EXAMINATION OF THE DIFFERENTIAL IMPACT OF INTERNATIONAL TRADE ON ECONOMIC GROWTH AMONG ECOWAS AND NON ECOWAS COUNTRIES: 2000 - 2015

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DECLARATION

I hereby declare that this dissertation has been written by me and it is a report of my research work and that it has not been presented elsewhere for award of any certificate. All quotations are indicated and sources of information specifically acknowledge by means of references.

Sign…….

Suleiman Adamu Ibrahim

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CERTIFICATION

This dissertation titled, Examination of the Differential Impact of International Trade on Economic Growth among ECOWAS and NON-ECOWAS countries meets the regulations governing the award of Master of Science in Economics of the School of Postgraduate Studies, Nasarawa State University, Keffi, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to the Almighty Allah for sparing my life to attend this level of education.

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ABSTRACT

The objective of the study was to examine the differential impact of international trade on economic growth among ECOWAS and Non-ECOWA countries from 2000 – 2015. To achieve this objective, the researcher used secondary data sourced from the World Bank Data Base on Macroeconomic Indicators and Selected Statistics on African Countries from annual publications of African Development Bank. GDP was used as a proxy for economic growth while import, export, and foreign exchange rate as proxies for international trade. The data were subjected to the following diagnostic tests: Unit Root Test, Co-integration Test and Granger Causality Test as well as Error Correction Mechanism before the estimation of the model. The model used Neoclassical Solow Growth Model adopted from Obadan (2008) and Usman (2011). E-views 10.0 and STATA Econometric Software Version 14.2 were used to estimate the model. The researcher selected six ECOWAS and six Non-ECOWAS countries based on the availability of data. The results of the study revealed that international trade drives economic growth in both ECOWAS and Non-ECOWAS countries. Comparatively, international trade promotes economic growth more in the Non-ECOWAS countries than the ECOWAS countries. The study recommends among others that ECOWAS countries need to borrow a leaf from their Non-ECOWAS countries in terms of trade enhancing policies. This is because the Non-ECOWAS countries benefit more from trade than the ECOWAS countries.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

There is no country which has grown without the useful tool of international trade, however the significance of international trade to economic growth relies a great deal on the conditions in which it works and the purpose it serves. The relevance of international trade originates from evidence that there is no country that can produce all commodities in terms of goods and services which its population requires for their utilization and consumption largely owing it to resources differences and constraints. It is therefore concluded that trade relationship suggests that countries need to export commodities in order to create revenue to be able to import those commodities which cannot be made domestically. International trade is simply known as the exchange of goods and services between nations of the world. At least two countries should be involved in the activities, that is, the aggregate of activities relating to trading between merchants across borders. Traders engage in economic activities for the purpose of the profit maximization engendered from differentials among international economic environment of nations (Adeleye, Adeteye & Adewuyi 2015). International trade enables nations to sell their domestically produced goods to other countries of the world (Adewuyi, 2002).

Igudia, 2004 sees the concept of international trade as the integration among the nations of the world. It is likened to openness of the world economy where nations come together to the extent that they have free trade, free movement of capital and financial activities.

Economic theory states that international trade, flow of factors, ideas and information stimulate economic and political progress (Aboagye, 2006). Thus, international to trade

can be said to be the platform of globalization while trade, finance, investment and entrepreneurs constitute the heart (Obadan, 2004; Uwatt, 2004). It also involves economic liberalization that has generated new markets for various economic actors within the global space and it has simultaneously brought about intense competition among them. Africa is basically an open economy with international transactions constituting a significant proportion of its aggregate output. To a large extent, Africa's economic development depends on the prospects of its export trade with other nations. Foreign trade provides both foreign exchange earnings and market stimulus for accelerated economic growth (Adewuyi, 2002).

The inability of developing countries to fully embrace international trade in their economic and developmental process is making them to participate somewhat marginally in the world economy. The modes and indicators of international trade include the rapid growth of international trade, Foreign Direct Investment (FDI) and international flows of capital and information. This could be one of the reasons for the formation of various regional economic groups around the world such as European Union (EU), Organization of Economic Co-operation and Development (OECD), Organization of Petroleum Exporting Countries (OPEC), with a view to harmonizing policies in order to reap the gains of economies of scale. Hence, some countries in West Africa have come under one umbrella Economic Community of West African States (ECOWAS), to maximize their potentials in order to reap the gains of international trade (Obadan, 2004).

It is not that ECOWAS members are not abundantly endowed with resources. In fact, they are very rich in both mineral and human resources. For instance, Nigeria had earned US$350 billion between 1965 and 2000. But while oil revenues per capita rose from US$33 to US$325 during the period Gross Domestic Product (GDP) per capita declined

from $1000 in 1980 to a trifling value of $300 in 2001 (Obadan, 2004). Thus, what Nigeria earned during the period did not add meaningful value to the people's living standard (Sala-i-Martin and Subramanian, 2003). Similarly, Ghana is endowed with gold, diamond, manganese ore, and bauxite; Liberia with iron, timber and rubber; and Sierra Leone has one of the world's largest deposits of rutile, titanium ore (Johnson, 2003).

1.2 Statement of the Problem

Literature on economic growth shows diverse channels through which growth can be achieved. A prominent channel is through international trade. The question of whether trade promotes economic growth and development is controversial. The traditional view maintains that trade act as an "engine of growth" while on the other hand, there have been loud dissenting voices in the 20th century claiming that trade can only perpetuate the underdevelopment of poor countries. This is true especially in developing African countries.

Promotion of economic growth is one of the major objectives of international trade, but in recent times, this has not been the case because the Nigerian economy is still experiencing some elements of economic instability such as price instability, high level of unemployment and adverse balance of payments.

There has been poor domestic production of export commodities in ECOWAS member countries, especially, in the last four decades. Exports of non-oil primary goods continued to fall, and that of manufactured commodities has been at their lowest ebb. Importation of finished goods and even those of raw materials continued to be costlier, and terms of trade as well as foreign exchange rate continued to be against ECOWAS member countries. Some of the goods imported into the ECOWAS member countries were those that cause damages to their local industries by rendering their products inferior and being neglected,

thereby reducing the growth rate of output of such industries which later spread to the aggregate economy. Also the poor performance of international trade has been ostensibly blamed on factors such as different languages, difficulty in transportation, risk in transit, lack of information about foreign businessmen etc.

The factors behind the unsatisfactory performance in international trade and economic growth in ECOWAS member countries can be broadly grouped into domestic and external factors.

In the domestic or internal factor, there has been the problem of high costs of production due to poor and inadequate infrastructural facilities; lack of incentives to manufacturers; corruption; bad governance and misapplication of resources have led to inadequate funds for productive sectors and in particular manufacturing sub-sectors in most of the ECOWAS member countries, leading to their poor performances, which have worsened their external economic performance. There has also been the problem of rising insecurity as a result of persistent and general increase in the spate of communal, political, and economic crises leading to declining productive activities and aggregate production in the sub-region.

In the external sector, there has been the problem of consistent fall in exchange values of the currencies of ECOWAS member countries as a result of poor foreign exchange management leading to dwindling foreign exchange earnings for them. This has compounded their inability to finance economic growth programmes and to import the needed raw materials and technologies that can be used in production of manufactures towards fastening the pace of economic growth in the sub-region. The problem of continued importation of manufactured commodities has negatively affected foreign exchange value for the currencies of ECOWAS member countries leaving little or no exchange earnings for them to finance growth programmes. These problems combines in various ways not only to incapacitate ECOWAS member countries to produce enough for

exports but also cause the inability of the country to import improved technologies that will enhance production of goods and services towards economic growth in the sub-region. Hence the need for this study to uncover the differential impact of international trade on economic growth in ECOWAS and Non-ECOWAS countries during the period 2000 to 2015.

1.3 Research Questions

This study examines the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries. This study seeks to answer the following research questions:

i. What is the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries?
ii. What is the relationship between international trade and economic growth among ECOWAS and Non-ECOWAS countries? and
iii. What is the direction of causality between international trade and economic growth among ECOWAS and Non-ECOWAS countries?

1.4 Research Objectives

The main objective of this study is to empirically examine the differential impact of international trade on economic growth among ECOWAS and non-ECOWA countries. The study achieved the following specific objectives:

i. To examine the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries
ii. To examine the relationship between international trade and economic growth among ECOWAS and Non-ECOWAS countries and

iii. To examine causality relationship between international trade and economic growth among ECOWAS and Non-ECOWAS countries.

1.5 Research Hypotheses

H_{O1}: There is no differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries.

H_{O2}: There is no relationship between international trade and economic growth among ECOWAS and Non-ECOWAS countries, and

H_{O3}: There is causality between international trade and economic growth among ECOWAS and Non-ECOWAS countries.

1.6 Scope of the Study

This study focused on the examination of the differential impact of international trade on economic growth between ECOWAS and Non-ECOWA countries. The research covers six ECOWAS countries namely (Cote d'Ivoire, Gambia, Ghana, Nigeria, Sierra Leone and Togo) and six NON-ECOWAS countries (Algeria, Cameroon, Central African Republic, Congo Democratic Republic, Equatorial Guinea and Gabon). These countries were selected based on the availability of data from the World Bank's Data Base on Macroeconomic Indicators and Selected Statistics on African Countries an annual publication of African Development Bank. The variables covered in this study are: gross domestic product, export, import, and foreign exchange rate. Moreover, the study covered a period of 16 years that is from 2000-2015.

1.7 Significance of the Study

The study has unveiled the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries. The findings of this study when added to the existing body of literature, will be a valuable guide especially to policy makers and a good source of reference for future scholarly research. One advantage of academic research is that it investigates matters which practitioners and policy makers find useful but have little time to study.

The study is very vital especially to policy makers and development partners because it enables them to initiate, develop and manage long term economic strategies based on empirical evidence. The study would serve as an extension to the earlier researches on the impact of international trade on economic growth which in some cases have mixed results.

1.8 Organization of the Study

The study is presented in five chapters. Chapter one contains the introduction of the study, by highlighting the background to the study, statement of the problem, research questions, research objectives of the study, hypotheses of the study, significance of the study, scope of the study and organization of the study. Chapter two reviews the related literature dealing with conceptual review, empirical review, and theoretical review and the gaps in the literature. Chapter three discusses the methodology of the study which includes research design, theatrical framework, model specification, variable measurement, sources of data, method of estimation, and justification of the technique. Chapter four presents the data gathered and the results of the analysis. Chapter five discusses the summary of major findings, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 International Trade

Usman (2011) conceives international trade as exchange of goods and services across international borders. Lipsey & Chrystal (1999) defined foreign trade as exchange of goods and services that take place across international boundaries. International trade is concerned with the relationship amongst nations in both the economic and financial sense. It plays a life-sustaining role in coordinating socio-economic performance and the possibilities for less developed countries (Esther & Kamtochukwu, 2017).

International trade is the exchange of capital, goods, and services across international borders or territories. In most countries, such trade represents a significant share of gross domestic product (GDP). While international trade has existed throughout history for example Uttarapatha, Silk Road, Amber Road, scramble for Africa, Atlantic slave trade, salt roads, its economic, social, and political importance has been on the rise in recent centuries. Carrying out trade at an international level is a complex process when compared to domestic trade. When trade takes place between two or more nations factors like currency, government policies, economy, judicial system, laws, and markets influence trade (Samuelson, 2001).

International trade refers to as the transfer of goods and services which include capital goods from one country to another. This definition was provided by Economics Concepts (2012) who defined it as trade across international boundaries. In most countries, such trade represents a significant share of gross domestic product (GDP). While international trade has been present all the way through the history, its economic,

social and political importance has been on the rise in recent centuries. Therefore, without international trade, nations would be limited to the goods and services produced within their own borders. However, Economics Concept (2012) adds that, the difference between international trade and domestic trade is that, this type of trade is more costly than domestic trade. This is because the trade across international border require other charges or costs such as tariffs, and other costs associated with country differences such as language, legal system or culture are also incurred. Factors of production such as capital and labour typically move more freely within a country than across countries. Therefore, these determinants really give clear polarization of the two concepts to business individual and organisations.

2.1.2 Export

Exports are described by Kimberly (2017) as the sale of goods produced in one country to other countries for future sale or consumption. Exports are the goods and services produced in one country and purchased by residents of another country. It doesn't matter what the good or service is. It doesn't matter how it is sent. It can be shipped, sent by email, or carried in personal luggage on a plane. If it is produced domestically and sold to someone in a foreign country, it is an export.

Exports are one component of international trade. The other component is imports. Exports can be broadly classified into four namely: agriculture produce, manufactured commodities, solid minerals (or mining) exports, and crude oil (Odu, 2015). Akeem (2011) defined agricultural exports as the exports of agricultural commodities. These include: groundnuts, cocoa, rubber, palm products, cotton etc. manufactured exports include: automobile, computers, electrical and electronics, etc. Mining export is defined

by Akeem (2011) as the export of minerals, including coal, colombite, tin, precious stones, etc.

2.1.3 Import

Mohan (2009) defined import as a good or service brought into one country from another. The word import is derived from the word port since goods are often shipped via boat from foreign countries. Along with exports, imports form the backbone of international trade. The higher the value of imports entering a country compared to the value of exports, the more negative that country's balance of trade becomes. According to Kimberly (2017), imports are goods and services bought from other countries by residents of a country. Residents include citizens, businesses and the governments. Imports are carried by email, in personal luggage on a plane or shipped from one country to another.

2.1.4 Foreign Exchange Rate

Foreign exchange rate is one of the most important prices in international trade. According to MacDonald (2007), foreign exchange rate is the price of one currency in terms of another or it is simply the rate at which currencies are exchanged. In order words, FER links the domestic economy with rest of the world through both the goods and assets markets. Rao and Tolcha (2016) defines foreign exchange rate as the rate at which foreign exchange can be bought and sold for immediate delivery, usually one or two days. The author further states that foreign exchange rate is divided into nominal and real exchange rates.

Nominal exchange rate indicates quantities of one currency that can be traded for a unit of another currency. Real exchange rate on the other hand describes how much of goods and services that can be bought in another country (Lee, Leong, Lin, Nong, and Yee,

2006). Nominal exchange rate indicates quantities of one currency that can be traded for a unit of another currency. The more units of a country's currency exchanged for a unit of another country's currency, the smaller the value of the former country's currency, or vice visa (Ude, 1999).

Real exchange rate on the order hand describes how much of goods and services that can be bought in another country (Lee, Leong, Lin, Nong, and Yee, 2006). According to Ude (1999) the real exchange rate is defined as the nominal exchange rate deflated by price levels (international relative to domestic). It is the real exchange rate that matters most for the real economy. If a currency has a high value in real terms, this means that its products are selling at less competitive prices on world markets, which will tend to discourage exports and encourage imports. They've got two main functions: providing security and influencing exchange rates.

In the first case, they help prove that the central bank has enough money to pay international debts and meet other costs in tricky economic times. This makes it easier to access lending. Countries usually buy commodities like oil in foreign reserve currency as well, as it helps protect them from rate volatility. That's why the IMF recommends central banks hold enough to cover 100% of short-term debt, or the equivalent of three months' worth of imports. In the second, the central bank buys domestic currency using the foreign reserve. That raises demand, which bumps up the price. It can be a useful tactic to fall back on when a country's currency is falling fast in value.

2.1.5 Economic growth

Jhinghan, (2003), regards it as quantitative sustained increase in a country's per capita output or income accompanied by expansion in its labour force, consumption, capital

and volume of trade. Samuelson (2006), sees economic growth as the expansion of a country's potential GDP or national output. He explains it further as when a nation's productivity frontier shifts outward. From the above definitions, we can infer that economic growth is the process which leads to sustained increase in the national output over a period of time, thereby increasing the level of savings, capital accumulation and investment in a nation's economy (Clunnies, 2009). Kuznet (1993) defined economic growth as cited by (Todaro, 1995) as a long-term rise in capacity to supply increasingly diverse economic goods and services to its population; this growth capacity is based on advancing technologies, the institutional and ideological advancement that its demand.

Economic grow this defined by Bjork (1999) as the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. Growth is usually calculated in real terms - i.e., inflation-adjusted terms – to eliminate the distorting effect of inflation on the price of goods produced. Measurement of economic growth uses national income accounting. Since economic growth is measured as the annual percent change of gross domestic product (GDP), it has all the advantages and drawbacks of that measure. The economic growth rates of nations are commonly compared using the ratio of the GDP to population or per-capita income.

The rate of economic growth refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. This growth rate is the trend in the average level of GDP over the period, which ignores the fluctuations in the GDP around this trend. An increase in economic growth caused by more efficient use of inputs (increased productivity of labour, physical capital, energy or materials) is

referred to as intensive growth. GDP growth caused only by increases in the amount of inputs available for use (increased population, new territory) is called extensive growth (Gordon, 2016).Development of new goods and services also creates economic growth.

2.1.6 ECOWAS and NON-ECOWAS Countries

ECOWAS is an acronym of Economic Community of West African States. The treaty establishing ECOWAS was signed in Lagos on 28th May, 1975 by eleven Head of States and four Parliamentarians representing (15) West African Countries. These are Benin Republic, Burkina Faso, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Niger, Nigeria, Mali, Mauritania, Senegal, Sierra Leone and Togo. Cape Verde joined in 1977 members but Mauritania withdrew its membership in 2002. At present, ECWAS has 15 members (Suleiman and Yarima, 2009). The main objective of the community according to Suleiman and Yarima (2009) is to promote cooperation and development in all fields of economic activities particularly in the field of industry, transport, telecommunication, energy, Agriculture, natural resources, commerce, monetary, social and cultural matters for the purpose of rising the standard of living of its people and maintaining economic stability of fostering closer relations among its members and contributing to the progress and development of African continent.

The Non-ECOWAS countries on the other hand, are those countries of the world that are not members of the Economic Community of West African States. These include Algeria, Angola, Botswana, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Kenya, Lesotho, Libya, Madagascar, Malawi, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Rwanda, Sao Tome and

Principe, Seychelles, Djibouti, South Africa, South Africa, Sudan, Swaziland, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

2.1.7 Differential Impact

Differential impact refers to the differences in the impact of an explanatory variable on the dependent variable. Put in another way, it is the differences in the impact of international trade on economic growth across countries, regions, and trading partners. In this study, differential impact means the differences in the impact of international trade on economic growth between ECOWAS member countries and Non-ECOWAS countries. Differential impact measured in terms of the volume of exports, volume of imports balance of trade, foreign exchange rate, and balance of payments. Were (2015) asserted that effects of trade differ by the level of development of a country. He went further to say that trade has a significant positive impact on economic growth in developed countries. However, the impact is not significant for less developed nations, most of which are in Africa. Brueckner and Lederman (2015) and Kim (2011) hold a strong view that there is differential impact of international trade between countries. They went further and stated that the international trade has impacted positively on economic growth for the developed countries but surprisingly, it impacted negative for the developing countries.

2.2 Theoretical Review

Theories of international trade can be broadly classified into - (a) Mercantilist view (b) Classical theories of trade (c) Modern theory of trade (d) New Theories of trade.

2.2.1 Mercantilism

It was only after the publication of *The Wealth of Nations* by Adam Smith in 1776, the subject of economics emerged in an organized scientific form. Prior to that during the 17^{th}& 18^{th} centuries in Europe a group of men like merchants, bankers, traders,

government officials and philosophers, wrote essays and pamphlets on international trade that advocated an economic philosophy known as mercantilism. The term mercantilism first acquired significance at the hands of Adam Smith. Mercantilism, as the term implies is closely associated with trade and commercial activities of an economy. Mercantilist theory was highly nationalistic in its outlook and favoured state regulation and centralization of economic activities including foreign trade.

The mercantilists believed that a nation's wealth and prosperity is reflected in its stock of precious metals (also known as specie), namely, gold and silver. At that time, as gold and silver were the currency of trade between nations, a country could accumulate gold and silver by exporting more and importing less. The more gold and silver a nation had, the richer and more powerful it was. They argued that government should do everything possible to maximize exports and minimize imports. However, since all nations could not simultaneously have an export surplus and the amount of gold and silver was limited at any particular point of time, one nation could gain only at the expense of other nations. In other words, mercantilists believed that trade was a *zero sum game* (i.e. one's gain is the loss of another). For mercantilists, the objective of international trade was considered to be achievement of surplus in the balance of payments. Hence, they advocated achieving as high trade surplus as possible.

In this context, Blaug (1978) points out that the core of mercantilism, of course, is the doctrine that a favorable balance of trade is desirable because it is somehow productive of national prosperity. When mercantilist authors speak of the surplus in the balance of trade, they mean an excess of exports, both visible and invisible, over imports, calling either for an inflow of gold or for granting of credit to foreign countries, that is capital exports. In other words, they were roughly thinking of what we would now call 'the current account' as distinct from 'the capital account' in the balance of payments. The

mercantilist ideas were however, strongly criticized in the 18th century by economists like David Hume, Adam Smith and David Ricardo. For instance, Adam Smith criticized mercantilists on the ground that the mercantilists falsely equated money with capital and the favourable balance of trade with the annual balance of income over consumption. Thus, Blaug (1978) critically points out that the idea that an export surplus is the index of economic welfare may be described as the basic fallacy that runs through the whole of the mercantilist literature.

Another flaw of mercantilism is that it viewed trade as a *zero sum game*. This view was challenged by Adam Smith and David Ricardo who demonstrated that trade was a *positive sum game* in which all trading nations can gain even if some benefit more than others. From the above analysis it is seen that the concept of balance of payments or balance of trade was evolved for the first time in the writings of mercantilists. As pointed out earlier, at that time economics was not yet developed in an organized form, so the concept of balance of payments / balance of trade was evolved in a vague form. In spite of various flaws in the ideology, due credit may be given to the mercantilist writers in the development of the concept of balance of payments / balance of trade.

It is to be noted that the mercantilists failed to address three relevant issues of international trade which are: –

a) **Gains from trade:** – The first important issue is about the gains from trade? Do countries gain from international trade? Where do the gains come from, and how are they divided among the trading countries?

b) **Structure of trade:** – The second relevant issue is the structure or direction or pattern of international trade. In other words, which goods are exported and which are imported by each trading country? What are the fundamental laws that govern the international allocation of resources and the flow of trade?

c) **Terms of trade:** – The third relevant issue is the terms of trade. In other words, at what prices are the exported and imported goods exchanged?

2.2.2 Classical Theories of International Trade

It was the classical economists like Adam Smith, David Ricardo, Robert Torrens and John Stuart Mill, who explained these three issues through their theories which can be grouped under classical theories of international trade.

a) Absolute Cost Advantage Theory (Adam Smith, 1776)

It was Adam Smith who emphasized the importance of free trade in increasing wealth of all trading nations. According to Adam Smith, mutually beneficial trade is based on the principle of absolute advantage. His theory is based on the assumptions that there are two countries, two commodities and one factor (labour) of production. Adam Smith's theory is based on labour theory of value, which asserts that labour is the only factor of production and that in a closed economy goods exchange for one another according to the relative amounts of labour they embody. The principles of absolute cost advantage points that a country will specialize and export a commodity in which it has an absolute cost advantage.

b) Comparative Cost Advantage Theory (David Ricardo, 1817)

According to Ricardo, it is not the absolute but the comparative differences in costs that determine trade relations between two countries. The comparative cost theory was first systematically formulated by the English economist David Ricardo in his *Principles of Political Economy and Taxation* published in 1817. It was later refined by J. S. Mill, Marshall, Taussig and others. According to Ricardo, differences in comparative costs form the basis of international trade. The law of comparative advantage indicates that each country will specialize in the production of those commodities in which it has the greatest

comparative advantage or the least comparative disadvantage. Thus, a country will *export* those commodities in which its comparative advantage is the greatest and *import* those commodities in which its comparative disadvantage is the least.

The comparative cost doctrine is however, not complete in itself. It has been severely criticized by economists due to its unrealistic assumptions. Bertil Ohlin critically pointed out that the principle of comparative advantage is not applicable to international trade alone, rather it is applicable to all trade. Furthermore, the theory does not explain why there are differences in costs.

Ricardo's theory of comparative advantage did not explain the ratios at which the two commodities would be exchanged for one another. In other words, it does not indicate what the terms of trade are. It was J. S. Mill who discussed this issue in detail his theory of reciprocal demand. The term 'reciprocal demand' indicates a country's demand for one commodity in terms of the quantities of the other commodity which it is prepared to give up in exchange. Thus, it is the reciprocal demand that determines the terms of trade which, in turn, determines the relative share of each country. Equilibrium would be established at that ratio of exchange between the two commodities at which quantities demanded by each country of the commodity which it imports from the other, should be exactly sufficient to pay for one another. Mill's theory of reciprocal demand relates to the possible terms of trade at which the two commodities will exchange for each other between the two countries. The terms of trade here refer to 'the barter terms of trade' between the two countries i.e. the ratio of the quantity of imports for a given quantity of exports of a country.

The Ricardian theory, though based on a number of wrong assumptions, is regarded as an important landmark in the development of the theory of international trade**.**

2.2.3 Modern Theory of International Trade

One of the main drawbacks of Ricardian theory of comparative cost was that it did not explain why differences in comparative costs exist. Heckscher (1919) propounded the idea that trade results from differences in factor endowments in different countries. The idea was further carried forward and developed by Bertil Ohlin in 1933 in his famous book *Inter-regional and International Trade.* This book forms the basis for what is known as Heckscher – Ohlin theory or modern theory of international trade.

Heckscher – Ohlin Theory

The Heckscher – Ohlin theory is based on most of the assumptions of the classical theories of international trade and leads to the development of two important theorems (a) Heckscher – Ohlin theorem and (b) Factor price equalization theorem. Heckscher& Ohlin have explained the basis of international trade in terms of factor endowments. According to Heckscher& Ohlin, regions or countries have different factor endowments. It means that some countries are rich in capital while some are rich in labour. In their theory, the concept of factor endowments or factor abundance is used in relative terms and not in absolute terms. Moreover, they have defined the concept of factor endowment or factor abundance in terms of two criteria (a) Price criterion and (b) Physical criterion.

As per price criterion, a country is said to be capital abundant if the ratio of price of capital to the price of labour (PK / PL) is *lower* as compared to the other country. This criterion considers both demand for and supply of factors. On the physical criterion, a country is said to be capital abundant if the ratio of the total amount of capital to the total amount of labour (K/L) is *greater* as compared to other country. This criterion considers only supply of factors.

On the basis of above criterion, the Heckscher – Ohlin theorem states that – "A nation will export the commodity whose production requires the intensive use of the nation's relatively abundant and cheap factor and import the commodity whose production requires the intensive use of the nation's relatively scarce and expensive -factor". In other words, the countries in which capital is cheap & abundant will export capital - intensive goods and import labour – intensive goods. On the contrary, the countries in which labour is cheap & abundant will export labour – intensive goods and import capital-intensive goods.

Thus, for them it is the differences in factor intensities in the production of goods along with actual differences in factor endowments of the countries which explain international differences in comparative costs of production.

The Heckscher –Ohlin theory further leads to the development of factor price equalization theorem. The factor price equalization theorem indicates that free international trade will ultimately lead to equalization of commodity prices and factor prices.

Samuelson & Stolper (1941) have further contributed to this theory and have formed Stolper – Samuelson theorem. Stolper –Samuelson theorem explains the effect of change in relative product prices on factor allocation and income distribution. It postulates that an increase in the relative price of a commodity raises the return or earnings of the factor used intensively in the production of that commodity. In other words, an increase in the relative price of labour intensive commodity will increase wages. Similarly, an increase in the relative price of capital intensive commodity will increase the price of capital. This implies that free trade would raise the returns to the abundant factor and reduce the returns to the scarce factor.

It is clear from the above that the Heckscher – Ohlin (hence forth, H-O) theory is superior to Ricardian theory. It accepts comparative advantage as the cause of international trade and explains the reasons behind the differences in comparative cost. Thus, it supplements the Ricardian theory of comparative cost. However, one of the limitations of H-O theory is that it is based on static model of given factor endowments and given technology.

2.2.4 New Theories of International Trade Heckscher (1919)-Ohlin (1933)

It is observed that the Ricardian theory and H – O theory provided good explanations of trade theory till the first half of the 20th century. Economists now believe that the traditional trade theories (i.e. Ricardian theory and H-O theory) fail to provide a complete explanation of the structure of the world trade. The world trade data now contains several empirical regularities or stylized facts that appear to be inconsistent with the traditional theories. Thus, the assumptions of H- O theory like – perfect competition, constant returns to scale, and same technology are invalid in today's context of world trade. Hence, economists have modified H-O theory by relaxing most of its assumptions and have developed new trade theories or complementary trade theories. These new theories are based on economies of scale, imperfect competition, and differences in technology among nations.

2.2.5 Leontief Paradox

In the early 1950s, Russian-born American economist Leontief (1953) studied the US economy closely and noted that the United States was abundant in capital and, therefore, should export more capital-intensive goods. However, his research using actual data showed the opposite: The United States was importing more capital-intensive goods. According to the factor proportions theory, the United States should have been importing labor-intensive goods, but instead it was actually exporting them. His analysis became

known as the Leontief Paradox because it was the reverse of what was expected by the factor proportions theory. In subsequent years, economists have noted historically at that point in time, labor in the United States was both available in steady supply and more productive than in many other countries; hence it made sense to export labor-intensive goods. Over the decades, many economists have used theories and data to explain and minimize the impact of the paradox. However, what remains clear is that international trade is complex and it is impacted by numerous but often-changing factors. Trade cannot be explained neatly by one single theory, and more importantly, our understanding of international trade theories continues to evolve.

2.2.6 Modern or Firm-Based Trade Theories

In contrast to classical, country-based trade theories, the category of modern, firm-based theories emerged after World War II and was developed in large part by business school professors, not economists. The firm-based theories evolved with the growth of the multinational company (MNC). The country-based theories couldn't adequately address the expansion of either MNCs or intra-industry trade, which refers to trade between two countries of goods produced in the same industry. For example, Japan exports Toyota vehicles to Germany and imports Mercedes-Benz automobiles from Germany. Unlike the country-based theories, firm-based theories incorporate other product and service factors, including brand and customer loyalty, technology, and quality, into the understanding of trade flows.

2.2.7 Country Similarity Theory

Swedish economist Steffan Linder developed the country similarity theory in 1961, as he tried to explain the concept of intra-industry trade. Linder's theory proposed that consumers in countries that are in the same or similar stage of development would have

similar preferences. In this firm-based theory, Linder suggested that companies first produce for domestic consumption. When they explore exporting, the companies often find that markets that look similar to their domestic one, in terms of customer preferences, offer the most potential for success. Linder's country similarity theory then states that most trade in manufactured goods will be between countries with similar per capita incomes, and intra-industry trade will be common. This theory is often most useful in understanding trade in goods where brand names and product reputations are important factors in the buyers' decision-making and purchasing processes.

2.2.8 Product Life Cycle Theory

Raymond Vernon, a Harvard Business School professor, developed the product life cycle theory in the 1960s. The theory, originating in the field of marketing, stated that a product life cycle has three distinct stages: (1) new product, (2) maturing product, and (3) standardized product. The theory assumed that production of the new product will occur completely in the home country of its innovation. In the 1960s this was a useful theory to explain the manufacturing success of the United States. US manufacturing was the globally dominant producer in many industries after World War II. It has also been used to describe how the personal computer (PC) went through its product cycle. The PC was a new product in the 1970s and developed into a mature product during the 1980s and 1990s. Today, the PC is in the standardized product stage, and the majority of manufacturing and production process is done in low-cost countries in Asia and Mexico.

The product life cycle theory has been less able to explain current trade patterns where innovation and manufacturing occur around the world. For example, global companies even conduct research and development in developing markets where highly skilled labor and facilities are usually cheaper. Even though research and development is typically associated with the first or new product stage and therefore completed in the home

country, these developing or emerging-market countries, such as India and China, offer both highly skilled labor and new research facilities at a substantial cost advantage for global firms.

2.2.9 Global Strategic Rivalry Theory

Global strategic rivalry theory emerged in the 1980s and was based on the work of Paul Krugman and Kelvin Lancaster. Their theory focused on Multi-National Companies (MNCs) and their efforts to gain a competitive advantage against other global firms in their industry. Firms will encounter global competition in their industries and in order to prosper, they must develop competitive advantages. The critical ways that firms can obtain a sustainable competitive advantage are called the barriers to entry for that industry. The barriers to entry refer to the obstacles a new firm may face when trying to enter into an industry or new market. The barriers to entry that corporations may seek to optimize include: Research and development, the ownership of intellectual property rights, economies of scale, unique business processes or methods as well as extensive experience in the industry, and the control of resources or favorable access to raw materials (Brander and Krugman, 1983).

2.2.10 Porter's National Competitive Advantage Theory

In the continuing evolution of international trade theories, Michael Porter of Harvard Business School developed a new model to explain national competitive advantage in 1990. Porter's theory stated that a nation's competitiveness in an industry depends on the capacity of the industry to innovate and upgrade. His theory focused on explaining why some nations are more competitive in certain industries. To explain his theory, Porter identified four determinants that he linked together. The four determinants are (a) local

market resources and capabilities, (b) local market demand conditions, (c) local suppliers and complementary industries, and (d) local firm characteristics.

2.3 Empirical Review

Previous empirical studies on the impact of trade and economic growth have shown mixed results ranging from the argument that trade causes economic growth to absence of any causal relationship between the two variables or even the position that trade hurts an economy. The majority of variations in the results mainly arise from methods of analysis adopted; types of indicator variables employed, and regions of analysis.

Osabuohien (2017) examined the differential impact of international trade on economic performance of ECOWAS member countries with special emphasis on Ghana and Nigeria between the period 1975 through 2004, employing co-integration and Vector Error Correction techniques. He established a unique long-run relationship between economic performance, international trade, real government expenditure, labor force and real capital stock for Ghana and Nigeria.

Studies in the 1990s include Edwards (1992); Dollar (1992); Fosu (1996); Greenaway (1998); Sachs and Warner (1995); Frankel and Romer (1999), among others. For instance, Fosu (1990a) found that export growth impacted on economic growth positively based on a sample of 28 less developed countries in Africa. Onafowora and Owoye (1998) also found a significant positive effect of exports on economic growth for a sample of 12 Sub-Saharan Africa (SSA) countries, and concluded that it was possible to stimulate growth through an outward-oriented growth strategy. Sachs and Warner (1995) developed a speed of integration measure[1]and found that fast integrators mostly included the East Asian exporting economies while the weak and slow integrators included mostly the low income

countries of SSA and some middle income countries of Latin America. The integration indicator has been used in subsequent studies that analyse the impact of trade. Analysis by Greenaway et al. (1998, 2002) suggested a J-curve effect whereby growth at first falls and then increases after liberalization. A number of studies also found evidence showing that on average countries grew faster after trade liberalization (Thirlwall, 2000; Wacziarg and Welch, 2008; Favley et al., 2012; Salinas and Aksoy, 2006; and Salinas et al., 2015). According to a survey by Singh (2010), however, not all trade reforms have been successful.

Winters and Masters (2013) provide a compact review of recent empirical studies on international trade and growth. Although the emphasis in the earlier literature was on exports, subsequent literature has also shown that trade (both imports and exports) are important for economic progress and importing is just as important as exporting (see Rodrik, 1999). Savvides (1995), for example, estimated for African countries a positive effect of trade, which includes both exports and imports. Using different measures of trade openness (trade volumes and trade restrictions), Yanikkaya (2003) found strong evidence in support of the positive relationship between trade and growth through channels such as technology transfers, scale economies and comparative advantage. However, trade barriers (import duties, export taxes, taxes on international trade) were surprisingly, positively and, in some specifications, significantly associated with growth, especially for developing countries. However, the author acknowledged the limitations of trade barrier measures and the fact that interpretation of protection provided by tariffs is considerably difficult. Kim (2011) also found strong beneficial effects of international trade on growth and real income for the developed countries but surprisingly negative effects for the developing countries.

Instead of the volume of trade as a measure of trade orientation, Busse and Groizard (2008) used imports of Research and Development (R&D)-intensive capital goods in a bid to capture technology diffusion, and showed that technology imports had a positive impact on per capita incomes. They found that technology diffusion through imports accounted for much of the variations in technological levels across countries. Earlier studies by Lee (1995) and Schneider (2005) also found that imported inputs or capital goods increased efficiency of capital accumulation and domestic innovation both in developing and developed countries in the case of the latter.

Recent studies on Africa include those by Menyah, Nazlioglu, and Wolde-Rufael (2014) and Nicita, Olarreaga and Porto (2014). Menyah, Nazlioglu, and Wolde-Rufael (2014) examined the causal relationships between financial development, trade openness and economic growth for 21 SSA countries for the period 1965–2008. Their findings show limited support for trade-led growth hypothesis for the SSA countries studied. Nicita, Olarreaga and Porto (2014) examined and measure pro-poor bias in the structure of trade protection of six SSA countries (Burkina Faso, Cameroon, Cote d'Ivoire, Ethiopia, Gambia and Madagascar). The results suggest that protection increases the prices of agricultural goods sold by African households. In other words, elimination of the existing structure of protection would largely benefit the rich more than the poor households. In a case study focusing on Kenya, Musila and Yiheyis (2015) find a negative effect of trade openness on economic growth. Although there is some positive impact on investment, they conclude that it is not large enough to lead to higher economic growth. Ahmed and Suardi (2009) show that trade liberalization is associated with greater output and consumption growth volatility in SSA.

Pandhi (2007) analyzed the theories behind the role that exports play in growth in the Democratic Republic of Congo, Guinea Bissau, Malawi and Nigeria between the periods from 1981 to 2003 using ordinary least squares regression analysis. He found a positive relationship between exports and growth and mixed results for other independent variables like investment and population.

Evidence from empirical studies from other countries also reviewed. Li, Chen, and San (2010) conducted a research on the relationship between foreign trade and the GDP growth of East China for a period 1981-2008. Adopting the unit root test, co-integration analysis, and error correction model, they found out that foreign trade is the long-term and short-term reason of GDP growth, but no evidence proved that there exists long-term stationary causality between import trade and GDP.

Sun and Heshmati (2010) evaluated the effects of international trade on China's economic growth through examining improvement in productivity. Both econometric and non-parametric approaches were applied based on a 6-year balanced panel data of 31 provinces of China from 2002-2007. The study demonstrated that increasing participation in the global trade helped China reap the static and dynamic benefits, stimulating rapid national economic growth. Also, it revealed that both international trade volume and trade structure towards high-tech exports resulted in positive effects on China's regional productivity.

Usman (2011) examined the performance evaluation of international trade and economic growth in Nigeria using the popular OLS techniques. He observed that export, import, and foreign exchange rate are all negatively related to the real output. Muhammad, Mohammad and Abdul (2012) examined the relationship between international trade, financial development and economic growth in Australia over the period of 1965-2010, using the ARDL bounds testing approach. Their empirical evidence confirmed the long run

relationship among the variables. The results showed that international trade, financial development and capital are the drivers of economic growth both in short run and long run. The feedback effect exists between international trade and economic growth. The results reported that the variables are co-integrated for long run relationship. Therefore, exports, imports and trade openness have a positive impact on economic growth in Australia.

Omoju and Adesanya (2012) examined the impact of international trade on economic growth in Nigeria using data from1980 to 2010. Making use of the Ordinary Least Square (OLS) technique, the -study showed that trade, exchange rate, government expenditure and foreign direct investment have a positive and significant impact on economic growth in Nigeria.

Nwosa (2012) studied the relative contribution of trade liberalization on trade tax revenue in Nigeria between 1970 and 2009 using a simplified regression estimate. Their estimates revealed that trade liberalization, labour force, gross domestic product and public debt impacted positively on trade tax revenue while exchange rate had a negative effect. They concluded that there is the need for adequate macroeconomic policy to improve trade liberalization in Nigeria.

Emeka, Ikpesu and Peter (2012) investigated the Macroeconomic impact of trade on Nigeria economic growth over the periods of 1970 to 2008 using a combination of bivariate and multivariate models. The empirical examination points out that exports and Foreign Direct Investment inflows have positive and significant impact on economic growth in the Nigerian economy and that there should be a harmonization of export and fiscal policies, towards a greater shift of non-oil exports by the Nigerian government in order to achieve a desirable growth prospects of external trade.

Abughalia and Abusalem (2013) investigated the empirical analysis on the Libyan economy and its structural changes, with special reference to Libyan foreign trade during the last three decades (1980-2010). The analysis was conducted using descriptive analytical methods and statistical tools such as linear regression analysis. The study observed that the trade process between Libya and the EU has experienced some success, leading to more economic cooperation through bilateral relations, promoting the private sector to play its role in the trade process during the period of study. The gains from export were higher than the loss for import, where this situation has led to positive balance of payment.

Yelwa and Diyoke (2013) examined the export-economic growth relationship amongst some selected ECOWAS countries. Their aim was to examine whether or not export-led growth is indeed potent enough to drive her economic growth as an alternative to foreign direct investment during the period from 1980 through 2011, using panel model analysis. They found a stable export-driven growth among these selected countries and showed that export-led growth in the region is potentially able to drive growth, most especially aggregate net transfer and trade on exportable goods and services.

Adelowokan and Maku (2013) empirically examined the effect of international trade and financial investment openness on economic growth in Nigeria between 1960 and 2011. Findings from the reported dynamic regression model showed that trade openness and foreign investment exert both positive and negative effect on economic growth of the country respectively. In addition, the partial adjustment term, fiscal deficit, inflation and lending rate were found growth increasing. It was then proved that there is long-run relationship between trade openness, foreign investment, and economic growth in Nigeria.

Adenugba and Dipo (2013) examined the performance of non-oil exports in the economic growth of Nigeria from 1981 to 2010. Their estimates revealed that non-oil exports have performed below expectations; therefore, giving reason to doubt the efficacy of the export promotion strategies that have been used and since implemented. They rightly indicated that the Nigerian economy is still far from shifting from crude oil exports and as such the crude oil sub-sector continues to be the single most important sector of the economy.

Edoumiekumo and Opukri (2013) empirically investigated the contributions of international trade (proxy with export and import values) to economic growth in Nigeria measured by real gross domestic product (RGDP). The Time-series data collected was for a period of 27years which was analyzed using Augmented Dickey-Fuller (ADF) test, Ordinary Least Square (OLS) statistical technique, Johansen co-integration test and Granger Causality test. The results showed that there is a positive relationship between the variables and also co-integration exists among the variables. In addition, the Granger Causality test realized a uni-directional relationship showing that RGDP Granger cause export and also import Granger cause RGDP and export.

Olaifa, Subair and Biala (2013) empirically investigated the effect of international trade liberalization on economic growth in Nigeria between 1970 and 2012 with a view to examining the possibility of a long term relationship existing between the two and also to account for the structural changes that may have occurred with the implementation of a free trade regime in 1986. Adopting the ordinary least squares in estimating the relationship, they find that there is a long run relationship between trade liberalization and economic growth in Nigeria. Strong evidence was also found to support structural changes that took place in 1986 with the use of free trade policy. However, export was reported to have a negative relation to growth. The study concluded by recommending that an enabling

environment that will engender further growth such as better infrastructural base, adequate financing support adherence to international best practice in export and sound institutional structure be put in place for sustainability.

Lloyd, Ogundipe and Ojeaga (2014) investigated the impact of export diversification and composition on GDP growth and GDP per capita in ECOWAS region during the period 1975 through 2007 using cointegration and panel least square estimation technique. They found that export diversification and manufacturing value added index had a positive and significant impact on per capita growth. They further ascertained that it is not how much that is exported that matters but what is exported as regions with less specialization and more diversified exports generally experienced higher economic growth rates. This study provided evidence for the important role of export diversification rather than just an export -growth relationship.

Arodoye and Iyoha (2014) studied the nexus between international trade and economic growth in Nigeria making use of quarterly time-series data for the period 1981 to 2010. The results indicated that there is a stable, long-run relationship between international trade and economic growth and they concluded that trade policies which are in favour of export expansion should be encouraged because exports are a driver of economic growth. Furthermore, an exchange rate policy which is favourable to export expansion and consistent with Nigeria's status as a small open economy should be encouraged.

Mongoe and Mongale (2014) examined the relationship between international trade and economic growth in South Africa using cointegrated vector auto-regression approach. The Empirical investigation exposes that inflation rate, export and exchange rates have a positive relation to GDP while import is negatively related to GDP.

Brueckner and Lederman (2015) examined international trade and economic growth: Panel data evidence from Sub-Saharan Africa employ the instrumental variable approach

to a panel of 41 Sub-Saharan African countries. They found that international trade increases economic growth both in the short and long run.

Musila and Yiheyis (2015) studied the impact of international trade on economic growth: The case of Kenya. They investigated the case of Kenya and find that international trade has positive effect on investment ratio but not on the rate of economic growth.

Polat, Shahbaz, Rehman, and Satti (2015) investigated the linkages between financial development, international trade and economic growth in South Africa: Fresh evidence from combined cointegration test. Quality and Quantity, find that international trade impedes economic growth in South Africa.

2.4 The Gap in the Literature

The debate on the relationship between international trade and economic growth has exhibited considerable interest in the field of development economics; several empirical studies have been conducted to assess the role of international trade on economic growth of developed countries from various aspects (see, Abu al-Foul, 2004; Seipati and Itumeleng, 2014, Musila and Yiheyis 2015, Brueckner and Lederman 2015). The findings of these studies indicate that international trades have a statistically significant positive impact on economic growth. However, for developing countries like Nigeria, the evidence is an inconsistency (see Oviemuno, 2003; Usman, 2011; Polat, Shahbaz, Rehman, and Satti; 2015 Adeleye, Adeteye and Adewuyi, 2015). Therefore, there is the need to fill the literature gap.

CHAPTER THREE

RESARCH METHODOLOGY

3.1 Research Design

This study employed Ex-Post Facto Method to examine the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries for the under review. This method investigates the extent and possible cause-and-effect relationship between dependent, independent and intervening variables by observing some existing consequence and researching back through the data for plausible causal factors. In this method, conclusions are not based on what the author feels or think but on concrete evidence derived from the data collected on the issue being investigated.

3.2 Theoretical Framework

In order to investigate empirically the differential impact of international trade on economic growth among ECOWAS and NON-ECOWAS countries, a standard Cobb-Douglas (1928) production function which relates output (Y) as a linear function of capital (K) and labour (L) is stated and this is modified with Solow (1956).

The model is: $Y = f(L, K)$ ……...3.1

We introduce technical progress to the function and restate it as:

$Y=f(A, L, K)$…….……..…….3.2

Equation (3.2) is known as Solow (1956) residual.

Alternatively, $Y = (A L^{\alpha} K^{\beta})$ ……...……..3.3

Where:

Y = Gross Domestic Product (a determinant of economic development)

L = Labour input

K = Capital input

A = Efficiency parameter

α= Contribution of each worker to GDP

β= Contribution of each unit of capital to GDP, and α +β = 1, implying constant return to scale.

To promote economic growth, governments of both ECOWAS and NON-ECOWAS countries need to promote both human and physical capital, mobilize both domestic and external financial resources as well as equitable distribution of income. Therefore, external capital which eventually reduce savings-investment gap is significant to these countries. To capture the impact of external financial resources on economic growth in both ECOWAS and NON-ECOWAS countries, Barro's (1990) model was applied in this study. The Barro (1990) type endogenous growth model as used states that there are two sectors in the economy, that is, Private (P) and Public (G) whose outputs depend on Labour (L) and Capital (K). Besides, the output of (G) has some external effect on output in (P). Thus, the production function of the sectors is stated as:

P = P (Lp, Kp)…….…….3.4

Also

G = g (Lg, Kg)…….…….3.5

But, the total inputs are given as:

LT = (Lp + Lg)……...……..3.6

Similarly:

KT = (Kp + Kg)…….……..3.7

Total output (Y) is the sum of sectoral outputs or a function of sectoral inputs. Therefore:

Y = P + G……..... …3.8

That is,

$Y = P (Lp + Kp) + g (Lg + Kg)$…….....3.9

Similarly:

$Y = LT + KT + G$…….……3.10

3.3 Model Specification

This study adopted the basic Neoclassical Solow Growth Model but departs from it by allowing technology, At, to evolve over time. The majority of the literature on economic growth indicates that there are large numbers of variables that can affect the TFP (At) in equation (3.3). With the introduction of technical progress represented by 'A' in equation (3.2) and taking into consideration the dynamics of international trade and capital inflows, the necessary variables of interest are then introduced through technical progress factor (A) as presented herewith. Following studies by Obadan (2008), and Usman (2011), we augment equation (3.3) as follows:

$AE = h (EXP_t, IMP_t, FERt)$ ----------3.11 (a) for ECOWAS

$ANE = h (EXP_t, IMP_t, FERt)$ ----------3.11(b) for Non-ECOWAS

Where:

AE = Technical progress factor for ECOWAS Countries;

ANE = Technical progress factor for non-ECOWAS Countries

EXP_t= Exports at time t;

IMPt = Imports at time t;

FER = Foreign Exchange Rate at time t

Integrating equation (3.11) with equation (3.2), we have:

$YE = f (EXP_t, IMP_t, FERt, L_t)$……..3.12 (a) for ECOWAS

and

$YNE = f(EXP_t, IMP_t, FERt, L_t)$..……..3.12 (b) for non-ECOWAS

Since Solow (1956).model adopted in this study is an optimization model it is suitable for application in both ECOWAS and NON-ECOWAS countries. The regression form of the model is thus stated in a linear form as:

$YE_t = a_o + a_1EXP_t + a_2IMP_t + a_3FERt + a_5 L + U$……..3.13 (a) for ECOWAS

and

$YNE_t = a_o + a_1EXP_t + a_2IMP_t + a_3FERt + a_5 L + U$……...3.13 (b) for non-ECOWAS

We modify equation (3.12) by dropping labour force (L_t) and replace output (Y) by gross domestic product (GDP_t). Thus, the linear model stated in the log form becomes:

$lnGDP_{t\,(E)} = a_o + a_1EXP_t + a_2IMP_t + a_3FERt + U_E$.....3.14 (a) for ECOWAS

$lnGDP_t\ (_{NE}) = a_o + a_1EXP_t + a_2IMP_t + a_3FERt + U_{NE}$.....3.14 (b) for non-ECOWAS

Where: Ln = Logarithm

a_o = Intercept

a_1 = Coefficient of Export

a_2 = Coefficient of Import

a_3 = Coefficient of foreign exchange rate; and

U = Error term

3.3.1 A Priori Expectation

The expected signs of the coefficient of the explanatory variables are,

$a_o > 0$, $a_1 > 0$, $a_2 < 0$, $0 \leq a_3 \leq 1$

a_o is expected to be positive because there are other factors that determine GDP aside from the one mentioned in the model.

(i) As export (EXP) rises, gross domestic product is expected to rise. Thus, $a_1 > 0$.

(ii) As importation of goods increases, gross domestic product is expected to fall. Therefore, $b_2 < 0$

(iii) As foreign exchange reserves rises, gross domestic product is expected to rise. Thus, $b_3 > 0$

3.4 Definition of Variables

i. **Economic growth:** This is defined as annual GDP per capita at current prices for a given country. It is measured in Naira.

ii. **Export:** Exports are the sale of goods produced in one country to other countries for future sale or consumption. Export is measured as value of total exports expressed in billions of naira. The values for exports are in current price of the naira.

iii. **Import:** Imports are goods and services bought from other countries by residents of a country. Residents include citizens, businesses and the governments. Imports are carried by email, in personal luggage on a plane or shipped from one country to another. Import is computed as value of total imports expressed in millions of US dollar. The values for import were in current prices of the naira.

iv. **Foreign exchange rate:** Foreign exchange rate is the price of one currency in terms of another or it is simply the rate at which currencies are exchanged. Foreign exchange rate is expressed as the rate of national currency per US dollar at the end period.

3.5 Nature and Sources of Data

The study used secondary data on GDP, import, export and foreign exchange rate of Cote d'Ivoire, Gambia, Ghana, Nigeria, Sierra Leone and Togo as ECOWAS countries and Algeria, Cameroon, Central African Republic, Congo Democratic Republic, Equatorial Guinea and Gabon as NON-ECOWAS countries which were extracted from World Bank's Data Base of Macroeconomic Indicators for a period of sixteen years (2000-2016).

3.6 Estimation Techniques

The study adapted autoregressive distributed lag technique to estimate the model. According to Yaffee (2005) the technique has advantages of blue properties. The model

was estimated using the Ordinary Least Square. The data set on the inclusive variables i.e. GDP, import, export and foreign exchange rate were analyzed using STATA Econometric Software Version 14.2 and E-Views 10.0.

3.6.1 Unit Root Test

Here, we examine the stationary of the variables under consideration in order to avoid having spurious results, and to determine the co-integration properties of all the variables included. The unit root property requires all variables to be stationary in levels or first differences. To achieve this, we employed augmented Dickey-Fuller (ADF) unit root test to detect the presence or otherwise, of unit root in the series. To carry out the ADF test, the following model will be estimated.

$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \Delta Y_{t-1} + U_t$……………………………………….……… (3.15)

Where: Y_t = variable under investigation;

$\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$;

And U_t = pure white noise error term

Decision Rule: The null hypothesis which state there is no presence of unit root in the series is rejected if the t-statistic i.e. the calculated value of t is greater than critical or tabular t-value, or otherwise.

3.6.2 Co-integration Test

Cointegration test is carries out is order to determine the long-run relationship between the dependent and independent variables when one of all of the variables is non-stationary at level which means they have stochastic trend. Essentially, it is used to check of the independent variables can predict the dependent variable both now (short-run) or in the future (long-run) (Hamilton, 1994). Economically speaking, two variable will be integrated of they have a long term or equilibrium relationship between them (Gujarati, 2004). The

cointegration property requires all variable to converge in the long run (Kromtit, et al., 2017).

Decision Rule: The null hypothesis of no cointegration is rejected if the calculated value is greater than the tabular value at a chosen relevant significance level or otherwise.

The Model for the cointegration test runs in the following form:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 IMP_{t-1} + \beta_3 EXPt_{-1} + \beta_2 FEXt_{-1} + U_t \quad (3.16)$$

Where Y represents Real GDP, K = other explanatory variables and t_{-1} is the number of time lagged

3.6.3 Granger Causality Test

The Granger technique (Granger, 1969, Gujarati, 1995) is adopted to determine the direction of causation between GDP and international trade as viewed in this study. Granger (1969) proposed that for a pair of linear covariance stationary time series X and Y; X causes Y if the past values of X can be used to predict Y more accurately than simply using the past value of Y. Formally, X is said to cause Y if $\partial_1(Y_t:Y_{t-j},X_{t-j}) < \partial_2(Y_t:Y_{t-j})$ where ∂ represents the variance of forecast error i, j=1,2,3 ……..K.

This is carried out based on the following equations:

$$lnGDP_t = \phi lnEXP_{t-1} + \beta_t lnGDP_{t-1} + U_1 \quad \ldots\ldots 3.17$$

$$lnEXP_t = \propto_i lnEXP_{t-1} + \lambda_i lnGDP_{t-1} + U_2 \quad \ldots\ldots 3.18$$

$$lnGDP_t = \delta_i lnIMP_{t-1} + \pi_i lnGDP_{t-1} + U_3 \quad \ldots\ldots 3.19$$

$$lnIMP_t = \rho_i lnIMP_{t-1} + \Delta_i lnGDP_{t-1} + U_4 \quad \ldots\ldots 3.20$$

$lnGDP_t = \mu_i lnFER_{t-1} + k_i lnGDP_{t-1} + U_5$ ……..3.21

$lnFER_t = a_i lnFER_{t-i} + w_i lnGDP_{t-i} + U_6$……3.22 etc

The Granger causality test requires the use of F-Statistic to test whether lager information on a variable say "Y" provides any statistical information about another variable "X", if not then, "Y" does not Granger cause "X" hence, it provide useful information regarding the suitable technique for estimating a given problem.

Decision Rule: If the computed f-values exceed the critical p-value at a chosen level of significance, we reject the null hypothesis at a chosen relevant significance level or otherwise.

3.6.4 Error Correction Mechanism

This test is carried out only if the variables are co-integrated (meaning that they are mostly likely to converge in long run). To achieve this, we employ the Engle-Granger method. Thus we use an error correction method as:

$DGDP_t = a_o + a_1 L(\Delta Z) - a_2 ECM_{t-1} + \lambda_t$ ……..……...…(3.23)

Where Z is the Vector of Variables that co-integrated with real gross domestic product, L is a general lag operator, and ECM is the time series of residuals from co-integrating vector.

The error correction model in its log-linear form is:

$\Delta lnGDP_t = w_o + \sum_{i=1}^{n} w_i \Delta lnEXP_t + \sum_{i=1}^{n} \Delta lnIMP_t + w_3 \Delta lnFER_{t-1} + W_4 \Delta lnRGDP_{t-1} \sum_{i=1}^{n} w_5 U_{t-1} + et_1 \ldots\ldots \sum_{i=1}^{n} \ldots\ldots(3.24)$

Where:

Δ = First Difference;

U_{t-1}= One period lagged value of the residual, i.e., the error correction factor whose coefficient should be negative and statistically significant to support the presence of co-integration.

One of the diagnostic methods employed is the Hausman test which tests the null hypothesis of non-existence of a correlation between unobservable individual effects and the growth determinants against the alternative hypothesis of an existence of a correlation. If the null hypothesis is not rejected, we can conclude that correlation is not relevant and therefore a panel model of random effect is the most correct way of carrying out the analysis of the impact of trade on economic growth between ECOWAS and non-ECOWAS countries.

3.6.5 The Fixed Effect Approach

The Fixed Effect Model (FEM) assumes that the slope coefficients are constant for all cross-section units and the intercept varies over individual cross-section units but does not vary over time. If there is a correlation between countries individual effects and growth determinants, the most appropriate way of carrying out the analysis is to use a panel model of fixed effect. Suppose the disturbance term is correlated with the explanatory variables, the fixed effect model controls adequately for heterogeneity (Gujarati and Sangeetha (2007), and Won and Hsioa 2008). For our application, the FEM can be written as follow:

$$Y_i\, t = \beta_1\, x_1\, t + \alpha_i + u_i t \text{ ---------- (3.25)}$$

Taking the average of the above for individual group overtime, the equation (1) above will be stated as: $\bar{Y}_i = \beta_1\, x_i + \alpha_i + u_i$ ---------- (3.26)

Where

$$\overline{\mathbf{Y}}_{\mathbf{it}} = \frac{1}{T} \sum_{t=1}^{t} Y_{it}$$

Where Yit can be one of our four endogenous variables, $_i$ is the $_i$th cross-section unit and t is the time of observation. The intercept, α_i, takes into account of the heterogeneity influence from unobserved variables which may differ across the cross-section unit. The $_i$tx is a row vector of all lag endogenous variables. The β is a column vector of the common slope coefficients for the group of economies.

Subtract equation (3.16) from (3.15) above, we deduce a model that does not contain unobserved individual group effect and it is stated as:

$$Y_i t - \bar{Y}_i = \beta_1 (x_i t - x_i) - \bar{U}_i t - \bar{U}_i t \text{ ---------- (3.27)}$$

t= 1, 2, 3, 4 … T.

$$\ddot{Y}_i t = \beta_1 \ddot{x}_i t + \ddot{u}_i t \text{ ---------- (3.28)}$$

t= 1, 2, 3, 4 … T.

Where wit = $\mu_i + \varepsilon_{it}$ with μ_i being countries unobservable individual effects. The difference between a polled OLS regression and a model considering unobservable individual effects lies precisely in μ_i. However, in that case, μ_i is presumed to have the property of zero mean, independent of individual observed error term ε_{it}, has constant variances and is independent of the explanatory variables. However, there may be a correlation between countries unobservable individual effects and growth determinants.

3.6.6 The Random Effect Approach

According to Gujarati and Sangeeta (2007) if there is no correlation between unobservable individual effects of foreign trade and economic growth, the most appropriate way of carrying out the analysis is to use a random component effect model of panel data. We generate their model by taking the unobserved effect equation of (1).

$$Y_i t = \alpha^{\circ} + \lambda x_i t_1 + \ldots \beta_k x_i t_k + \alpha_i + U_i t \text{ ---------- (3.29)}$$

$t = 1, 2, 3 \ldots T$

Gujarati & Sangeeta (2007) went further to say that symbolically; we demonstrated an equation or model with no correlation of unobserved fixed effect with explanatory variable.

$$Cov\ (x_i t_j, \alpha_i) = 0,\ t = 1, 2, 3, 4, \ldots\ldots\ldots\ldots T$$

Including an error term $V_i t = \alpha_i + U_i t$ we deduce from equation (5) above as

$$Y_i t = \alpha_o + \lambda_i x_i t_1 + .. + .. + \beta_k x_{itk} + V_{it} \text{ ----------(3.30)}$$

The results of Hausman diagnostic test will be used to assist in making a choice between FE and RE approaches. However, in order to ascertain the direction of causality between the dependent and independent variables, Granger Causality Test was performed.

3.7 Justification of the Methods Used

As demonstrated in model specification (3.1 - 3.30) above, the use of these methods is justified on the ground that they have been used by many authors at different times and places in the past. For instance, studies by (Osabuohien, 2007; Obadan, 2008; Usman, 2011; and Brueckner & Lederman, 2015) have used the methods discussed above at different times and places and they are found plausible. These methods are rooted in Solow (1956) with modifications.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS OF RESULTS

4.1 Trend Analysis

Presented below are the trend analysis of Gross Domestics Product, Import, Export and Foreign Exchange Rate for ECOWAS member and NON-ECOWAS countries in Africa for the period under review, 2000 - 2015.

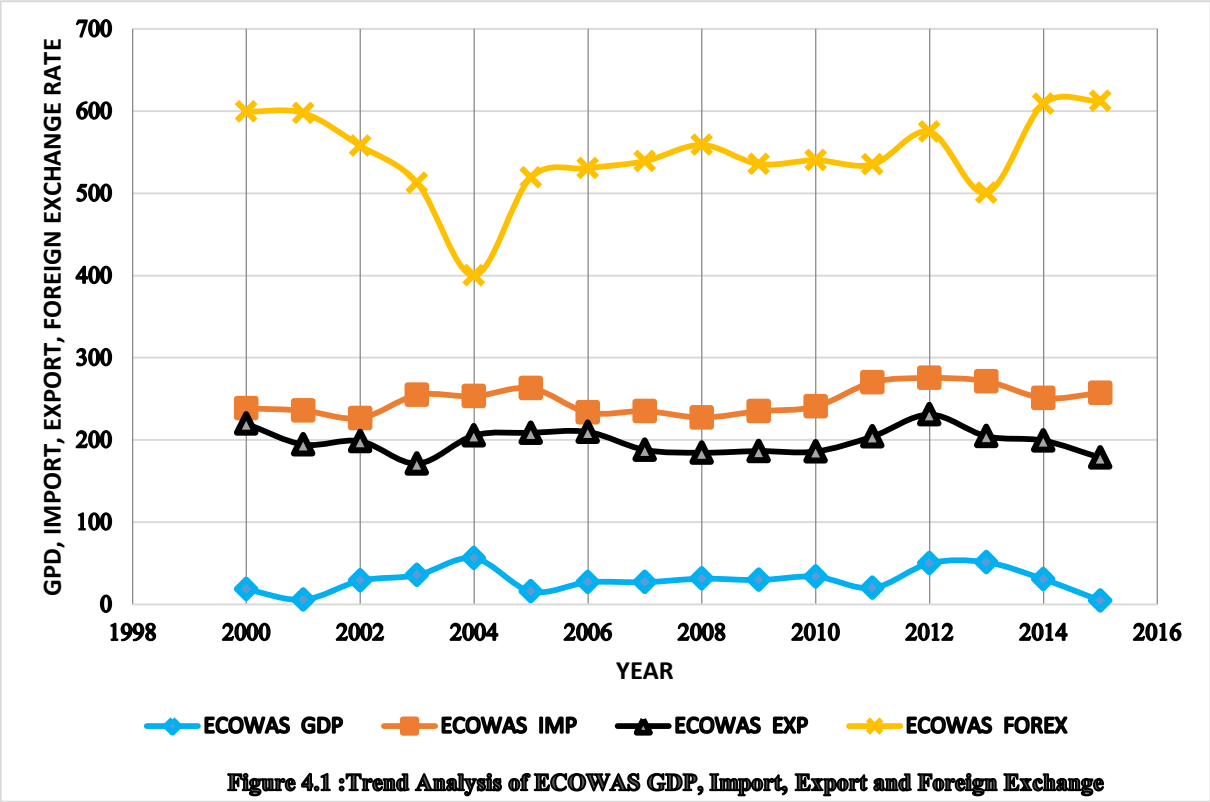

Figure 4.1: Trend Analysis of ECOWAS GDP, Import, Export and Foreign Exchange

GDP of ECOWAS countries fluctuates year-in year-out up to 2005 but it was relatively stable between 2005 and 2008. It continues to fluctuate up to 2015. Besides, export of ECOWAS countries depreciated after the first year until 2004. From 2004 it appreciated up to 2006 and finally fluctuates up to 2015. The import of ECOWAS countries witnessed a steady declined for three consecutive years, from 2000 to 2002 and thereafter, fluctuates for the remaining years. Foreign exchange rate of ECOWAS declined from the year 2000 and continue to up to 2004 as its minimum point and later in

the same year picks up and appreciates consistently up to 2008 but decline in 2009 and fluctuates year-in year-out from 2010 to 2015.

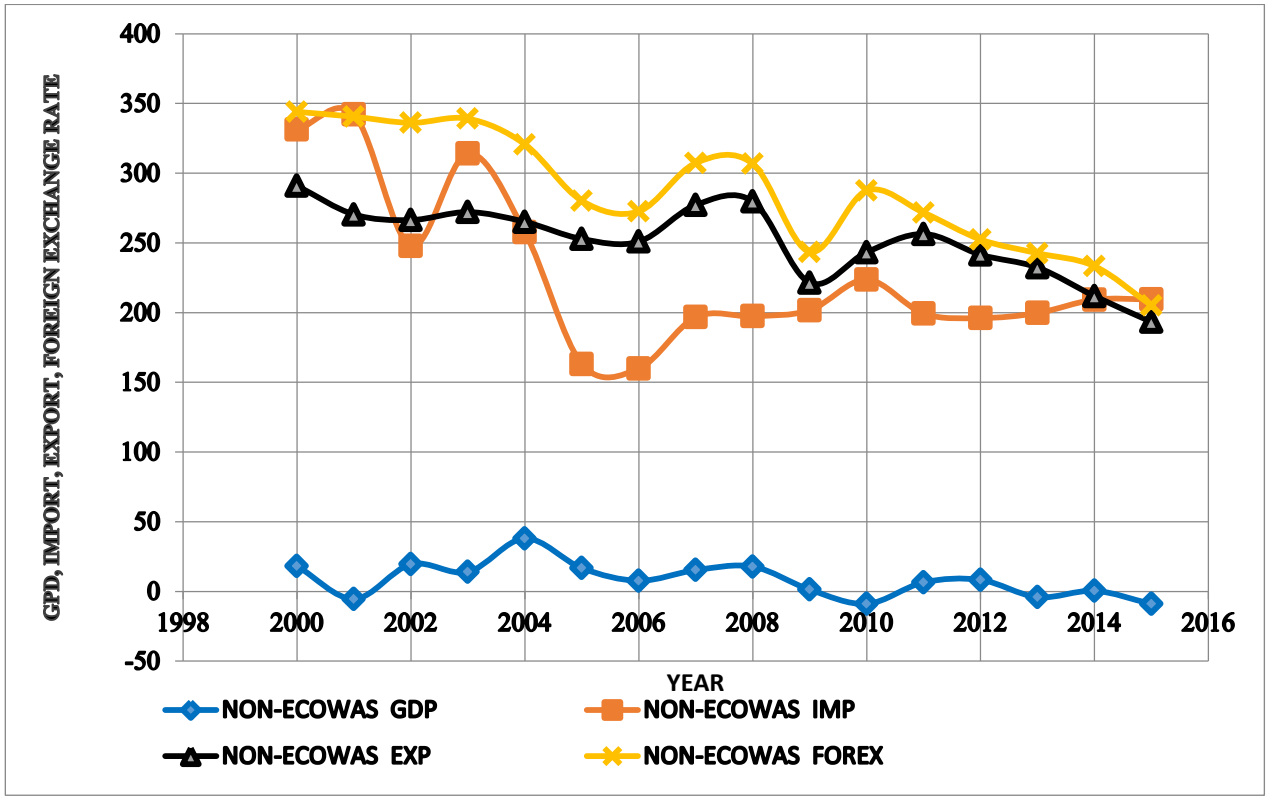

Figure 4.2: Trend Analysis of Non-ECOWAS GDP, Import, Export and Foreign Exchange Rate

The GDP of Non-ECOWAS countries experienced a declined after the first year, 2001 to a negative GDP. Thereafter, the Non-ECOWAS countries recorded positive GDP although it fluctuates year after year till in 2010 where it becomes negative again. The GDP fluctuates further and end with a negative GDP in 2015. In addition Non-ECOWAS countries import witnessed a steady fluctuates from 2000 up to 2015. Besides that, export of Non-ECOWAS countries started declining right from 2001 and declined further 2002 but appreciated little in 2003 and declined again in 2004. This fluctuation continues up to 2015. Foreign exchange rate of Non-ECOWAS countries starts declining right from the year 2001 up to 2006 but it appreciated in 2007 and further depreciated in 2008, 2009. Thereafter, it appreciated in 2010 and finally continued to decline up to 2015.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics

Variables	Observation	Mean	Standard deviation	Minimum	Maximum
GDP	864	4.157407	6.400906	-62.1	63.4
Export	781	34.44609	20.41679	4.4	124.4
Import	781	44.02714	25.42164	10.5	236.4
Foreign Exchange Rate	306	104.652	53.23364	54.1	827.6

Source: Author's Computation 2019, using E-View 10.0

Although the main technique of data analysis in this study is the Multiple Regression Model, the need to understand the trend and distribution of the variables of the study is highly necessary. This is to help in the determination of the most appropriate regression estimation techniques. To fulfill this obligation, the descriptive statistics of all the variables are computed as contained in table 4.1. The results showed that the average GDP, Export, Import and Foreign exchange rate over the period of 16 years are about 4.157407, 34.44609, 44.02714 and 104.652 in their respective units. There are wide ranges between the minimum and maximum values of all the variables. Also, the standard deviations are large (greater than 2). The wide range and large standard deviations are indications that significance changes have occurred on the variables over the period covered. This implies that there are enormous changes in the variables that worth studying. Further, since all the standard deviations are greater than zero, both fixed effect and random effect models can be applied. If the standard deviation is zero, the estimates of the fixed effect model become indeterminate.

4.3 Diagnostic Tests

4.3.1 Unit Root Test for Data from ECOWAS Countries

According to Dickey-Fuller (1979), there is likelihood for obtaining spurious results if the series that generated the results are non-stationary. This is why this study investigated the time series properties of the data by conducting Unit Root Test for stationary using Augmented Dickey-Fuller (ADF) method. The results are presented on table 4.1 below.

Table 4.2: Augmented Dickey-Fuller (ADF) Unit Root Test for Data from ECOWAS Countries

Series	ADF Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	Order of Co-integration
GDP	3.549129	-4.0113	-3.1003	-2.6927	I(1)
IMP	1.851534	-4.0113	-3.1003	-2.6927	I(1)
EXP	2.503567	-4.0113	-3.1003	-2.6927	I(1)
FER	2.146048	-4.0113	-3.1003	-2.6927	I(1)

Source: Author's Computation 2019, using E-View 10.0

The result of unit root test shown on table 4.2 above indicated that all the absolute value of ADF test statistics for each variable is less than their critical values (at 1%, 5% and 10%). The result also showed that all the variables were integrated of same order, that is, I (1) see column 6.

Table 4.3: Johansen Co-integration Test for Data from ECOWAS Countries

No of CE(s)	Eigen Value	Trace Statistics	5% Critical Value	Prob.
None	0.935725	58.4007	29.68	0.0000
At most 1	0.753248	19.9765	15.41	0.0000
At most 2	0.027146	10.3853	3.76	0.0000

Source: Author's Computation 2019, using E-View 10.0

The results on table 4.3 above showed that the Eigen value is less than 5% critical value (at all Levels). This implies that there are three unique co-integrations equations between GDP, IMP, EXP and FER at 5% level. Thus, it can be concluded that there is long-run relationship between gross domestic product and international trade in ECOWAS countries during the year 2000 – 2015.

Table 4.4: Granger Causality Test for Data from ECOWAS Countries

Null Hypothesis	F-Statistics	P-Value
IMP does not granger cause GDP	13.1465	*0.00214
GDP does not granger cause IMP	1.80938	0.21853
EXP does not granger cause GDP	0.04772	0.95364
GDP does not granger cause EXP	0.72043	0.51260
FER does not granger cause GDP	0.05943	0.94267
GDP does not granger cause FER	1.61679	0.25125
EXP does not granger cause IMP	3.35560	0.08150
IMP does not granger cause EXP	9.53735	*0.00598
FER does not granger cause IMP	0.47772	0.63507
IMP does not granger cause FER	1.54629	0.26470
FER does not granger cause EXP	0.64742	0.54614
EXP does not granger cause FER	0.59185	0.57348

Source: Author's Computation 2019, Using E-View 10.0

Causality test was employed to examine the direction of causality between international trade and economic growth. Import, export and foreign exchange are used for international trade. The results of Granger causality test presented on table 4.4 above reveals that there is unidirectional causality between IMP and GDP flowing from IMP to GDP. This implies that Import can influence GDP in ECOWAS countries. Therefore we reject H_{03} which states that there is no causality between international trade and economic growth among ECOWAS countries and accept H_{13} which states that there is causality between international trade and economic growth among ECOWAS countries.

The results of Granger causality test presented on table 4.4 above further reveals that there is unidirectional causality between IMP and EXP flowing from IMP to EXP. This implies that IMP can strongly influence EXP in ECOWAS countries. Therefore we reject H_{03} which states that there is no causality between international trade and economic growth among ECOWAS countries and accept H_{13} which states that there is causality between international trade and economic growth among ECOWAS countries.

Besides, the results of Granger causality test presented on table 4.4 above also reveals that there is no causality between EXP and GDP. This implies that EXP cannot influence GDP in ECOWAS countries. Therefore we Accept H_{03} which states that there is no causality between international trade and economic growth among ECOWAS countries and Reject H_{13} which states that there is causality between international trade and economic growth among ECOWAS countries.

So also the results of Granger causality test presented on table 4.4 above also reveals that there is no causality between FER and GDP. This implies that FER cannot influence GDP in ECOWAS countries. Therefore we Accept H_{03} which states that there is no causality between international trade and economic growth among ECOWAS

countries and Reject H_{13} which states that there is causality between international trade and economic growth among ECOWAS countries.

Table 4.5: Ordinary Least Square Parsimonious (VECM) Results: Dependent Variable: D (GDP)

Variable	Coefficient	Standard Errors	t-Statistics	5% critical value
Constant (C)	-33.84714	68.1371	-049675	2.20
GDP (-1)	0.0168293	0.33810	0.49776	2.20
IMP (-1)	0.897517	0.26664	3.36601	2.20
EXP (-1)	-0.094089	0.46971	-0.20031	2.20
FER (-1)	0.022537	0.06904	0.32643	2.20
R-Square	0.846463			
R-Square Adjusted	0.600805			
F-Statistics	3.445688			
Akaike Info. Criteria	32.34443			

Source: Author's Computation 2019, using E-View 10.0

The results of vector error correction mechanism on table 4.5 above reveals that the coefficient of export (-0.094089) is negative, indicating negative relationship between it and GDP in all countries. But, IMP and FER have positive relationship with GDP since their respective coefficients are positive. The coefficient of multiple determination (R-Square) is high at 84.65%. This means that the included explanatory variable could account for about 84% of the total variation in GDP. The model has a good fit f-statistic at 3.445688 and also information criteria of 32.34443 also underscore the good fit of the model. The table further reveals that IMP passed the significant test, that is t-statistic

(3.36601) is greater than its 5% critical value (2.20). But, EXP and FER did not pass the significant test.

4.2.2 Unit Root Test for Data from NON-ECOWAS Countries

The results of unit root test for data from NON-ECOWAS countries are presented on table 4.6 below.

Table 4.6: Augmented Dickey-Fuller (ADF) Unit Root Test for Data from NON-ECOWAS Countries

Series	ADF Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	Order of Co-integration
GDP	1.382971	-4.0113	-3.1003	-2.6927	I(1)
IMP	2.919404	-4.0113	-3.1003	-2.6927	I(1)
EXP	0.655338	-4.0113	-3.1003	-2.6927	I(1)
FOR	0.498423	-4.0113	-3.1003	-2.6927	I(1)

Source: Author's Computation 2019, using E-View 10.0

The result of unit root test shown on table 4.6 above indicated that all the absolute value of ADF test statistics for each variable is greater that their critical values (at 1%, 5% and 10%). The result also showed that all the variables were integrated of some order, that is in (1) see column 6.

Table 4.7: Johansen Co-integration Test for Data from NON-ECOWAS Countries

No of CE(s)	Eigen Value	Trace Statistics	5% Critical Value	Prob.
None	0.720281	27.93413	29.68	0.0000
At most 1	0512193	10.09857	15.41	0.0000
At most 2	0.003484	0.048863	3.76	0.0000

Source: Author's Computation 2019, using E-View 10.0

The results on table 4.7 above showed that the Eigen value is less than 5% critical value (at all Levels). This implies that there are three unique co-integration equations between GDP, IMP, EXP and FER at 5% level. Thus, it can be concluded that there is long-run relationship between gross domestic product and international trade in ECOWAS countries during the year 2000 – 2015.

Table 4.8: Granger Causality Test for Data from Non-ECOWAS Countries

Null Hypothesis	F-Statistics	P-Value
IMP does not granger cause GDP	3.81829	0.06299
GDP does not granger cause IMP	1.08488	0.37835
EXP does not granger cause GDP	4.61801	*0.04168
GDP does not granger cause EXP	0.16306	0.85199
FER does not granger cause GDP	8.71099	*0.00786
GDP does not granger cause FER	0.85957	0.45538
EXP does not granger cause IMP	0.03965	0.96130
IMP does not granger cause EXP	0.02093	0.97933
FER does not granger cause IMP	0.01206	0.98803
IMP does not granger cause FER	0.17185	0.84481
FER does not granger cause EXP	0.63539	0.55192
EXP does not granger cause FER	0.36243	0.70569

Source: Author's Computation 2019, using E-View 10.0

The results of Granger causality test presented on table 4.4 above reveals that there is unidirectional causality between EXP and GDP flowing from EXP to GDP. This implies that EXP can influence GDP in Non-ECOWAS countries. Therefore, we reject H_{03} which states that there is no causality between international trade and economic growth among Non-ECOWAS countries and accept H_{13} which states that there is causality between international trade and economic growth among Non-ECOWAS countries.

The results of Granger causality test presented on table 4.4 above reveals that there is unidirectional causality between FER and GDP flowing from FER to GDP. This implies that FER can influence GDP in Non-ECOWAS countries. Therefore, we reject H_{03} which states that there is no causality between international trade and economic growth among Non-ECOWAS countries and accept H_{13} which states that there is causality between international trade and economic growth among Non-ECOWAS countries.

Besides, the results of Granger causality test presented on table 4.4 above also reveals that there is no causality between IMP and GDP. This implies that IMP cannot influence GDP in Non-ECOWAS countries. Therefore we accept H_{03} which states that there is no causality between international trade and economic growth among Non-ECOWAS countries and Reject H_{13} which states that there is causality between international trade and economic growth among Non-ECOWAS countries.

So also the results of Granger causality test presented on table 4.4 above also reveals that there is no causality between EXP and IMP. This implies that EXP cannot influence IMP in Non-ECOWAS countries. Therefore, we Accept H_{03} which states that there is no causality between international trade and economic growth among Non-ECOWAS

countries and Reject H_{13} which states that there is causality between international trade and economic growth among Non-ECOWAS countries.

Table 4.9: Ordinary Least Square Parsimonious (VECM) Results: Dependent Variable: D (GDP)

Variable	Coefficient	Standard Errors	t-Statistics	5% critical Value
Constant (C)	-5.936544	39.6484	-0.14973	2.20
GDP (-1)	-0.027226	0.22885	-0.11897	2.20
IMP (-1)	0.111551	0.07587	1.47034	2.20
EXP (-1)	0.170360	0.28792	0.59170	2.20
FER (-1)	0.076347	0.22087	0.34566	2.20
R-Square	0.899559			
R-Square Adjusted	0.738854			
F-Statistics	5.597561			
Akaike Info. Criteria	31.05179			

Source: Author's Computation 2019, using E-View 10.0

The results of vector error correction mechanism on table 4.9 above reveals that the coefficient of export (0.170360) is positive, indicating positive relationship between it and GDP in all countries. IMP and FER have positive relationship with GDP since their respective coefficients are positive. The coefficient of multiple determination (R-Square) is high at 89.96%. This means that the included explanatory variable could account for about 90% of the total variation in GDP. The model has a good fit f-statistic at 5.597561 and also information criteria of 31.05179 also underscore the good fit of the model. The table further reveals that all the variables IMP, EXP and FER do not passed the significant test as their t-statistic (1.47034), (0.59170) and (0.34566) respectively are less than its 5% critical value (2.20).

Table 4.10: Regression result for both ECOWAS and NONECOWAS combined.

	Dependent Variable: GDP		
	Pooled regression	**Fixed effect**	**Random effect**
Independent Variables	(1)	(2)	(3)
Export	-0.00032	0.015**	0.0043
	(0.0029)	(0.0072)	(0.0045)
Import	0.0072***	0.0043	0.0064**
	(0.0021)	(0.0030)	(0.0025)
Foreign exchange rate	-0.00064	-0.00064	-0.00069
	(0.00089)	(0.00090)	(0.00088)
Constant	1.31***	0.88***	1.17***
	(0.14)	(0.23)	(0.18)
Observations	261	261	261

Source: Author's Computation 2019, using STATA 14.2** and *** denote significant at 5% and 1% respectively. Standard errors are in parentheses

To examine the relationship between trade and economic growth in Africa (ECOWAS and NONECOWAS countries combined), the pooled, fixed effect and random effect regression techniques, were employed and the result is presented in table 4.10. The dependent variable is Growth of GDP while the independent variables Export, Import and Foreign exchange rate. Column 1, 2 and 3 of table contain the regression results of the pooled, fixed effect and random effect models respectively.

Both the fixed effect model random effect model indicates that Export and Import are positively related to GDP while Foreign exchange rate is negatively related to GDP. But the pooled regression indicates that export is also related to GDP.

However, Foreign exchange rate is statistically insignificant in all the models while export and import are statistically significant at 5% level in the fixed effect and random effect models respectively. The statistical significance of the variables is indicated by the standard errors. The standard errors of the coefficients are less than half of coefficients of the variables.

Thus, the variables are statistically significant. By the magnitude of coefficients, the fixed effect model indicates that 0.015 units increase in economic growth results from a unit increase in export while the random effect model indicates that a unit increase in increase in import lead to 0.0064 unit increase This implies that Export and Import have significant positive relationship with economic growth while Foreign exchange rate does not significantly affect economic growth in Africa.

Table 4.11: Regression Result for ECOWAS

	Dependent Variable: Growth of GDP		
	Pooled regression	Fixed effect	Random effect
Independent Variables	(1)	(2)	(3)
Export	-0.015**	0.00079	-0.012*
	(0.0059)	(0.0090)	(0.0065)
Import	0.0054**	0.0015	0.0047*
	(0.0022)	(0.0035)	(0.0025)
Foreign exchange rate	0.0048***	0.0061	0.0043**
	(0.0017)	(0.0050)	(0.0020)
Constant	1.36***	0.99**	1.33***
	(0.15)	(0.41)	(0.18)
Observations	218	218	218

Source: Author's Computation 2019, using EView10.0 *, ** and *** denote significant at 10%, 5% and 1% respectively. Standard errors in parentheses

The regression result for the examination of the relationship between international trade and economic growth for ECOWAS countries is presented in table 4.11. The dependent variable is GDP while the independent variables are Export, Import and Foreign exchange rate. The pooled is presented in column 1 while the fixed effect model and random effect model are in column 2 and 3 respectively. The results of the fixed effect model show that the relationship between GDP and all the independent variables is positive. But the pooled regression and random effect model show that export is negatively related to GDP.

The coefficients of all the variables are statistically significant in pooled and random regression but insignificant in the fixed effect model. A unit increase in Import and Foreign

exchange rate bring about 0.054 and 0.048-unit increase in GDP each in the pooled regression. Conversely, a unit increase in export will result to 0.015 decreases in GDP correspondingly. In the random effect model, increase in Import and Foreign exchange rate leads to 0.047 and 0.043 increase in GDP while 0.012 decrease in GDP results from increase in export. This implies that trade has significant impact on economic growth in ECOWAS countries.

Table 4.12: Regression Result for NON-ECOWAS Countries

	Dependent Variable: Growth of GDP		
	Pooled regression	Fixed effect	Random effect
Independent Variables	(1)	(2)	(3)
Export	0.0030	0.031***	0.010**
	(0.0029)	(0.0082)	(0.0047)
Import	0.0071***	0.00094	0.0053**
	(0.0021)	(0.0030)	(0.0025)
Foreign exchange rate	-0.00073	-0.00097	-0.00096
	(0.00084)	(0.00084)	(0.00083)
Constant	1.18***	0.47*	1.03***
	(0.14)	(0.25)	(0.19)
Observations	177	177	177

Source: Author's Computation 2019, using EView10.0 ** and *** denote significant at 5% and 1% respectively. Standard errors in parentheses

Regression estimates of the coefficients of pooled, fixed effect and random effect regression models for the assessment of the relationship between trade and economic growth in Non-ECOWAS member countries in Africa are presented in table 4.12. The dependent variable is still GDP while the independent variables still remain the same presented in previous tables. Also, column 1, 2 and 3 contains the pooled, fixed effect and the random effect models respectively. The results of all the models illustrate that export and import are positively related to GDP while Foreign exchange rate is inversely related to it. Meaning, increase in export and import will bring about increase in

economic growth and vice versa. But increase in exchange rate will lead to decrease in economic growth in the region.

However, the results indicate that foreign exchange is not significant; import and export are significant in the pooled and fixed effect regressions while both import and export are significant in the random effect model. This is given by the standard errors of the coefficients less than half the coefficients. Thus, the trade has significant impact on economic growth in the Non-ECOWAS region of Africa.

The estimates of the coefficients of the random effect model show that one unit increase in export and will lead to 0.010 and 0.0053 increase in GDP growth respectively. Similarly, in the pooled and fixed effect model, a unit increase in import and export will bring about 0.0071 and 0.010 unit increase in GDP respectively. Since two of the variables representing trade have positive and significant relationship with GDP, the result thus indicates that trade significantly affect economic growth in the Non-ECOWAS countries.

Table 4.13: Results of Goodness of fit /overall significance

TEST Goodness of fit /Overall significance		
MODEL	**Statistics**	**P-value**
POOLEDCOMBINED	6.27	0.0004
FIXCOMNIED	6.92	0.0002
RANCOMBINED	18.15	0.0004
POOLEDECOWAS	3.69	0.0127
FIXECOWAS	0.62	0.6008
RANECOWAS	6.84	0.0771
POOLEDNONECOWAS	9.92	0.0000
FIXNONECOWAS	11.69	0.0000
RANNONECOWAS	26.89	0.0000

Source: Author's Computation 2019, using E-View 10.0

Interpretation of Goodness of Fit /Overall Significance

To test the goodness of fit and overall significance of the coefficient of the panel regression models employed in this study, F- test and Breusch-Pagan Lagrange Multiplier (LM) test were employed for the fixed effect and random effect models respectively. When the P-Value of the statistics is less than the conventional level of significance (10% 5% or 1%) , the model is said to have a good fit otherwise the fit is bad. The results of the tests of Overall significance are contained in table 4.13.THE statistics of all the models except fixed effect for ECOWAS (FIXECOWAS) have P-values which are less than 5%. So, the individually significant independent variables considered jointly have significant impact on the respective dependent variables for all the models. This implies that all the models have good fit and there is overall significance.

Table 4.14: Result of Poolability test

	Poolability test	
Model	**F-Statistics**	**P-value**
FIXECOWAS	1.73	0.0524
FIXNONECOWAS	4.86	0.0000
FIXCOMNIED	4.29	0.0000

Source: Author's Computation 2019, Using E-View 10.0

The null hypothesis of the test is that pool regression is better against the alternative hypothesis that fixed effect regression is better. It is important to note that the test is conducted for fixed effect regressions only. When the probability value (P-value) of the test is less than 5%, we reject the null hypothesis at 5% level of significance. Otherwise we do not reject it. The result of the poolability test for all the fixed effect models in this study is presented in table 4.15. The result shows that the F-statistic for FIXECOWAS, FIXNONECOWAS and FIXCOMNIED are 1.73, 4.86 and 4.29 with P-values 0.0524, 0.000

and 0.0000 respectively. This indicates the rejection of the hull hypothesis. Therefore, we conclude that the fixed effect model is better than the pool regression in this study.

Table 4.15: Comparison of the Results

VARIABLES	(1) ECOWAS	(2) Non-ECOWAS	(3) All countries
Export	0.00079	0.0030	0.0043
	(0.0090)	(0.0029)	(0.0045)
Import	0.0015	0.0071***	0.0064**
	(0.0035)	(0.0021)	(0.0025)
Foreign exchange rate	0.0061	-0.00073	-0.00069
	(0.0050)	(0.00084)	(0.00088)
Constant	0.99**	1.18***	1.17***
	(0.41)	(0.14)	(0.18)
Observations	218	177	261

Source: Author's Computation 2019, Using E-View 10.0

Having estimated and analyzed the regression models for ECOWAS and Non-ECOWAS as well as all the countries in the sample, the comparative analysis is done by considering the best models for each of the sample. The result of the Hausman test shows that the fixed effect model is the best for each sub-region but the random effect model is the best for the sample of all the countries. Therefore, the comparison is done in table 4.15 using the models as indicated by the Hausman test. The result shows that import, export and foreign exchange are positively related to economic growth in the ECOWAS Sub-region. Meanwhile, as indicated by the result, none of the variables has significant impact on trade on economic growth in the region. The insignificant positive relationship implies that foreign trade does not enhance economic growth in the region.

In the case of the Non-ECOWAS countries, import and export have positive relationship with economic growth while exchange rate has negative relationship with it. But only import has significant positive relationship with economic growth, this is similar to the result of the sample of all the countries. Meanwhile, import is more significant for the Non-ECOWAS sample than the sample of all the counties. In short, foreign trade has positive relationship with economic growth in Africa.

4.4 Discussion of Major Findings

The data had been analyzed first using descriptive statistics followed by panel data regression techniques and Granger Non-Causality Test among the variables. Based on this analysis, the results of the findings reported. The summary statistics indicate wide ranges and large standard deviations. This shows that there are significant fluctuations in import, export, exchange rate and economic growth of the countries over the period under review 2000-2015. This justify the influx of studies the area as presented in the literature review. If there are no significant changes in the variables, there would not be need for the study.

From the regression result, it is identified that import and export have significant positive relationship with economic growth in Africa (combined sample) while exchange rate has insignificant negative relationship with economic growth in the region. These findings collaborate the findings of Balassa (1978), Bairam (1988); Fosu (1990) and Dollar and Kraay (2001).

Another important finding of the study is that, all the variables (import, export and exchange rate) representing international trade has positive but insignificant relationship with economic growth in the ECOWAS Sub-region. This is in line with the conclusion of

Oviemuno (2007) who found that import and export do not serve as an engine of growth in the developing countries. However, import and export have significant positive relationship with economic growth in the Non-ECOWAS Sub-region. This confirms the submissions of Michaely (1977).

Also, the results indicate that, trade drives economic growth in ECOWAS and Non-ECOWAS Sub-regions of Africa as well as the continent as a whole. This implies that improvement in international trade can enhances economic in the selected countries. In other words, there is causality between foreign trade and economic growth in Africa. This affirms the findings of Mohammed *et al* (2012) which shows the existence of bidirectional causality between foreign trade and economic growth.

Finally, foreign trade has more significant positive impact on the Non-ECOWAS than the ECOWAS countries. That is, foreign trade drives economic growth more in the Non-ECOWAS countries than the ECOWAS countries. This could be as a result of the fact that the Non-ECOWAS countries are relatively more opened to trade as found by Harrison (1996)the conclusion of this study is based on these findings

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5. 1 Summary of Findings

The study comparatively examines the differential impact foreign trade on economic growth in some selected African countries over the period 2000-2015 using panel data econometric techniques. The result of the study is summarized as follows:

There significant changes in import, export, exchange rate and economic growth of the countries over the period covered. Import and export have significant positive relationship with economic growth in Africa (combined sample) while exchange rate has insignificant negative relationship with economic growth in the ECOWAS countries.

All the trade variables (import, export and exchange rate) have positive but insignificant relationship with economic growth in the ECOWAS Sub-region. Import and export have significant positive relationship with economic growth in the Non-ECOWAS Sub-region. Trade drives economic growth in ECOWAS and Non-ECOWAS Sub-regions of Africa as well as the continent as a whole. Comparatively, foreign trade drives economic growth more in the Non-ECOWAS countries than the ECOWAS countries.

5.2 Conclusion

International trade has insignificant positive relationship with economic growth in the ECOWAS countries. Extensive literature review shows that trade is an important determinant of economic growth. But little or no attention has been paid to the comparative analysis of the relationship between international trade and economic growth particularly among ECOWAS and Non-ECOWAS countries of Africa. For strategic design of sound developmental policy framework deep, such comparative analysis is indispensable. This project therefore, deals with the relationship between

international trade and economic growth, comparison of ECOWAS and Non-ECOWAS Countries.

Given the overwhelming evidence (expressed by the various econometric techniques) for the relationship, the study concludes that there is positive relationship between foreign trade and economic growth in ECOWAS and Non-ECOWAS Countries as well as the entire Africa. However, the relationship is insignificant for the ECOWAS countries. Also, there is bidirectional causal relationship between import and economic growth in selected countries. On the other hand, there is unidirectional causality between export and Non-ECOWAS Countries but no causality in the ECOWAS Countries. It means, foreign trade drives economic growth in Non-ECOWAS Countries while it does not in ECOWAS Countries. In short, the nature relationship between foreign trade and economic growth in the selected ECOWAS and Non-ECOWAS Countries is mixed.

5.3 Recommendations

Having empirically examined the differential relationship between International trade and economic growth in selected African countries, it is established the nature relationship between foreign trade and economic growth in the selected ECOWAS and Non-ECOWAS Countries is mixed. The following recommendations are thereby suggested.

i) First, manufacturing sectors should be given adequate attention in order to improve export capacity in the countries. This can be achieved by developing infant industries in the countries.

ii) The findings do not show evidence of bidirectional causality between foreign trade and economic growth. This implies that the relationship has a feedback link as such it is recommended that policies that promote international trade should be given

adequate attention in order to enhance economic growth. This could be achieved by export promotion and import substitution strategies particularly for the ECOWAS countries.

iii) It was found that the Non-ECOWAS countries benefit more from trade than the ECOWAS countries. It is suggested that ECOWAS countries need to borrow a leaf from their non-ECOWAS counterparts in terms of trade enhancing policies.

Finally, intra-regional trade should be promoted in order to derive the full benefits of International trade.

5.4 Limitations of the Study

The major limitations of this research work are unavailability of data of most West African countries and cumbersome nature of analyzing panel dataset especially when heterogeneity is taking into consideration. In order to circumvent this problem, effort was made to obtained data from reliable sources and a numbers of diagnostic tests were used to minimize the problems.

Generalization problem may also occur at the end of this study. This is so because most of the countries selected from the population may have different economic, social, and environmental features and all these factors affect the volume of trade. To mitigate this problem, appropriate methods of analysis that will take care of country specific effects were employed.

5.5 Contribution to Knowledge

From the result of this study, one can easily have a better understanding of the differential impact of international trade on economic growth among ECOWAS and Non-ECOWAS countries. From the result, the researcher concludes that there is

positive relationship between foreign trade and economic growth in ECOWAS and Non-ECOWAS Countries as well as the entire Africa. However, the relationship is insignificant for the ECOWAS countries. Also, there is bidirectional causal relationship between import and economic growth in selected countries. On the other hand, there is unidirectional causality between export and Non-ECOWAS Countries but no causality in the ECOWAS Countries. It means, foreign trade drives economic growth in Non-ECOWAS Countries while it does not in ECOWAS Countries. In short, the nature relationship between foreign trade and economic growth in the selected ECOWAS and Non-ECOWAS Countries is mixed.

5.6 Suggestions for Further Study

This researcher wish to suggest that future research on this topic should include other areas of international trade such as balance of trade, terms of trade, balance of payment and foreign exchange earnings which may help to better explain the differential impact of international trade on economic growth among ECOWAS and non-ECOWAS countries.

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APPENDIX (A)
DATA USED FOR ESTIMATION

GDP, Import, Export and Foreign Exchange Rate of some Selected ECOWAS Countries

ECOWAS COUNTRIES				
YEAR	**GDP**	**IMP**	**EXP**	**FOREX**
2000	18.3	238.4	219.6	599.3
2001	5.6	235.6	194.4	597.6
2002	28.7	226.5	198.4	557.8
2003	35.5	254.6	171.2	512.5
2004	56.1	253.1	205.4	400.1
2005	15.6	262.8	208.6	519.3
2006	26.8	233.2	209.6	530.4
2007	26.9	235	187.8	539.1
2008	31.2	227.2	184.4	558.8
2009	29.5	234.9	186.4	535.6
2010	33.6	240.6	185.9	540.2
2011	19.9	270.1	204.2	535
2012	49.9	275.2	230.8	574.8
2013	51.1	271.3	204.4	500.6
2014	30.5	250.9	199.1	608.7
2015	4.5	256.9	178.3	612.2

Created from: World Development Indicator Series: GDP of Goods & Services (% of GDP)

GDP, Import, Export and Foreign Exchange Rate of some Selected Non-ECOWAS Countries

NON-ECOWAS COUNTRIES				
YEAR	**GDP**	**IMP**	**EXP**	**FOREX**
YEAR	GDP	IMP	EXP	FOREX
2000	18.2	331.4	290.9	344
2001	-5.4	342.1	270.4	340.5
2002	19.5	247.9	266.4	336.1
2003	14	314.2	272.1	339.1
2004	38	257.7	265.1	320.7
2005	16.7	163.1	252.8	280.2
2006	7.7	159.9	250.9	272.6
2007	15.3	196.8	277.2	307.3
2008	17.8	197.4	279.7	306.7
2009	1.3	201.7	221.4	243.5
2010	-8.9	223.7	243.3	287.5
2011	6.5	199.3	256.4	271.7
2012	8.3	196.1	241.5	252.4
2013	-4.1	199.7	232.3	242.6
2014	0.4	209.3	211.8	233.3

Created from: World Development Indicator Series: GDP of Goods & Services (% of GDP)

APPENDIX (B)

ECOWAS AND NON-ECOWAS REGRESSION RESULTS

ECOWAS REGREESSION ANALYSIS

Dependent Variable: GDP
Method: Least Squares
Date: 04/08/19 Time: 18:16
Sample: 2000 2015
Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	61.82377	66.54251	0.929087	0.3712
IMP	0.090467	0.207355	0.436291	0.6704
EXPORT	0.203109	0.211950	0.958289	0.3568
FOREX	-0.175172	0.060025	-2.918330	0.0129

R-squared	0.480170	Mean dependent var	28.98125
Adjusted R-squared	0.350213	S.D. dependent var	14.75214
S.E. of regression	11.89161	Akaike info criterion	8.001861
Sum squared resid	1696.924	Schwarz criterion	8.195008
Log likelihood	-60.01489	F-statistic	3.694828
Durbin-Watson stat	1.857429	Prob(F-statistic)	0.043019

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON GDP

ADF Test Statistic	-3.549129	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 04/08/19 Time: 18:18
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-1.322523	0.372633	-3.549129	0.0046
D(GDP(-1))	0.365307	0.276516	1.321107	0.2133
C	41.25311	12.17495	3.388360	0.0061

R-squared	0.564676	Mean dependent var	-0.078571
Adjusted R-squared	0.485526	S.D. dependent var	19.60672
S.E. of regression	14.06328	Akaike info criterion	8.312421
Sum squared resid	2175.534	Schwarz criterion	8.449362
Log likelihood	-55.18694	F-statistic	7.134263
Durbin-Watson stat	2.328071	Prob(F-statistic)	0.010315

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON IMP

ADF Test Statistic	-1.851534	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

***MacKinnon critical values for rejection of hypothesis of a unit root**

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IMP)
Method: Least Squares
Date: 04/08/19 Time: 18:19
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMP(-1)	-0.515211	0.278262	-1.851534	0.0911
D(IMP(-1))	0.125601	0.294763	0.426108	0.6782
C	129.1448	68.98561	1.872055	0.0880

R-squared	0.249781	Mean dependent var	1.521429
Adjusted R-squared	0.113378	S.D. dependent var	16.00962
S.E. of regression	15.07476	Akaike info criterion	8.451330
Sum squared resid	2499.731	Schwarz criterion	8.588270
Log likelihood	-56.15931	F-statistic	1.831197
Durbin-Watson stat	2.101611	Prob(F-statistic)	0.205842

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON EXPORT

ADF Test Statistic	-2.503567	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPORT)
Method: Least Squares
Date: 04/08/19 Time: 18:21
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORT(-1)	-0.951173	0.379927	-2.503567	0.0293
D(EXPORT(-1))	0.227749	0.288050	0.790658	0.4459
C	187.4206	75.56181	2.480361	0.0306

R-squared	0.390668	Mean dependent var	-1.150000
Adjusted R-squared	0.279880	S.D. dependent var	18.83000
S.E. of regression	15.97912	Akaike info criterion	8.567852
Sum squared resid	2808.654	Schwarz criterion	8.704792
Log likelihood	-56.97496	F-statistic	3.526273
Durbin-Watson stat	2.159245	Prob(F-statistic)	0.065569

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON FOREX

ADF Test Statistic	-2.146048	1%	Critical Value*	-4.0113
		5%	Critical Value	-3.1003
		10%	Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FOREX)
Method: Least Squares
Date: 04/08/19 Time: 18:22
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FOREX(-1)	-0.839180	0.391035	-2.146048	0.0550
D(FOREX(-1))	0.108040	0.312435	0.345799	0.7360
C	451.1605	210.1346	2.147008	0.0549

R-squared	0.368282	Mean dependent var	1.042857
Adjusted R-squared	0.253424	S.D. dependent var	62.27994
S.E. of regression	53.81275	Akaike info criterion	10.99631
Sum squared resid	31853.94	Schwarz criterion	11.13325
Log likelihood	-73.97415	F-statistic	3.206412
Durbin-Watson stat	1.993509	Prob(F-statistic)	0.079961

JOHANSEN COINTEGRATION TEST

Date: 04/08/19 Time: 18:24
Sample: 2000 2015
Included observations: 14
Test assumption:
Linear deterministic trend in the data
Series: GDP IMP EXPORT
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.935725	58.40073	29.68	35.65	None **
0.753248	19.97647	15.41	20.04	At most 1 *
0.027146	0.385296	3.76	6.65	At most 2

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 2 co-integrating equation(s) at 5% significance level

Unnormalized Co-integrating Coefficients:

GDP	IMP	EXPORT
-0.038324	0.017724	-0.021600
0.004770	-0.020585	0.042398
0.043087	-0.060838	0.046947

Normalized Cointegrating Coefficients: 1 Co-integrating Equation(s)

GDP	IMP	EXPORT	C
1.000000	-0.462467	0.563612	-28.37299
	(0.08197)	(0.08357)	

Log likelihood	-145.3503			

Normalized Co-integrating Coefficients: 2 Co-integrating Equation(s)

GDP	IMP	EXPORT	C
1.000000	0.000000	-0.435613	54.71505
		(0.28657)	
0.000000	1.000000	-2.160644	179.6628
		(0.54798)	
Log likelihood	-135.5547		

VECTOR AUTOREGREESSION ESTIMATE

Date: 04/08/19 Time: 18:26
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints
Standard errors & t-statistics in parentheses

	GDP	IMP	EXPORT	FOREX
GDP(-1)	0.168293	0.012511	-0.757828	-1.132480
	(0.33810)	(0.40751)	(0.35385)	(1.45410)
	(0.49776)	(0.03070)	(-2.14167)	(-0.77882)
GDP(-2)	-0.795868	-0.415831	-0.369366	5.105259
	(0.40968)	(0.49378)	(0.42876)	(1.76195)
	(-1.94267)	(-0.84214)	(-0.86147)	(2.89750)
IMP(-1)	0.897517	0.888511	1.078430	-2.605030
	(0.26664)	(0.32138)	(0.27906)	(1.14678)
	(3.36601)	(2.76467)	(3.86448)	(-2.27161)
IMP(-2)	-0.647386	0.620508	0.151048	0.185740
	(0.44886)	(0.54101)	(0.46977)	(1.93049)
	(-1.44227)	(1.14694)	(0.32153)	(0.09621)
EXPORT(-1)	-0.094089	-0.484434	-0.310554	3.478783
	(0.46971)	(0.56613)	(0.49159)	(2.02012)
	(-0.20031)	(-0.85569)	(-0.63174)	(1.72207)
EXPORT(-2)	0.292369	-0.928298	-0.320819	-0.402965
	(0.24455)	(0.29476)	(0.25595)	(1.05178)
	(1.19552)	(-3.14935)	(-1.25347)	(-0.38313)
FOREX(-1)	0.022537	0.085511	-0.139226	0.076105
	(0.06904)	(0.08322)	(0.07226)	(0.29694)
	(0.32643)	(1.02759)	(-1.92680)	(0.25630)
FOREX(-2)	-0.056027	0.085834	0.012169	0.939108
	(0.08500)	(0.10245)	(0.08896)	(0.36556)
	(-0.65916)	(0.83784)	(0.13680)	(2.56896)
C	-33.84714	77.29007	120.8266	-135.2904
	(68.1371)	(82.1250)	(71.3111)	(293.045)
	(-0.49675)	(0.94113)	(1.69436)	(-0.46167)
R-squared	0.846463	0.844994	0.863809	0.790514
Adj. R-squared	0.600805	0.596985	0.645904	0.455336

Sum sq. resids	387.0256	562.2427	423.9231	7158.834
S.E. equation	8.798018	10.60418	9.207856	37.83869
F-statistic	3.445688	3.407105	3.964151	2.358493
Log likelihood	-43.10117	-45.71527	-43.73860	-63.52445
Akaike AIC	7.443025	7.816468	7.534086	10.36064
Schwarz SC	7.853847	8.227290	7.944909	10.77146
Mean dependent	31.41429	249.4500	196.7500	537.5071
S.D. dependent	13.92490	16.70383	15.47384	51.27102

Determinant Residual Covariance	7648813.
Log Likelihood	-190.4110
Akaike Information Criteria	32.34443
Schwarz Criteria	33.98772

GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 04/08/19 Time: 18:29
Sample: 2000 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
IMP does not Granger Cause GDP	14	13.1465	0.00214
GDP does not Granger Cause IMP		1.80938	0.21853
EXPORT does not Granger Cause GDP	14	0.04772	0.95364
GDP does not Granger Cause EXPORT		0.72043	0.51260
FOREX does not Granger Cause GDP	14	0.05943	0.94267
GDP does not Granger Cause FOREX		1.61679	0.25125
EXPORT does not Granger Cause IMP	14	3.35560	0.08150
IMP does not Granger Cause EXPORT		9.53735	0.00598
FOREX does not Granger Cause IMP	14	0.47772	0.63507
IMP does not Granger Cause FOREX		1.54629	0.26470
FOREX does not Granger Cause EXPORT	14	0.64742	0.54614
EXPORT does not Granger Cause FOREX		0.59185	0.57348

NON-ECOWAS REGREESSION ANALYSIS

Dependent Variable: GDP
Method: Least Squares
Date: 04/08/19 Time: 18:34
Sample: 2000 2015
Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-49.69576	32.09543	-1.548375	0.1475
IMP	-0.105739	0.079905	-1.323305	0.2104
EXPORT	0.090178	0.309115	0.291729	0.7755
FOREX	0.208228	0.230932	0.901683	0.3850

R-squared	0.474050	Mean dependent var	8.518750
Adjusted R-squared	0.342563	S.D. dependent var	12.64559
S.E. of regression	10.25336	Akaike info criterion	7.705406
Sum squared resid	1261.577	Schwarz criterion	7.898553
Log likelihood	-57.64325	F-statistic	3.605292
Durbin-Watson stat	1.993693	Prob(F-statistic)	0.045926

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON GDP

ADF Test Statistic	-1.382971	1%	Critical Value*	-4.0113
		5%	Critical Value	-3.1003
		10%	Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 04/08/19 Time: 18:34
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.512066	0.370265	-1.382971	0.1941
D(GDP(-1))	-0.172229	0.294566	-0.584689	0.5706
C	4.172708	4.976806	0.838431	0.4196

R-squared	0.331213	Mean dependent var	-0.257143
Adjusted R-squared	0.209616	S.D. dependent var	14.41979
S.E. of regression	12.81971	Akaike info criterion	8.127253
Sum squared resid	1807.793	Schwarz criterion	8.264194
Log likelihood	-53.89077	F-statistic	2.723849
Durbin-Watson stat	1.544486	Prob(F-statistic)	0.10941

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON IMP

ADF Test Statistic	-2.919404	1%	Critical Value*	-4.0113
		5%	Critical Value	-3.1003
		10%	Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IMP)
Method: Least Squares
Date: 04/08/19 Time: 18:36
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficie	Std. Error	t-Statistic	Prob.
IMP(-1)	-0.572593	0.196134	-2.919404	0.0140
D(IMP(-1))	-0.083879	0.225325	-0.372256	0.7168
C	116.9495	45.13433	2.591143	0.0251

R-squared	0.474091	Mean dependent var	-9.471429
Adjusted R-squared	0.378471	S.D. dependent var	45.35356
S.E. of regression	35.75544	Akaike info criterion	10.17869
Sum squared resid	14062.97	Schwarz criterion	10.31563
Log likelihood	-68.25084	F-statistic	4.958076
Durbin-Watson stat	1.862192	Prob(F-statistic)	0.029175

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON EXPORT

ADF Test Statistic	-0.655338	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPORT)
Method: Least Squares
Date: 04/08/19 Time: 18:36
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORT(-1)	-0.231269	0.352900	-0.655338	0.5257
D(EXPORT(-1))	-0.031016	0.351604	-0.088213	0.9313
C	52.81714	90.59026	0.583033	0.5716

R-squared	0.062722	Mean dependent var	-5.507143
Adjusted R-squared	-0.107692	S.D. dependent var	20.83818
S.E. of regression	21.93156	Akaike info criterion	9.201140
Sum squared resid	5290.926	Schwarz criterion	9.338081
Log likelihood	-61.40798	F-statistic	0.368055
Durbin-Watson stat	1.915457	Prob(F-statistic)	0.700288

AUGMENTED DICKEY FULLER UNIT ROOT TEST ON FOREX

ADF Test Statistic	-0.498423	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FOREX)
Method: Least Squares
Date: 04/08/19 Time: 18:38
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints

Variable	Coefficien	Std. Error	t-Statistic	Prob.
FOREX(-1)	-0.109800	0.220296	-0.498423	0.6280
D(FOREX(-1))	-0.262734	0.312010	-0.842071	0.4177
C	19.88371	64.88353	0.306452	0.7650

R-squared	0.119858	Mean dependent var	-9.67857
Adjusted R-squared	-0.040168	S.D. dependent var	27.0238
S.E. of regression	27.56122	Akaike info criterion	9.658106
Sum squared resid	8355.827	Schwarz criterion	9.795046
Log likelihood	-64.60674	F-statistic	0.748990
Durbin-Watson stat	2.217907	Prob(F-statistic)	0.495497

JOHANSEN COINTEGRATION TEST

Date: 04/08/19 Time: 18:40
Sample: 2000 2015
Included observations: 14
Test assumption: Linear deterministic trend in the data
Series: GDP IMP FOREX
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.720281	27.93413	29.68	35.65	None
0.512193	10.09857	15.41	20.04	At most 1
0.003484	0.048863	3.76	6.65	At most 2

Unnormalized Co-integrating Coefficients:

GDP	IMP	FOREX
-0.018772	-0.007815	0.006006
-0.046066	-0.004714	0.015043
0.001136	-0.006758	0.012914

Normalized Co-integrating Coefficients: 1 Co-integrating Equation(s)

GDP	IMP	FOREX	C
1.000000	0.416328	-0.319932	-9.339464
	(0.14347)	(0.11783)	
Log likelihood	-173.8812		

Normalized Co-integrating Coefficients: 2 Co-integrating Equation(s)

GDP	IMP	FOREX	C
1.000000	0.000000	-0.328706	85.64043
		(0.10804)	
0.000000	1.000000	0.021076	-228.1374
		(0.45017)	
Log likelihood	-168.8564		

GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 04/08/19 Time: 18:41
Sample: 2000 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
IMP does not Granger Cause GDP	14	3.81829	0.06299
GDP does not Granger Cause IMP		1.08488	0.37835
EXPORT does not Granger Cause GDP	14	4.61801	0.04168
GDP does not Granger Cause EXPORT		0.16306	0.85199
FOREX does not Granger Cause GDP	14	8.71099	0.00786
GDP does not Granger Cause FOREX		0.85957	0.45538
EXPORT does not Granger Cause IMP	14	0.03965	0.96130
IMP does not Granger Cause EXPORT		0.02093	0.97933
FOREX does not Granger Cause IMP	14	0.01206	0.98803

IMP does not Granger Cause FOREX		0.17185	0.84481
FOREX does not Granger Cause EXPORT	14	0.63539	0.55192
EXPORT does not Granger Cause FOREX		0.36243	0.70569

VECTOR AUTOREGREESSION ESTIMATE

Date: 04/08/19 Time: 18:43
Sample(adjusted): 2002 2015
Included observations: 14 after adjusting endpoints
Standard errors & t-statistics in parentheses

	GDP	IMP	EXPORT	FOREX
GDP(-1)	-0.027226	-1.613833	-0.784358	-1.463778
	(0.22885)	(1.13185)	(0.83586)	(1.01138)
	(-0.11897)	(-1.42584)	(-0.93839)	(-1.44731)
GDP(-2)	0.191556	-2.309538	-0.091509	-0.444731
	(0.19750)	(0.97684)	(0.72139)	(0.87287)
	(0.96988)	(-2.36429)	(-0.12685)	(-0.50950)
IMP(-1)	0.111551	-0.294488	-0.349257	-0.455256
	(0.07587)	(0.37523)	(0.27711)	(0.33529)
	(1.47034)	(-0.78481)	(-1.26037)	(-1.35778)
IMP(-2)	-0.123669	-0.305480	-0.240410	-0.355480
	(0.07089)	(0.35062)	(0.25893)	(0.31330)
	(-1.74449)	(-0.87126)	(-0.92848)	(-1.13463)
EXPORT(-1)	0.170360	-2.068487	-0.784350	-1.793640
	(0.28792)	(1.42401)	(1.05162)	(1.27245)
	(0.59170)	(-1.45258)	(-0.74585)	(-1.40960)
EXPORT(-2)	-0.690469	0.765928	-0.394022	0.097443
	(0.24840)	(1.22854)	(0.90726)	(1.09778)
	(-2.77972)	(0.62345)	(-0.43430)	(0.08876)
FOREX(-1)	0.076347	1.674739	1.195841	2.052180
	(0.22087)	(1.09241)	(0.80673)	(0.97614)
	(0.34566)	(1.53307)	(1.48232)	(2.10234)
FOREX(-2)	0.439955	0.722647	0.620197	0.903790
	(0.21376)	(1.05722)	(0.78075)	(0.94470)
	(2.05819)	(0.68353)	(0.79436)	(0.95670)
C	-5.936544	15.66049	160.6385	49.07845
	(39.6484)	(196.097)	(144.816)	(175.225)
	(-0.14973)	(0.07986)	(1.10926)	(0.28009)
R-squared	0.899559	0.743224	0.666913	0.804761
Adj. R-squared	0.738854	0.332382	0.133974	0.492380
Sum sq. resids	211.9227	5184.043	2827.206	4139.231
S.E. equation	6.510342	32.19951	23.77901	28.77232
F-statistic	5.597561	1.809025	1.251387	2.576211
Log likelihood	-38.88529	-61.26512	-57.02105	-59.68959
Akaike AIC	6.840756	10.03787	9.431578	9.812799
Schwarz SC	7.251578	10.44870	9.842401	10.22362
Mean dependent	8.821429	212.5929	247.4429	278.4786

S.D. dependent	12.73977	39.40807	25.55220	40.38363
Determinant Residual Covariance		2099951.		
Log Likelihood		-181.3625		
Akaike Information Criteria		31.05179		
Schwarz Criteria		32.69508		

```
. xtset countryid year
       panel variable:  countryid (strongly balanced)
        time variable:  year, 2000 to 2015
                delta:  1 unit

. reg lngdp exp imp fer
```

Source	SS	df	MS	Number of obs	=	218
				F(3, 214)	=	3.69
Model	5.95814153	3	1.98604718	Prob > F	=	0.0127
Residual	115.02701	214	.537509393	R-squared	=	0.0492
				Adj R-squared	=	0.0359
Total	120.985152	217	.557535261	Root MSE	=	.73315

lngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exp	-.0152065	.0059381	-2.56	0.011	-.0269111	-.0035019
imp	.0053863	.0022302	2.42	0.017	.0009903	.0097822
fer	.0047621	.0017215	2.77	0.006	.0013689	.0081553
_cons	1.363449	.1537753	8.87	0.000	1.060341	1.666558

```
. outreg2 using ecowas, word auto(2) ctitle(ecowas pooled)replace
ecowas.rtf
dir : seeout

. xtreg lngdp exp imp fer , fe

Fixed-effects (within) regression               Number of obs      =       218
Group variable: countryid                       Number of groups   =        15

R-sq:                                           Obs per group:
     within  = 0.0093                                         min =        12
     between = 0.0550                                         avg =      14.5
     overall = 0.0176                                         max =        16

                                                F(3,200)           =      0.62
corr(u_i, Xb)  = -0.3352                        Prob > F           =    0.6008
```

lngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exp	.0007903	.0089526	0.09	0.930	-.0168633	.0184439
imp	.0014573	.0034659	0.42	0.675	-.0053772	.0082918
fer	.0061401	.0050327	1.22	0.224	-.0037839	.0160641
_cons	.9881083	.4085668	2.42	0.016	.1824571	1.79376
sigma_u	.31431848					
sigma_e	.7162923					
rho	.16146565	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(14, 200) = 1.73                     Prob > F = 0.0524
```

```
Random-effects GLS regression                   Number of obs     =       218
Group variable: countryid                       Number of groups  =        15

R-sq:                                           Obs per group:
     within  = 0.0039                                         min =        12
     between = 0.3907                                         avg =      14.5
     overall = 0.0488                                         max =        16

                                                Wald chi2(3)      =      6.84
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0771
```

lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
exp	-.0122757	.0064696	-1.90	0.058	-.0249559	.0004045
imp	.0047077	.0024724	1.90	0.057	-.0001382	.0095535
fer	.0043019	.0020298	2.12	0.034	.0003235	.0082803
_cons	1.333459	.1825726	7.30	0.000	.9756234	1.691295
sigma_u	.14893433					
sigma_e	.7162923					
rho	.04144079	(fraction of variance due to u_i)				

```
. xtset countryid year
       panel variable:  countryid (strongly balanced)
        time variable:  year, 2000 to 2015
                delta:  1 unit

. reg lngdp exp imp fer
```

Source	SS	df	MS	Number of obs	=	177
				F(3, 173)	=	9.92
Model	12.3438361	3	4.11461204	Prob > F	=	0.0000
Residual	71.7647394	173	.414825083	R-squared	=	0.1468
				Adj R-squared	=	0.1320
Total	84.1085755	176	.477889633	Root MSE	=	.64407

lngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exp	.0030054	.0028844	1.04	0.299	-.0026878	.0086986
imp	.0071376	.0020985	3.40	0.001	.0029955	.0112796
fer	-.0007284	.0008445	-0.86	0.390	-.0023953	.0009386
_cons	1.177585	.1365637	8.62	0.000	.9080397	1.447131

```
. outreg2 using nonecowas, word auto(2) ctitle(nonecowas pooled)replace
nonecowas.rtf
dir : seeout
```

```
. xtreg lngdp exp imp fer , re

Random-effects GLS regression                   Number of obs     =       177
Group variable: countryid                       Number of groups  =        14

R-sq:                                           Obs per group:
     within  = 0.1529                                         min =         4
     between = 0.1738                                         avg =      12.6
     overall = 0.1321                                         max =        16

                                                Wald chi2(3)      =     26.89
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
exp	.0102297	.0047303	2.16	0.031	.0009584	.0195009
imp	.0052563	.0024748	2.12	0.034	.0004057	.0101069
fer	-.0009569	.0008301	-1.15	0.249	-.0025839	.0006701
_cons	1.027251	.1912408	5.37	0.000	.6524254	1.402076
sigma_u	.31863386					
sigma_e	.5670677					
rho	.23996488	(fraction of variance due to u_i)				

```
. outreg2 using nonecowas, word auto(2) ctitle(nonecowas random)append
nonecowas.rtf
dir : seeout
```

```
. xtset countryid year
       panel variable:  countryid (strongly balanced)
        time variable:  year, 2000 to 2015
                delta:  1 unit

. reg lngdp exp imp fer
```

Source	SS	df	MS	Number of obs	=	261
				F(3, 257)	=	6.27
Model	9.0678389	3	3.02261297	Prob > F	=	0.0004
Residual	123.819731	257	.481788837	R-squared	=	0.0682
				Adj R-squared	=	0.0574
Total	132.88757	260	.511106038	Root MSE	=	.69411

lngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exp	-.0003162	.0028886	-0.11	0.913	-.0060046	.0053722
imp	.0071775	.0021016	3.42	0.001	.0030389	.0113161
fer	-.0006436	.0008927	-0.72	0.472	-.0024016	.0011143
_cons	1.305021	.1379251	9.46	0.000	1.033413	1.576628

```
. outreg2 using combined, word auto(2) ctitle(combined pooled)replace
combined.rtf
dir : seeout

. xtreg lngdp exp imp fer , fe
```

```
. xtreg lngdp exp imp fer , fe

Fixed-effects (within) regression               Number of obs      =       261
Group variable: countryid                       Number of groups   =        20

R-sq:                                           Obs per group:
     within  = 0.0802                                         min =         4
     between = 0.0385                                         avg =      13.1
     overall = 0.0414                                         max =        16

                                                F(3,238)           =      6.92
corr(u_i, Xb)  = -0.5286                        Prob > F           =    0.0002

------------------------------------------------------------------------------
       lngdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         exp |   .0152414   .0072434     2.10   0.036      .000972    .0295108
         imp |   .0043442   .0030213     1.44   0.152    -.0016077    .0102961
         fer |  -.0006377    .000898    -0.71   0.478    -.0024067    .0011314
       _cons |   .8825986   .2263535     3.90   0.000     .4366865    1.328511
-------------+----------------------------------------------------------------
     sigma_u |  .44794322
     sigma_e |  .62251855
         rho |  .34114095   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(19, 238) = 4.29                     Prob > F = 0.0000

. outreg2 using combined, word auto(2) ctitle(combined fixed)append
combined.rtf
dir : seeout
```

```
. xtreg lngdp exp imp fer , re

Random-effects GLS regression                   Number of obs     =       261
Group variable: countryid                       Number of groups  =        20

R-sq:                                           Obs per group:
     within  = 0.0725                                         min =         4
     between = 0.0640                                         avg =      13.1
     overall = 0.0619                                         max =        16

                                                Wald chi2(3)      =     18.15
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0004
```

lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
exp	.0043276	.0044867	0.96	0.335	-.0044661	.0131213
imp	.0063829	.0025007	2.55	0.011	.0014815	.0112843
fer	-.0006892	.0008753	-0.79	0.431	-.0024047	.0010263
_cons	1.171372	.1826148	6.41	0.000	.8134538	1.529291
sigma_u	.33118897					
sigma_e	.62251855					
rho	.2206008	(fraction of variance due to u_i)				

```
. outreg2 using combined, word auto(2) ctitle(combined random)append
combined.rtf
dir : seeout
. xtgcause  exp gdp


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          1.6882
Z-bar =          1.6857   (p-value = 0.0918)
Z-bar tilde =    1.3351   (p-value = 0.1818)
------------------------------------------------------------------
H0: gdp does not Granger-cause exp.
H1: gdp does Granger-cause exp for at least one panelvar (cid).

. xtgcause   gdp exp


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 1
W-bar =          4.1310
Z-bar =          7.6693   (p-value = 0.0000)
Z-bar tilde =    6.6230   (p-value = 0.0000)
------------------------------------------------------------------
H0: exp does not Granger-cause gdp.
H1: exp does Granger-cause gdp for at least one panelvar (cid).
```

```
. xtgcause  imp gdp


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.3652
Z-bar =          3.3441   (p-value = 0.0008)
Z-bar tilde =    2.8007   (p-value = 0.0051)
------------------------------------------------------------
H0: gdp does not Granger-cause imp.
H1: gdp does Granger-cause imp for at least one panelvar (cid).

. xtgcause   gdp imp


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.5893
Z-bar =          8.7918   (p-value = 0.0000)
Z-bar tilde =    7.6151   (p-value = 0.0000)
------------------------------------------------------------
H0: imp does not Granger-cause gdp.
H1: imp does Granger-cause gdp for at least one panelvar (cid).


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.7243
Z-bar =          9.1225   (p-value = 0.0000)
Z-bar tilde =    7.9073   (p-value = 0.0000)
------------------------------------------------------------
H0: gdp does not Granger-cause export.
H1: gdp does Granger-cause export for at least one panelvar (cid).

. xtgcause       gdp export


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          7.2374
Z-bar =         15.2785   (p-value = 0.0000)
Z-bar tilde =   13.3476   (p-value = 0.0000)
------------------------------------------------------------
H0: export does not Granger-cause gdp.
H1: export does Granger-cause gdp for at least one panelvar (cid).
```

```
Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.7368
Z-bar =          9.1534   (p-value = 0.0000)
Z-bar tilde =    7.9346   (p-value = 0.0000)
------------------------------------------------------------
H0: gdp does not Granger-cause import.
H1: gdp does Granger-cause import for at least one panelvar (cid).

. xtgcause     gdp import


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          4.1242
Z-bar =          7.6528   (p-value = 0.0000)
Z-bar tilde =    6.6084   (p-value = 0.0000)
------------------------------------------------------------
H0: import does not Granger-cause gdp.
H1: import does Granger-cause gdp for at least one panelvar (cid).
```