency, its exports are more expensive, and domestic consumers can buy foreign exports more cheaply, factors which can lead to negative net exports (Agbola et al., 2004).

$NX = X - M$.....2.3

$X = (\frac{P_x}{E}, Y^*) - M(P_m \times E, Y)$.....2.4

Where: NX, the net export, X is export earning, M is import payment, P_x is the domestic price of exports, P_m is foreign price of imports, E is exchange rate of USD per unit of foreign currency, Y* and Y are foreign and domestic incomes respectively. In this case, net export is represented by the ratio of exports to imports. This ratio, or its inverse, has been used in many empirical investigations of trade balance exchange rate relationship (Onafowora et al.,2003).

2.1.5. Exchange Rate and Devaluation of Currency

The issue of devaluation has exerted a strong attraction for both theoretical and appliedeconomists. There are many reasons as to why a country seeks to adopt the policy of exchange ratedevaluation; the main reason is the need to overcome economic difficulties initiated by overvaluation of exchange rate. A currency's level has a direct impact on nation's international trade or its exports and imports and weaker currency is stimulate exports and make imports more expensive thereby decreasing a nation's trade deficit (or increasing surplus) over time. Devaluation has the immediate effect of raising prices of imported goods in terms of the local currency (Brixiova et al., 2014).

The logical reason of the devaluation of currency in modern monetary policy is a reduction in the value of money with a respect to those goods, services or other monetary units with which that currency can be exchanged. In addition to, overvalued exchange rategovernment has to provide subsidies for domestic producers and hence resources available todevelopment expenditure are reduced. When outside currencies are much stronger, a country can attract international business with cheaper production and labour costs by having a lower valued currency (Solomon et al.,2010).

2.1.6. Approaches of Devaluation of Exchange Rate

Exchange rate devaluation of currency is its own effect on the nation's trade balance. Net export of different countries would like to adopt devaluation as a monetary policy, so as to overcome their economic growth.The effect of devaluation of currency on developed countries is quite different from that of the developing ones. This reality leads economists to come up with three different approaches of devaluation namely the elasticity approach, the absorption approach and the monetary approach.

2.1.6.1. Elasticity Approach

This approach provides an analysis of what happens to net export, when a country devalues its currency and conditions that must prevail in the foreign exchange market for a devaluation of the currency to improve the net export starting from equilibrium. Devaluation may be able to reverse the imbalance of trade balance by lowering its price so that exports are encouraged while imports are made to decline. Devaluation of a currency may improve or worse the trade balance the ultimate outcome of currency devaluation depends on the nation's price elasticity of demand for exports and imports. Therefore, it presumed that devaluation leads to a rise in the domestic price of internationally traded commodities and, therefore, to relative price changes between imported and exported goods on the one hand and goods and services not easily traded on the other (Praven et al., 2013).

In this model, two important models are useful. These are Bickerdike-Robinson-Metzler (BRM) model and Marshall-Lerner (ML) condition. The model checks the response of imports and exports following change in price make happen by the realization of devaluation. The Marshall-Lerner Condition states that a change in exchange rate improve net export and balance of payment as well if the sum of the absolute values of elasticity of demand for import and export is greater than one. The Marshall-Lerner condition assume that trade is initially at its equilibrium level and the supply of both domestic and foreign currencies is not affected by any factors other than changes in the relative price of currencies which results from exchange rate changes itself (Lencho et al., 2013).

Assumptions of the BRM models are there are only two countries, two commodities initially the market is at its equilibrium level and there is free trade in the economy. The model did formalization in order to separate export and import markets of the two nations and finally

reach at one statistical model that enables to show the elasticity of imports and exports as exchange rate changes of devaluation. The model tells us that a change in exchange rate will affect the trade balance depending on the values of price elasticity of domestic supply and demand. If the absolute value price elasticity of export supply is greater than that of import demand, the nation's trade balance would be improved after the adoption of devaluation and the vice versa. (Le Khak et al., 2006).

This is mathematically expressed as follows:

$NX = X - RM, R = EP^*/P$ ..... (2.5)

Substitute for R, $NX = X - (EP^*/P) M$ ..... (2.6)

Where P is the price of domestic goods in domestic currency, P* is price of foreign goods in foreign currency, M is volume of imports of the domestic country, X is volume of exports of domestic country, NX, is the net export of the nation and R is the real exchange rate relative price of foreign goods to domestic goods and can be computed by multiplying the domestic spot rate with the price of foreign goods and divide it to the price of domestic goods in domestic currency. Therefore, if devaluation is needed to improve the trade balance, the sum of elasticity of the foreign price of demand for exports and domestic price elasticity of imported goods have to be greater than one (Lencho, 2013). Mathematically stated the Marshal Learner condition as follows:

$|\varepsilon X + \varepsilon M| > 1, \varepsilon X + \varepsilon M$ ..... (2.7)

$\Delta NX = X (\varepsilon X + \varepsilon M - 1) \Delta E$ ..... (2.8)

Where X is the initial amount of export in which equilibrium trade balance has reached (X=M), ΔE is change in exchange rate, ΔNX is change in trade balance (Net export), **εX**and **Em**are elasticity of export and import respectively. Whenever **εX + εM**> 1, a change in exchange rate isa positive effect on the trade balance and the vice versa. In the countries where the Marshall-Lerner condition holds, following the actualization of devaluation, a slight increase in the level of trade deficit could be observed at the beginning and when time goes on trade surplus could be observed due to the fact that devaluation makes exported goods cheaper for international buyers and imported goods expensive for domestic consumers in the long run and which is called J curve effect (Petrovic and Gligoric, 2010).

During this time, J curve occurs when the trade balance initially deteriorates for a while and got improved following the adoption of devaluation as a monetary policy. On the other hand, if a nation realizes revaluation of domestic currency the inverted J curve would be observed. As we can see from the above equation, after the implementation of devaluation as a policy, net export has aggravated but after a while it starts to improve. This shows us that, elasticity is low in the short run (Khalk et al.,2006).

2.1.6.2. Absorption Approach

The absorption approach tells us, if devaluation is needed to achieve improvement in trade balance the nation's total output production should get improved and at the mean time it should reduce its total absorption. In other words, the growth rate of absorption must not be greater than the rate of growth of the total national output. It also considers the impact of devaluation in changing the spending behaviour of domestic economy and the effect of domestic spending on the trade balance(Lencho et al., 2013)

However, after the realization of devaluation, if the nation's supply of output increases and import decreases or if the rate of increase in output level is relatively greater than the rate of increase in the level of domestic absorption, the trade balance is improved. Therefore, the absorption approach is to integrate the balance of payments with the functioning of the total economy in a general equilibrium framework in which balance of payments disequilibrium on current account viewed as the outcome of the difference between decisions to produce and spend or to save and invest (Lencho, 2013)

The absorption approach gives insights howthe country reacts to devaluation by considering two points. These are the impact ofdevaluation on the spending behaviour of the domestic economy and the influence ofdomestic spending on the trade balance.The balance of trade is the difference between the total domestic output and the domesticabsorption. Positive trade balance means the total domestic output exceeds the domesticspending and negative means if the spending exceeds output. Therefore the approach starts with the idea that the value of total domestic output (Y) equals the level of total spending, where total spending is composed of consumption (C), investment (I), and government expenditure (G) and net export (X-M) (Carbough 2006). This can be written as:

$$Y = C + I + G + (X - M) \quad (2.9)$$

The absorption approach consist the three economic aggregates that are C, I and G. Z, stands for the C + I + G, for the sake of convenience and made NX stands for net export (X –M). Therefore, Total domestic output became the sum of absorption and the level of net exports (X - M), and which is re-written as follows by substituting Z and NX in to the former formula.

Y = Z+NX..... (2.10)

So as to get the balance of trade (net export) we have to deduct "Z" from "Y" the formula for the trade balance can be written as follows:

NX = Y – Z..... (2.11)

If the national output (Y) greater than domestic absorption (Z), in the above equation, the economiesof trade balance ispositive and trade surplus are the cases. In the Contrary, if the trade balance is negative, it indicates that the economy is spending beyond its ability to produce and trade deficit were experienced.

2.1.6.3. Monetary Approach

A monetary consequence is not associated with balance of payment adjustment. Devaluation of home currency would increase the price level is domestic currency price of importable and exportable. This increases the demand for money because larger amount of money are needed for transaction. The effect of devaluation on real economic variables is thus temporary. Over the long run currency devaluation merely raises the domestic price level. The principal objectives of the monetary policy continue to be maintaining price and exchange rate stabilities. Price stability is important in setting favourable environment for investment and economic growth (UNDP, 2014)

The main arguments of monetary approach as follows the balance of payments is a monetary phenomenon, therefore any disequilibrium in trade balance is initiated by disequilibrium in the money market requires analysis with the tools of monetary theory and not barter or real trade theory. The monetary approach focus on both current and capital accounts of balance of payment and it assumes that a change in international currency reserve is a function of disequilibrium of the supply of and demands for money in other words its international currency reserve is a function of fluctuation of demand for and supply of the currency (Lencho, 2013).

2.1.7. Theories of Economic Growth

Economic Growth is well-defined as a long term rise in the capacity of a country to supply increasing and diverse economic goods and services to its population. This growing capacity is being based on advancing technology and institutional and ideological adjustments that it demands. Growth in national income is usually measured by a percentage change in the real gross domestic product which takes change in price levels in to account (Barro et al., 2004).

A fundamental prediction of this growth framework is the idea of conditional convergence, meaning that growth rates tend to be higher when the relative initial level of GDP per capita in relation to the steady-state position is lower. This prediction is derived from the neoclassical assumption of diminishing returns to capita, where higher growth rates and rate of returns are linked to countries that have a relatively low initial capital per labour ratio, in comparison to their long-run ratio. The convergence is, however, conditional due to the interdependency of the steady state levels of output and capital per labourer and the growth rate of the population, the rate of saving, and the general position of the production function properties that differ across countries (Sala et al., 2004).

A variety of studies have addressed the issue of economic growth, mostly using either cross country or panel data approach. While most of these studies utilize the standard neo-classical growth Model, More recent studies focus on endogenous growth models. There have been two periods of powerful work on growth theory, the first was in the 1950s and 1960s, and the second in 1980s and 1990s. In the first period, the neoclassical theory of growth was best known contribution by Robert Solow (1956).

This section provides various theories of economic growth and how the capital component can be integrated in to these theories. The theoretical view about economic growth can be classified under three broad headlines, namely: (1) the Keynesian (Harod-Doma growth model), (2) the neo-classical (Solow) growth model, and (3) the endogenous growth theory.

2.1.8.1. The Keynesian Theory of Growth Model

According to the Keynesian theory of growth demand from consumer and state were the prerequisite for economic growth. The model tells a functional economic relationship in which growth rate of grossdomestic product depends on the national net savings rate and inversely on the national capital output ratio. This model uses saving as a ladder to economic

growth. The model is based on the assumptions that potential output is proportional to the stock of capital and factor inputs are employed in fixed proportion with no possibility of substitution. The model suggests that the economic rate of growth depends on the level of saving and the productivity of investment and labour force is assumed to grow at a constant exogenous rate (Keynesetal., 2000).Thus, aggregate production function with fixed technological coefficient isgiven as:

$$Y_t = min\left(\frac{K_t}{V}\frac{E_t}{u}\right) \quad (2.12)$$

Where, Yt is total output at a time t, Kt is physical capital stock at a time t, v is utilized capital-output ratio (constant, is K/Y) Et is effective labour force at a time t, u is employed effective labour-output ratio (constant, is. L/Y). However, the changes of the function are:

$$\Delta Y = \frac{1}{V}\Delta K \quad (2.13)$$

Where Y is potential output, K is physical capital and V is constant capital output ratio. According to the model, change in capital stock equals to gross investment. Hence, considering constant rate of capital depreciation (δ) of the growth rate of potential output.

$$\frac{\Delta Y}{Y} = \frac{1}{V}\frac{I}{Y} \quad (2.14)$$

The model shows that output and capital formations are linearly related. That is, when there is more capital stock (which is financed by saving including its foreign capital components), the higher would be the growth of an economy. From the outset, the H-D model was used to calculate the amount of finance required to bridge the gap between the available savings and the required amount that must be channelled to investment to bring about the targeted growth rate. The role of foreign capital in this regard is to augment domestic savings so as to achieve the targeted rate of growth. In closed economy, total output is the sum of consumption and saving or income side(Easterly et al., 1998).We can write the simple national income equation as:

$$Y_t = C_t + S_t \quad (2.15)$$

Where Yt = GDP, Ct is consumption and St is saving. The model suggests that the economic rate of growth depends on the level of savings, and the productivity of investment. In line with these total output is defined as the sum of consumption and investment.

$$Y_t = C_t + I_t \quad \ldots\ldots (2.16)$$

In the H-D growth model, gross investment (It) is assumed to be equal to aggregate saving (St); that is the equation from (2.15) and (2.16) above which gives.

$$S_t = I_t \quad \ldots\ldots (2.17)$$

The accumulation of capital stock provide a more detailed analysis, first of the role of capital accumulation and then of the role of technological progress in the process of growth. The evolution of the capital stock over time is given by:

$$K_{t+1} = K_t + \delta K_t + I_t \quad \ldots\ldots (2.18)$$

δ is the rate of depreciation; K_t is capital stock at time t, $K_t + 1$ is capital stock at time next period. By assuming that total saving (St) is some proportion (s) of GDP (Yt).

$$s = {St}/{Yt} \quad \ldots\ldots (2.19)$$

Hence $S_t = sYt$

$V = \frac{K}{Y}$, from this K = vY and $I_t = S_t = sY_t$, it follows that we can rewrite equation (2.18) as:

$$vY_{t+1} = (1 - \delta)vY_t + sY_t \quad \ldots\ldots 2.20$$

Dividing both sides equation (2.20) by Y_t yields that:

$$\frac{\Delta Y}{Y} = \left(\frac{s}{v}\right) - \delta, \rightarrow gy$$

$$= \left(\frac{s}{v}\right) - \delta \quad \ldots\ldots (2.21)$$

This simply states that the growth rate (***gy***) of GDP is jointly determined by the savings ratio (*s*) divided by the capital output ratio (*v*). The higher the savings ratio and the lower the capital output ratio and depreciation rate, the faster is an economy growing.

The H-D model and the extended versions point that the approaches suffer from basic limitations. First, the underlying assumption that growth is proportional to capital stock is unlikely to be true. That is, a linear association of capital and output would imply that as long as the finance required for capital formation is available, any growth target would be achieved. This assumption is incorrect according to easterly have admitted it to be unrealistic and dismissed the original model (Howard et al. 2005).

Thus, the level of capital formation alone does not guarantee growth as postulated by the H-D model. Several factors that affect productivity at the same time must be addressed. This includes identifying the relationships between debt, investment, policies and growth. Moreover, the growth impact of foreign aid is not one - for-one as postulated by the H- D type of analysis (Hjertholm et al., 2000).

2.1.9.2. The Neo-classical (Solow) growth model

Economic growth can be traced back to the classical economists of the eighteenth century, whose works are briefly reviewed alongside the transition to neo classical growth theory. Neo-classical model states that, at any point in time, the total output of the economy depends on the quality and quantity of physical capital employed, the quantity of labour employed and the average level of skills of the labour force. However, once the economy reaches the full equilibrium level, additional growth in the stock of capital per worker is only take place if productivity increases, either through enhanced capital stock or through improvements in the quality of the labour force (Robert et al., 1956).

Unlike the H-D model, the neoclassical growth model allows for factor inputsubstitution and diminishing marginal returns in the production process. The model isdiminishing returns to each factor of production but constant return to scale. The basicneoclassical growth model shows that for the growth of an economy capital accumulation is thecentral issue. That means aggregate saving or investment determines the growthof capital stock which in turn plays a key role in the growth of an economy (Johns et al.,1998).

Based on this growth model, high investment rate or saving rate is leads to high level technology and skilled human capital. However, low level of population growth rate and low rate of capital depreciation are the most determinants of economic growth in long run. Therate of investment and population growth determines the growth rate of per capita output

and therate of technological change which is exogenous and determines the growth rate ofthe economy. That means, independently of all other factors and technological progress is absent and whose prime role is to augment labour(Serven and Solimano, 1996).

Solow model theory includes constant return to scale diminishing marginal productivity of capital exogenously determined technical progress and substitutability between capital and labour.Solow growth model studies the path of economies by assuming a neoclassical productionfunction which combines two factors to produce output capital and labour. Both factors areperfectly substitutable and exhibit diminishing returns to scale (Morrissey et al., 2001). This model can be briefly explained as follows:

$$Y(t) = AK(t)^{\alpha}L(t)^{\alpha-1} \ldots \ldots (2.22)$$

Where, 0 < α <1, Y is Output, K is capital, L is labour and A is technology. The assumption ofdiminishing returns implies that each additional investment project produces a smaller returnuntil the point where the next project is not profitable. Whenno profit exists there are no incentives to invest and no capital is accumulated,the neoclassical models describe how an economy is eventually converging to a steady statewhere the growth rate of per capita output is constant in the long run. The growth rate of theeconomy is determined by the growth of the labour force and the savings rate which are taken asexogenous. The per capita savings rate is defined as:

$$S_t = \frac{I_t}{Y_t} \ldots \ldots (2.23)$$

This equation represents the connection between savings and investment which are the drivingforce behind growth in the Solow Model. Household’s savings are lent to investors via banks.These investors can then use the funds to expand production, or replace machinery with sourcesof capital to accumulate (Ray, 2001). The capital movement equation follows:

$$\boldsymbol{(1+n)K(t+1) = (1+\delta)k(t) + sy(t) \ldots \ldots (2.24)}$$

Where, 0< δ<1, is the level of capital depreciation, k (t) is the level of capital at time t andsy (t) is the fraction of income which is saved, and combining all the components on theright hand side of the equation explains how much capital is available in the next time period isk (t+1). Capital tomorrow depends on the existing capital today minus depreciation plus thefraction of income which is invested. It is assumed that the population grows at a constant

rate n,which has a negative effect on capital in the next period. The first limitation is that the Solow Model only describes changes in the levelof growth in the long run, whilst the rate of growth cannot be changed.

2.1.9.3. The Endogenous Theory of Growth

To overcome the long term effects of the Solow Model, human capital is introduced intothe theory. Human capital is not subject to diminishing return allowing growth tooccur continuously at a rate of human capital accumulation. This is indicates, the growth theorychanges very little, with foreign capital and policy distortions having the same impact in theshort run. However, this endogenous model doe's drop the assumption of diminishing returnswhich allows for unbounded long term growth. This is because non-diminishing returns to capitalmean that the returns on investment projects are never equal the cost (depreciation) whichallows for a profit on each subsequent investment (Romer et al., 2004).

According to Endogenous theory, economic growth does not slow as capital accumulation, but the rate of growth depends on the type of capital countries invest in. As research indicates that increasing human capital (education) and technological change (innovation) fast economic growth in long run. This endogenous model, suggests equilibrium can be reached where continuous long term growth exists. Thismeans that foreign aid is increase growth well into the long run.The model states that growth is closely related to the level of human capital. Firms directlybenefit from knowledge accumulation due to new innovations and designs that allow for greaterproductivity (Lucas et al., 2004).

In endogenous growth, the role ofexternality that arises from research and development is considered as growth stimulant factor,unlike the neo-classical model. Therefore, new growth models acknowledge that policy measures could havesignificant impact on long run growth. Both H-D and Solow growth models, foreign capital is treated as a component oftotal saving. However, the Solow model argues that foreign capital is most productive when thecountry is poorest. To capture the macroeconomic complicationassociated with foreign capital, modern theories have extended their analysis to examine theinfluence of foreign capital inflows on several other variables. This includes examining theimpact of capital inflows on saving, investment and economic growth (Bulir and Lane, 2002).

The first version of endogenous growth theory is present by AK theory, which did not make an explicit distinction between capital accumulation and technological progress. An early version of AK theory was produced by Frankel (1962), who argued that the aggregate production function can exhibit a constant or even increasing marginal product of capital. In the special case where the marginal product of capital is exactly constant, aggregate output (Y) is proportional to the aggregate stock of capital (K). Sustained growth in living standard is due to technical progress is exogenous. Endogenous growththeory is a set of models in which the growth rate of productivity and living standard is endogenous Productionfunction:

Y = A K..... (2.25)

Where A is the amount of output for each unit of capital (A is exogenous and constant). According to **AK** theory, an economy's long-run growth rate depends on its saving rate. Investment (sY), Depreciation (δ K) and Equation of motion for total capital are given .The key difference between this model and Solow, marginal product of capital is constant here, diminishes in Solow. For example, if a fixed fraction **s** of output is saved and there is a fixed rate of depreciation, the rate of aggregate net investment is:

K * = s Y −δK..... (2.26)

ΔK = sY−δK..... (2.27)

Divide through by K and use Y = AK to get

$\frac{\Delta y}{y} = \frac{\Delta k}{k} = sA - \delta$..... (2.28)

If **sA**>δ, then income is grow forever, and investment is the engine of growth. Here, the permanent growth rate depends on **s**. In Solow model, it does not. Yes, if capital is narrowly defined (plant and equipment).

2.2. Empirical Literature

The main empirical evidence supports theargument that a real depreciated (appreciated) exchange rate is associated to higher/lower growth rates.In today's world, no one can deny the importance of Globalization. Therefore Net export and exchange rate is a macroeconomic device of international trade and that gives rise to world economy and for the country growth plays a backbone role. In fact, Exchange rate and Net export has become very important for every country of the world is it big or small developing nation or developed nation. Favourable net export and exchange rate is a major determinant of economic growth in any country economy and as surplus increases GDP and deficit reduces it. The net export and exchange rate of East African country integration helps in acquiring goods and services at much low costs. This is because the removals of trade barriers reduce or remove the tariffs entirely (Berg and Miao, 2010).

The estimation suggests that real depreciation in the first three years trade balance deteriorateand subsequently improves. The forecast error variance decomposition for each variable reveals the proportion of the movement in variable due to its own shocks versus the shocks in other variables. The variance decomposition of trade balance reveals that changes in its own shock, trade balance is the predominant source of variation in the logarithm of trade balance. The result showed own series shock of trade balance explain most of the forecast error variance of the series in both based on VAR and VECM (Abebe, 2014).

It is quite apparent that,exchange rate of currency devaluation improve trade balance. The empirical literature showsa mixed result for both developed and developing countries as well as panel and single country. The literature on the subject suggests that the trade balance improves with devaluation in some cases, while quite the opposite holds true in other cases. It expected that the current study make a substantial contribution to the debate on this important issue by shedding some light on the phenomenon in major east African countries(Elif, 2014).

In east Africa country, the exchange rate devaluation of currency practice on the recent environment has an ambiguous impact on the economic growth of a developing world. Many a time, rational economists do not agree on the net effect of devaluation on trade balance or net export which is important. In many countries, especially the developing ones, the weakening of their currency is decrease or depreciation of their own value of currency in terms of foreign currencies has become a central sensitive issue. These currency devalue

changes can have an expansionary or contractionary effect on county economic activity are the intuition of filling the gap(Kedir, 2017).

According to Kediret al.(2017)attempt an empirical investigation of the impact of exchange rate devaluation on major East Africancountries trade balance using the panel co-integration and panel group fully modified least square estimation technique from1990-2014. Whether exchange rate devaluation improves or worsens trade balance has been at the centre of literature debateover time with varying empirical evidences for developed and developing nation. The results indicate that there exist long run stationary relationships between trade balances.

According to Dansonet al. (2012)investigates the impact of real exchange rate volatility on economicgrowth in Kenyan by employed the Generalized Autoregressive Condition of Heteroscedasticity (GARCH) and computation of the unconditional standarddeviation of the changes to measure volatility and Generalized Method Moments(GMM) to assess the impact of the real exchange rate volatility on economic growthfor the period from1993 to 2009.

According to Ahmedet al.(2007)studied the relation between export, foreign direct capital investment and economic growth for five Sub-Saharan Africa countries by using time series and panel data analyses with the help of the co-integration test. According to analysis done, it has been seen that there is long term relation between export and GDP increase in the Sub-Saharans Africa countries. In short term, there is bi-directional causality relation for other countries except South Africa and there is unidirectional causality relation from growth to export for the Republic of South Africa.

According to Musyokiet al.(2012)investigate theoretical and empirical work shows that a volatile economic environment has a harmful effect on economic performance. This study employed the Generalized Autoregressive Condition of Heteroscedasticity (GARCH) and computation of the unconditional standard deviation of the changes to measure volatility and Generalized Method Moments to assess the impact of the real exchange rate volatility on economic growth for the period 1993 to 2009.

According to Mangıret al. (2012)investigated the relationship between economic growth and export for Turkey economy in the study that he did by using the trimester time series data in the era between 2002-2011 with the help of Juselusco-integration and Granger Causality

Test. In the results of the study, it had been found that there is co-integration and bi-directional causality between export and GDP.

According to Zanget al. (2012)searched the relation between export, import and economic growth for South Korea and Japan by constituting vector autoregressive model. According to empirical analysis result, it had been concluded to that there is bi-directional causality on export and economic growth for each country. It had been found that export has negative effect on economic growth in South Korea while export has positive effect on economic growth in Japan.

According to Luiz et al.(2011)the aim issue to assess the role of real effective exchange rate volatility on long-run economic growth for a set of 82 advanced and emerging economies using a panel data set ranging from 1970 to 2009. With an accurate measure for exchange rate volatility, the results for the two-step system GMM panel growth models show that a more (less) volatile RER has significant negative/positive impact on economic growth and the results are robust for different model specifications. In addition to that, exchange rate stability seems to be more important to foster long-run economic growth than exchange rate misalignment.

According to Moses et al. (2013)the study focuses on the Analysis of the Main determinants that have an impact on trade balance. Specificallythis study focus on the main cause of trade deficit in Tanzania,analysing the impact of foreign direct investment, human capital development, household consumption expenditure, government expenditure ,inflation, natural resources availability, real exchange rate and foreign income and trade linearization.In this study The Ordinary Least Square method under the E-View 7.1software has been used for the econometric analysis with a sample period spanning from 1980-2012.

The literature reviews ofthe previous researchers have the mixed results on the factors in questions. However this study tried to use more variablesthat have rarely been explored specifically in Tanzania and found out that the main influencing factors for the case ofTanzania are Foreign Direct investment, human capital development, household consumption expenditure, government expenditure, inflation, natural resources availability, foreign income and trade liberation so suggested policy measures should focus on them to reduce the trade deficit inthe Tanzanian economy (Ibid).

According to Tassewet al.(2016)analysed the determinants of the realexchange rate and the dynamic adjustment of the real exchange rate using yearly Ethiopian time series data covering the period 1971 to 2010. Itbegins with a review of literatures on Exchange rate, real exchange rate, determinants of thereal exchange rate and provides an updated background on the exchange rate system inEthiopia. An empirical model linking the real exchange rate to its theoretical determinants isthen specified. This study had employed the co-integration and vector Autoregressionanalysis with impulse response and variance decomposition analyses to provide robust longrun effects and short run dynamic effects on the real exchange rate.

Share of investment, foreign exchange reserve, capital inflow and government consumption ofnon-tradable goods were the variable that have been found to have a long run relationshipwith the real exchange rate. The estimate of the speed of adjustment coefficient found in thisstudy indicates thatabout a third of the variation in the real exchange rate from itsequilibrium level is corrected within a year.The regression result of VECM reveals that terms of trade, nominal exchange rate, and oneperiod lag of capital flow were the variables significantly affects the real exchange rate in the short run (Ibid).

According to Nega et al. (2015)this paper tried to assess the movement of real effective exchange rate and external sector development such as export, import and trade balance of Ethiopiausing descriptive analysis to incorporate the two major devaluation period from the year 1985/86 to 2012/13. The result revealed that the depreciation of the real effective exchange rate improves the export performance however it doesn't discourage our import. A result even if there is higher growth of export after a depreciation of the real effective exchange rate, since the growth rate of imports outweigh, there is no improvement in the trade balance account. Thus, the paper recommends among others, Promoting import substitution strategy through subsidies to the domestic industries and reducing taxes to their imported semi-finished inputs and awareness creation in favour of the home Produced substitutes should be made to reduce import expense.

Dicksonet al.(2012) Rwanda's economic growth over the last decade has been remarkable. With a governmentthat is committed to achieving sustainable economic growth coupled with growth in employmentopportunities for its people, Rwanda has made impressive progress in rehabilitating and stabilizing itseconomy to exceed pre-1994 levels. The overall economy is growing at a significant rate.Although still at an earlystage, set a path towards economic transformation which shows signs of economictransformation in Rwanda. There is evidence

of a significant increase in private sector investment following the introduction ofa revised tax code and implementation of the doing business reforms since 2005 although there was adownturn due to the World economic crisis in 2009.Both foreign and domestic investment hasincreased with FDI exceeding local investment and new jobs have been created. Exports haveincreased and there is some evidence of a beginning of export diversification into areas prioritisedby government as well as an increase in revenues from tourism. However, imports have alsoincreased and so the balance of trade has worsened.

According to Ronaldet al. (2012)the paper investigates the role of real exchange rate misalignment on long-run growthfor a set of ninety countries using time series data from 1980 to 2004. We first estimatea panel data model (fixed and random effects) for the real exchange rate in order to produce estimates of the equilibrium real exchange rate and this is then used to constructmeasures of real exchange rate misalignment. It provides an alternative set of estimatesof RER misalignment using panel co-integration methods. The results for the two-stepSystem GMM panel growth models indicate that the coefficients for real exchange ratemisalignment are positive for different model specification and samples, which meansthat a more depreciated (appreciated) real exchange rate helps (harms) long-run growth.The estimated coefficients are higher for developing and emerging countries.

On the side of Henryet al.(2015)exports play an important role in Uganda's economy, influencing the level of economic growth, employment and the Balance of Payments. Uganda has initiated several trade policy reforms aimed at promoting the export sector. However,Uganda's share in total world exports is still very low. Given the central role of exports in the economy, it was important to identify the plausible factors affecting export flows between Uganda and its trading partners. Thus, this paper examines the factors affecting Uganda's exports using an augmented gravity model of trade.

According to Jonatan et al. (2013)the purpose of this thesis is to investigate the relationship between trade diversityand growth in the East African Community. This was done by measuring differentlevels of diversification in exports and further test if they could contribute toexplaining the different growth levels between member countries. Using data collected for the five member countries; Burundi, Kenya, Rwanda, Tanzania andUganda over a thirteen year period, the tests investigated whether the traditionalgrowth models, with the assumption of unconditional convergence, could explainthe different growth rates or if there seemed to be other underlying structures thatcan't be explained through these models. A sign

of divergence in growth wasfound indicating other explanatory variables than used in traditional models.Further adding measures of export diversity, a correlation between export diversityand GDP per capita growth was found.

According to Geofreyet al. (2013)thisstudy examined factors affecting export performance in Tanzania using a time series datafor the periodbetween 1990 and 2009. Specifically, the study analysed the influence ofmacroeconomic factors such as Foreign Direct Investment, Gross Domestic Product,inflation rate, real exchange rate and terms of trade. The main proposition of the studywas that macroeconomic factors significantly influence export performance.In testing this proposition, three regression models were estimated for total export,traditional exports and non-traditional exports.

Empirical results and analysis indicatedthat real exchange rate and foreign direct investment were significant to exportperformance in all sectors that is total export, traditional and non-traditional exports.Gross Domestic Product was also found significant in all sectors except traditional sector.However, Inflation Rate and Terms of Trade were found significant determinants to totalexport and traditional exports. The same variables were found insignificant tonon-traditional exports. The study concludes with a recommendation to improve exportperformances for both traditional and non-traditional exports, as well as to diversifyexport base of the country by formulating good trade policy, attract more Foreign DirectInvestment, improve infrastructure and create good business environment (Ibid).

In general, the above reviewed empirical literature shows that, the relationship of exchange and net export is a blurred thought and a clear weight not vividly shown whether exchange rate or net export is leaning or slanting towards economic growth which explained in the empirical review. The major point of analysis that put clear research gap are: Majority of studies were done for country specific cases and they used time series analysis. In this case, where it is difficult to make conclusion and inference of exchange rate and net export and its relationship on dependent variable and bidirectional effect for cross country analysis. In this schoolwork, it will be better to add net export and use of panel data is very well and fills the paper gaps and it reaches the ultimate decision. No previous work exists by this award in the recent time and well done by panel data analysis **.**The relationship of exchange and net export, there is a blurred thought and a clear weight not vividly shown whether exchange rate or net export is leaning or slanting towards economic growth which explained in the empirical review.The methodology taken into account and variables incorporated in the

econometric model for further analysis based on the expected the results is also another area of disparity among these researchers. Thus, this paper tries to address and fill the gap by taking into account the above noted issues and investigates exchange rate, net export and economic growth for eight east African countries the period from 2000-2015/2016 using by panel data analysis.

2.2.3. Conceptual Framework

Many empirical analyses used both multi-country panel regressions and econometric models applied to individual countries conducted to show how exchange rate affects the net export of developing and developed countries. Among the empirical studies dealing with the exchange rate, net export and economic growth nexus is a great majority issue, to find a correlation between exchange rate and economic growth for broad geographical samples of developed and developing countries. More overvalued exchange currency trended leads to slighter per capita growth rate and net export improvement (Donald et al. 2010).

Expenditure growth is a country's aggregate expenditures on GDP. Government expenditures refer to the expenses that the government incurs for its own maintenance, for the society and the economy as a whole. Government spending reflects the policy choices of government. Once governments have decided up on the type and quantity of goods and services to provide, government spending represents the cost of carrying out these policies(Wondmu et al., 2016).

Economists identify several factors that contribute to economic growth, such as growth in the number of workers, the number of plants and equipment and economic productivity. To ensure well-functioning of markets and stimulate economic growth government must expend resources to enforces contract, maintain national security, protect against criminals and provide valuable public goods, some argue that increased government expenditure beyond the diminishing effect on the growth of the economy (Mitchell et al., 2005).

On the net export aspect, imports and exports may seem like terms that have little bearing on everyday life for the average person, but they can, in fact, exert a profound influence on both the consumer and the economy. In today’s interlinked global economy, consumers are used to seeing products and produce from every corner of the world in their local malls and stores. These overseas products or imports provide more choices to consumers and help them

manage strained household budgets. But too many imports coming into a country in relation to exports which are products shipped from the country to a foreign destination can distort a nation's net export and devalue its currency. The value of a currency in turn is one of the biggest determinants of a nation's economic performance of the country.As a result, even in an event of depreciation in their exchange rate, imports are still bound to increase given the necessity of the produces (Alegeet al.,2015).

Trade openness, the higher the demand for national exports, the higher the demand for the national currency. The reason is that as terms of trade is the ratio between the export price and the import price for overall commodity prices, it does not relate only to trade between east African country, but also to trade with other partner countries. Moreover, a fluctuation in terms of trade openness is primarily reflecting changes in the commodity prices rather than volume of trade.Based on the actual results, GDP and trade openness have positive and statically significant coefficients.Despite the well-known gains from trade, the effects of trade openness are a priori ambiguous. For this reason it's important to establish effects of trade openness on both aggregate and disaggregated import demand. This study sought to establish the effects of trade openness on disaggregated imports. The findings on the effects of trade openness on import demand show that an increase in the tariff rate reduces imports both at the aggregate and disaggregated levels. An increase in income positively influences the aggregate and disaggregated levels of imports. An increase in prices positively influences the aggregate and disaggregated levels of imports(Wyplosz et al., 2012).

Foreign Direct Investment is the other indicator of growth of economy and significant contribution to East African countries of growing of GDP performance. The variables income FDI of major countries and is found to be insignificant. However, Foreign Direct Investment is one of the key catalysts to economic development strategies in many developing nations. Many growing nations have promoted FDI in the last two decades by providing financial incentives and reducing barriers. FDI is one of the channels for creating new employment opportunities and human capital formation in the host country, together with infrastructure enhancement and technology spill overs. FDI is believed to be important for local firms by creating linkages to technology spill overs, encouraging the presence of skilled foreign labour and facilitating better export prospects through associations with multinational corporations (Blomstrom et al., 2000).

Broad money is a measure of the total amount of money held by households and companies in the economy. Broad money is made up of bank deposits which are essentially from commercial banks to households and companies and currency mostly from the central bank. Of the two types of broad money, bank deposits make up the vast majority 97% of the amount currently in circulation. And in the modern economy, those bank deposits are mostly created by commercial banks themselves Commercial banks create money, in the form of bank deposits, by making new loans. When a bank makes a loan, for example to someone taking out a mortgage to buy a house, it does not typically do so by giving them thousands of pounds worth of banknotes. Instead, it credits their bank account with a bank deposit of the size of the mortgage. At that moment, new money is created. For this reason, some economists have referred to bank deposits as fountain pen money created at the stroke of bankers' pens when they approve loans (Michaelet al, 2014).

Generally, these conceptual frameworks adopted from the empirical literature and researchmodelregarding the effect of exchange rate and net exporton economic growth. The importedgoods and its exchange rate currencyare determined freely to the economic growth rate. In fact, exchange rate devaluation of currency is desirable for economic growth but the claim that it works more through developing country is increasing savings and capital build-up of the economy. The empirical evidence on the effect of misalignment results due to overvaluation on growth of exports is conclusive and the evidence regarding the effect of undervaluation of the exchange rate on economic growth.Thegeneral framework of economic growth and its contributing aspect is explained in the following diagram.

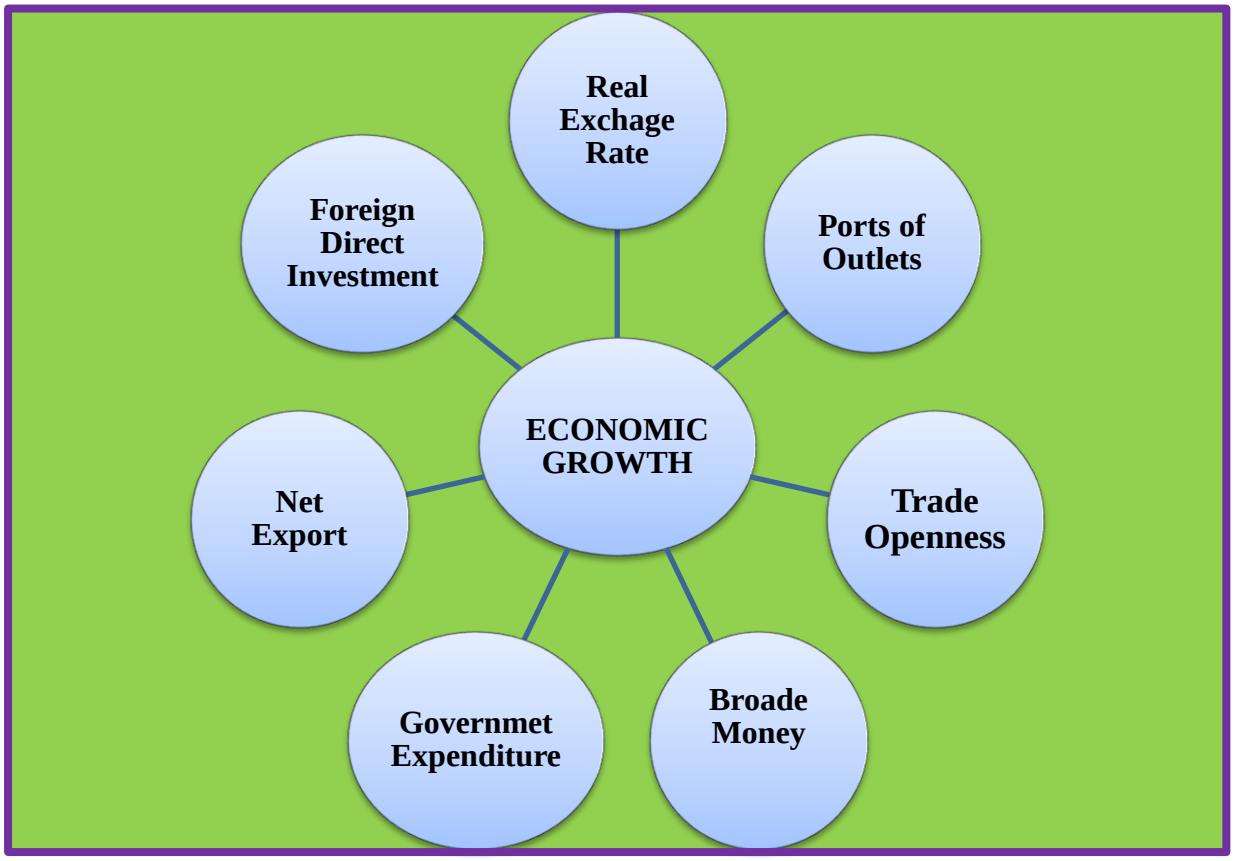


Figure 2.1 General frameworks of economic growth and its contributing factor

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Data Type and Sources

This study used fully on panel data approach for the period 2000- 2015/2016 and to estimate on the relationship between exchange rate and net export on economic growth in selected eight East African Countries, namely; Ethiopia, Djibouti, Kenya, Tanzania, Zambia, Rwanda, Burundi and Uganda. The selection of data and countries were being based on availability of net data and geographical location. Theses country is based on its relevance information, its economic status, and best of import-export of trade and exchange rate transaction and lastly due to thenumber of variables available in the data set. In this study, the country exchange rate and net export was measured by US dollars considered.**GDP** growth is the sum of gross value added by all resident produced products in the economy plus any product taxes (import and export of goods) and minus any subsidies (like aid) not included in the value of the products. GDP is expressed in current U.S. dollars per person. The data are derived by first converting GDP in national currency to U.S. dollars and then dividing it by total population.

The data were gathered and verified from united nation Statistics database, World Bank, World Development and Africa Development Indicators, National Bank of Ethiopia and International Monetary Fund. The main reason for choosing panel dataan approach is due to the advantages over the other conventional methods of both cross sectional and time series data. Panel data are most useful when we suspect that, the outcome variable depend on explanatory variables which are not observable, but correlated with the observed explanatory variables. If such omitted variables are constant over time, panel data estimators allow to consistently estimating the effect of the observed explanatory variables.

A panel hasthe advantage of having N cross-section and T time series that contributing a totalof NT observations. The substantial benefit is, in terms of obtaining a large sample, giving more degrees of freedom, more variability, more information and in order to less multicollinearity among the variables. The improvement comes with a possibility of controlling for individual ortime heterogeneity, which the pure cross-section or pure time series data. Paneldata also opens up a scope for dynamic analysis.The main advantage of

panel data comes from its solution to the difficulties involved ininterpreting the regression coefficients(Hsiao et al., 2014).

Particularly, panel data approach is essential to (1) provide the researcher a large number of data points thus increasing the degrees of freedomand reducing the problems of co-linearity among explanatory variables. This improves theefficiency of econometric estimates. (2) Gives the researchers to the means of resolving the magnitude of econometric problems that oftenarises in empirical revisions (3) Better able to study the dynamics of adjustment. Unlike cross-sections, panel surveys yielddata on changes for individuals or households or individual country analysis(4) Controlling for individual heterogeneity. However, time-series and cross-section studies can't control for theheterogeneity runs the risk of obtaining biased results (Badi, 2005).

3.2. Method of Data Presentation and Analysis

To investigate the effect of exchange rate and net export on economic growth for in selectedfor eight East African Countries. This keeping fit were used both descriptive statistics, and empirical econometric analysis by using Stata13.0 and Eviews 9.0 software's fordata presentation and analysis. In panel data analysis, the most commonly estimated models are the fixed effects and random effects models. The crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regresses in the model or not (Yerbeek, 2004).

The study examine the extent to which exchange rate,net export and economic growth in East African country areaffected by exchange rate changes with the aid of a panel data analysis. Majority of previous studies is showing that, most macroeconomic variables are non-stationary.Performing a regression on variables that are non-stationary iscontracting economic theory and providing inefficient results. It is vital when analysing economic data to conduct initial testsof unit root or non-stationery before continuing to the thorough estimation of model. Based onthe literature, there are five varieties of panel unit root tests, namely, Levin et al. (2002),Breitung (2001), Im et al. (2003), Fisher-type tests using ADF and PP tests (Maddala andWu, 1999; Choi, 2001; Hadri, 2000). Despite their importance, for the purpose of thisstudy, only three of these tests (popular in the literature) and employed namely; theLevin, Lin and Chu (LLC) test, the Im, Pesaran and Shin (IPS) and the Fisher test. After testing for unit roots in the variable, should the results confirm that the variable are

stationary at their level and the next procedure is the estimation of the regression model.

Estimating a regression based on the method of the pooled ordinary least squares (OLS) is combining both time series and cross-sectional data into one single equation and estimate an OLS regression model. While estimating the pooled OLS regression model, the nature of the data (i.e., the time series and cross sectional data are ignored). This method is seen as the easiest method because it rests on the hypothesis that the coefficients of the explanatory variables are identical across all entities. Contrary tothe pooled OLS, the fixed effects regression is a method that permits the control ofomitted variables in panel data when these omitted variables vary across states (countries)but do not change over time (Stock and Watson, 2012).

The authors further acknowledgethat fixed effects regression can be used when there are two or more time observationsfor each entity. One of the great benefits of using the fixed effects model is that itcontrols for unobserved heterogeneity, which consequently aids in controlling for countryand time specific effects. An alternate approach to the fixed effects model is the randomeffects model.The two regression models differ in the sense that while the fixed effects regressionmodel is essentially based on the hypothesis that each cross section has its own uniqueintercept, the random effects model on the other hand is based on the statement that foreach cross sectional unit, is drawn from a distribution that is centred around the meanintercept.

From the above information, this therefore means that each intercept is arandom draw from an intercept distribution and is therefore independent of the error termfor any particular observation. The random effects regression model therefore rests as aproper specification when the number of countries under investigation is random selectedfrom the population. This is imply that the differences in the countries here are treatedas being arbitrary rather than fixed as in the case of the fixed effects model. In therandom model therefore, the disparity across the entities is presumed to berandom anduncorrelated with the independent variables.In choosing the appropriate model for this study, we use the Hausman test (testing between the fixed andrandom effects model).

3.2.1. The Fixed Effect Model

In the fixed effect model, the individual specific effect is a random variable that is allowed to be correlated with the explanatory variables. This model explores the relationship between predictor and outcome variables within an entity (country).The observation of fixed effect model is independent across individuals but not necessarily across time. This is guaranteed by random sampling of individuals. Fixed effect models control for, or partial out, the effects of time invariant variables with time-invariant effects. When there is many variables that rise over time, and when one is interested in analysing the impact of variables over time. As a result, FE effect models are essential to capture the effect of these variables (Maziya, Tijaniet al, 2005). Accordingly the fixed effect model equation becomes as:

$$\boldsymbol{Y_{it} = \alpha_i + Y_i X_{it} + u_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3.1)}$$

Where, the dependant variable is $\boldsymbol{Y_{it}}$ denotes like exchange rate in this study, i cross section entity and t denotes time, $\boldsymbol{\alpha_i}$ is the unknown intercept for each entity (i = 1, 2…….n) and i denotes individual countries, $\boldsymbol{X_{it}}$refers to explanatory variables; Y_i refers to the coefficient of independent variables included in the model, and $\boldsymbol{u_{it}}$is the error term. We use fixed effects models when there is exists unexpected variation or special events that affect the outcome variable by using time dummies to control for time effects. Thus the equation for the fixed effects model becomes:

$$\boldsymbol{Y_{it} = \theta_1 X_{1,it} \ldots + \theta_k X_{K,it} + \delta_2 F_2 + \delta_3 F_3 \ldots\ldots\ldots \delta_n F_n + u_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3.2)}$$

Where; $\boldsymbol{Y_{it}}$ is as usual dependent variable, whereas i and t is cross section entities and time; $\boldsymbol{X_{K,it}}$ denotes the potential explanatory variables, $\boldsymbol{\theta_k}$represents the coefficients of the independent variables, $\boldsymbol{\delta_2}$ are the coefficients of these entities, $\boldsymbol{F_n}$ are binaries (dummies) for n-entities, hence requires n-1 entities included in the model. By adding the dummy for each entity (specific country), FE model also used by least squares dummy variables (**LSDV)** to estimating the pure effect of each independent variable by controlling for the unobserved heterogeneity through each dummy variable and absorbing the particular effects of each country. In addition LSDV estimator is pooled OLS including a set of *N* -1 dummy variable to identify each individuals and hence an additional *N* - 1 parameters. In this case, one of the individual dummies variables is dropped because we include a constant. Time-invariant explanatory variables are dropped because they are perfectly collinear with the individual

dummy variables. The LSDV estimator of parameteris numerically identical with the FE estimator and therefore consistent under the same. Therefore, the fixed effect model is:

$$\boldsymbol{Y_{it} = \theta_1 X_{1,it} \ldots + \theta_k X_{K,it} + \delta_2 F_2 + \delta_3 F_3 + \cdots \delta_n F_n + \alpha_2 T_2 \ldots \alpha_t T_t + u_{it}} \ldots\ldots\ldots\ldots\ldots \textbf{(3.3)}$$

Where all the variables are refers as defined in equation (3.2) above; the only variable included here is T_n is time dummy (binary variable) thus we have t-1 time periods whereas $\boldsymbol{\alpha_t}$ is the coefficient for the binary time repressors. The time-varying explanatory variables are not perfectly collinear, that they have non-zero within-variance and not too many extreme values. The usual standard errors of the fixed effects estimator are drastically understated in the presence of serial correlation. It is therefore advisable to always use cluster-robust standard errors for the fixed effects estimator (Bertrand and Duflo, et al, 2004).

3.2.2. The Random Effects Models

In the random effects model, the individual-specific effect is a random variable that is **uncorrelated** with the explanatory variables. When the individual-specific effect is a random variable, which is uncorrelated with the explanatory variables of all past, current and future time periods of the same individual. However, the observations are independent across individuals but not necessarily across time. We use random effect model when we assume variation across entities to be random and uncorrelated with explanatory variables included in the model. In other words, if we find reasons that influence difference across entities affect the dependant variable. The equation of random effect model is given by:

$$\boldsymbol{Y_{it} = Y_i X_{it} + \alpha_i + U_{it} + \in_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3.4)}$$

Where; $\boldsymbol{Y_{it}}$ is the dependent variable as usual; $\boldsymbol{X_{it}}$ represent the potential explanatory variables; $\boldsymbol{Y_i}$ the corresponding coefficients of independent variables. $\boldsymbol{\alpha_i}$ Represent the group specific constant term; $\boldsymbol{U_{it}}$ is the error term which unobserved or due to specification problem individual entity specific is the error or idiosyncratic error or varies over time entities$\boldsymbol{U_{it}}$ is assumed uncorrelated with the explanatory variables of all past, current and future time periods of the same individual. This is a strong assumption which example rules out lagged dependent variables and uncorrelated with the individual specific effect and while $\in_{it}$ is the usual error component which is assumed to be independent and identically distributed over individual country and time with mean zero variance (Woodrageet al, 2005).

To decide between fixed effect and random effects model for this study, we are seeing after running a Hausman test where the null hypothesis is that the preferred model is RE versus the alternative the FE. It is basically tests whether the idiosyncratic error ($\boldsymbol{U_{it}}$) is correlated with the regresses. The null hypothesis says there is no correlation against the alternative (there is correlation) (Masuku, 2015).

The random effects model can be consistently estimated by both the RE estimator or the FE estimator. We would prefer the RE estimator, if we can be sure that the individual-specific effect really is an unrelated effect. This is usually tested by a (Durbin-Wu-) Hausmann test. However, the Hausman test is only valid under homoscedasticity and cannot include time fixed effects.The assumption of *RE* is better tested by running an auxiliary regression.Not rejecting RE does not mean accepting it. Interest in the effect of a time-invariant variable is no sufficient reason to use the RE estimator (Wooldridge 2010).

3.3.3. Model Specification

In this paper, the researcher completely used cross-section and time series data to study the effect of net export and exchange rate following the convention adopted by the model. Netexport is measured by the ratio rather or instead that of differentiation of exports to imports. This ratio, or its inverse used in many empirical investigations of trade balance and real exchange rate relationship. According to their views, the use of this ratio has the following advantages. First, it is invariant to units as one measures exports and imports, in other words, whether they are in real or nominal terms or in domestic or foreign currency, it is invariant. Second, the regression equation can be expressed in log linear form or constant elasticity form, that gives the Marshall-Lerner condition rather than as approximation and the estimated coefficients (Eric, 2010)

In fact, the short run import volume effects prevails grater and while the volume effects dominate in the long run. Therefore, dependent variable GDP and independent variable is given by natural logarithms and as a function of independent macroeconomic variable. A port of dummy variables which shows whether a country is landlocked or has port is also included in this model as it shows proximity to international market and low cost of transportation as countries having port has cheap cost of transportation compared to landlocked countries (Svetlana, 2007).

All variables are transformed into natural logarithms so that the estimated coefficients are interpreted as elasticity's. In other words, the elasticity is interpreted as the response of the dependent variable that is explained by a 1% increase in the independent variable. A panel data regression differs from a regular time-series or cross-section regression in that it has a double subscript on its variables, taking into account the case of panel analysis. Therefore, the following final log linear model is developed asfollows:

$LnGDP_{it} = \beta_0 + \beta_1(LDLK\ Dummy)_{\ i} + \beta_2 \log(RER)_{\ it} + \beta_3\ log(NX)_{\ it} + \beta_4 \log(BM)_{\ it} + \beta_5 \log(TOPN)_{\ it} + \beta_6 \log(GOV\ EXP)_{\ it} + \beta_7 \log(FDI)_{\ it} + \varepsilon_t$.... ..... (3.5)

Where,$\varepsilon_t$is error term of i at time t, GDP it is gross domestic product country i at time t, LDLK is land locked dummy of country i at time t, RER is exchange rate of country i at time t, NX is net export, BM is broad money of country i at time t, $TOPN$ is trade openness of the country i at time t, $GOV\ EXP$ is government expenditure of the country i at time t, FDI is foreign direct investment of the country at time t. this refers to direct investment equity flows in the reportingeconomy.

3.3.4. Description of the variables and their expected signs

Gross Domestic Product (GDP): Gross domestic product is the best way to measure a country's overall economy. GDP is the total value of everything produced by all the people and companies in the country. In many East African countries specific cases, it is foundthat of GDPgrowth rate display the percentage increase in GDP from quarter to quarter. It tells that exactly how fast a country's economy is growing and the countries use real gross domestic product to remove the effect of inflation problems.

Landlocked Dummy (LDLK): In studying the determinant of exchange rate and net export performance, it isimportant to consider whether the countries have outlet or not (Rahman, 2006). Many East Africacountries are characterized by fewer ports and overseas out lets. Accordingly land lockedcountries expected to have poor exchange rate currency and net export performance compared to costal interior countries due totheir geographical location.

Real Exchange Rate (RER): A decrease in the relative domestic price due to exchange ratedepreciation makes export cheaper and in international markets. This results an increase demandfor export. Thus in this case, the expected sign ofexchange rate is positive.On the contrary, the reverse may occur when the exchange rate devaluation of exchange rate leads

toan increase in cost of export through decreasing country's international competitiveness.Higher exchange rate means higher diversification forexport and hence improves export. Therefore the expected sign of this variable is positive on exchange rate andnet export.

Net Export (NX): Net export and factors that influence net export which includes, import of goods, and export of goods, exchange rate, domestic income and world income which is measured as the ratio of country i's exports to the rest of the world and country i's import from the rest of the world.Even though net export is usually measured as the difference between total value of exports and total value of imports, in this study, net export is represented by the ratio of exports to imports. This ratio, or its inverse, has been used in many empirical investigations and it shows trade balance exchange rate relationship (Onafowora et al., 2003).

Broad Money (BM): One measure of the money supply that includes M1, plus savings and small time deposits, overnight repos at commercial banks, and non-institutional money market accounts. This is a key economic indicator used to forecast inflation, since it is not as narrow as M1 and still relatively easy to track. All the components of M_2 are very liquid, and the non-cash components can be converted into cash very easily.

Trade Openness (TOPN): is the sum of imports and exports of a country in a given period of time use in this analysis as a ratio of GDP. The most obvious approach is to use the simple concept of the total trade volume (exports plus imports) relative to GDP. Also, one may doubt whether any particular measure of openness or trade is likely toinclude all aspects of how trading activities affect growth. For example, Alcalá and Ciccone(2004) point out that measuring openness as exports plus imports relative to nominal GDPhas drawbacks due to the treatment of non-tradable goods. They propose, instead, to use ameasure which they refer to as real openness.This is to know the percentage share of it from the national output and how much it contributes for economic performance. It indicates access to and from external market (international market) has the most important effect on export performance. Researchers strongly support that as the economy becomes more open to the external world results better achievements of foreign exchange earnings from export. This implies that countries should integrate in the world market through diversifying their trading partner. The expected sign of this variable is positive.

Government expenditure: is government expenditure, it is customarily assumed that any increase in domestic government expenditure that fails to displace an equal amount of private expenditure increase total spending (absorption) thus worsening on economic growth.

Foreign Direct Investment (FDI): this refers to direct investment equity flows in the reportingeconomy. FDI is the sum of equity capital, reinvestment of earnings, and other capital inflows. FDI is one of the most powerful instruments for upgradingdeveloping nations from their current economic status. Inother words, foreign direct investment is a category of cross-border investment associated with aresident in one economy having control or a significant degree of influence on the management of anenterprise that is resident in another economy.

3.3.5. Panel Unit Root and Stationary Test

After choosing between random and fixed models, the next step in the panel data analysis is to conduct panel unit root tests and determine the order of Integration. Panel unit root testing arises from the time series nature of the data and its unit root. The major difference between time series testing of unit roots and panel unit root tests is that we have to consider asymptotic behaviour of the time-series dimension (T) and the cross-sectional dimension of individual observation (N). Using Statistical software we can implements a variety of tests for unit roots or stationary in panel datasets.

Fisher-type (Choi 2001) tests have set the null hypothesis as the entire panels containa unit root. Augmented Dickey-Fuller (ADF)-type tests of unit root suffer from the problem of low power in rejecting the null of stationary of the series, especially for short-spanned data. Recent literatures suggest that panel-based unit root tests have higher power than unit root tests based on individual time series. Recent panel unit root tests include: Levin, Lin and Chu (LLC) (2002), Im, Pesaran and Shin (IPS) (2003), Maddala and Wu (1999), Choi (2001), and Hadri (2000). From these different panel unit root tests developed in the literature, LLC and IPS are the most popular tests. However, LLC assumes homogeneity in the dynamics of the autoregressive coefficients for all panel members. In this approach we develop the nullhypothesis for each time series rather than applying the test on the average of the variables. Inaddition to this approach is appropriate for small size of cross country and time series dimensions.Accordingly Levin, Lin and Chu test assumes cross-sectional independence of the variables; thenull hypothesis is that each individual time series contains a unit root against the alternative thateach time series is stationary

H_0: each time series contains a unit root

H_a: each time seriesis stationary**.**

There are two ways of transforming a non-stationary variable in to a stationary one. If a non-stationary variable turns in to a stationary one by differencing, it is called Differenced stationary process. If a non-stationary variable turns in to a stationary one by removing its trend, it is called trend stationary process (Gujarati 2004).

If stationary test shows that some or all of the series are non-stationary at level, but after first difference, the co-integration test are undertaken as co-integration is expected between variables. The co-integration test is performed to determine the existence of the long run relationship between the variables of interest. The testing of hypothesis is null for non-co-integration against the alternative hypothesis, which means the existence of co-integration. The Johansen's test of integration is usually used for co-integration test. The estimated co-integration equation is of the following form:

$$y_{it} = \beta_{i0} + \beta_{i1}X_{i1t} + \beta_{i2}X_{i2t} + \cdots + \beta_{ik}X_{ikt} + e_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.6$$

For t = 1…T; i = 1…N; m = 1… M, Where: Tis the number of observations over time, *N* number of cross-sectional units in the panel, and *K,* number of regression. In this set up, β_{i0} is the member specific intercept or fixed effects parameter, which varies across individual cross-sectional units. The equation can be re-written as:

$$e_{it=}y_{it} - (\beta_{i0} + \beta_{i1}X_{i1t} + \beta_{i2}X_{i2t} + \cdots + \beta_{ik}X_{ikt}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

Johansen's procedure is useful in conducting individual co-integration tests, but does not deal with co-integration test in panel settings. Instead, panel co-integration test which is recently developed by (Pedroni, 2004) which provides a technique that allows for using panel data and thereby, overcoming the problem of small samples, in addition to allowing for heterogeneity in the intercepts and slopes of the co-integrating equation. The test starts with the following panel regression.

$$y_{it} = \alpha_i + \sum_{j=1}^{\rho i} \beta_{ji}X_{jit} + e_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.8)$$

$$e_{it} = \alpha_i + \rho_i e_{(t-1)} + \omega_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.9)$$

Where, $\varepsilon_{it,}$represents the disturbance term from the panel regression; $\alpha_{I,}$allows for the possibility of country specific fixed effects and the coefficients of $\beta_{ji,}$allows for the variation across individual countries. X_{jit} is a vector of explanatory variables. ρ_I and $\omega_{it}$are the coefficient and error terms of the equation. In the null hypothesis, no co-integration within dimension estimation which given as: $H_0= \rho i =1, \forall I$ Against the alternative hypothesis. H1= $\rho i =\rho<1$ Here, under alternative hypothesis, within-dimensional estimation assumes a common value for $\rho i=\rho$. That means it does not allow an additional source of possible heterogeneity across individual country members of the panel.

3.4.6. Panel Multicollinearity and Heterogeneous Test

In the diagnostic tests, that inspiration to be conducted the test for normality assumption, testfor Multicollinearity, test for autocorrelation, testing for Heteroscedasticity, testing for serial correlation and test for the overall goodness of fits. Most of the time, it is common to test if there is Multicollinearity among explanatory variables, before going into estimation and interpretation of the model. Furthermost econometric literatures reveal that, the presence of Multicollinierity results is inflated standard errors which make inferences from the estimation highly problematic (Gujarati, 2004).

The Im, Pesaran and Shin (2003) panel unit root test, which is commonly known as IPS is more general in the sense that it allows for heterogeneity in these dynamics. Therefore, it is described as a Heterogeneous Panel Unit Root Test. It is particularly reasonable to allow for such heterogeneity in choosing the lag length in ADF tests when imposing uniform lag length is not appropriate. In addition, slope heterogeneity is more reasonable in the case, where cross country data is used. In this case, heterogeneity arises because of differences of country context. As a result, the test IPS has higher power than other tests in its class, including LLC.

3.4.7. Panel Causality Test

Pedroni‘s heterogeneous panel co-integration method tests only for the existence of long run relationships. The tests indicate the presence or absence of long run links between the variables, but do not indicate the direction of causality when the variables are co-integrated. Causality which shows the direction of the long run relationship between of the variables is traditionally tested by the standard Engle and Granger causality procedure. Given three variables Y,X and Z having a long run relationship, being co-integrated, the causality

equation is given by running each variable as a function of its lags and the lags of the other variable in the following form.

$$Y_{it} = \sum_{k=1}^{K} \alpha_k Y_{it-k} + \sum_{l=1}^{L} \delta 1 \ X_{it-1} f_{yi} + u_{it} \ldots\ldots(3.10)$$

$$X_{it} = \sum_{m=1}^{M} \beta_m Y_{it-m} + \sum_{n=1}^{N} \gamma 1 \ X_{it-n} + f_{xi} + v_{it.} \ldots\ldots(3.11)$$

$$\mathbf{Z_{it}} = \sum_{h=1}^{H} \delta_h Y_{it-h} + \sum_{n=1}^{N} \gamma 1 \ X_{it-n} + f_{zi} + \omega_{it.} \ldots\ldots(3.15)$$

Where Yit, Xit and Zit are the three co-integrated variables, i=1… N represents cross-sectional panel members, i=1…T represents the time period, uit, vit and $\omega_{it}$is error terms. This model differs from the standard causality model in that it adds three terms, fxi, fyiandfzi, which are individual fixed effects for the panel member i.Given these three variables, the causality may run from Y toX and Z, and X causing Y or Zas well as Z causing Y and X. If, after controlling for all information in the past value of Y, X and Z, we add significantly to the explanation of current Y, X and Z andwe can say that X causes Y and Y cause X, and Z cause both Y and X. Therefore, these equivalent approach, we can form the granger causality model for the variables of our interest in this study which are exchange rate and net export of both inflow and outflow of GDP per capita in the following form.

$$\mathbf{lnGDP_{it}} = \sum_{k=1}^{K} \alpha_k \mathbf{lnER_{it-k}} + \sum_{l=1}^{L} \delta 1 \ \mathbf{NX_{it-1}} \emptyset_i + u_{it} \ldots\ldots(3.16)$$

$$\mathbf{lnER_{it}} = \sum_{m=1}^{M} \beta_m \mathbf{lnGDP_{it-m}} + \sum_{n=1}^{N} \gamma 1 \ \mathbf{NX_{it-n}} + \tau_{xi} + v_{it.} \ldots\ldots(3.17)$$

$$\mathbf{lnNX_{it}} = \sum_{h=1}^{H} \delta_h \mathbf{LN_{it-h}} + \sum_{n=1}^{N} \mathbf{lnGDP1} \ \mathbf{X_{it-n}} + f_{zi} + \omega_{it.} \ldots\ldots(3.18)$$

Where ϕi,τi and $\omega_{it.}$are individual specific effects of the countries in the equations of ER, NX and GDP, respectively. The time period in this case is represented by t=1….15 whereas the individual panel member is given by i=1…..7. The error terms are given by uitand vitand $\omega_{it.}$ respectively. In this case the Wald causality test is employed to test the causal relationship between ER, NX and GDP per capita. To determine the causal relationship between them, the null and alternative hypotheses are respectively given as: Ho:δl = 0, H1: δl ≠ 0, where l=1...L Similarly the null and alternative hypotheses for a given by H0: γ_n=0, H1: γ_n≠0 where

n=1……N In the above tests we say that there is a unidirectional relationship between exchange rate, net export and economic growth if we fail to reject one of the two null hypotheses. If, however, we fail to reject both of the null hypotheses, then bidirectional relationship is said to exist between the two variables. Net export and economic growth will have no causal relationship if both of the null hypotheses will be rejected.

CHAPTER FOUR

4. RESULT AND DESCUSIONS

4.1. Result of Descriptive Analysis

This section describe and deals with the regression result and important tests of exchange rate, net exportand economic growth on the major selected East African Countries by using strongly balanced panel data analysis from2000 to 2015/2016. In this case, all the important variables are observed and estimated for each cross section and each timeperiod.

The dataset takes two segments, a time series segment running and across section segment across the countries which are consisting of eight Eastern African Countries namely: Ethiopia, Burundi, Djibouti, Kenya, Tanzania,Uganda, Rwanda and Zambia. The analysis comprises: descriptive statistics of thevariables in the model.Hausman test is used to determine whether fixed or random effect model isappropriate. Diagnostic Tests/ tests for the assumptions of Classical Linear Regression Model(CLRM) like Multicollinearity, Heteroscedasticity, Normality, Granger causality for the relationship between variables and Autocorrelation isconducted. Finally discussion of the results and comparisons with the existing empiricalliterature were done.

The sample for this descriptive section covers the annual observations for the selected EasternAfrican countries. In this descriptive case, net export is not improved and exchange rate is systematically lower under both intermediate and flexible foreign exchangesystems. Broad money (the summation of money supply and quasi money) growth under the pegged exchange systems washigher than those of intermediate and flexible exchange rate system possibly explaining the difference in inflation performance. Broad moneygrowth under flexible classification had the highest average compared to both thepegged and intermediate system.The fixed exchange rate regime had fiscal deficits as a ratio of GDP that were greater thanthose of flexible and intermediate regimes, supporting the notion that a pegged foreignexchange regime, not backed by an appropriate fiscal stance, would not necessarily deliverlower inflation (Janet et al., 2012).

According to Hetal et al. (2006) proposed three main techniques of analysis namely; 1) SummaryStatistics; which contains information about the variables used in the model. The description ofthe variables includes mean, standard deviation, minimum andmaximum

values. The table below shows the descriptive statistic values of the variableswhich consist of both dependent and independent variables for 128 observations. Gross domestic product is a proxy,measured in natural logarithmic form as the dependent variable andindependent variables.

Table 4.1: Summary of Descriptive Statistics Regression Results

Variable	Observation	Mean	Std. Dev.	Minimum	Maximum
LNGDP	128	23.2103	1.199243	20.48075	25.299
LNEXP	128	21.0503	1.521896	17.48879	23.17485
LNBM	128	3.249006	0.5948318	2.000915	5.997362
LNFDI	128	17.92643	1.837868	12.78089	21.11097
LNRER	128	5.217959	2.134307	1.134894	8.083528
XM	128	0.5705784	0.2350002	0.139655	0.9890137
LNTOPN	128	3.060294	0.5976069	1.544538	4.063846

Source: WB, NBE, IMF and Own Computations, by using stata 13.0, 2018

From the above summery of statistics table, the observation of all variable are equivalent or not different is 128 observations, because, the year and time period is strongly balanced to each selected east African country. The mean value of dependent variable is interpreted by natural logarithm (lnGDP).The growth GDP of the country has experienced affecting growth performance with average GDP growth rate of which is equals 23.21. Thisshows that, average output level or economic growth of goods and services in the natural logarithmic or percentage form selected eight East Africa Countries is better growth improvement.Standard deviation,minimum and the maximumvalue of growth domestic product is1.19, 20.48 and 25.29 respectively.These indicate that, the economic growth performance of theregion (country) from 2000 to 2015/2016 is relatively well and the movement is apositive association with independent variable in East African countries.

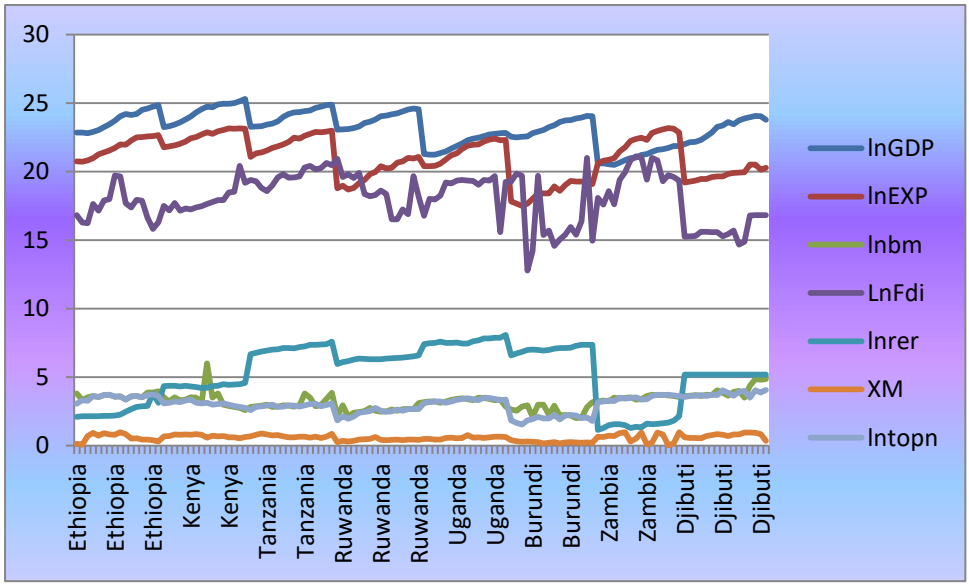
Foreign Direct Investment (lnFDI) is also one of the powerful independent variable and the mean value of 17.92 and standard deviation of 1.92, which is relatively less fluctuate from the mean value. It has a minimum and maximum value of lnFDI is 12.78 and 21.11. This is a good progress and positive contribution to a cross-border investment associated with aresident in one economy having control or a significant degree of influence on the running of anenterprise that is resident in another economy. The roleof FDI in GDP improvement in

developing countries depends on the motives of investment. Ifthe motive is to recover domestic market, and itcontributes for improve of economic growth. The remaining of other variables like real exchange rate, net export, trade openness, and broad money, are interpreted by the above movements.

4.1.1. THE TREND OF VARIABLES

The figure below the line graph shows the trend of economic growth on independent variable in East African countries.As shown trend of the country below, Kenya, Tanzania and Ethiopia are better economic description compared the other East African countries. This is dueto its better exchange rate operation, net export, openness to the external world and foreign direct investment. Burundi, Zambia, Djibouti and Rwanda are among the lowersimplementation in the last sixteen years. The common thing is her, real exchange rates and net export status is improved throughtimebeyond supportive independent variables.

Figure4.1: The Trend of All Variable Results



Source: WB, NBE, IMF and Own Computations, by using line graph, 2010

Furthermore, besides this study, the trend of economic growth of East Africa country is relatively similar progress on the above line graphs. Basically, Ethiopia is practiced a good trend of economic growth followed by Kenya and Tanzania. Uganda and Zambia are low economic trend of economic growth. The countries improve the productivity items for consumption, import-export goods and exchange rate after real devaluations of currency. The

estimation suggests that, real devaluation of money in the current situation that influenced on net export of each country. Because, most of these selected east Africa country art practiced (produced) and export of primary products.

East African economy continued its inspiring and fluctuation GDP growth, low exchange rate and less export trend, more import of manufacturing and industrial product. GDP growth and income per capita is low, that shows insignificant development and the intra-regional difference between Djibouti, Uganda and Zambia. This indicates that, there exists wide gap of generate income between selected east countries. East Africa countries expanded the value of its total trade imports or openness of trade continues to dominate the region's import and export of trade.

Ethiopia has experienced strong economic growth in recent years. The country has consistently outperformed most other countries in Africa and expanded much faster than the continent-wide average. At the same time, the country still faces some structural weaknesses that present significant challenges in the medium term. East Africa attracted foreign direct investment inflows with a combined total inflow of more income, the two main energy rich countries of Uganda and Tanzania of the investment inflows into the region. Uganda and Rwanda experienced aid cuts. Theaid allocations helped by donors away from the poorest countries, towards middle-income countries. These are signs that declining aid flows to the region could soon be a strong feature of its economic relationship with donor countries. This is directly affecting the economic growth of the country and forecast error variance decomposition for each variable reveals proportion of the movement in variables due to its own shocks versus the surprise in other variable.

4.2. Haussman Test Result

The organized data is estimated based on the panel model, which includes cross sectional and time series dimensions for eight African countries. Fixed effects and random effects models are commonly used models for the panel dataset. In order to choose fixed or random effect model a formal test used called Hausman test is used which is based on the null hypothesis in favor of random effect model estimator or the hypothesis states as:

H_o: Fixed effect model is appropriate and Ha: Random effect model is appropriate

The decision rule is when the prob>chi^2 or the P- value is greater than the given level of significan (usualy 5%), then we fail to reject the null hypothesiss (Ho), thus random effect

model is apropriate. On the other hand, if the P- value is less than a given level of significan or 5% we reject the null or the fixed effect model isapropriate (Woodridge, 2006).

The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The crucial distinction between fixed and random effects is whether the unobserved individual effect represent elements that are correlated with the repressors in the model, not whether these effects are stochastic or not (Green, 2008).

Table 4.2: Summary Of Results In Choosing The Appropriate Model

Test for model one: Ho: RE model is appropriate. H1: FE model is appropriate.				
Test Statistics	Chi-squ Statistics (χ^2)	Chi-sqdf	Prob.	Appropriate model
Cross Sectional random	2.4900	7	0.8694	RE model is appropriate

Source: WB, NBE, IMF and Own Computations, by using stata 13.0, 2018

As shown in the table above, the P- value or the probability is 0.8694 which is above 0.05, thus we fail to reject the null hypothesis at 5% level of significant. Therefore, random effect model is appropriate for this analysis.After simultaneously conducting statistical tests (Hausman test) todetermine the model between the fixed and random effects is suitable to presents the empirical findingof each of the model of exchange rate, net exports and economicgrowth. The study starts with the interpretation of results for the modelof real exchange ratefollowed by the net exports and economic growth. Based on the diagnostic tests, it was revealed that the random effects model were the best fitted model for measure the variables. The overall system indicates a good goodness of fit based on a very high coefficient ofdetermination.Based on the results, the coefficient of determination (R^2) is 0.86 indicating that 86% of the variation in dependent variable is explained by the respective of explanatory variables.

4.3. Panel Unit Root Test

There are a variety of tests for unit roots or stationary in panel datasets like the Levin–Lin–Chu (2002). This study uses the Levin–Lin–Chu (2002) test to analysisor investigates stationary of the Variables in the time series dimension. The assorted tests makedifferent asymptotic assumptions regarding the number of panels in the dataset and the numberof time periods in each panel, thus this test assumes for balanced data sets. Livin-Lin-Chu test(LLT) is based on the following hypothesis:

H_0: Each time series contains a unit root.
H_a: Each time series is stationary.

Where the lag order is allowed to vary across the individuals and the power of the test is the probability of rejecting of the null hypothesis, when it is false and the null hypothesis isunit root. It also shows the order of integration. The main difference between panel and timeseries unit root test is that we have to consider asymptotic behaviour of the time-series dimensionT and the cross-sectional dimension N. If the calculated value is greater than the tabulated (P-value or critical) value at a given level, the given variable is stationary at the given order. The unit root test result of the continuous variables is presented in the following table.

Table 4.3: Summery Of Panel Unit Root Test Results

H0: Panel Data Has Unit Root		**H1: Panel Data Has Not Unit Root**	
VARIABLES	3.2613	P – value	Level Of Integration
LN GDP	2.8178	0.0006	I(1)
LNEXP	2.7294	0.0024	I(0)
LN FDI	3.3119	0.0019	I(0)
LN RER	3.9852	0.0000	I(0)
LN TOPN	2.8918	0.0000	I(0)
LN NX	2.7824	0.0019	I(0)
LN BM	3.2613	0.0027	I(0)

Source: WB, NBE, IMF and Own Computations, by using stata 13.0, 2018

For the sake of simplicity, the empirical decision and result of the researchers for each model, the majority as well as the consistency of the results is chosen. The LLC test display that all

variables are indeed stationary at their level which indicates that the variables are integrated of order zero and a critical look at other panel unit root results is observed that except growth of GDP, the majority of variables are stationary areI(0). In this regard,Following that the majority of the results are in favour of variables being I(0) and also forthe fact that LLC produces consistent results of I(0) variables, this study therefore considers that the variables under study are all I(0). With the inference that the variablesare I (0), the next step of the analysis is estimate the regression equations andchoose the most appropriate models and accomplish the objectives.Given the heavy reliance of East African countries on theabove-mentioned goods, a policy of exchange rate devaluation would not have the desired effects. This ever-increasing level of imports, despite the depreciation of exchange rate, was also established and net export deteriorates (Alegeet al., 2015).

4.5. Discussion on the Regression Results

After analyzing the various econometric issues that were presented and discussed, and based on this estimation technique which results in consistence and unbiased estimator is used. Thus the random effect estimation technique is more appropriate to analyze and discuss in the analysis exchange rate, net export and economic growth in East African countries as the estimation technique yields efficient and consistent result.

Table 4.4: Summary Regression Result of Random Effect Estimation

Dependent Variable In Natural Logarithm Of Economic Growth				
VARIABLES	Coefficient	St.error	Z	P-value
LNEXP	0.8516355	0.0507253	16.790	0.0000
LNFDI	0.0161114	0.0018772	0.860	0.3910
LN RER	0.3188917	0.1015579	3.140	0.0020
LNBM	0.0766113	0.0598005	1.280	0.2000
XM	0.2895529	0.1306889	2.220	0.0270
LNTOP	0.6435021	0.1696043	3.790	0.0000
CON.	5.46430700	0.8086148	6.760	0.0000

Source: WB, NBE, IMF and Own Computations, by using stata 13.0, 2018

The regression results have their own implications, and hence the coefficient indicates each variable's level of influence on the dependent variable. The influence or the relationship may be positive or negative. The P- value and Z- statics shows the level of significant of the variables. Except foreign direct investment and broad money, all variables are significant, with positivecoefficients and thebehaviour of expected signs. The theorysuggests that as real exchange rate depreciates, exports are increase; imports are decreasethereby improve net export.

The empirical result tells that as real exchange rate increases whichindicate a depreciation of the domestic currency as per the definition of exchange rate.The statistical tests previously conducted revealed that the most appropriate model (Random Effect) which indicates, the regression model fits well forthe regression model. To sum up, the result from the stata shows that the Adjusted R^2 is 0.0.86. This means that the explanatory variables affect with 86% of economic growth or the estimated model shows a fair goodnessof fit with a coefficient of determination of 0.86, indicating that about 86% of thevariation in GDP is explained by the explanatory variables. Economic theory suggests that as the GDP of trading partners increase, exports is also increase accordingly.

Exchange rate depreciation is too aggravating imports rather than export of goods in East African country. In accordance with economic theory and the given outcome, it is a positive and significant relationship was found to exist between net export and GDP. The coefficient is also observed to be statistically significant which confirms the accuracy of the estimated coefficient. One of the central goals and to achieve the objectives of this study was to investigate the effects of exchange rate changes on trade of import-import and economic growth in East African Country. With the results of the previous estimations (imports and exports) suggesting that exchange rate depreciation is boost imports while decreasing exports; one would expect the effects to be negative on the trade balance equation. Surprisingly, the results of the analysis reveal the evidence of a positive relationship between exchange rate changes and net export. However, it is mindful to note that the magnitude of the response is strong, and the coefficient is statistically significant, suggesting the evidence of a relatively strong positive relationship between exchange rate changes and net export/trade balance as well as economic growth.With regard to explanatory variables, they are interpreted as follows:

Expenditure of Government (EXP): Expenditure of growth is a country's aggregate expenditures on GDP. Increase in government expenditure has positive and statically significant on countries economic growth.The results tell that a 1% increase in GDP, LnExp to increase by 0.8516355%, which means that, the expenditure of government play a significant role for the growth of economic performance in east African country. Government expenditures areto the expenses that the government incurs for its own maintenance, for the society and the economy as a whole. Government spending reflects the policy choices of government. Once governments have decided up on the type and quantity of goods and services to provide, government spending represents the cost of carrying out these policies (Bhatia et al., 2003).

High levels of unproductive government expenditure create an adverse impact on export growth. Identifying the channels, by which such adverse effects are felt, such as whether it is through distortionary taxation or its impact on the prices of non-tradable or a combination of the two, will give an important input for policy makers. Thus governments' expenditure on the construction and the quality infrastructural facilities, as well as developing competitive domestic infrastructure leads to achieve higher economic diversification and grow in developing countries (Wondmu, et al., 2016).

Economists identify several factors that contribute to economic growth, such as growth in the number of workers, the number of plants and equipment and economic productivity. To ensure well-functioning of markets and stimulate economic growth government must expend resources to enforces contract, maintain national security, protect against criminals and provide valuable public goods, some argue that increased government expenditure beyond the diminishing effect on the growth of the economy (Mitchell et al.,2005).

Net Export(NX): The expectation is that GDP is positively related to net export. The results tell that a 1% increase in GDP, LnXM to increase by 0.2895529%, indicating that a boost in US domestic activity encourages East Africanimport and exports net export. Compared to this background, this study concludes that East African country export performance is linked to US economic growth. Imports and exports may seem like terms that have little bearing on everyday life for the average person, but they can, in fact, exert a profound influence on both the consumer and the economy. In today's interlinked global economy, consumers are used to seeing products and produce from every corner of the world in their local malls and stores. These overseas products or imports provide more choices to consumers and help them

manage strained household budgets. But too many imports coming into a country in relation to exports which are products shipped from the country to a foreign destination can distort a nation's net export and devalue its currency.

The value of a currency, in turn, is one of the biggest determinants of a nation's economic performance.While all those terms are important in the context of an economy, let's look closer at the term (X – M), which represents exports minus imports, or net exports. If exports exceed imports, the net exports figure would be positive, indicating that the nation has a trade surplus. If exports are less than imports, the net exports figure would be negative, indicating that the nation has a trade deficit.Positive net exports contribute to economic growth, something that is intuitively easy to understand. More exports mean more output from factories and industrial facilities, as well as a greater number of people employed to keep these factories running. The receipt of export proceeds also represents an inflow of funds into the country, which stimulates consumer spending and contributes to economic growth.

As a result, even in an event of depreciation in their exchange rate, imports are still bound to increase given the necessity of the produces. Given the heavy reliance of East African countries on the aforementioned goods, a policy of exchange rate depreciation would not have the desired effects. These ever increasing levels of imports, despite the depreciation of exchange rate were also established by with the authors citing that exchange ratedepreciation would only aggravate on imports in East African countries (Alege et al.,2015).

The empirical result is also consistent with other similar studies) established that domestic GDP has a positive role to play in the increase of imports in a country. As a final point, many economists state that running a consistent trade deficit has a negative effect on an economy because domestic producers have an incentive to relocate overseas, and there is pressure to devalue a nation's currency and lower interest rates. However, the United States has the world's largest GDP and deficit, so it appears that neither positive nor negative net exports are inherently detrimental. Exchange rate adjustment is the instrument the free market uses to ensure trade balances are kept in check(Odili et al., 2015).

The Real Exchange Rate (RER): Similarly, though not consistent with a priori expectations, the results reveal that 1% increase inGDP, real exchange rate the origin of exports to increase by 0.3188917%. One of the central goals of this study was to investigate the effects of exchange rate changes on economic growth in East Africa Country. An increase in the

growth capacity of an economy is to produce goods and services compared from one period of time to another.Real exchange rate measureshow much goods and services in the domestic country can be exchanged for the goods and services in a foreign country which are adjusted and control of inflation and which leads increases both exchange rate and net export (Demirden et al., 2015).

The theory by Marshall-Lerner suggests that a depreciation or appreciation in a country's domestic currency lead to animprovement or deterioration in the net export. With the results of the previous estimations (imports and exports) suggesting that exchange rate depreciation is boost imports while decreasing exports;one would expect the effects to be negative on the net export equation. Surprisingly, the results of the analysis revealthe evidence of a positive relationship between real exchange rate changes and economic growth (Lenchoet al., 2013).

Trade Openness (TOPN): The results also reveal that as LnGDP increase by 1%,trade openness is improve by or increased by 0.6435021% and this coefficient is statistically significant. The higher the demand for national exports, the higher the demand for the national currency. The reason is that as terms of trade is the ratio between the export price and the import price for overall commodity prices, it does not relate only to trade between east African country, but also to trade with other partner countries. Moreover, fluctuations in terms of trade primarily reflect changes in the commodity prices rather than volume of trade.

Based on the actual results, GDP and trade openness have positive and statically significant coefficients.Despite the well-known gains from trade, the effects of trade openness are a priori ambiguous. For this reason it's important to establish effects of trade openness on both aggregate and disaggregated import demand. This study sought to establish the effects of trade openness on disaggregated imports.The findings on the effects of trade openness on import demand show that an increase in the tariff rate reduces imports both at the aggregate and disaggregated levels. An increase in income positively influences the aggregate and disaggregated levels of imports. An increase in prices positively influences the aggregate and disaggregated levels of imports.

Exports positively influence the aggregate and disaggregated levels of imports. Lastly the real effective exchange rate negatively influences aggregate and disaggregated imports. The policy implications is that governments of East African Country could use trade openness

reforms, particularly the tariff rate to minimize the importation of goods that can be produced locally, this will help inmanaging the balance of trade.

Foreign Direct Investment (FDI): Foreign Direct Investment is the other indicator of growth of economy and while insignificant contribution to East African countries of growing of GDP performance. The variables income FDI of major countries and is found to be insignificant. However, Foreign Direct Investment is one of the key catalysts to economic development strategies in many developing nations. Many growing nations have promoted FDI in the last two decades by providing financial incentives and reducing barriers.FDI is one of the channels for creating new employment opportunities and human capital formation in the host country, together with infrastructure enhancement and technology spill overs. FDI is believed to be important for local firms by creating linkages to technology spill overs, encouraging the presence of skilled foreign labourand facilitating better export prospects throughassociations with multinational corporations (Blomstrom et al., 2000)

All of these contribute to higher productivity and economic growth. Basically, FDI institutes competitive business environment, elevates efficiencies and enhances industrial development. FDI is one of the most powerful instruments for upgrading developing nations from their current economic status. FDI, on the whole, significantly helps the development process of growing nations. FDI benefits developing countries in terms of transferring technology, creating employment, supplying additional capital and promoting trade. Furthermore, the report stressed that developing nations attracted FDI with abundant resources, especially low wage labour. FDI provides a base for MNCs to avoid trade barriers on imported goods and to export finished labour-intensive goods(Moran et al., 2010).

Broad money (BM): Broad money determination at the aggregate level. Broad money is a measure of the total amount of money held by households and companies in the economy. Broad money is made up of bank deposits which are essentially from commercial banks to households and companies and currency mostly from the central bank. Of the two types of broad money, bank deposits make up the vast majority 97% of the amount currently in circulation. And in the modern economy, those bank deposits are mostly created by commercial banks themselves Commercial banks create money, in the form of bank deposits, by making new loans. When a bank makes a loan, for example to someone taking out a mortgage to buy a house, it does not typically do so by giving them thousands of pounds worth of banknotes. Instead, it credits their bank account with a bank deposit of the size of

the mortgage. At that moment, new money is created. For this reason, some economists have referred to bank deposits as fountain pen money created at the stroke of bankers' pens when they approve loans (Michael et al., 2014).

If money demand is stable it means central bank can predict the amount of money the economy needs with good accuracy. As a result if national bank meets its operational target (base money) it means simultaneously can achieve it intermediate target (broad money) and then final target (stable price). To achieve its target both direct and indirect instruments are used. Direct instruments that used frequently including intervene in forex market through supplying foreign exchange and also buying from banks if there is excess supply, moreover direct control on credit like credit ceiling, required reserve (both are used with less frequency) and dealing with commercial banks to decide on what to do and not to do (moral suasion) used as instruments. In addition national bank is also net lender to the government so it can alter the amount of credit extend to the government to be in line with its target in discussion with fiscal policy makers.

The policy makers of each country under this investigation should emphasis on devaluation of real exchange rate of trading partner with high income so as to increase their export performance and improve net export. Hence, a devaluation of their exchange rates may have little or no effects in improving their respective balance of payments account given the ever increasing level of imports. Stable exchange rate policy has to be ensured in order to avoid the exchange rate risks associated with the assets, import prices and profit considerations of direct investor in East African countries.Exchange rate fluctuation can affect the value of global investment portfolios as well as competitiveness related to imports and exports, international reserves and government debt that is related to the value of the country's own currency. When there is a shift in the exchange rate, this can have a role in eliminating imbalances in international trade, because nations that currently have trade surpluses would expect to their currency to appreciate, while the currencies of nations with trade deficits should depreciate.

4.4. Diagnosing Test Results

Once we have identified the fixed and random effect model, the next step is to check whether the estimation techniques or our data fulfils the assumptions of CLRM. One of the assumptions the states that the expected value of the error term is zero, E ($\in_i$) = 0. Since the

constant term or the intercept is included in the model, thus this assumption is fulfilling (Woodridge et al., 2009). In fact in our model we include the constant term (β_o), the average value of the error term expected to be zero. This is one basic assumption that any model should pass.

Accordingly the following assumptions tests were conducted in this study. Once we have identified the fixed and random effect model, the next step is to check whether the estimation techniques or our data fulfils the assumptions of CLRM. One of the assumptions the states that the expected value of the error term is zero, E (∈) = 0. Since the constant term or the intercept is included in the model, thus this assumption is fulfilling (Woodridge, 2009 and Verbeek, 2005). In fact in our model we include the constant term (β_o), the average value of the error term expected to be zero. This is one basic assumption that any model should pass. Accordingly the following assumptions tests were conducted in this study.

4.4.1. Test for Serial Autocorrelation

Serial correlation same as autocorrelation correlation, the error is that arises when the error terms at successive points in time are related. Durbin-Watson tests, a test to determine whether first-order autocorrelation is present and used to detect serial or autocorrelation. Thus, for our purposes, we consider serial correlation only to be a potential and one of the assumptions of the regression model is the error terms are independent. When autocorrelation is present, serious errors can be made in performing tests of statistical significance based upon the assumed regression model. It is therefore important to be able to detect autocorrelation and take corrective action.

Table 4.5: Summery Of Test for Serial Autocorrelation

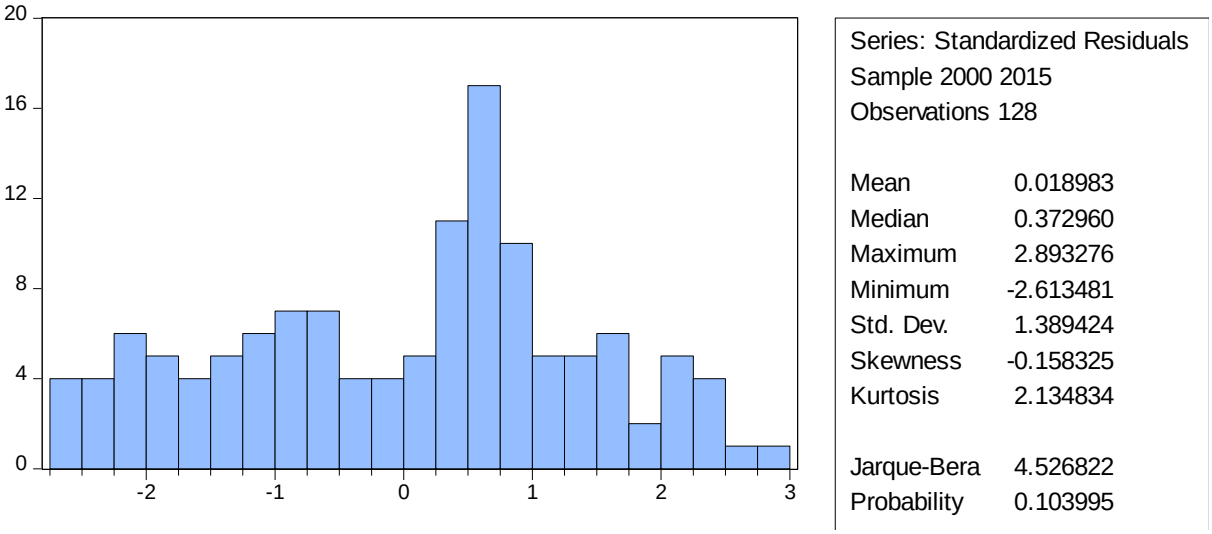
Cross-section means were removed during computation of correlations			
Test	Statistic		Prob.
Pesaran CD	0.505560		0.6132

Source: WB, NBE, IMF and Own Computations, by using Eviews 9.0, 2018

4.4.2. Test for Normality

This test is concerned with whether the disturbances terms are normally distributed or not is one of the assumptions of CLRM. To fulfil this assumption the data distributional pattern should have a kurtosis value of three and follow the normal distribution pattern with mean equals to median which also equals its mode. Normality test can be conducted either Graphical plot or numerically through commands. Accordingly it is one of the most commonly applied tests for normality.The decision rule is when the *p*-value is greater than 5% then accept the null hypothesis of normally distribute. According to the Shapiro-Francia test result the variables have is normality distribute.

Figure 4.3 Normality Test



Source: WB, NBE, IMF and Own Computations, by using Eviews 9.0, 2018

The selected model should be normally distributed in order to say the model is good. To test normality Jarquebera test is considered and the null hypothesis stated that the residuals are normally distributed against the residuals are not normally distributed. From the graphical distribution of normality test below shows that the residuals are normally distributed. For the reason that, the p value associated with the Jarque-Berra normality test (0.1039) is higher than 0.05 we accept that the error term is normally distributed.

4.4.3. Test for Multicollinearity

Test of multicollinearity is conducted in this study to identify the correlation between explanatory variables and to avoid double effect of independent variable in the model. This problem is usually arises when certain variables are correlated or have strong relationships

between the variables. Correlation is a single number that describes the degree of relationshipbetween two variables. As indicated in the following correlation matrix except the foreign directinvestment and GDP correlations that have occurred among explanatory variables aresurprisingly weak. This indicates of in some extent there is multicollinearity problem on the study. Correlations coefficients, which has the value is positive referred to as strongcorrelations. Thus from the table above, tread openness and foreign direct investment has relatively strongand positive correlation. The rest of the variables except the land locked dummy have weakcorrelations. There is a negative and weak correlation between real exchange rate and GDP;likewise there is positive and weak relationship between Gross Domestic Product and foreigndirect investment.

Table 4.6: Correlation of Explanatory Variables

variable	lnGDP	lnEXP	lnbm	LnFdi	lnrer	XM	Lntopn
lnGDP	1.0000						
lnEXP	0.1796	1.0000					
lnbm	0.0756	0.3746	1.0000				
LnFdi	0.1387	0.4385	0.1274	1.0000			
lnrer	0.2792	0.3416	0.4241	0.0178	1.0000		
XM	0.0469	0.3917	0.4123	0.0405	0.2131	1.0000	
lntopn	0.1842	0.5402	0.5628	0.0852	0.5013	0.5483	1.0000

Source: Own survey of computation by using stata 12.0, 2018

The above table shows the correlation coefficient of two pair of variables using the Pearson correlation coefficient matrix. Some of the explanatory namely: net export, real exchange rate and economic growth are positive and strong correlations with thecorrelation coefficient values. On the other hand, broad money, foreign direct investment and trade openness is weakly correlated with GDP growth with correlationcoefficient value. When we compared to the general East Africa country level, the dependentvariable (GDP growth) for Ethiopia shows better correlation.

When we see the other explanatory variables the income of majorexport destination countries and GDP growth trends show better improvement through time.Trade openness and real

effective exchange rate shows relatively small growth trends. Therefore, from the table above we can say that there is no the problem ofmulticollinearity and there is also another test called variance of inflation factors for multicollinearityin the model.

4.4.5. Test for Hetroscedaciticty Assumptions

The test of hetroskedasticity is conducted in this study to know the weather the variance of the error term is constant or varying. This theoretically assumed that the variance of the error term is assumed to be constant or var $(\in_t)$ $=\delta^2$, this also known as homoscedasticity assumption. Heteroscedasticity arises as a result of the presence outliers. The inclusion or exclusion of such observations, especially when the sample size is small, can substantially alter the results of regression analysis.The standard errors and *t* statistics are justified only as the sample size becomes large, even if the CLRM assumptions are true. With small sample sizes, the *t* statistics can have distributions that are not very close to the *t* distribution, and that could throw off our inference.

The distribution of one or more regressors included in the model is another source of heteroscedasticity. Even sometimes incorrect data transformation, incorrect functional form (linear or log-linear model) is also the source of heteroscedasticity. There are many ways of testing hetroscedacitsity tests of problem, like the White (1980), and Breash Pagan. This study uses the formula for testing hetroskedasticity, given by Calculated value or test statistics is = NR^2(T-1), Where N refers to number of groups or observations R^2 is the goodness of fit from the regression of the residual square on the independent variable and T is the time series dimension. The hypothesis is, the null Ho: There is homoscedasticity and the alternative H_1: There is hetroscedasitcity.

Table 4.7: summeryresults of Hetroscedasticity test.

Ho: Homoscedasticity and H_A: Hetroscedasticity		
Test statists or calculated value	Tabulated value	P - value
43.3104	14.067	0.0000

Source: Own survey of computation by using stata 12.0, 2018

As indicated in the above table we reject the null hypothesis, and indicate the presence of hetroscedaciticity problem. To overcome this problem we use the robust standard error regression result instead of the default stata standard error of the model, and hence this problemis eliminated.

4.4.6. Test for Autocorrelation

The other important diagnostic test which is performed in this study is the autocorrelation test. Autocorrelationis the measure of the linear statistical relationshipamong the error terms. Empirically, this assumption of OLS regression and theoretically expressed by the numbers of researchers among others (Brooks et al., 2008). They expressed as; $\text{cov}(\in_i, \in_j) = 0$, this is another assumption that is made of the CLRM disturbance terms is that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero. In other words, it is assumed that there is no correlation between the error terms. If the errors are correlated with one another, it would be stated that they are autocorrelated or that they are serially correlated.

The most common test of this assumption is by using the Durbin–Watson test, Pesaran CD test and the Breusch-Godfrey test (2008). This study is going to use Breusch and Pagan Lagrangian multiplier test for random effects, test for serial correlation by using the command *xtseria*. The hypothesis stated as Ho: there is no autocorrelation against the alternative (HA): There is autocorrelation. The null is no serial correlation and the alternative says there is serial correlation.

Accordingly, we fail to reject the null and conclude the data does not have first-order autocorrelation at 5% level of significant. Thus P- value is around 0.05 and this indicates that the errors are not seriously correlated. Accordingly as shown in the above we reject the null and conclude the data have first-order serial correlation at 5% level of significant. Thus P-value is less than 0.05 and this indicates that the errors are serially correlated. Of course it is not much of the concern of panel data model, we can correct by using first order autoregressive estimation techniques.

CHAPTER FIVE

5. CONCLUSION AND POLICY OF RECOMMENDATIONS

5.1. Concussion

This research attempts to determine the effect ofexchange rate, net export on economic growth using a panel data analysis consists of eight east African countries over the period 2000 to 2015/2016. In fact it was worthwhile to conduct an empirical test to observe the time related nature of the relationship between net exportand exchange on economic growth in order to realize the direction of movement and the effect of control variable. In order to internment the bearingof control variables are included such as economic growth, expenditure of government, Openness of trade, broad money, net export, foreign direct investment and exchange rate.

The empirical estimation result suggested that a devaluation of the exchange rate and the enhancement of net export were improves economic growth. Exchange rate is considered as a tool for the regulation of net export, which affects national income and welfare of a nation development.The discussionresult is statistically significant and consistent with the standard economic theory. Hausman test result the random effect estimation technique is found to be appropriate as the estimation techniques gives consistence and efficient results. The results of the studies conformregarding to methodology of data set and the association of exchange rate and net export (trade balance) on economic growth in major east African countries.

The empirical result tells that as real exchange rate increases which indicate a devaluation of the domestic currency as per the explanation of exchange rate.The statistical tests previously conducted revealed that the most appropriate model (Random Effect) which indicates, the regression model fits well for the regression model.This finding is consistent with economic theory, indicating the limited production capacities economic growth and the heavy reliance of East African Country countries on net export and exchange rate. The currency devaluation would be an effective policy tool in reversing the precarious balance of payment situation facing most of these countries.

5.2. Policyof Recommendation

Based on the analysis made and conclusion arrived the following policy implication are derived.As it existed and observed from the estimation results, exchange rate and net exportis one of the major contributions to economic growth and significant variable. This implies that East African countries should eliminate or at least minimize import and export duties so as to improve their net export performance. This is confirmed the fact that, the device of openness of trade is a positive effect on economic growth and more pronounced with the consideration of net export and exchange rate. Since real exchange rate found to be significantly affecting economic growth enactment of East African countries.

The aimof policies government of the East African Countries should devaluate their currency so as to encourage their export product and reduced import of goods. In the long run, the way to provide a conducive environment for import of good and exports prior to continuous devaluation of the domestic currency.An increase in net export and exchange rates were statistically significant on economic growth. the trading partner of major East African countries increase real income and purchasing power of the trading partner rise, which can improve net export. Hence, understanding theinfluence of exchange rate movements on net export is of great importance to both researchers and policymakers specifically in this present time of global imbalances of import and export.A positive and elastic relationship between net exports improvement and growth GDP shows the importance of economic growth to the performance of trade exports.

The policy implications from this result are that governments of East African countries should use trade openness reforms, particularly the tariff rate to minimize the importation of goods that can be produced locally. This will help in managing the net export of trade and exchange rate.In line with theoretical predictions, the impact of exchange rate uncertainties is more pronounced when a country is more open to import. Following the results of the study, it is recommended that east African country authorities draw up strategies and programs that is make the economies less reliant on imports.Because majority of East African countries is heavily depend on import of goods, which leaves them at the mercy on volatile commodity prices.

Generally, thepolicy makers of east African countries should give almost equal emphasis for exchange rate and net export on economic growth performance and the efficient potential

utilization of East African countries is concerned.The empirical investigation of this study indicates that both the growth factor of exchange rate and net export are equally important in determining the economic growth GDP in east African countries.In developing countries like those in Africa, more is dictated by policies than market forces and exchange rate is not different. It has an institutional component. Thus, the more unstable import-export and exchange rate statistics, the stronger the signal investor gather about the poor macroeconomic stability in these countries in major east African countries.

5.3. Areas for Future Studies

This study examines only specific exchange rate, net export and economic growth due to absences of organized data and time. The other challenge is the incompatibility of data from different sources; from World Bank, IMF and NBE some variables are not consistence. Thus, Future research should continue the quest for a better measure of exchange rate and net export on economic growth performance by considering the effect of other factors such as domestic infrastructure development for economic growth, human capital development for innovation of technology, market structure stability for net export stability and manufacturing product improvement for reducing import of this product and the reverse is true.

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APPENDIX

Appendix 1: List of countries used in the study

EthiopiaDjibouti

KenyaRwanda

Burundi Tanzania

UgandaZambia

Appendix 2: Hausman Specification Test

```
. hausman fixed .

                ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |      fixed        random       Difference          S.E.
-------------+----------------------------------------------------------------
       lnEXP |     .8516355     .8615797       -.0099442              .
        lnbm |     .0766113     .0730786        .0035327        .0131611
       LnFdi |    -.0161114    -.0137767       -.0023347        .0030055
       lnrer |     .3188917     .3097618         .00913              .
          XM |     .2895529     .2940847       -.0045317        .0259854
      lntopn |    -.6435021    -.6397873       -.0037148        .0212728
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        2.49
                Prob>chi2 =      0.8694
                (V_b-V_B is not positive definite)
```

Appendix 3: Random effect regression result

```
. xtreg lnGDP lnEXP lnbm LnFdi lnrer XM lntopn, re

Random-effects GLS regression                   Number of obs      =       128
Group variable: countrycode                     Number of groups   =         8

R-sq:  within  = 0.8644                         Obs per group: min =        16
       between = 0.0644                                        avg =      16.0
       overall = 0.1775                                        max =        16

                                                Wald chi2(6)       =    686.43
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
       lnGDP |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnEXP |    .8516355   .0507253    16.79   0.000     .7522158    .9510552
        lnbm |    .0766113   .0598005     1.28   0.200    -.0405956    .1938181
       LnFdi |   -.0161114    .018772    -0.86   0.391    -.0529039    .0206811
       lnrer |    .3188917   .1015579     3.14   0.002     .1198419    .5179415
          XM |    .2895529   .1306889     2.22   0.027     .0334073    .5456986
      lntopn |   -.6435021   .1696043    -3.79   0.000    -.9759205   -.3110838
       _cons |    5.464307   .8086148     6.76   0.000     3.879451    7.049163
-------------+----------------------------------------------------------------
     sigma_u |   .97291029
     sigma_e |   .24027202
         rho |   .94251568   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 4: Unit root Test Results

```
. xtunitroot llc lnGDP , lags(1)

Levin-Lin-Chu unit-root test for lnGDP
------------------------------

Ho: Panels contain unit roots              Number of panels  =      8
Ha: Panels are stationary                  Number of periods =     16

AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
--------------------------------------------------------------------------------
                 Statistic      p-value
--------------------------------------------------------------------------------
 Unadjusted t       -3.8892
 Adjusted t*        -3.2613       0.0006
--------------------------------------------------------------------------------
```

Appendix 5: Test for Correlations

Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in residuals			
Equation: Untitled			
Periods included: 16			
Cross-sections included: 8			
Total panel observations: 128			
Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	104.5546	28	0.0000
Pesaran scaled LM	10.23004		0.0000
Pesaran CD	0.505560		0.6132

```
. xtunitroot llc lnEXP , lags(0)

Levin-Lin-Chu unit-root test for lnEXP
------------------------------

Ho: Panels contain unit roots              Number of panels  =      8
Ha: Panels are stationary                  Number of periods =     16

AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 0 lags
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                 Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -3.6255
 Adjusted t*        -2.8178       0.0024
------------------------------------------------------------------------------
```

```
. xtunitroot llc lnbm , lags(0)

Levin-Lin-Chu unit-root test for lnbm
------------------------------

Ho: Panels contain unit roots              Number of panels  =      8
Ha: Panels are stationary                  Number of periods =     16

AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 0 lags
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                 Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -6.0311
 Adjusted t*        -2.7824       0.0027
------------------------------------------------------------------------------
```

```
. xtunitroot llc XM , lags(0)

Levin-Lin-Chu unit-root test for XM
------------------------------

Ho: Panels contain unit roots              Number of panels  =      8
Ha: Panels are stationary                  Number of periods =     16

AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 0 lags
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                 Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -6.6193
 Adjusted t*        -2.8918       0.0019
------------------------------------------------------------------------------
```

```
. xtunitroot llc lntopn , lags(0)

Levin-Lin-Chu unit-root test for lntopn
------------------------------

Ho: Panels contain unit roots              Number of panels  =      8
Ha: Panels are stationary                  Number of periods =     16

AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 0 lags
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                 Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t       -6.3780
 Adjusted t*        -3.9852       0.0000
------------------------------------------------------------------------------
```

APPENDIX 6: TEST RESULTS OF HETROSCEDACITICITY

```
. predict e2, residuals

. xtgls e2 lnGDP lnEXP lnbm LnFdi lnrer XM lntopn

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =         1          Number of obs      =       128
Estimated autocorrelations =         0          Number of groups   =         8
Estimated coefficients     =         7          Time periods       =        16
                                                Wald chi2(6)       =  8.76e+16
Log likelihood             =  2073.923          Prob > chi2        =    0.0000
```

e2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lnGDP	1	2.10e-09	4.8e+08	0.000	1	1
lnEXP	-.5761302	2.24e-09	-2.6e+08	0.000	-.5761302	-.5761302
lnbm	-.4026868	5.12e-09	-7.9e+07	0.000	-.4026868	-.4026868
LnFdi	.3066961	1.48e-09	2.1e+08	0.000	.3066961	.3066961
lnrer	-.153573	1.13e-09	-1.4e+08	0.000	-.153573	-.153573
XM	-.7820857	1.04e-08	-7.6e+07	0.000	-.7820857	-.7820857
lntopn	1.406531	7.04e-09	2.0e+08	0.000	1.406531	1.406531
_cons	-18.35514	5.12e-08	-3.6e+08	0.000	-18.35514	-18.35514

```
. reg lnGDP lnEXP lnbm LnFdi lnrer XM lntopn
```

Source	SS	df	MS		
Model	70.6300544	6	11.7716757	Number of obs =	128
Residual	112.019361	121	.925779842	F(6, 121) =	12.72
Total	182.649415	127	1.43818437	Prob > F =	0.0000
				R-squared =	0.3867
				Adj R-squared =	0.3563
				Root MSE =	.96217

lnGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnEXP	.5761302	.0815147	7.07	0.000	.4147502	.7375101
lnbm	.4026868	.2186494	1.84	0.068	-.0301874	.835561
LnFdi	-.3066961	.0574426	-5.34	0.000	-.420419	-.1929733
lnrer	.153573	.0468487	3.28	0.001	.0608236	.2463224
XM	.7820857	.442227	1.77	0.079	-.0934193	1.657591
lntopn	-1.406531	.276386	-5.09	0.000	-1.95371	-.8593521
_cons	18.35514	1.456038	12.61	0.000	15.47253	21.23775

APPENDIX 7: MULTICOLINEARITY TEST RESULT

```
. corr lnEXP lnGDP lnbm LnFdi XM lnrer lntopn
(obs=128)
```

	lnEXP	lnGDP	lnbm	LnFdi	XM	lnrer	lntopn
lnEXP	1.0000						
lnGDP	0.1801	1.0000					
lnbm	0.3613	-0.0709	1.0000				
LnFdi	0.4584	-0.1217	-0.0988	1.0000			
XM	0.3927	0.0347	0.4047	0.0975	1.0000		
lnrer	-0.3419	0.2801	-0.4159	-0.0489	-0.2130	1.0000	
lntopn	0.5390	-0.1867	0.7605	-0.0391	0.5485	-0.5012	1.0000

Appendix 8: Breuschand Pagan LagrangianMultiplier Test for Random Effects

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        lnGDP[countrycode,t] = Xb + u[countrycode] + e[countrycode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
               lnGDP |   1.438184       1.199243
                   e |   .0578624       .2405461
                   u |   .2388312       .4887036

        Test:   Var(u) = 0
                            chibar2(01) =   374.41
                         Prob > chibar2 =   0.0000
```

Appendix 9: Marginal effects

Marginal effects after xtreg

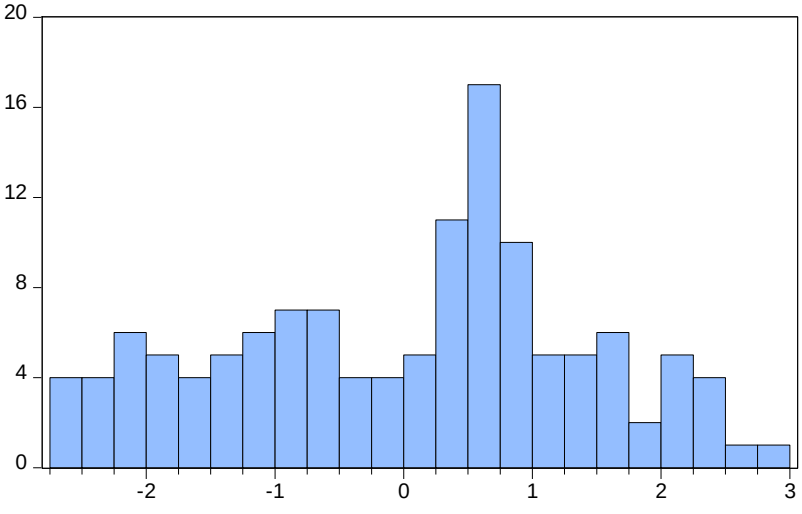
y = Linear prediction (predict)

= 23.210373

variable	dy/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
lnEXP	.8353944	.05224	15.99	0.000	.733	.937788		21.0503
lnbm	.0710685	.0695	1.02	0.307	-.065155	.207292		3.24901
LnFdi	-.0296696	.02191	-1.35	0.176	-.072614	.013275		17.9264
lnrer	.320893	.07836	4.09	0.000	.167306	.474481		5.21796
XM	.2577532	.1467	1.76	0.079	-.029776	.545282		.570578
lntopn	-.6618661	.18527	-3.57	0.000	-1.02499	-.298739		3.06029

Appendix 10: Normality Test Result

```
. sfrancia lnGDP lnEXP

                Shapiro-Francia W' test for normal data

    Variable |   Obs        W'          V'        z       Prob>z
-------------+--------------------------------------------------
       lnGDP |   128     0.96336       4.091     2.830    0.00233
       lnEXP |   128     0.94971       5.616     3.466    0.00026

. sfrancia lnGDP lnEXP lnbm LnFdi lnrer XM lntopn

                Shapiro-Francia W' test for normal data

    Variable |   Obs        W'          V'        z       Prob>z
-------------+--------------------------------------------------
       lnGDP |   128     0.96336       4.091     2.830    0.00233
       lnEXP |   128     0.94971       5.616     3.466    0.00026
        lnbm |   128     0.93768       6.960     3.897    0.00005
       LnFdi |   128     0.96676       3.713     2.635    0.00421
       lnrer |   128     0.89385      11.855     4.966    0.00001
          XM |   128     0.98050       2.178     1.563    0.05901
      lntopn |   128     0.94743       5.871     3.555    0.00019

.
```



Series: Standardized Residuals
Sample 2000 2015
Observations 128

Mean	0.018983
Median	0.372960
Maximum	2.893276
Minimum	-2.613481
Std. Dev.	1.389424
Skewness	-0.158325
Kurtosis	2.134834
Jarque-Bera	4.526822
Probability	0.103995

Appendix 11: Granger Causality Test

Pairwise Granger Causality Tests

Date: 06/11/18 Time: 09:44
Sample: 2000 2015
Lags: 2

Null Hypothesis:	F-Statistic	Prob.
LNEXP does not Granger Cause LNGDP	2.39211	0.0963
LNGDP does not Granger Cause LNEXP	2.23215	0.1123
LNFDI does not Granger Cause LNGDP	0.52105	0.5954
LNGDP does not Granger Cause LNFDI	0.27418	0.7607
LNRER does not Granger Cause LNGDP	0.13390	0.8748
LNGDP does not Granger Cause LNRER	2.57515	0.0809
LNTOPN does not Granger Cause LNGDP	0.45967	0.6327
LNGDP does not Granger Cause LNTOPN	1.84930	0.1623
XM does not Granger Cause LNGDP	0.40559	0.6676
LNGDP does not Granger Cause XM	0.19908	0.8198
LNFDI does not Granger Cause LNEXP	0.59168	0.5552
LNEXP does not Granger Cause LNFDI	7.10437	0.0013
LNRER does not Granger Cause LNEXP	0.36473	0.6952
LNEXP does not Granger Cause LNRER	3.04640	0.0517
LNTOPN does not Granger Cause LNEXP	0.01987	0.9803
LNEXP does not Granger Cause LNTOPN	1.12104	0.3297
XM does not Granger Cause LNEXP	1.47225	0.2340
LNEXP does not Granger Cause XM	3.58786	0.0310
LNRER does not Granger Cause LNFDI	0.30623	0.7369
LNFDI does not Granger Cause LNRER	4.25724	0.0166
LNTOPN does not Granger Cause LNFDI	0.81733	0.4443
LNFDI does not Granger Cause LNTOPN	1.27292	0.2842
XM does not Granger Cause LNFDI	1.36233	0.2605
LNFDI does not Granger Cause XM	0.28638	0.7516

LNTOPN does not Granger Cause LNRER	0.64259	0.5279
LNRER does not Granger Cause LNTOPN	0.44400	0.6426
XM does not Granger Cause LNRER	1.36316	0.2603
LNRER does not Granger Cause XM	2.10387	0.1270
XM does not Granger Cause LNTOPN	0.00581	0.9942
LNTOPN does not Granger Cause XM	9.40927	0.0002

Appendix 12: long run and short run panel data test

1. INTERCEPT ONLY

Pedroni Residual Cointegration Test

Series: LNGDP LNEXP LNFDI LNRER LNTOPN XM

Date: 07/13/18 Time: 06:12

Sample: 2000 2015

Included observations: 128

Cross-sections included: 7 (1 dropped)

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-0.031117	0.5124	-0.097754	0.5389
Panel rho-Statistic	1.831471	0.9665	1.985521	0.9765
Panel PP-Statistic	-0.680775	0.2480	-0.427107	0.3347
Panel ADF-Statistic	0.984734	0.8376	0.876907	0.8097

Alternative hypothesis: individual AR coefs. (between-dimension)

Statistic	Prob.

Group rho-Statistic	3.014273	0.9987
Group PP-Statistic	-0.178796	0.4290
Group ADF-Statistic	1.467930	0.9289

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Ethiopia	0.245	0.013712	0.013500	2.00	15
Kenya	0.414	0.003152	0.002367	3.00	15
Tanzania	0.263	0.004966	0.003789	3.00	15
Ruanda	-0.482	0.003127	0.003152	1.00	15
Uganda	0.317	0.001250	0.001250	0.00	15
Burundi	-0.129	0.007750	0.007750	0.00	15
Zambia	0.233	0.007808	0.008089	1.00	15
Djibouti	Dropped from Test				

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Ethiopia	0.040	0.012278	1	--	14
Kenya	0.004	0.002024	1	--	14
Tanzania	-0.048	0.004621	1	--	14
Ruanda	-0.481	0.003089	1	--	14
Uganda	0.235	0.001319	1	--	14
Burundi	-0.075	0.008096	1	--	14
Zambia	0.188	0.008294	1	--	14
Djibouti	Dropped from Test				

2. INTERCEPT AND TREND

Pedroni Residual Cointegration Test

Series: LNGDP LNEXP LNFDI LNRER LNTOPN XM

Date: 07/13/18 Time: 06:13

Sample: 2000 2015

Included observations: 128

Cross-sections included: 7 (1 dropped)

Null Hypothesis: No cointegration

Trend assumption: Deterministic intercept and trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	1.941125	0.0261	0.701505	0.2415
Panel rho-Statistic	3.487396	0.9998	3.388723	0.9996
Panel PP-Statistic	1.462858	0.9282	1.896114	0.9710
Panel ADF-Statistic	-0.046464	0.4815	0.687338	0.7541

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	4.385603	1.0000
Group PP-Statistic	1.211904	0.8872
Group ADF-Statistic	0.501107	0.6919

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Ethiopia	0.086	0.006283	0.001283	9.00	15
Kenya	0.340	0.003049	0.002140	3.00	15
Tanzania	0.356	0.003850	0.003890	2.00	15
Rwanda	-0.325	0.001892	0.001381	4.00	15
Uganda	0.225	0.001346	0.001360	1.00	15
Burundi	0.083	0.004871	0.004996	1.00	15
Zambia	0.151	0.002592	0.000475	10.00	15
Djibouti	Dropped from Test				

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Ethiopia	-0.361	0.004943	1	--	14
Kenya	-0.033	0.002319	1	--	14
Tanzania	0.102	0.003523	1	--	14
Ruanda	-0.678	0.001511	1	--	14
Uganda	0.102	0.001401	1	--	14
Burundi	-0.013	0.005089	1	--	14
Zambia	-0.280	0.001864	1	--	14
Djibouti	Dropped from Test				

3. NO TREND AND INTERCEPT

Pedroni Residual Cointegration Test

Series: LNGDP LNEXP LNFDI LNRER LNTOPN XM

Date: 07/13/18 Time: 06:14

Sample: 2000 2015

Included observations: 128

Cross-sections included: 8

Null Hypothesis: No cointegration

Trend assumption: No deterministic intercept or trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-1.991283	0.9768	-2.394854	0.9917
Panel rho-Statistic	2.067188	0.9806	2.227322	0.9870
Panel PP-Statistic	0.169454	0.5673	0.448424	0.6731
Panel ADF-Statistic	2.272808	0.9885	2.198609	0.9860

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	3.173870	0.9992
Group PP-Statistic	0.340733	0.6333
Group ADF-Statistic	2.027483	0.9787

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Ethiopia	0.367	0.016894	0.016894	0.00	15
Kenya	0.280	0.003870	0.001279	7.00	15
Tanzania	0.033	0.009739	0.007454	4.00	15
Ruwanda	-0.096	0.005206	0.005206	0.00	15
Uganda	0.430	0.006743	0.007128	2.00	15
Burundi	0.371	0.017701	0.016817	1.00	15
Zambia	0.454	0.075487	0.064157	2.00	15
Djibuti	0.029	0.036147	0.036147	0.00	15

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Ethiopia	0.150	0.015074	1	--	14
Kenya	-0.184	0.002706	1	--	14
Tanzania	-0.201	0.009650	1	--	14
Ruwanda	-0.105	0.005578	1	--	14
Uganda	0.461	0.007032	1	--	14
Burundi	0.537	0.017874	1	--	14
Zambia	0.481	0.079878	1	--	14
Djibuti	0.108	0.038006	1	--	14

The above test shows says that there is no cointegration among the variables. Since majority of test with intercept, intercept and trend, no intercept confirm there is no cointegration among the variables. Hence, no need of running VECM and hence short and long run relationship.