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Musa Peter Mwanja

Master of Arts in Economics

May, 2022

Declaration

Abbreviations

List of Tables

List of Figures

Table of Contents

CHAPTER ONE

INTRODUCTION

1.1. Background

Africa as a continent is the 2nd largest in the world as well as 2nd most populous continent, after Asia. It is made of 54 countries with the overall population of about 1.3 billion people. Africa has a continental union called African Union (AU) consisting of all countries in the continent. The union was first announced on September 9th, 1999 in the so called "Sirte Declaration" in Sirte, Libya, in the call for African Union establishment. On 26th of May 2001, the bloc was officially found in Addis Ababa, Ethiopia. It was finally launched on 9th of July 2002 in Durban City, South Africa.

Apart from this mother bloc, there are several other Regional and Sub-regional groupings across the continent. As of recent, 8 Regional Economic Cooperation are recognised by the AU and each bloc is established under a separate regional treaty The **Economic Community of West African States** (**ECOWAS**; also known as *CEDEAO* in French) is among the major trade and economic integrations in Africa. Among others are East African Community (EAC), Arab Maghreb Union (AMU), Community of Sahel-Saharan States (CEN-SAD), Common Market for Eastern and Southern Africa (COMESA), Intergovernmental Authority on Development (IGAD), Economic Community of Central African States (ECCAS) and Southern African Development Community (SADC).

ECOWAS being a regional political and economic union of fifteen countries located in West Africa is comprised of an area of 5,114,162 km^2 (1,974,589 sq mi) collectively. According to 2015 population estimates, ECOWAS was estimated having a population of more than 349 million people. The 15 Member Countries of ECOWAS are Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

The motive behind the formation of ECOWAS bloc was provision of regional economic cooperation with the goal to achieve "collective self-sufficiency" for its member states by creating a single large trade bloc by building a full economic and trading union.

The Community's objectives are to promote cooperation and integration in West Africa, leading to the formation of an economic union, in order to raise the continent's people's

standard of living, as well as to maintain and improve economic stability, foster relations among Member States, and contribute to the continent's progress and development.[1]

Later on, the cooperation evolved to political and military spheres. Serving as a peacekeeping organ in the region, the member states occasionally sending joint military forces to intervene in the bloc's member countries at times of political instability and unrest.

The area data comes from a United Nations Statistics Division report of 2012, released in December 2016 shows the statistics of Population, nominal GDP, and purchasing power parity are as shown in table 1. The GDP figures are based on World Bank estimates for 2015.

Table 1. ECOWAS Members Geographic, Demographic and Economic Profile

Country	Area	Population	Nominal GDP	GDP (PPP)	Currency	Official Language
Benin	114,763	10,880	8,291	22,377	CFA franc	French
Burkina Faso	272,967	18,106	10,678	30,708	CFA franc	French
Cape Verde	4,033	521	1,603	3,413	Escudo	Portuguese
Gambia	11,295	1,991	939	3,344	Dalasi	English
Guinea	245,857	12,609	6,699	15,244	Franc	French
Guinea-Bissau	36,125	1,844	1,057	2,685	CFA franc	Portuguese
Liberia	111,369	4,503	2,053	3,762	Dollar	English
Mali	1,240,192	17,600	12,747	35,695	CFA franc	French
Senegal	196,712	15,129	13,610	36,625	CFA franc	French
Sierra Leone	72,300	6,453	4,215	10,127	Leone	English
Ghana	238,533	27,410	37,543	115,409	Cedi	English
Ivory Coast	322,463	22,702	31,759	79,766	CFA franc	French
Niger	1,267,000	19,899	7,143	19,013	CFA franc	French
Nigeria	923,768	182,202	481,066	1,093,921	Naira	English
Togo	56,785	7,305	4,088	10,667	CFA franc	French

1.2 Importance of the Study

This study focuses on assessment of trade between India and 15 Member countries of ECOWAS. Due to its scope, it will provide thoughtful and prominent insights on the existing trade and prospects for future trade involvement between the parties.

Many empirical studies uses different trade indicators in undertaking International Trade Assessments between trading partners. The most used index, RCA helps in green lighting

[1] ECOWAS COMMISSION ABUJA NIGERIA, *The Economic Community of West African States*, *ECOWAS Commission, Abuja Printed (1993) Reprint (2010)*, 2010, https://doi.org/10.4324/9780367274634-7.

trade structure in terms of Complementarity and Similarity between countries and serves as the basis for decision making on international trade matters.

So far, no study has ever conducted with main objective of analysing the bilateral trade patterns and structure between India and all ECOWAS countries focusing on uncovering the trade complementarities as well as similarities using Revealed Comparative Advantage Index.

Therefore, it is most likely that the study will give a crucial benchmark towards understanding the value and contribution of trade relations that exists between India and ECOWAS in a period 15 years.

Additionally, the study will do Stability Analysis in assessing the stability of export patters of a country. According to Dalum, Laursen, and Villumsen[2], assessing whether countries are stable across sectors and whether they tend to grow more or less specialised intra-country, i.e. cross-sectoral, and testing whether countries tend to converge inside the same sector are equivalent.

This study employs regression analysis tool to assess The Stability of Export Specialization Pattern of India and 8 ECOWAS countries. Other countries were not assessed due to data deficiency setback

1.3 Research Questions and Objectives of the Study

The study targets in addressing the following three questions which forms the basis of this research:-

i. Does India have a Substantial trade with ECOWAS Trade Bloc?
ii. Is there the possibility of beneficial trade between India and ECOWAS i.e. Which sectors appear to form Trade Complementarity/Similarity?
iii. How Stable is Export Specialization Pattern of countries under study and What is the speed of change in specialization over time? i.e. Degree of Export Specialization

From the aforementioned research questions, the focus of the research is in turn do meet the following objectives:-

i. Assessment of existence of Substantial Trade between India and ECOWAS Bloc

[2] Bent Dalum, Keld Laursen, and Gert Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness,'" *International Review of Applied Economics* 12, no. 3 (1998): 423–43, https://doi.org/10.1080/02692179800000017.

ii. Analysis of Revealed Comparative Advantage of India and 15 ECOWAS Members based on HS 1 Classification (2 Digit Classification) across 15 years starting from 2006 to 2020.
iii. To investigate The Stability of Export Specialization Pattern of India and ECOWAS countries over a period of 2006 to 2019

1.4 Methodology

The trade data of 16 countries across 15 years were extracted form World Integrated Trade Solution (WITS). Analysed data are Two Digit HS Classification of 2002 Review from year 2006 to 2020. Study uses Analysis of Revealed Comparative Advantage Index of India and 15 ECOWAS Members to obtain some significant insights on trade that exists between the involved parties.

1.4.1 Revealed Comparative Advantage Index (RCAI)

The Revealed Comparative Advantage has its foundation rooted from The Ricardian Principle of Comparative Advantage developed by David Ricardo which asserts that an economy benefits by specializing in production of goods and/or services with which it has lower opportunity cost compared to its trading partners. The Comparative advantage principle then lays down the proposition that a country will engage in trade with another by exporting the commodities with relative advantage in and import the commodities which has disadvantage in production.

Though analysis have been proven that the mutual benefit bilateral trade is facilitated when there exists Complementarity in trade structure between the trading partners leading to swapping of exports and imports. The Revealed Comparative Advantage Index is a widely used index in international economics for evaluating a country's relative advantage or disadvantage in a particular class of commodities or services, as indicated by trade flows. The index reveals the commodities or sectors in which an economy has advantage compared to other countries.

This index provides the insights on how competitive a product is in the export of a particular country relative to the share of that product in general world trade. Generally, the product with high RCA is considered more competitive and in this sense it can be exported to other countries having low RCA.

Furthermore, the RCA Index is used in assessment of export potential that the country have in particular point in time. The analysis of RCA can play an important role in prospects of potential trade that a country have with unengaged trade partners. Countries with different RCA Indices, say one having RCA above one and another having RCA below one, are more likely to have high scope of bilateral trade as they appear to be complementary. Contrary to this, similarity in RCA like both with either RCA above one or below one, tends to have low scope of bilateral trade between them unless there's revealed scope for Intra-Industry Trade.

The Revealed Comparative Advantage is expressed as a ratio of two shares by definition. The numerator is the proportion of a country's total exports of a certain item to its total exports, while the denominator is the proportion of world shipments of the same commodity to total world exports.

The RCA Index of say country ***i*** for product ***j*** is simply given by the product ***j*****'s** share of country ***i*****'s** exports in relation to that product ***j*****'s** share in world trade:

$$RCA_{ij} = (x_{ij}/X_{it})/(x_{wi}/X_{wt})$$

Where:

x_{ij} and x_{wi} are the values of country *i's* exports of product *j* and world exports of product j respectively

X_{it} and X_{wt} refer to the country *i's* total exports and world total exports respectively.

If a resulted value exceeds unity, the country is said to have a revealed comparative advantage in the product. The opposite applies to the product in the different case where by a country has the RCA value less than unity.

1.4.2 Stability of Export Specialization

A basic tenet of international economics is that specialisation of an economy based on comparative advantages leads to trade gains. However, no empirical research has been done that directly links comparative advantages to export specialisation.

Trends in trade specialisation may be linked to overall growth success. The essential idea is that if overall economic performance diverges, it is due to cumulative innovation, which manifests itself in diverging trade specialisation patterns. If, on the other hand, growth performance convergence is the most prominent aspect, it is mostly due to technical diffusion, which manifests itself in converging trade specialisation patterns.

The Simple Regression Analysis is done to scrutinize the Stability of Export Specialization Pattern of India and ECOWAS countries over a period of 2006 to 2019

1.5 Limitations

The study has encountered major limitation in Data Deficiency. Data inefficiency has manifested in two ways:

i. Firstly, two ECOWAS countries; Guinea Bissau and Liberia had completely no data throughout the study period of fifteen years starting from 2006 to 2020.

ii. Secondly, the rest of ECOWAS members are in one way or another missing important trade data in some of the years. Notable example is Sierra Leone with only trade data of five years, 2014 to 2018 followed by Guinea having only seven years data; 2006 to 2008 and 2013 to 2016.

1.6 Chapters Scheme

The organisation of this work is enclosed in five main chapters. Chapter 1 gives the introduction of the study with Background information, Importance of the Study, Methodology employed, Objectives of the Study and Study Limitations.

Chapter 2 has the Review of Literature with Theoretical Literature Review, Review of Economics of Regional Integration, Empirical Literature Review on Revealed Comparative Advantage and Stability of Export Specialization and lastly The Research Gap.

The 3rd chapter presents Trade Relations between India and ECOWAS Countries. It gives some vital features of India Trade Profile as well as ECOWAS Trade Profile as a bloc.

Chapter 4 provides the detailed analysis using The Revealed Comparative Advantage Index and presented the findings on trade compatibility between India and 12 ECOWAS countries. It also presents the assessment of Stability of Export Specialization Pattern of India and 8 ECOWAS countries.

Last chapter, which is chapter 5 presents the general findings and conclusions of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review of Literature

2.1.1 Comparative Advantage: From Mercantilists to David Ricardo

Dominick Salvatore, *Professor of Economics; Fordham University* in his book titled *International Economics*[3] he presented the evolution of International Trade starting from Mercantilists era to David Ricardo who introduced the Theory of Comparative Advantage. The Mercantilists' views on trade were centred on external (geopolitical) competition between nations, whereas **Adam Smith's** view were centred on a nation's internal administration.

Before Adam Smith's publication of *The Wealth of Nations in 1776*, there were numerous writings on international trade from all over the world done by Mercantilists. Over this period of seventeenth and eighteenth centuries, different groups such as merchants, bankers, government officials, and even philosophers laid down lots of writing on international trade.

Their paper works advocated an economic philosophy of mercantilism whereby mercantilist's ideology was promotion of more export than imports as the only means for a nation to become rich and powerful. The excess exports over imports generates surplus created by an inflow of bullion, or precious metals, i.e. gold and silver. The nation then derives its power from the riches resulted from surplus of gold and silver it has.

Mercantilists emphasized on the role of the government was to increase its power to stimulate the nation's exports and discourage and restrict imports and thus their view led them to consider the nation's stock of precious metals as the only measure of wealth of a nation in question.

Mercantilists' belief on accumulation of precious metals was due to the fact that, they were writing and working for rulers to maintain and enhance the national power. The more gold and silver the nation has, the more powerful and influential it becomes as it can strengthen armies and navies thus being able to acquire more colonies. Additionally, promotion of exports and restricting imports implies that the nation gets more precious metals (money i.e.

[3] Domonick Salvatore, *International Economics, Angewandte Chemie International Edition, 6(11), 951–952.*, 11th Editi (New York: Wiley, 2018).

gold coins) in exchange with the domestically produced goods, and finally stimulates national product/output and employment.

At the meantime, measure the wealth of a nation focus on the stock of human, man-made, and natural resources available for producing goods and services contrary to Mercantilists belief of the measure of wealth of the nation. The greater the stock of these valuable resources, the greater the flow of commodities and services to meet human needs, and the higher the nation's level of life standard.

Furthermore, merchants believed that all nations could not simultaneously have an export surplus and the amount of gold and silver was fixed at any particular point in time, thus, one nation could benefit only at the expense of others.

Adam Smith, on the other hand, marked the beginning of new era with different thoughts simple truth that; for voluntary trade between two nations to happen, both nations must gain from the trade. He **rejected the basic tenets of mercantilism** and argues that the division of labor and the market process it allows for are the phenomena behind economic growth. If one nation gained nothing or lost, it would simply refuse to trade. Smith laid the foundation on how mutually beneficial trade take place, and revealed the answer to the question of from where do these gains from trade come using his ***Theory of Absolute Advantage.***

Smith highlighted that, trade between two countries is based on what he referred to as "Absolute Advantage." The theory states that, "***When one nation is more efficient than (or has an absolute advantage over) another in the production of one commodity but is less efficient than (or has an absolute disadvantage with respect to) the other nation in producing a second commodity, then both nations can gain by each specializing in the production of the commodity of its absolute advantage and exchanging part of its output with the other nation for the commodity of its absolute disadvantage.***

The process explained in the Theory of Absolute Advantage leads to specialization to enhance most efficient utilization of scarce economic resources to the point that raises the output of both commodities and lastly increase the nation's social welfare. This rise in output for both commodities reflects the benefits of specialisation in production that may be shared between the two countries through trade. Due to existence of absolute advantage, the country specializes in production and exports of the commodity of its absolute advantage and imports the commodity of its absolute disadvantage from the country with efficiency and specialization in that commodity.

About 40 years after Smith, British Economist, David Ricardo (1817) published *The Principles of Political Economy and Taxation*. He presented The Law of Comparative Advantage in his seminal work in an attempt to fully explain the pattern of commerce and the gains from trade across countries. This law is one of the most essential and yet unquestioned economic laws, having several practical applications.

According to Ricardo, The Law of Comparative Advantage, posits that, ***"Even if one nation is less efficient than (has an absolute disadvantage with respect to) the other nation in the production of both commodities, there is still a basis for mutually beneficial trade."***

The following clear and simple example from everyday life can convince ourselves about this law: Assuming that a lawyer can type twice as fast as his secretary who have no Law Degree. On the basis of Smith's Law of Absolute Advantage, the lawyer then has an Absolute Advantage over his secretary in both the practice of law and typing. On the second hand, since the secretary has no law degree and cannot practice law without it, he has Absolute Disadvantage in both typing as well as law practice.

Upon further consideration, it is correct to say that the both lawyer and secretary can be more productive and efficient by each specializing in one of the two activities of their best qualification. It is then efficient for the lawyer to specialize in law practice because he has a greater absolute advantage or a comparative advantage in it, and the secretary in typing. According to the law of comparative advantage, the lawyer should devote all of his time to practising law and delegate typing to his secretary in order to maximise productivity and efficiency.

Ricardo's first explanation of the law of comparative advantage was completely based on the Labor Theory of Value. His explanation was open to criticisms and was subsequently rejected. In the first part of the twentieth century, Gottfried Haberler, an Austrian-American economist, came to Ricardo's "rescue" by explaining the law of comparative advantage in terms of the Opportunity Cost Theory, as reflected in production possibility frontiers, or transformation curves.

2.1.2 Economics of Regional Integration Review

Many theories have been established to explain the formation of Regional blocs and deviation from Multilateralism. Gottfried von Haberler[4] in his book *The Theory of International Trade (1936)* he used the following words to describe "custom union": "The custom unions are to be wholeheartedly welcomed even when they are not between neighboring or complementary States"

In addition, Haberler defined a custom union as a removal of duties between the countries that make up the union, rather than between them and other countries. The lowering of tariff barriers between two states then causes widespread protectionist resistances. Furthermore, because two sets of interested persons and organizations must agree on a uniform Tariff Schedule, a custom union generates a slew of difficult political and administrative issues. Furthermore, he stated that an agreement must be achieved on the distribution of customs revenue, taxation issues, and customs administration procedures.

Jacob Viner, on the other hand made revolution through development of his Theory of Customs Union focusing on describing Creation and/or Diversion of Trade. Studies in the Theory of International Trade is his seminal work on the history of economic theory (1937). The Customs Union Issue is a key publication for this concept by Viner (1950).

Viner's idea of custom unions is founded on concepts of trade diversion and trade creation impacts of various regional integration arrangements. Viner demonstrated that custom unions can have favorable or harmful consequences. Because imports of the same commodity are subject to different customs and obstacles depending on whether the country of origin belongs to the integration group or not, all economic integration procedures require a system of custom discrimination among nations. As a result, although some countries will benefit from the custom union, others would suffer.[5]

[6]Gupta wrote on Establishment and Evolution of ECOWAS in the paper ***Regional integration in West Africa: The Evolution of ECOWAS.*** In his paper, he examined the development of Regional Integration in Africa; its initiatives *(started with the establishment of the South African Customs Union (SACU) in 1910 and the East African Community in*

[4] Daniela Filip, "Jacob Viner and Gottfried von Haberler , Two Theories of Custom Union , a Precise Answer for the European Union," no. February (n.d.): 1–35.

[5] Daniela Filip, "Jacob Viner and Gottfried von Haberler , Two Theories of Custom Union"

[6] Arushi Gupta, "Regional Integration in West Africa: The Evolution of ECOWAS," *New Delhi: Observer Research Foundation*, 2015.

1919) and challenges. It analyses the organization of ECOWAS and the efforts it has taken to attain its goals and targets, as well as the necessity to expand infrastructure in the area to speed economic growth.

He ascertained that over time, India's relations with West Africa have grown exponentially. On the economic front, for example, ECOWAS provides India a strategic opportunity to promote sustainable growth to facilitate more South- South cooperation. Not only has the India-ECOWAS connection generated progress, but it has also fostered interdependence.

The Federation of Indian Chambers of Commerce and Industry (FICCI) and ECOWAS signed a Memorandum of Understanding (MoU) to facilitate trade in relations January, 2010[7]. The main objective of the MoU was to expedite investment opportunities, to boost private sector investments and business-to-business transactions. Indian private sectors can also invest in e-learning services in Africa and in infrastructure, to meet social demand.

India and ECOWAS have also come together in the field of education. Indian ministries have provided scholarships to West African students leading to increased enrolment of students from those countries at the Indian Institutes of Technology (IITs)

In his article ***Obstacles to Increased Intra-ECOWAS Trade***[8] Okolo (1988) asserts that a comprehensive assessment of the barriers facing ECOWAS in this area of activity is the only way to acquire an understanding of the community's incapacity to support trade liberalization. Despite the efforts made to encourage Intra-regional trade through the progressive elimination of barrier, an examination of actual Intra-regional trade shows that it remains at a low level.

He identified obstacles such as The nature of West African Economies, Poor Transport and communications facilities, Diversity of Currencies, Competing Sub-regional Unions, and Legal and Administrative problems. He finally proposed the solutions to tackle them

Hanink and Owusu (2015)[9] tried to answer the question of ***Has ECOWAS Promoted Trade among Its Members?*** They employed the Trade Intensity Index (TII) to examine the

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[7] "ECOWAS, India business group sign MoU", Pana Press, January 14, 2010. See: http://www.panapress.com/ECOWAS,-india-business- group-sign-MOU--13-532179-17-lang1-index.html

[8] Julius Emeka Okolo, "Obstacles to Increased Intra-Ecowas Trade," *International Journal* 44, no. 1 (1988): 171, https://doi.org/10.2307/40202583.

[9] Dean M. Hanink and J. Henry Owusu, "Has ECOWAS Promoted Trade among Its Members?," *The SAGE Encyclopedia of Stem Cell Research* 7, no. 3 (2015): 363–83, https://doi.org/10.4135/9781483347660.n462.

direction of trade within the Economic Community of West African States (ECOWAS). They discovered that a very similar pattern of trade flows existed before ECOWAS was created by comparing modern trade flows to earlier ones. Their primary finding, therefore, is that ECOWAS has not been effective in promoting trade among its members.

2.2 Empirical Literature Review

2.2.1 Revealed Comparative Advantage

Revealed Comparative Advantage concept tries to examine to the relative trade performance of individual countries in particular sector/commodities. Its Index is referred to as Balassa Index as firstly introduced by Balassa (1967)[10] and Balassa & Noland (1989)[11].

In other words, the Revealed Comparative Advantage Index (RCAI) is a tool used in international economics to determine a country's relative advantage or disadvantage in a specific class of commodities or services, as measured by trade flows. It is based on the Ricardian Theory of Comparative Advantage.

The theoretical construction of Revealed Comparative Advantage Index is defined as the ratio of two shares. The numerator is the proportion of a country's overall exports of the commodity in question to its total exports. The denominator is proportion of world exports of the same commodity in total world exports as highlighted by Mia Mikic and John Gilbert[12] in his book, ***Trade Statistics in Policymaking: A Handbook of Commonly Used Trade Indices and Indicators***

Several studies have employed RCAI in empirical analysis of bilateral trade between ECOWAS countries as well as between India and few members of ECOWAS. Etuk and Ohen[13] conducted investigation of ***Revealed Comparative Advantage and competitiveness: The case of Palm oil Exports from Nigeria, Ghana and Côte d'Ivoire.*** This study analyzed

[10] Bela Belassa, "Trade Creation and Trade Diversion in the European Common Market Authors (s): Bela Balassa Published by : Wiley on Behalf of the Royal Economic Society Stable URL : Http://Www.Jstor.Org/Stable/2229344 REFERENCES Linked References Are Available on JSTOR" 77, no. 305 (1967): 1–21.

[11] Bela Balassa and Marcus Noland, "'Revealed' Comparative Advantage in Japan and the United States," *Journal of Economic Integration* 4, no. 2 (1989): 8–15, https://doi.org/10.11130/jei.1989.4.2.8.

[12] Mia Mikic and John Gilbert, *Trade Statistics in Policymaking: A Handbook of Commonly Used Trade Indices and Indicators*, *Angewandte Chemie International Edition, 6(11), 951–952.*, 2018.

[13] E.A. Etuk and S.B. Ohen, "Revealed Comparative Advantage and Competitiveness: The Case of Palm Oil Exports from Nigeria, Ghana and Côte d'Ivoire," *IOSR Journal of Agriculture and Veterinary Science* 10, no. 07 (2017): 36–40, https://doi.org/10.9790/2380-1007023640.

the competitiveness of palm oil export in Nigeria, Ghana and Côte d'Ivoire from 1990 to 2013. The empirical findings suggests that Côte d'Ivoire is highly competitive in the export of palm oil followed by Ghana and lastly Nigeria, which is less competitive, compared to the aforementioned countries.

The assessment of ***Trade and Revealed Comparative Advantage Measures: A Case of Main Export Crops of Benin Republic*** done by Alidou, Ceylan & Ilbasmis[14] showed that Benin has comparative advantage over Nigeria in Cashew production and comparative disadvantage in Cotton over both Nigeria and Burkina Faso.

Another study by Hannafi[15] analyzed the ***Trade Complementarity and Similarity between Nigeria and India in the context of Bilateral Trade Relations*** based on the mean revealed comparative advantage indices of Nigeria and India of twenty major product categories of Nigeria and India's exports. Findings show that Nigeria has comparative advantage in only few products like mineral fuels, ships boats and floating structures, rubber and articles thereof, lac; gums resins and other vegetables.

India has comparative advantage and can export to Nigeria Organic Chemicals, Nuclear reactors, Fish Crustacean and other Aquatic, Copper, Coffee, Tea, Mati and Spices, Residues and waste from food industries, Footwear, Man-made staple fibres, Edible fruit and nuts, Cereals. Neither do Nigeria nor India has comparative advantage in products such as Cotton, Plastic and Articles thereof, Electrical Machinery and Equipment, Aluminium and vehicles railway tram and roll-stock.

Throughout the whole study period, there exist a partial match between Nigeria's exports supply and the India's imports demand as the trade complementarity indices lies between 31.98 and 45.21. Despite the existence of partial export and import match between Nigeria and India the trade complementarity index has been steadily increasing from 2000-2014, implying that Nigeria and India trade profiles are becoming more compatible

[14] Mouinatou Alidou, R. Figen Ceylan, and Eda Ilbasmis, "Trade and Revealed Comparative Advantage Measures: A Case of Main Export Crops of Benin Republic," *Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 18, no. 1 (2017): 382–97.

[15] Kabiru Hannafi Ibrahim, "Trade Complementarity and Similarity between Nigeria and India in the Context of Bilateral Trade Relations," *IOSR Journal of Economics and Finance Ver. IV* 6, no. 6 Ver. IV (2015): 28–32, https://doi.org/10.9790/5933-06642832.

Furthermore, Tawheed Nabi and Tushinder Preet Kaur[16] in their study of ***India's trade with Nigeria: A competitive analysis through RCA and RSCA Index*** reveals that India is having Comparative Advantage by exporting four commodities viz; Machinery, Pharmaceutical Products (30), Nuclear Reactors, Mechanical Appliances, Boilers; parts thereof (84), Vehicles other than Railway or Tramway Rolling Stock, and parts and accessories thereof (87), articles of Iron or Steel (73), and mainly with Pharmaceutical goods because of the average value of RCA from the period 2000-01 to 2017-18 is 50 and having a higher positive value of RSCA near to 0.9. The study has analyzed the Bilateral Trade of India and Nigeria, India is having high Comparative advantage over Nigeria in this trade.

The literature also provides some useful findings of India's engagement in trade with other trade partners apart from ECOWAS countries. Amita Khan and Batra Zeba (2005)[17] in their study ***"Revealed Comparative Advantage: The Analysis for India and China,"*** attempted a systematic evaluation of the similarities of the patterns of revealed comparative advantage (using the Balassa (1965) index for export data) for India and China in the global market at the sector and commodity level of the Harmonized System of classification.

Their analysis shows broad similarities in the structure of comparative advantage for India and China where they both enjoy comparative advantage for labour and resource intensive sectors in the global market.

The paper revealed that, the index of RCA is greater than one for 41 sectors like organic chemicals, cotton iron and steel, articles of apparel accessories, not knit or crochet etc., indicating that India holds comparative advantage in these sectors in the world market.

China on the other hand enjoys comparative advantage in the world market in 47 sectors in sectors like articles of electrical and electronic equipment, manufacture of leather, toys, organic chemicals, articles of apparel and cotton.

Chandran[18] conducted a study of ***Trade Compatibility Between India And ASEAN Countries*** using RCAI. He found that India has High RCA RCA (1 to 2) in Agricultural Products, Food, Manufacture, Iron and Steel, Pharmaceuticals, and Chemicals; Strong RCA

[16] Tawheed Nabi and Tushinder Preet Kaur, "India's Trade with Nigeria: A Competitive Analysis through RCA and RSCA Index," *International Journal of Recent Technology and Engineering* 8, no. 3 (2019): 6240–44, https://doi.org/10.35940/ijrte.C5793.098319.

[17] Amita Khan and Batra Zeba, "Revealed Comparative Advantage: The Analysis for India and China," *De Economist*, n.d., https://doi.org/10.1007/BF02384068.

[18] B.P. Sarath Chandran, "Trade Compatibility Between India And ASEAN Countries," no. 33138 (2011).

(above 2) in Textiles and Clothing and High Comparative Disadvantage RCA (<0.5) in Fuels, Machinery & Transport Equipments, Office & Telecom Equipments, Telecom and Automotive.

Konstantakopoulou & Tsiona[19] On Measuring comparative advantages in the Euro Area highlighted the measurement of Comparative Advantage using The Revealed Comparative Advantage (RCA) Index of Balassa (1965).

They further employed Revealed Symmetric Comparative Advantage Index (RSCA) suggested by Laursen (2015) to deal with symmetrical problems encountered by RCA. The RSCA Index, is a transformation of the RCA Index that has the following form:

$$RSCA_k^i = (RCA_k^i - 1)/(RCA_k^i + 1)$$

Where; $-1 < RSCA_k^i < +1$

The RSCA's interpretation is that, a country with RSCA > 1 has CA for respective sector contrary to CD when $-1<RSCA<0$. On the other hand, a country is having neither CA nor CD when RSCA equals 0.

2.2.2 Stability of Export Specialization

In his paper Krugman (1987), presented a stability in the specialisation pattern of countries predicting model, given the presence of economies of scale. His model was based on neoclassical point of view highlighting *"that the productivity of resources in each sector, in each country, depends on an index of cumulative experience ('learning-by-doing'), creating economies of scale at the level of the industry. Thus, once a pattern of specialisation is established (e.g. by chance) in the model, it remains unchanged with changes in relative productivity acting to lock the pattern in further."*

Dosi et al. (1990) described how Trade specialisation trends may be connected to overall growth success. The underlying premise is that if overall growth performance diverges, this is seen as a result of cumulative innovation, which is represented in trade specialisation patterns diverging. If, on the other hand, growth performance convergence is the major feature, this is mostly due to technological diffusion, which is represented in converging trade specialisation patterns.

[19] Ioanna Konstantakopoulou and Mike G. Tsionas, "Measuring Comparative Advantages in the Euro Area," *Economic Modelling* 76, no. August 2017 (2018): 260–69, https://doi.org/10.1016/j.econmod.2018.08.005.

Dalum, Laursen & Villumsen[20] stated that, the methodology for testing whether countries are stable across sectors and whether they tend to become more or less specialised intra-country i.e. cross-sectoral on one hand and the test of whether countries tend to converge within the same sector on the other hand are analogous. They employed a method first used in the context of specialisation by John Cantwell (1989) whose source of inspiration was a 'Galtonian' regression model presented by Hart & Prais (1956). Stability (and specialisation trends) is tested by means of the following regression equation (country by country). Something notable here is that nothing said on these grounds about what were the determinants of the initial export specialisation pattern of a particular country.

Stability of Specialization of Country's Exports is done by using RSCA instead of Balassa (1965) RCA Index as it was suggested by Laursen (2015)[21] that the un-adjusted RCA has symmetrical problems. Because Balassa RCA Index received non-symmetrical criticisms, Laursen (2015) addressed the problem by suggesting RSCA Index [-1, 1]

According to him, a 'pure' RCA is non-comparable in either sides of unity. The country that RCA Index taking range of values 0 to 1 is classified as not specialized in that sector/commodity and values ranging from 1 to $+\infty$ implies that the country is specialized. He argued that using non-adjusted RCA in either regression analysis or some other statistical analysis imposes much more weight to values > 1 in comparison to the counterpart observations with $RCA < 1$.

Laursen (2015) also expressed the asymmetric problem in the context of regression analysis that the disadvantages of the Balassa measure is the inherent risk of lack of normality in its distribution because it takes values between zero and infinity with a (weighted) average of 1.0. A skewed distribution is likely to violate the assumption of normality of the error term in regression analysis and to produce unreliable t-statistics.

If the non-adjusted RCA is used to estimate export stability regression equation the estimates might be biased (an example of an application of a non-adjusted RCA (an example of an application of a non-adjusted RCA includes Crafts & Thomas (1986)[22]

[20] Dalum, Laursen, and Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness.'"

[21] Keld Laursen, "Revealed Comparative Advantage and the Alternatives as Measures of International Specialization," *Eurasian Business Review* 5, no. 1 (2015): 99–115, https://doi.org/10.1007/s40821-015-0017-1.

[22] N.F.R. Crafts and Mark Thomas, "Comparative Advantage in UK Manufacturing Trade, 1910-1935," *Angewandte Chemie International Edition, 6(11), 951–952.* 96, no. 383 (1986): 10–27.

Konstantakopoulou & Tsionas[23] employed Revealed Symmetric Comparative Advantage Index (RSCA) suggested by Laursen (2015) to deal with symmetrical problems encountered by RCA. The RSCA Index, is a transformation of the RCA Index that has the following form:

$$RSCA_k^i = (RCA_k^i - 1)/(RCA_k^i + 1) \ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Where; $-1 < RSCA_k^i < +1$

The RSCA's interpretation is that, a country with RSCA > 1 has CA for respective sector contrary to CD when $-1<RSCA<0$. On the other hand, a country is having neither CA nor CD when RSCA equals 0.

The RSCA is then used to investigate The Stability of Export Specialization Pattern of a country over a specified period. Generally, the stability of export specialization i.e. Specialization Trends is tested by convergence regression equation for each country as stated below;

$$RSCA_{ij}^{t2} = \alpha_j + \beta_j RSCA_{ij}^{t1} + \varepsilon_{ij} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (ii)$$

The dependent variable, the Revealed Symmetric Comparative Advantage of country *i,* sector/commodity *j* at period t_2 is regressed on the value of RSCA in period t_1 ($t_1 < t_2$).

The Regression Coefficients α and β and ε_{ij} is the regression error are estimated by OLS Method. The regression coefficients *(β value)* has 3 different interpretation as emphasized by Konstantakopoulou & Tsionas

Furthermore, Laursen (2015)[24] provided a generalization about the value of *β.* He stated that the size of β measures the stability of a country's specialization pattern between the two periods. A low β indicates a high degree of turbulence but if β is not significantly different from 1 then the pattern has remained unchanged, β^*/R^* (R^* is the regression correlation coefficient) measures whether the level of specialization has gone up or down between the two periods (an increase or a fall in the spread of specialization). If $\beta^*/R^* > 1$, specialization has increased; and if $\beta^*/R^* < 1$ then specialization has decreased

Konstantakopoulou & Tsionas further asserted that it is important to test the hypothesis that the *β-values* are significantly different from zero i.e. $\beta > 0$ because if $\beta \leq 0$, one cannot reject

[23] Konstantakopoulou and Tsionas, "Measuring Comparative Advantages in the Euro Area."

[24] Keld Laursen, "Revealed Comparative Advantage and the Alternatives as Measures of International Specialization," *Eurasian Business Review* 5, no. 1 (June 1, 2015): 99–115, https://doi.org/10.1007/S40821-015-0017-1.

that the development in export specialization models was either due to chance or reversed.

On the Degree of Specialization, Dalum, Laursen & Villumsen (1998)[25] explained how to extract/measure The Degree of Export Specialization from the regression analysis. This reveals the intensity/extent/speed of change in specialization over time.

According to Cantwell (1989 pp. 31-32), the situation where $\beta > 1$, this is not a necessary condition for an increase in the structure of a country′s specialization. What is required is the examination of the RSCA variance fraction in the two sub-samples. Hart (1976) specifically showed that:

$$\sigma^2 t^2/\sigma^2 t^1 = \beta_i^2/R_i^2 \text{ thus } \sigma_i t^2/\sigma_i t^1 = |\beta_i|/|R_i|$$

where σ^2 is the dispersion of RSCA and R_i's the square root of the coefficient of determination. If the dispersion remains unchanged, we have: $\beta = R$ with implication that the degree of specialization should remain stable between the two sub-periods contrary to when $\beta > R$, means that the degree of specialization increases (i.e. a country have *β-specialization*).

Furthermore, for $\beta < R$ the degree of specialization decrease between two sub-periods (i.e. *β-de-specialization*).

2.3 Research Gap

Several studies have been conducted to explain ECOWAS Intra-trade and trade with other economies. However, no any empirical study conducted to study Trade Complementarity between ECOWAS and India.

Additionally, none of these empirical works as analysed in my review of literature tried to directly linking comparative advantages with the country's export specialization pattern.

This study has made an attempt to reveal the comparative advantage using Revealed Comparative Advantage Index and link this with Export Specialization Pattern of respective country to tell how stable is the country's export of its products of comparative advantage.

[25] Dalum, Laursen, and Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness.'"

CHAPTER THREE

TRADE RELATIONS BETWEEN INDIA AND ECOWAS COUNTRIES

3.1 India Trade Profile

India borders Afghanistan, Bangladesh, Bhutan, Myanmar, China, Nepal, and Pakistan by land and Indonesia, Maldives, Sri Lanka, and Thailand by sea.

In 2020 India was ranked number 6 economy in the world in terms of GDP (current US$), the number 18 in total exports, the number 12 in total imports, the number 150 economy in terms of GDP per capita (current US$) and the number 40 most complex economy according to the Economic Complexity Index (ECI).

Also in 2020, India was the world's biggest exporter of Diamonds ($16B), Rice ($8.21B), Crustaceans ($3.95B), Non-Retail Pure Cotton Yarn ($2.61B), and Pepper ($1.16B). In same year, India was reported as the world's biggest importer of Coal Briquettes ($20.9B), Diamonds ($15.8B), Palm Oil ($5.04B), Soybean Oil ($3.02B), and Nitrogenous Fertilizers ($2.64B)

Table 2. Top 5 India's Exported and Imported Commodities

Export	**Value *($ B)***	**Import**	**Value*($ B)***
Refined Petroleum	25.3	Crude Petroleum	59
Packaged Medicaments	17.8	Gold	21.9
Diamonds	16	Coal Briquettes	20.9
Rice	8.21	Diamonds	15.8
Jewellery	7.57	Petroleum Gas	13.8

The source of import are predominantly from China ($64.2B), United States ($26.6B), United Arab Emirates ($22.1B), Saudi Arabia ($16.8B), and Iraq ($14.4B) while the exports destination are mostly to United States ($49.7B), China ($18.5B), United Arab Emirates ($18.1B), Hong Kong ($9.18B), and Germany ($8.8B) while

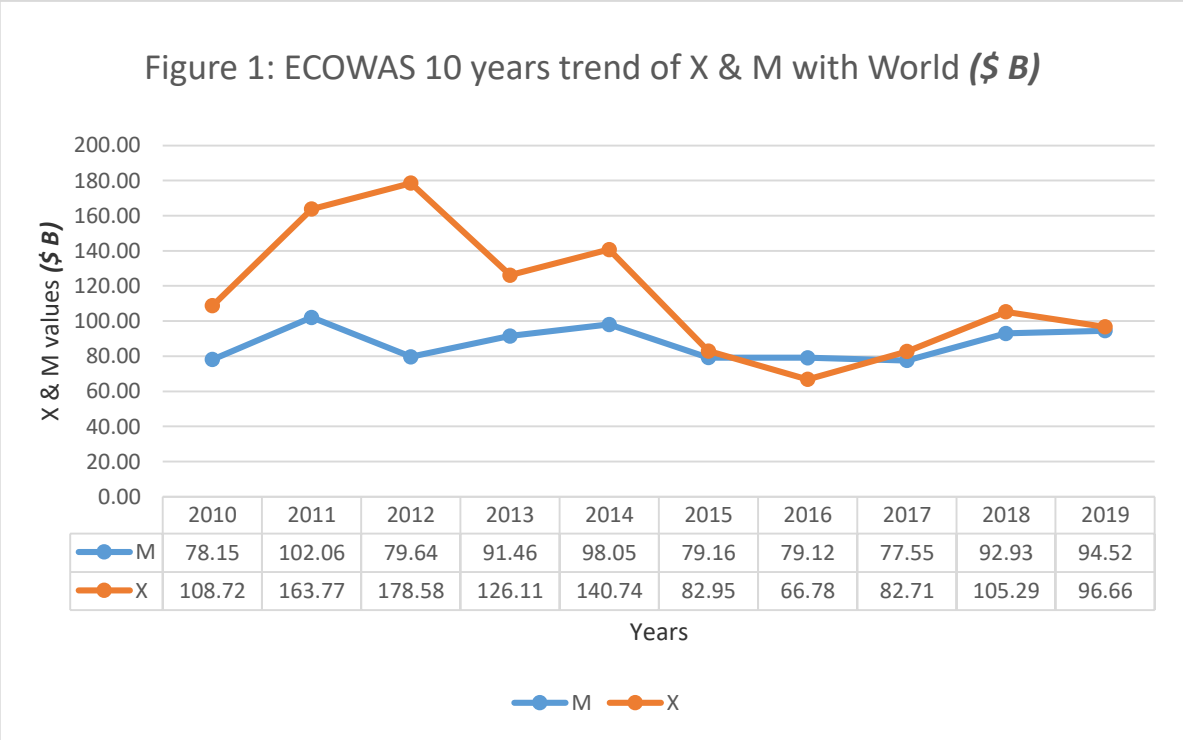
3.2 Trade Profile for ECOWAS Countries

Ten years of trade between ECOWAS as a bloc with the World (RoW) from 2010-2019 reveals that ECOWAS had Trade Surplus between year 2010 and 2015 having its peak in

year 2012. ECOWAS experienced deficit with The World in 2016 and thereafter the size of the surplus decreased. This trade trend shows that the ECOWAS imports from The World is slightly stable with very low fluctuations over the period studied.

The study was not able to find the clear reasons of high fluctuations of export trend. Even the trade deficit of 2016 was not as a result of increase in export over import but rather was due to decline in exports as imports looks slightly stable between 2015 and 2017 as displayed in

Figure 1. ECOWAS 10 years trend of X & M with World



The Table 3 shows ECOWAS Exports to and Imports from The World top 10 Economies in ($1000) for ten years period, 2010-2019. It's clear from the table that India is the first exports destination of ECOWAS followed by United States and Japan is the last destination. ECOWAS sources its imports largely from China, United States and France. India is the fourth source of ECOWAS imports

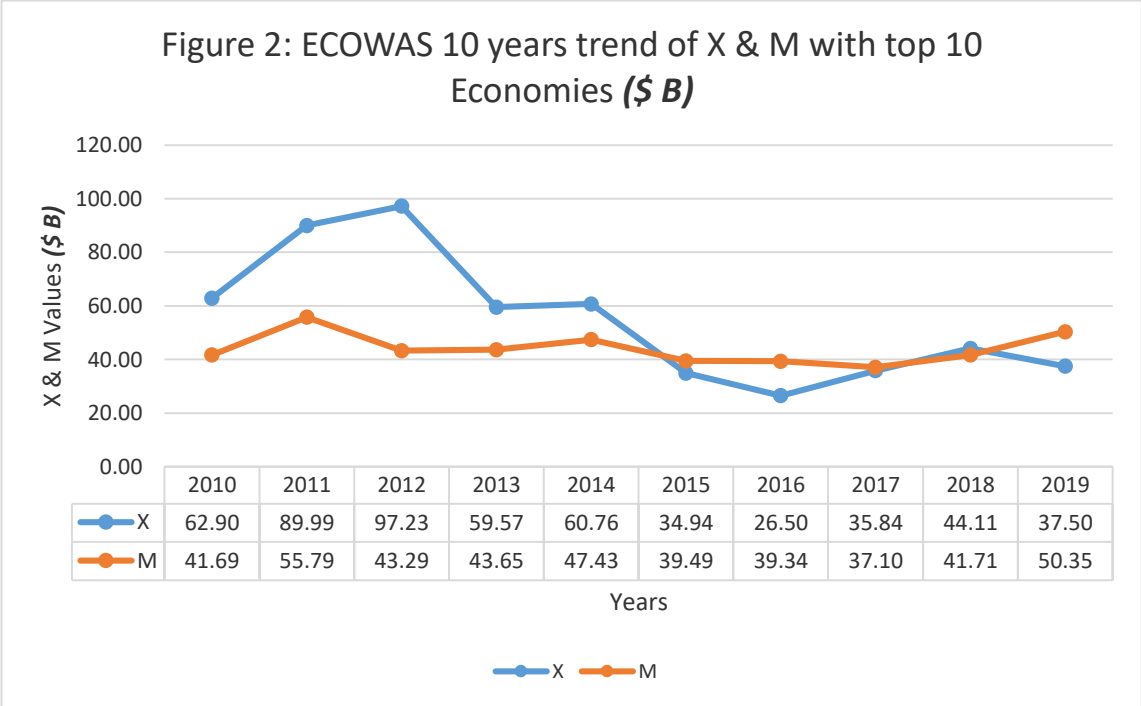
Table 3. ECOWAS Exports to and Imports from top 10 Economies and RoW in ($1000)

Position	Country	Export, X	Country	Import, M
	World	**1,152,335,459.95**	**World**	**872,653,883.73**
1	India	129,859,647.36	China	145,283,458.75
2	United States	127,724,425.92	United States	72,878,774.48
3	France	63,959,268.80	France	54,109,807.49
4	Brazil	53,578,516.67	India	47,579,007.89
5	Italy	45,225,622.98	United Kingdom	29,711,140.77
6	United Kingdom	42,587,179.24	Germany	25,612,790.59
7	China	35,648,214.42	Brazil	21,500,912.20
8	Germany	21,588,683.91	Italy	18,674,632.45
9	Canada	18,709,423.70	Japan	17,358,296.69
10	Japan	10,453,613.14	Canada	7,132,368.64

Graphical representation of ECOWAS 10 years trend of X & M with top 10 Economies is mapped in Figure 2. This figure has the features which are more or less similar with ECOWAS trade with The World presented in Figure 1.

This is a clear indicator that ECOWAS trades more with The Top 10 Economies than it does with the remaining countries/economies.

Figure 2. ECOWAS 10 years trend of X & M with top 10 Economies ***($ B)***



The commodities that ECOWAS trades most with the World are listed in Table 4. Topping the table is 27.Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes and in the bottom of the table is 41.Raw hides and skins. Table 5 on the other hand, shows the top 10 ECOWAS imports form The World.

Table 4. Top 10 Products that ECOWAS exports to The World in ($1000)

Prod. Code	Product Description	Exports, X
27	Mineral fuels, oils & product of th	771,363,350.52
71	Natural/cultured pearls, prec stone	97,937,582.03
18	Cocoa and cocoa preparations.	78,885,014.17
40	Rubber and articles thereof.	29,421,629.28
89	Ships, boats and floating structure	20,078,703.08
8	Edible fruit and nuts; peel of citr	17,029,558.43
52	Cotton.	13,569,771.27
26	Ores, slag and ash.	9,435,405.66
12	Oil seed, oleagi fruits; miscell gr	7,406,920.89
41	Raw hides and skins (other than fu	7,195,154.19

Table 5. Top 10 Products that ECOWAS imports from The World in ($1000)

Prod. Code	Product Description	Imports, M
27	Mineral fuels, oils & product of th	146,878,019.06
84	Nuclear reactors, boilers, mchy & m	106,863,214.19
87	Vehicles o/t railw/tramw roll-stock	85,832,895.50
85	Electrical mchy equip parts thereof	61,951,610.77
10	Cereals	54,512,649.04
39	Plastics and articles thereof.	32,104,908.59
73	Articles of iron or steel.	27,026,973.69
72	Iron and steel.	21,289,061.19
30	Fertilisers.	19,250,076.33
3	Fish & crustacean, mollusc & other	18,928,996.51

3.3 Bilateral trade between India and ECOWAS Countries

Table 6 shows the Trade between India and ECOWAS countries for 10 years HS-1 Classification of 2002 Review. It displays the Exports, Imports and Trade Balance at each point in time extracted from WITS in ($1000)

Table 6. Trade between India and ECOWAS countries for 10 years from 2010-2019

Year	Imports (M)	Exports (X)	Trade Balance (X – M)
2010	11,625,585.30	3,528,946.64	- 8,096,638.66
2011	15,708,394.59	5,363,460.76	- 10,344,933.84
2012	16,028,447.07	5,963,398.89	- 10,065,048.18
2013	15,682,861.03	6,993,885.21	- 8,688,975.82
2014	18,566,805.35	6,543,222.73	- 12,023,582.62
2015	16,029,195.37	5,559,181.13	- 10,470,014.23
2016	10,865,502.97	5,227,018.31	- 5,638,484.66
2017	14,105,637.07	6,076,080.55	- 8,029,556.52
2018	21,858,976.94	6,633,687.07	- 15,225,289.87
2019	16,100,673.57	7,959,948.09	- 8,140,725.48

Ten years data from 2010 – 2019, as presented by the Figure 3 reveals that India has been experiencing Trade Deficit with ECOWAS countries. Though its Exports have been fairly rising *(not at high pace),* in this time period, the Imports appears to fluctuate and widen the deficit.

Imports from ECOWAS countries has been rising from 2010 before its fall from 2014 – 2016 where India experienced the lowest trade deficit. It then rose in 2017 even higher in 2018 creating the maximum ever experienced deficit in the period.

Figure 3. India's Trade Balance with ECOWAS countries collectively

3.4 Important Commodities traded

Displayed in Table 7 and 8 are the ECOWAS countries Exports and Imports with India in ($1000). In the tables are the top 10 products which are most traded between the two parties in terms of their values.

The salient feature observed from these two tables is the presence of products that are both exported and imported with ECOWAS countries. Product codes of 27, 52, 72, 76 demonstrate this characteristic which implies that there is Intra-Industry trade that was difficult to be noticeable in HS 1 Classification because of its aggregation.

Table 7. ECOWAS countries top 10 Exports to India

Position	Prod. Code	Product Description	Exports, X
1	**10**	Cereals	9,260,493.62
2	**31**	Fertilisers.	6,883,224.65
3	**87**	Vehicles o/t railw/tramw roll-stock	5,804,785.44
4	**84**	Nuclear reactors, boilers, mchy & m	4,955,387.93
5	**27**	Mineral fuels, oils & product of th	3,794,169.65
6	**85**	Electrical mchy equip parts thereof	3,591,449.23
7	**52**	Cotton.	2,586,615.66
8	**39**	Plastics and articles thereof.	2,474,355.16
9	**73**	Articles of iron or steel.	2,290,091.97
10	**72**	Iron and steel.	1,978,440.31

Table 8. ECOWAS countries top 10 Imports from India

Position	Prod. Code	Product Description	Imports, M
1	**27**	Mineral fuels, oils & product of th	118,734,953.49
2	**71**	Natural/cultured pearls, prec stone	17,239,697.09
3	**8**	Edible fruit and nuts; peel of citr	8,647,926.73
4	**28**	Inorgn chem; compds of prec mtl, r	3,055,784.90
5	**44**	Wood and articles of wood; wood ch	1,448,742.99
6	**52**	Cotton.	1,108,642.01
7	**26**	Ores, slag and ash.	1,012,146.24
8	**72**	Iron and steel.	982,250.35
9	**25**	Salt; sulphur; earth & ston; plaste	925,385.19
10	**76**	Aluminium and articles thereof.	841,650.91

CHAPTER FOUR

ECONOMIC ANALYSIS OF INDIA – ECOWAS TRADE

3.1 Trade Indicators Analysis; The RCA

Economists use statistical data and indicators in all branches of economics. Research in International Trade use both Indicator Method and Modelling Approach. Indicators can be leading indicators (when they have predictive power) or lagging indicators (to describe what has happened in the past).

Simple and composite indices are established as recognized approaches in ***monitoring progress*** in achieving ***various policy goals*** or in benchmarking various policy options.

According to Mia Mikic and John Gilbert [26], a broad definition of a trade indicator is that it is an index or a ratio that can be used to describe and assess the **state of trade flows** and **trade patterns** of a particular economy or economies and can be used to monitor these flows and patterns over time or across economies/regions. Trade indicators are used in the analysis of international or foreign trade, at the national, regional or global level.

In order to assess The Sectoral Structure of Trade, the mainly used indicators are Major Export Category, Index of Export Diversification, Revealed Comparative Advantage, Intra-Industry Trade, Trade Overlap, Complementarity Index, Export Similarity Index, and Competitiveness Index.

For the purpose of this study, the trade indicators are going to be used to address the question that "Are (regional) trading partners' exports becoming more similar (more competitive) or more complementary? This is nothing but Revealed Comparative Advantage Index.

Economists' explanations for the observed pattern of inter-industry trade are based on comparative advantage. Comparative advantage is measured in terms of comparable pricing in the absence of trade in theoretical models. We measure comparative advantage indirectly in practise because these are not observable. By comparing the trade profile of the country of interest to the world average, revealed comparative advantage indices (RCA) use the trade pattern to discover the sectors in which an economy has a comparative advantage.

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[26] Mikic and Gilbert, *Trade Statistics in Policymaking: A Handbook of Commonly Used Trade Indices and Indicators*.

The RCA index is defined as the ratio of two shares. The numerator is the ratio/share of a country's total exports of the service/commodity of interest in the total exports of that service/commodity. The denominator is ratio/share of world exports of that particular servive/commodity in world total exports. Range of values: Takes a value between 0 and +∞. A country is said to have a revealed comparative advantage if the value exceeds unity.

This analysis of study is based on the Harmonized System (HS) Classification i.e HS-1 comprised of 97 products. To simplify analysis, the 97 products were classified into 7 groups as follows:

1. Agricultural Products (HS 01 - HS 24)
2. Mineral Products, Products Of The Chemical Or Allied Industries (HS 24 - HS 38)
3. Plastics, Rubber, Animal Products And Wood Products (HS 39 - HS 49)
4. Textiles And Textile Articles (HS 50 - HS 63)
5. Industrial Products (HS 64 - HS 83)
6. Machinery & Electrical Appliances, Electronics And Arms & Ammunition (HS 84 - HS 93)
7. Miscellaneous Manufactured Articles And Work Of Arts (HS 94 - HS 97)

The RCA Analysis applied in this study is Descriptive Analysis and some kind of Predictive Analysis. The trade data of 16 countries across 15 years were extracted form World Integrated Trade Solution (WITS). Analyzed data are Two Digit HS Classification of 2002 Review from year 2006 to 2020. Study uses Analysis of Revealed Comparative Advantage Index of India and 15 ECOWAS Members to obtain some significant insights on trade that exists between the involved parties.

The complete RCA analysis is done on the basis of these seven product groups at one step at a time.

Table 9. Average RCA for Agricultural Products

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*GHA*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
1	Live animals	0.01	6.16	0.00	0.01	0.02	0.03	0.00	43.1	74.7	0.02	0.09	0.02	0.03	0.05
2	Meat and edible meat offal	4.72	0.00	0.00	0.01	0.05	0.00	0.00	0.07	0.00	0.00	0.04	0.00	0.01	1.36
3	Fish & crustacean, mollusc & other	0.24	0.10	52.78	0.15	33.07	0.82	1.26	0.03	0.17	0.27	22.9	12.9	0.02	2.23
4	Dairy prod; birds' eggs; natural ho	0.64	0.02	0.04	0.19	0.01	0.18	0.01	0.20	0.13	0.17	1.04	12.8	3.61	0.26
5	Products of animal origin, nes or	0.52	0.12	0.11	0.01	0.29	0.01	0.06	0.01	0.00	0.02	0.10	2.63	0.02	0.62
6	Live tree & other plant; bulb, root	0.02	0.47	0.02	0.24	0.13	0.07	0.01	0.01	0.00	0.30	0.20	0.00	0.07	0.26
7	Edible vegetables and certain roots	0.05	0.97	0.02	0.05	6.93	0.91	0.00	0.15	15.3	0.01	4.26	0.20	0.30	0.99
8	Edible fruit and nuts; peel of citr	23.14	4.57	0.00	9.50	36.20	4.52	1.33	1.10	0.21	0.34	1.74	0.14	0.75	0.92
9	Coffee, tea, matï and spices.	0.15	0.05	0.43	4.68	0.04	0.38	4.76	0.06	1.12	0.13	0.23	5.55	5.72	3.66
10	Cereals	5.15	0.74	0.00	0.14	0.10	0.04	0.19	0.40	6.74	0.02	2.08	0.02	0.40	3.21
11	Prod. mill. indust; malt; starches;	3.37	0.29	3.55	1.64	6.24	1.18	0.09	0.17	0.27	0.05	2.70	33.7	6.87	0.60
12	Oil seed, oleagi fruits; miscell gr	5.54	12.6	0.02	0.29	39.52	1.31	0.05	0.78	0.98	0.85	2.70	4.36	1.07	1.03
13	Lac; gums, resins & other vegetable	0.16	0.11	0.00	0.02	0.05	0.04	0.00	1.37	0.10	2.35	3.88	0.00	0.04	10.3
14	Vegetable plaiting materials; veget	21.29	0.07	0.00	3.95	83.51	4.62	0.00	0.04	0.11	0.09	0.15	0.37	0.50	3.85
15	Animal/veg fats & oils & their clea	11.08	1.14	0.12	3.17	20.19	1.45	0.45	0.08	10.3	0.03	4.09	4.94	5.57	0.61
16	Prep of meat, fish or crustaceans,	0.01	0.00	124.5	1.67	6.11	1.73	0.00	0.00	0.05	0.01	1.75	24.3	0.01	0.40
17	Sugars and sugar confectionery.	6.10	0.11	0.11	0.56	0.04	0.04	0.01	0.07	6.70	0.03	0.84	0.99	3.51	2.07
18	Cocoa and cocoa preparations.	0.00	0.00	0.00	124.4	0.00	75.3	7.83	0.00	0.05	4.18	0.74	88.7	10.4	0.11
19	Prep.of cereal, flour, starch/milk;	0.37	0.02	0.99	0.80	0.01	0.56	0.01	0.36	2.78	0.10	3.23	0.00	0.24	0.36
20	Prep of vegetable, fruit, nuts or o	1.17	0.18	0.00	0.16	1.09	0.42	0.05	0.15	0.40	0.03	0.62	2.04	0.30	0.43
21	Miscellaneous edible preparations.	0.09	0.40	0.06	3.06	0.16	0.25	0.31	0.03	0.52	0.05	9.54	0.07	1.48	0.48
22	Beverages, spirits and vinegar.	0.20	0.24	2.86	0.11	0.49	0.33	0.01	0.39	0.10	0.05	0.29	0.94	5.90	0.13
23	Residues & waste from the food indu	5.28	0.77	1.54	0.38	9.32	0.22	0.16	0.24	0.01	0.15	0.83	0.04	0.89	1.93
24	Tobacco and manufactured tobacco	9.24	1.63	0.00	2.01	0.13	0.10	0.10	0.05	3.33	0.67	13.8	0.91	0.03	1.34

The above Table 9 showing Average RCA for Agricultural Products Group of India and thirteen ECOWAS Countries. The mean RCA reveals that there is no even single product which India has comparative advantage over all ECOWAS countries jointly.

This table depicts that India has RCA above one in ten Product Categories which are ***2.Meat and Edible Meat Offal;*** 3.Fish & Crustacean, Mollusc & Other Aquatic Invertebrates; ***9.Coffee, Tea, Matï And Spices;*** 13.Lac, Gums, Resins and other Vegetable Saps and Extracts; ***14.Vegetable Plaiting Materials, Vegetable Products Not Elsewhere Specified Or Included;*** 10.Cereals; ***12.Oil Seeds and Oleaginous Fruits, Miscellaneous Grains, Seeds and Fruit, Industrial or Medicinal Plants, Straw and Fodder;*** 17.Sugars and Sugar Confectionery; ***23.Residues and Waste from the Food Industries, Prepared Animal Fodder;*** and 24.Tobacco and Manufactured Tobacco Substitutes.

Table 10. India's ten Products of its Comparative Advantage

Product Code	*Product Description*	*BF*	*CV*	*CI*	*GHA*	*GUN*	*MAL*	*NRA*	*SL*	*TG*	*IND*
2	Meat and edible meat offal	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.00	0.01	1.36
3	Fish & crustacean, mollusc & other	0.10	52.78	0.15	0.82	1.26	0.03	0.27	12.9	0.02	2.23
9	Coffee, tea, matï and spices.	0.05	0.43	4.68	0.38	4.76	0.06	0.13	5.55	5.72	3.66
10	Cereals	0.74	0.00	0.14	0.04	0.19	0.40	0.02	0.02	0.40	3.21
12	Oil seed, oleagi fruits; miscell gr	12.6	0.02	0.29	1.31	0.05	0.78	0.85	4.36	1.07	1.03
13	Lac; gums, resins & other vegetable	0.11	0.00	0.02	0.04	0.00	1.37	2.35	0.00	0.04	10.3
14	Vegetable plaiting materials; veget	0.07	0.00	3.95	4.62	0.00	0.04	0.09	0.37	0.50	3.85
17	Sugars and sugar confectionery.	0.11	0.11	0.56	0.04	0.01	0.07	0.03	0.99	3.51	2.07
23	Residues & waste from the food indu	0.77	1.54	0.38	0.22	0.16	0.24	0.15	0.04	0.89	1.93
24	Tobacco and manufactured tobacco su	1.63	0.00	2.01	0.10	0.10	0.05	0.67	0.91	0.03	1.34

This implies that India has Comparative Advantage in production and exports of these product categories in this sector to ECOWAS countries with below one RCA in many product categories such as Mali, Ghana, Nigeria, Burkina Faso, Cape Verde, Togo, Cote d'Ivoire, Guinea and Sierra Leone.

Table 11. India – Benin mean RCA comparison

Product Code	*Product Description*	*BEN*	*IND*
2	Meat and edible meat offal	4.72	1.36
3	Fish & crustacean, mollusc & other	0.24	2.23
9	Coffee, tea, matï and spices.	0.15	3.66
10	Cereals	5.15	3.21
12	Oil seed, oleagi fruits; miscell gr	5.54	1.03
13	Lac; gums, resins & other vegetable	0.16	10.3
14	Vegetable plaiting materials; veget	21.29	3.85
17	Sugars and sugar confectionery.	6.10	2.07
23	Residues & waste from the food indu	5.28	1.93
24	Tobacco and manufactured tobacco su	9.24	1.34

From table 11 above, Benin appears to be more similar in trade with India in many categories except in three products which are 13.Lac, Gums, Resins and other Vegetable Saps and Extracts; ***9.Coffee, Tea, Matï and Spices;*** and 3.Fish & Crustacean, Mollusc & Other Aquatic Invertebrates where they are complementary.

The remaining countries like Gambia, Niger and Senegal appears to be slightly similar and slightly complementary in trade with India. Thus, India can export to these countries the products with RCA above one and in the products which are similar, trade cannot take place.

The rest of the fourteen product categories in Agricultural Sector, India has RCA below one indicating that it has weak performance in terms of beneficial exports. Hence, it can import from one or more ECOWAS members with comparative advantage depending on other factors such as tariffs, transport cost, Non-Tariff Barriers and other factors affecting trade as shown in table 9.

Table 12. Mean RCA for all countries; India's below 1 average RCA

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*GHA*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
1	Live animals	0.01	6.16	0.00	0.01	0.02	0.03	0.00	43.1	74.7	0.02	0.09	0.02	0.03	0.05
4	Dairy prod; birds' eggs; natural ho	0.64	0.02	0.04	0.19	0.01	0.18	0.01	0.20	0.13	0.17	1.04	12.8	3.61	0.26
5	Products of animal origin, nes or	0.52	0.12	0.11	0.01	0.29	0.01	0.06	0.01	0.00	0.02	0.10	2.63	0.02	0.62
6	Live tree & other plant; bulb, root	0.02	0.47	0.02	0.24	0.13	0.07	0.01	0.01	0.00	0.30	0.20	0.00	0.07	0.26
7	Edible vegetables and certain roots	0.05	0.97	0.02	0.05	6.93	0.91	0.00	0.15	15.3	0.01	4.26	0.20	0.30	0.99
8	Edible fruit and nuts; peel of citr	23.14	4.57	0.00	9.50	36.2	4.52	1.33	1.10	0.21	0.34	1.74	0.14	0.75	0.92
11	Prod. mill. indust; malt; starches;	3.37	0.29	3.55	1.64	6.24	1.18	0.09	0.17	0.27	0.05	2.70	33.7	6.87	0.60
15	Animal/veg fats & oils & their clea	11.08	1.14	0.12	3.17	20.1	1.45	0.45	0.08	10.3	0.03	4.09	4.94	5.57	0.61
16	Prep of meat, fish or crustaceans,	0.01	0.00	124	1.67	6.11	1.73	0.00	0.00	0.05	0.01	1.75	24.3	0.01	0.40
18	Cocoa and cocoa preparations.	0.00	0.00	0.00	124	0.00	75.3	7.83	0.00	0.05	4.18	0.74	88.7	10.4	0.11
19	Prep.of cereal, flour, starch/milk;	0.37	0.02	0.99	0.80	0.01	0.56	0.01	0.36	2.78	0.10	3.23	0.00	0.24	0.36
20	Prep of vegetable, fruit, nuts or o	1.17	0.18	0.00	0.16	1.09	0.42	0.05	0.15	0.40	0.03	0.62	2.04	0.30	0.43
21	Miscellaneous edible preparations.	0.09	0.40	0.06	3.06	0.16	0.25	0.31	0.03	0.52	0.05	9.54	0.07	1.48	0.48
22	Beverages, spirits and vinegar.	0.20	0.24	2.86	0.11	0.49	0.33	0.01	0.39	0.10	0.05	0.29	0.94	5.90	0.13

No any country with comparative advantage in production and export of 22.Beverages, spirits and vinegar; and 6.Live tree & other plant; bulb, root. Nigeria and Senegal has mean RCA above one in 19.Prep. of cereal, flour, starch/milk. Only Sierra Leone has mean RCA above one in 5.Products of animal origin, nes or

Table 13. Average RCA for Mineral Products, Products of The Chemical or Allied Industries

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*GHA*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
25	Salt; sulphur; earth & ston; plaste	10.86	0.80	0.12	1.14	10.27	0.91	0.02	0.08	0.48	0.16	33.96	1.94	117.00	2.37
26	Ores, slag and ash.	0.00	0.18	0.00	0.23	0.09	1.10	46.52	0.09	37.35	0.03	1.58	17.68	0.14	1.70
27	Mineral fuels, oils & product of th	0.11	0.06	0.00	1.49	0.00	1.18	0.04	0.03	1.09	6.41	1.21	0.00	0.29	1.02
28	Inorgn chem; compds of prec mtl, r	0.02	0.04	0.00	0.11	0.03	0.59	3.42	0.10	0.20	0.04	11.75	0.74	0.03	0.79
30	Pharmaceutical products.	0.12	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.01	0.07	0.00	0.00	1.80
31	Fertilisers.	0.02	0.01	0.06	0.01	0.00	0.03	0.00	0.03	0.02	0.00	0.17	0.00	0.11	1.19
29	Organic chemicals.	0.01	0.15	0.00	0.62	0.02	0.44	0.01	5.92	0.00	0.39	2.80	0.00	4.72	0.09
32	Tanning/dyeing extract; tannins &	0.52	0.08	0.02	0.33	0.00	0.15	0.00	0.14	0.04	0.01	0.19	0.01	0.06	1.69
33	Essential oils & resinoids; perf,	0.04	0.02	0.00	2.21	0.05	0.52	0.00	0.05	0.40	0.12	3.01	0.01	8.18	0.71
34	Soap, organic surface-active agents	0.34	0.02	0.00	2.39	0.64	0.14	0.03	0.14	0.00	0.07	2.05	0.50	0.65	0.47
35	Albuminoidal subs; modified starche	0.01	0.01	0.00	0.06	0.02	0.06	0.00	0.02	0.34	0.01	0.35	0.00	0.09	0.57
36	Explosives; pyrotechnic prod; match	0.24	2.25	0.00	0.10	0.00	1.70	0.74	0.71	0.00	3.37	1.35	21.77	0.09	1.28
37	Photographic or cinematographic goo	0.01	0.00	0.00	0.00	0.09	0.08	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.08
38	Miscellaneous chemical products.	0.04	0.17	0.00	0.21	0.02	0.09	0.00	0.02	0.03	0.03	0.53	0.00	0.01	0.98

Under this product group of Mineral Products and Products of The Chemical or Allied Industries, India has average RCA above one in seven out of fourteen product categories that forms this group. It has highest mean RCA in ***25.Salt, Sulphur, Earths and Stone, Plastering Materials, Lime and Cement*** followed by 30.Pharmaceutical products.

In all these seven product categories, India is perfectly complementary with Cape Verde and Mali as they both have weak mean RCA thus India can well export these products to them as shown in table 14.

Table 14. India CA over Mali and Cape Verde

Product Code	***Product Description***	***CV***	***MAL***	***IND***
25	Salt; sulphur; earth & ston; plaste	0.12	0.08	2.37
26	Ores, slag and ash.	0.00	0.09	1.70
27	Mineral fuels, oils & product of th	0.00	0.03	1.02
30	Pharmaceutical products.	0.00	0.00	1.80
31	Fertilisers.	0.06	0.03	1.19
32	Tanning/dyeing extract; tannins &	0.02	0.14	1.69
36	Explosives; pyrotechnic prod; match	0.00	0.71	1.28

Benin, Gambia and Togo forms complementary trade with India in all above-mentioned seven products except in 25.Salt, Sulphur, Earths and Stone, Plastering Materials, Lime and Cement where they are similar as they all have mean RCA above one.

Table 15. Trade Complementarity between India and Benin, Gambia and Togo

Product Code	***Product Description***	***BEN***	***GAM***	***TG***	***IND***
25	Salt; sulphur; earth & ston; plaste	10.86	10.27	117.00	2.37
26	Ores, slag and ash.	0.00	0.09	0.14	1.70
27	Mineral fuels, oils & product of th	0.11	0.00	0.29	1.02
30	Pharmaceutical products.	0.12	0.00	0.00	1.80
31	Fertilisers.	0.02	0.00	0.11	1.19
32	Tanning/dyeing extract; tannins &	0.52	0.00	0.06	1.69
36	Explosives; pyrotechnic prod; match	0.24	0.00	0.09	1.28

Both Guinea and Niger appears to be similar with India in 26.Ores, Slag and Ash. Niger also have similarity with India in 27.Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes. Above all, India can benefit from exporting the products of its comparative advantage to these two countries too as depicted in Table 16.

Table 16. Trade between India and Guinea and Niger

Product Code	*Product Description*	*GUN*	*NGR*	*IND*
25	Salt; sulphur; earth & ston; plaste	0.02	0.48	2.37
26	Ores, slag and ash.	46.52	37.35	1.70
27	Mineral fuels, oils & product of th	0.04	1.09	1.02
30	Pharmaceutical products.	0.00	0.00	1.80
31	Fertilisers.	0.00	0.02	1.19
32	Tanning/dyeing extract; tannins &	0.00	0.04	1.69
36	Explosives; pyrotechnic prod; match	0.74	0.00	1.28

Rest of ECOWAS countries constitutes of some similarity and other complementarity in different product categories as shown in Table 13. For example, India can export three out of seven products to Senegal. These are 30.Pharmaceutical products; 31.Fertilizers and 32.Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks.

The most dominant feature under this sector (Table 17) is that India has Comparative Advantage over ALL members of ECOWAS in three product categories which are 30.Pharmaceutical products; 31.Fertilizers and 32.Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks. India can enjoy fully-fledged exporting these commodities to all ECOWAS countries.

Table 17. India's CA over all ECOWAS countries

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*GHA*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
30	Pharmaceutical products.	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
31	Fertilisers.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	1.1
32	Tanning/dyeing extract; tannins &	0.5	0.0	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	1.6

Neither India nor any ECOWAS country has mean RCA above one in three product categories of ***35.Albuminoidal substances, modified starches, glues, enzymes;*** 37.Photographic or cinematographic goods and ***38.Miscellaneous chemical products*** hence no any mutual beneficial bilateral trade can be done between these commodities.

Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Niger, Nigeria and Sierra Leone have average RCA below one in all commodities that India has mean RCA below one. This forms perfect trade similarity between India and these countries as well as between themselves and hence no basis for mutual beneficial bilateral trade. Results displayed in Table 18.

Table 18. India's Similarity with 8 ECOWAS countries

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*GAM*	*GHA*	*NGR*	*NRA*	*SL*	*IND*
28	Inorgn chem; compds of prec mtl, r	0.02	0.04	0.00	0.03	0.59	0.20	0.04	0.74	0.79
29	Organic chemicals.	0.01	0.15	0.00	0.02	0.44	0.00	0.39	0.00	0.09
33	Essential oils & resinoids; perf,	0.04	0.02	0.00	0.05	0.52	0.40	0.12	0.01	0.71
34	Soap, organic surface-active agents	0.34	0.02	0.00	0.64	0.14	0.00	0.07	0.50	0.47
35	Albuminoidal subs; modified starche	0.01	0.01	0.00	0.02	0.06	0.34	0.01	0.00	0.57
37	Photographic or cinematographic goo	0.01	0.00	0.00	0.09	0.08	0.06	0.00	0.00	0.08
38	Miscellaneous chemical products.	0.04	0.17	0.00	0.02	0.09	0.03	0.03	0.00	0.98

In the seven products of its comparative disadvantage, India can trade most by importing from Senegal as Senegal has mean RCA above one in four of these product categories. These are ***28.Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes***; 29.Organic Chemicals; ***33.Essential oils and resinoids, perfumery, cosmetic or toilet preparations*** and 34.Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, "dental waxes" and dental preparations with a basis of plaster.

Apart from Senegal, India has trade complementarity thus can also trade with Cote d'Ivoire and Togo in two products as well as with Guinea and Mali in one product each as below Table 19 shows.

Table 19.India's complementarity with Guinea, Mali, Senegal and Togo

Product Code	*Product Description*	*GUN*	*MAL*	*SEN*	*TG*	*IND*
28	Inorgn chem; compds of prec mtl, r	3.42	0.10	11.75	0.03	0.79
29	Organic chemicals.	0.01	5.92	2.80	4.72	0.09
33	Essential oils & resinoids; perf,	0.00	0.05	3.01	8.18	0.71
34	Soap, organic surface-active agents	0.03	0.14	2.05	0.65	0.47
35	Albuminoidal subs; modified starche	0.00	0.02	0.35	0.09	0.57
37	Photographic or cinematographic goo	0.00	0.00	0.01	0.00	0.08
38	Miscellaneous chemical products.	0.00	0.02	0.53	0.01	0.98

Table 20. Average RCA for Plastics, Rubber, Animal Products and Wood Products

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*AV*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
39	Plastics and articles thereof.	0.13	0.04	0.00	0.34	0.01	0.48	0.22	0.06	0.04	0.06	0.47	0.54	2.85	0.53
40	Rubber and articles thereof.	0.04	0.02	0.02	4.89	0.02	0.47	1.41	0.05	0.66	0.68	0.12	0.08	0.02	0.78
41	Raw hides and skins (other than fu	0.10	1.89	0.06	0.12	0.17	0.02	0.03	1.99	0.03	3.53	2.87	0.00	0.08	1.94
42	Articles of leather; saddlery/harne	0.01	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.01	0.01	2.06
43	Furskins and artificial fur; manuf	0.05	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03
44	Wood and articles of wood; wood ch	2.87	0.01	0.01	2.48	16.49	4.27	1.19	0.11	0.00	0.10	0.25	6.26	0.21	0.14
45	Cork and articles of cork.	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.92	0.00	0.00	0.01	0.01	0.08
46	Manufactures of straw, esparto/othe	1.17	0.12	0.00	5.49	0.20	0.87	0.02	2.87	0.01	0.01	8.99	0.60	121.80	0.31
47	Pulp of wood/of other fibrous cellu	0.01	0.00	0.00	0.02	0.33	0.02	0.00	0.00	0.10	0.01	0.00	0.00	0.02	0.01
48	Paper & paperboard; art of paper pu	0.07	0.01	0.00	0.46	0.02	0.26	0.00	0.02	0.00	0.01	0.55	0.00	0.18	0.35
49	Printed books, newspapers, pictures	0.43	0.06	0.01	0.03	3.35	0.34	8.78	0.02	0.00	0.20	0.23	0.03	0.17	0.41

As the table 20 displays the average RCA for Plastics, Rubber, Animal Products and Wood Products for thirteen ECOWAS countries and India together. India has RCA above one in only two product out of eleven categories. The two categories are ***41.Raw hides and skins (other than furskins) and leather*** and 42.Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut).

India has comparative advantage over all thirteen ECOWAS members in products of 42. Articles of leather; saddlery/harne, thus, it can specialize in producing and trading by exporting to ECOWAS countries as they all have mean RCA below one and form Trade Complementarity with India.

Four among the nine products which India has comparative disadvantage as having mean RCA below one, all thirteen ECOWAS countries also have average RCA below one forming trade similarity with India as well as with themselves. There is no basis for mutual beneficial trade between India and ECOWAS members in these commodities. Neither India nor any of ECOWAS counties can specialize in production and exports of these products. These product categories are ***43.Furskins and artificial fur; manufactures thereof;*** 45.Cork and articles of cork; ***47.Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard;*** and 48.Paper and paperboard; articles of paper pulp, of paper or of paperboard

Further analysis shows that, only Togo has mean RCA above one in category of 39.Plastics and articles thereof. Togo can then trade by exporting these products to other ECOWAS countries because they are complementary. Since India too has comparative disadvantage in these commodities, there trade complementary between them and hence potential for mutual beneficial trade.

Cote d'Ivoire and Guinea has mean RCA above one in 40.Rubber and articles thereof. Meanwhile, both Gambia and Guinea has comparative advantage in 49.Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans. In these two product categories, India has mean RCA below one signifying the state of comparative disadvantage and hence complementarity in trade. India can then trade by importing from these three countries each with the product of its comparative advantage.

Table 21. Average RCA for Textiles and Textile Articles

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*AV*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
50	Silk.	0.00	0.00	0.00	0.04	0.22	0.01	0.00	0.00	7.22	0.02	0.00	0.00	0.00	4.64
51	Wool, fine/coarse animal hair, hors	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.68
52	Cotton.	131.45	56.40	0.15	5.13	0.05	1.45	0.34	32.69	0.02	0.38	2.71	0.00	20.72	7.00
53	Other vegetable textile fibres; pap	0.00	0.00	0.04	0.19	0.57	0.09	0.02	0.09	0.03	0.01	0.04	0.01	34.64	5.04
54	Man-made filaments.	0.02	0.02	0.01	0.03	0.05	0.02	0.00	0.00	0.01	0.00	0.18	0.00	0.06	2.70
55	Man-made staple fibres.	0.08	0.01	0.00	0.02	0.00	0.01	0.00	0.04	0.03	0.17	2.35	0.00	0.33	3.02
56	Wadding, felt & nonwoven; yarns; tw	0.09	0.37	0.00	0.20	0.00	0.36	0.00	0.00	0.01	0.00	0.32	0.00	3.58	0.74
57	Carpets and other textile floor co	0.01	0.00	0.00	0.01	0.05	0.47	0.00	0.00	0.01	0.01	0.01	0.02	0.00	6.00
58	Special woven fab; tufted tex fab;	0.50	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.29	1.44
59	Impregnated, coated, cover/laminate	0.02	0.01	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.46
60	Knitted or crocheted fabrics.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.45
61	Art of apparel & clothing access,	0.01	0.01	4.39	0.01	0.02	0.03	0.00	0.00	7.46	0.00	0.01	0.02	0.14	1.94
62	Art of apparel & clothing access, n	0.04	0.02	4.72	0.00	0.00	0.03	0.00	0.00	0.18	0.00	0.03	0.00	0.05	2.40
63	Other made up textile articles; set	0.07	0.43	1.03	0.73	0.33	0.45	0.02	0.11	0.01	0.15	0.72	0.05	4.23	4.00

The average RCA displayed in Table 21 from the Textiles and Textile Articles product group are for fourteen product categories. Among the fourteen categories, India has RCA below one in only four categories. In these products, only Togo has mean RCA above one in Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof and from complementarity with India.

All ECOWAS countries have mean RCA below one in other three categories which India is disadvantaged comparatively. Since they are similar, no room for mutual bilateral trade between them and India as well. These products are ***51.Wool, fine or coarse animal hair; horsehair yarn and woven fabric;*** 59.Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use; and ***60.Knitted or crocheted fabrics.***

India has comparative advantage over all ECOWAS countries in three products. It has mean RCA above one in ***54.Man-made filaments;*** 58.Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery; and ***57.Carpets and other textile floor coverings*** hence complementarity with all ECOWAS countries.

Trade on Cotton between India and six ECOWAS countries (Cape Verde, Gambia, Guinea, Niger, Nigeria and Sierra Leone) is Complementary as India has mean RCA above one. The remaining ECOWAS members appears to be similar with India in this product.

Among ECOWAS countries, only Togo, Niger, Senegal and Cape Verde has mean RCA above one respectively in the following products: ***53.Other vegetable textile fibres, paper yarn and woven fabrics of paper yarn;*** 50.Silk; ***55.Man-made staple fibres*** and ***62.Articles of apparel and clothing accessories, not knitted or crocheted.*** Since India too has mean RCA above one in these four products, there is trade similarity between them. In the same product categories, India has trade complementarity with all ECOWAS countries and can trade by exporting to them.

Table 22. Average RCA for Industrial Products

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*AV*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
64	Footwear, gaiters and the like; par	0.01	0.01	11.66	0.57	0.00	0.27	0.00	0.01	0.02	0.13	0.23	0.00	0.12	1.18
65	Headgear and parts thereof.	0.05	0.00	2.84	0.02	0.00	0.00	0.00	0.14	0.01	0.00	0.09	0.00	0.04	0.26
66	Umbrellas, walking-sticks, seat-sti	0.21	0.01	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.06
67	Prepr feathers & down; arti flower;	0.38	0.00	0.00	0.09	0.00	0.25	0.00	0.00	0.01	0.22	19.64	0.00	56.38	2.72
68	Art of stone, plaster, cement, asbe	0.07	0.01	0.00	0.06	0.00	0.01	0.00	0.00	0.02	0.00	0.16	0.02	0.02	1.58
69	Ceramic products.	0.02	0.06	0.00	0.01	0.12	0.06	0.00	0.00	3.41	0.00	0.10	0.00	0.06	0.82
70	Glass and glassware.	0.13	0.02	0.00	0.01	0.24	0.10	0.00	0.00	0.04	0.07	0.17	0.02	0.03	0.50
71	Natural/cultured pearls, prec stone	0.28	16.42	0.00	1.26	0.01	13.36	12.38	27.52	0.03	0.00	3.16	0.10	0.08	4.46
72	Iron and steel.	1.66	0.15	0.06	0.11	0.77	0.08	0.05	0.08	0.00	0.01	1.46	0.62	1.37	1.25
73	Articles of iron or steel.	0.22	0.06	0.00	0.15	0.18	0.11	0.03	0.06	0.00	0.02	0.30	0.10	0.47	1.30
74	Copper and articles thereof.	0.04	0.00	0.01	0.03	0.07	0.08	0.00	0.03	0.01	0.05	0.49	0.01	0.05	1.09
75	Nickel and articles thereof.	0.01	0.00	0.00	0.00	0.07	0.34	0.00	0.00	0.00	0.04	0.00	0.00	0.83	0.32
76	Aluminium and articles thereof.	0.07	0.01	0.00	0.03	0.02	0.68	0.00	0.01	0.01	0.14	0.19	0.00	0.05	0.87
78	Lead and articles thereof.	0.01	0.00	0.00	0.23	0.00	1.11	0.00	0.32	0.00	1.16	3.29	0.00	0.01	1.46
79	Zinc and articles thereof.	0.02	19.16	0.00	0.01	0.00	0.02	0.04	0.02	0.00	0.07	0.03	0.00	0.03	2.37
80	Tin and articles thereof.	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.55	0.08	0.57	0.04	0.00	0.00	0.30
81	Other base metals; cermets; article	0.00	0.02	0.00	0.20	0.08	0.08	0.00	0.00	0.01	0.07	0.06	0.10	0.01	0.18
82	Tool, implement, cutlery, spoon & f	0.19	0.05	0.00	0.23	0.06	0.15	0.02	0.04	0.10	0.01	0.33	0.77	0.04	0.76
83	Miscellaneous articles of base meta	0.01	0.01	0.00	0.07	0.00	0.01	0.01	0.00	0.04	0.65	0.04	0.01	0.01	0.47

Table 22 with the group that carries nineteen product categories whereby India has mean RCA above one in nine of them and below one in the rest ten categories.

In three commodities where India has comparative advantage, all the ECOWAS countries have mean RCA below one forming a trade complementarity between them and India. These products are ***68.Articles of stone, plaster, cement, asbestos, mica or similar materials***; 73.Articles of iron or steel and ***74.Copper and articles thereof.***

Only Burkina Faso and Cape Verde have mean RCA above one in ***79.Zinc and articles thereof*** and 64.Footwear, gaiters and the like; parts of such articles, respectively. They reveals trade similarity with India in these commodities and no mutual beneficial trade can exist. The remaining ECOWAS countries has mean RCA below one forming complementarity and basis for bilateral trade with India. Therefore, India can export from the rest of ECOWAS countries except Burkina Faso and Cape Verde.

On the second hand of products which India has RCA below one, only two ECOWAS countries Niger and Cape Verde has RCA above one in products ***69.Ceramic products*** and 65.Headgear and parts thereof respectively. This forms trade complementary between India and Niger and India and Cape Verde in respective products and trade similarity between India and the rest of ECOWAS members.

From the table, it is clear that, in eight product categories, both India all ECOWAS countries has average RCA below one. This implies the existence of bilateral trade similarity between themselves and with India as well. No potential for trade in these commodities. The eight categories are: ***70.Glass and glassware;*** 75.Nickel and articles thereof; ***76.Aluminium and articles thereof;*** 80.Tin and articles thereof; ***82.Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal;*** 83.Miscellaneous articles of base metal ***81.Other base metals; cermets; articles thereof;*** and 66.Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof.

Table 23. Average RCA for Machinery & Electrical Appliances, Electronics and Arms & Ammunition

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*AV*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
84	Nuclear reactors, boilers, mchy & m	0.16	0.08	0.00	0.06	0.02	0.05	0.03	0.07	0.04	0.01	0.10	0.15	0.07	0.37
85	Electrical mchy equip parts thereof	0.04	0.02	0.00	0.03	0.00	0.01	0.01	0.02	0.27	0.00	0.10	0.03	0.01	0.27
86	Railw/tramw locom, rolling-stock &	0.20	0.05	0.00	0.19	0.08	0.18	0.32	0.14	0.41	0.01	0.16	0.20	0.03	0.25
87	Vehicles o/t railw/tramw roll-stock	0.08	0.05	0.00	0.18	0.02	0.03	0.02	0.06	0.01	0.00	0.14	0.33	0.14	0.50
88	Aircraft, spacecraft, and parts the	0.02	0.15	0.00	0.40	0.00	0.03	0.03	0.18	0.26	0.10	0.43	0.00	0.04	0.52
89	**Ships, boats and floating structure**	**1.28**	**0.00**	**0.03**	**2.67**	**0.02**	**0.02**	**0.91**	**0.00**	**0.00**	**2.70**	**0.29**	**0.00**	**0.04**	**1.63**
90	Optical, photo, cine, meas, checkin	0.05	0.01	0.00	0.03	0.00	0.03	0.01	0.01	0.00	0.00	0.03	0.00	0.01	0.23
91	Clocks and watches and parts thereo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.11
92	Musical instruments; parts and ace	0.08	0.04	0.00	0.04	0.93	0.07	0.10	0.11	0.12	0.00	0.25	0.00	0.01	0.16
93	Arms and ammunition; parts and acc	0.01	0.06	0.00	0.46	0.00	0.06	0.00	0.42	0.01	0.00	0.42	0.00	0.00	0.26

The average RCA in Table 23 is for ten product categories that falls under the group of Machinery, Electronic Appliances, Electronics and Arms and Ammunition for India and thirteen ECOWAS countries. Benin, Cote d'Ivoire, Nigeria and India has mean RCA above one in only one product category of ***89.Ships, boats and floating structures.*** India is similar with these countries under this category.

Trade is complementary between India and the rest of ten ECOWAS members as they all have mean RCA below one in 89.Ships, boats and floating structures.

In all remaining nine categories under this product group, India has comparative disadvantage together with all ECOWAS countries having average RCA below one. This is an indication that there is no basis for trade between themselves, as they appears to be too similar.

India has no comparative disadvantage in products ranging from **HS 84** to **HS 93** except for only **HS 89** in which Benin, Cote d'Ivoire and Nigeria also do.

Table 24. Average RCA for Miscellaneous Manufactured Articles and Work of Arts

Product Code	*Product Description*	*BEN*	*BF*	*CV*	*CI*	*GAM*	*AV*	*GUN*	*MAL*	*NGR*	*NRA*	*SEN*	*SL*	*TG*	*IND*
94	Furniture; bedding, mattress, matt	0.15	0.12	0.00	0.04	0.02	0.08	0.01	0.05	0.01	0.01	0.12	0.02	0.19	0.29
95	Toys, games & sports requisites; pa	0.00	0.00	0.89	0.00	0.07	0.01	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.16
96	Miscellaneous manufactured articles	0.01	0.01	0.00	0.15	0.11	0.30	0.04	0.05	0.02	0.07	0.12	0.01	0.03	0.80
97	Works of art, collectors' pieces an	0.08	0.32	0.00	0.08	**3.04**	0.02	0.03	0.06	0.00	0.03	0.60	0.01	0.07	0.92

In table 4.16 with average RCA for Miscellaneous Manufactured Articles and Work of Arts, India has no RCA above one in either of the four categories. All ECOWAS countries has mean RCA below one in all commodities except Gambia with RCA of 3.04 in ***97. Works of art, collectors' pieces and antiques.***

India can only trade by importing from Gambia because they are complementary in this category. Rest of ECOWAS countries can also form bilateral beneficial trade with Gambia.

The remaining three products HS 94, HS 95 and HS 96, all ECOWAS members have below one mean RCA. They are all similar in trade and no possibility for bilateral trade among themselves as well as with India. India can import from other countries apart from ECOWAS bloc.

In the following table 25 to 37 are the Bilateral RCA Comparisons between India and each ECOWAS country. These tables reveals the Bilateral Trade Compatibility that exists between them.

Table 25. Trade Complementarity between India and Burkina Faso

Product Code	Product Description	India	Burkina Faso
1	Live animals		6.16
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
8	Edible fruit and nuts; peel of citr		4.57
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;	3.37	
14	Vegetable plaiting materials; veget	3.85	
15	Animal/veg fats & oils & their clea		1.14
17	Sugars and sugar confectionery.	2.07	
23	Residues & waste from the food indu	1.93	
25	Salt; sulphur; earth & ston; plaste	2.37	
26	Ores, slag and ash.	1.70	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
42	Articles of leather; saddlery/harne	2.06	
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
89	Ships, boats and floating structure	1.63	

Table 26. Trade Complementarity between India and Benin

Product Code	Product Description	Mean RCA	
		Benin	India
8	Edible fruit and nuts; peel of citr	23.14	0.92
15	Animal/veg fats & oils & their clea	11.08	0.61
20	Prep of vegetable, fruit, nuts or o	1.17	0.43
44	Wood and articles of wood; wood	2.87	0.14
46	Manufactures of straw, esparto/othe	1.17	0.31
26	Ores, slag and ash.	0.00	1.70
27	Mineral fuels, oils & product of th	0.11	1.02
29	Organic chemicals.	0.01	1.80
30	Pharmaceutical products.	0.12	1.19
32	Tanning/dyeing extract; tannins &	0.52	1.69
36	Explosives; pyrotechnic prod;	0.24	1.28
41	Raw hides and skins (other than fu	0.10	1.94
42	Articles of leather; saddlery/harne	0.01	2.06
50	Silk.		4.64
53	Other vegetable textile fibres; pap	0.00	5.04
54	Man-made filaments.	0.02	2.70
55	Man-made staple fibres.	0.08	3.02
57	Carpets and other textile floor co	0.01	6.00
58	Special woven fab; tufted tex fab;	0.50	1.44
61	Art of apparel & clothing access,	0.01	1.94
62	Art of apparel & clothing access, n	0.04	2.40
63	Other made up textile articles; set	0.07	4.00
64	Footwear, gaiters and the like; par	0.01	1.18
67	Prepr feathers & down; arti flower;	0.38	2.72
68	Art of stone, plaster, cement, asbe	0.07	1.58
71	Natural/cultured pearls, prec stone	0.28	4.46
73	Articles of iron or steel.	0.22	1.30
74	Copper and articles thereof.	0.04	1.09
78	Lead and articles thereof.	0.01	1.46
79	Zinc and articles thereof.	0.02	2.37

Table 27. Trade Complementarity between India and Cape Verde

Product Code	Product Description	India	Cape Verde
2	Meat and edible meat offal	1.36	
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		3.55
12	Oil seed, oleagi fruits; miscell gr	1.03	
13	Lac; gums, resins & other vegetable	10.30	
14	Vegetable plaiting materials; veget	3.85	
16	Prep of meat, fish or crustaceans,		124.55
17	Sugars and sugar confectionery.	2.07	
22	Beverages, spirits and vinegar.	2.86	
24	Tobacco and manufactured tobacco su	1.34	
25	Salt; sulphur; earth & ston; plaste	2.37	
26	Ores, slag and ash.	1.70	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
36	Explosives; pyrotechnic prod; match	1.28	
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
50	Silk.	4.64	
52	Cotton.	7.00	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
65	Headgear and parts thereof.		2.84
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 28. Trade Complementarity between India and Cote d'Ivoire

Product Code	Product Description	India	Cote d'Ivoire
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
8	Edible fruit and nuts; peel of citr		9.50
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		1.64
12	Oil seed, oleagi fruits; miscell gr	1.03	
13	Lac; gums, resins & other vegetable	10.30	
15	Animal/veg fats & oils & their clea		3.17
16	Prep of meat, fish or crustaceans,		1.67
17	Sugars and sugar confectionery.	2.07	
18	Cocoa and cocoa preparations.		124.48
21	Miscellaneous edible preparations.		3.06
23	Residues & waste from the food indu	1.93	
26	Ores, slag and ash.	1.70	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
33	Essential oils & resinoids; perf,		2.21
34	Soap, organic surface-active agents		2.39
36	Explosives; pyrotechnic prod; match	1.28	
40	Rubber and articles thereof.		4.89
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
44	Wood and articles of wood; wood ch		2.48
46	Manufactures of straw, esparto/othe		5.49
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	

Table 29. Trade Complementarity between India and Gambia

Product Code	Product Description	India	Gambia
2	Meat and edible meat offal	1.36	
7	Edible vegetables and certain roots		6.93
8	Edible fruit and nuts; peel of citr		36.20
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		6.24
13	Lac; gums, resins & other vegetable	10.30	
15	Animal/veg fats & oils & their clea		20.19
16	Prep of meat, fish or crustaceans,		6.11
17	Sugars and sugar confectionery.	2.07	
20	Prep of vegetable, fruit, nuts or o		1.09
24	Tobacco and manufactured tobacco su	1.34	
26	Ores, slag and ash.	1.70	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
36	Explosives; pyrotechnic prod; match	1.28	
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
44	Wood and articles of wood; wood ch		16.49
49	Printed books, newspapers, pictures		3.35
50	Silk.	4.64	
52	Cotton.	7.00	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	
97	Works of art, collectors' pieces an		3.04

Table 30. Trade Complementarity between India and Ghana

Product Code	Product Description	India	Ghana
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
8	Edible fruit and nuts; peel of citr		4.52
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		1.18
13	Lac; gums, resins & other vegetable	10.30	
15	Animal/veg fats & oils & their clea		1.45
16	Prep of meat, fish or crustaceans,		1.73
18	Cocoa and cocoa preparations.		75.37
17	Sugars and sugar confectionery.	2.07	
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
25	Salt; sulphur; earth & ston; plaste	2.37	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
44	Wood and articles of wood; wood ch		4.27
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 31. Trade Complementarity between India and Guinea

Product Code	Product Description	India	Guinea
2	Meat and edible meat offal	1.36	
8	Edible fruit and nuts; peel of citr		1.33
10	Cereals	3.21	
12	Oil seed, oleagi fruits; miscell gr	1.03	
13	Lac; gums, resins & other vegetable	10.30	
14	Vegetable plaiting materials; veget	3.85	
17	Sugars and sugar confectionery.	2.07	
18	Cocoa and cocoa preparations.	7.83	
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
25	Salt; sulphur; earth & ston; plaste	2.37	
27	Mineral fuels, oils & product of th	1.02	
28	Inorgn chem; compds of prec mtl, r		3.42
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
36	Explosives; pyrotechnic prod; match	1.28	
40	Rubber and articles thereof.		1.41
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
44	Wood and articles of wood; wood ch		1.19
49	Printed books, newspapers, pictures		8.78
50	Silk.	4.64	
52	Cotton.	7.00	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 32. Trade Complementarity between India and Mali

Product Code	Product Description	India	Mali
1	Live animals		43.08
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
8	Edible fruit and nuts; peel of citr		1.10
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
12	Oil seed, oleagi fruits; miscell gr	1.03	
14	Vegetable plaiting materials; veget	3.85	
17	Sugars and sugar confectionery.	2.07	
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
25	Salt; sulphur; earth & ston; plaste	2.37	
26	Ores, slag and ash.	1.70	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
36	Explosives; pyrotechnic prod; match	1.28	
42	Articles of leather; saddlery/harne	2.06	
46	Manufactures of straw, esparto/othe		2.87
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 33. Trade Complementarity between India and Niger

Product Code	Product Description	India	Niger
1	Live animals		74.73
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
7	Edible vegetables and certain roots		15.32
12	Oil seed, oleagi fruits; miscell gr	1.03	
13	Lac; gums, resins & other vegetable	10.30	
14	Vegetable plaiting materials; veget	3.85	
15	Animal/veg fats & oils & their clea		10.38
19	Prep.of cereal, flour, starch/milk;		2.78
23	Residues & waste from the food indu	1.93	
25	Salt; sulphur; earth & ston; plaste	2.37	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
36	Explosives; pyrotechnic prod; match	1.28	
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 34. Trade Complementarity between India and Nigeria

Product Code	Product Description	India	Nigeria
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
9	Coffee, tea, matï and spices.	3.66	
10	Cereals	3.21	
12	Oil seed, oleagi fruits; miscell gr	1.03	
14	Vegetable plaiting materials; veget	3.85	
17	Sugars and sugar confectionery.	2.07	
18	Cocoa and cocoa preparations.		4.18
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
25	Salt; sulphur; earth & ston; plaste	2.37	
26	Ores, slag and ash.	1.70	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
42	Articles of leather; saddlery/harne	2.06	
50	Silk.	4.64	
52	Cotton.	7.00	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
79	Zinc and articles thereof.	2.37	

Table 35. Trade Complementarity between India and Senegal

Product Code	Product Description	India	Senegal
2	Meat and edible meat offal	1.36	
4	Dairy prod; birds' eggs; natural ho		1.04
7	Edible vegetables and certain roots		4.26
8	Edible fruit and nuts; peel of citr		1.74
9	Coffee, tea, matï and spices.	3.66	
11	Prod.mill.indust; malt; starches;		2.70
14	Vegetable plaiting materials; veget	3.85	
15	Animal/veg fats & oils & their clea		4.09
16	Prep of meat, fish or crustaceans,		1.75
17	Sugars and sugar confectionery.	2.07	
19	Prep.of cereal, flour, starch/milk;		3.23
21	Miscellaneous edible preparations.		9.54
23	Residues & waste from the food indu	1.93	
28	Inorgn chem; compds of prec mtl, r		11.75
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
31	Fertilisers.		2.80
32	Tanning/dyeing extract; tannins &	1.69	
33	Essential oils & resinoids; perf,		3.01
34	Soap, organic surface-active agents		2.05
42	Articles of leather; saddlery/harne	2.06	
46	Manufactures of straw, esparto/othe		8.99
50	Silk.	4.64	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
68	Art of stone, plaster, cement, asbe	1.58	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 36. Trade Complementarity between India and Sierra Leone

Product Code	Product Description	India	Sierra Leone
2	Meat and edible meat offal	1.36	
4	Dairy prod; birds' eggs; natural ho		12.75
5	Products of animal origin, nes or		2.63
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		33.65
13	Lac; gums, resins & other vegetable	10.30	
14	Vegetable plaiting materials; veget	3.85	
15	Animal/veg fats & oils & their clea		4.94
16	Prep of meat, fish or crustaceans,		24.36
17	Sugars and sugar confectionery.	2.07	
18	Cocoa and cocoa preparations.		88.77
20	Prep of vegetable, fruit, nuts or o		2.04
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
44	Wood and articles of wood; wood ch		6.26
50	Silk.	4.64	
52	Cotton.	7.00	
53	Other vegetable textile fibres; pap	5.04	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
63	Other made up textile articles; set	4.00	
64	Footwear, gaiters and the like; par	1.18	
67	Prepr feathers & down; arti flower;	2.72	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
72	Iron and steel.	1.25	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

Table 37. Trade Complementarity between India and Togo

Product Code	Product Description	India	Togo
2	Meat and edible meat offal	1.36	
3	Fish & crustacean, mollusc & other	2.23	
4	Dairy prod; birds' eggs; natural ho		3.61
10	Cereals	3.21	
11	Prod.mill.indust; malt; starches;		6.87
13	Lac; gums, resins & other vegetable	10.30	
14	Vegetable plaiting materials; veget	3.85	
15	Animal/veg fats & oils & their clea		5.57
18	Cocoa and cocoa preparations.		10.41
21	Miscellaneous edible preparations.		1.48
22	Beverages, spirits and vinegar.		5.90
23	Residues & waste from the food indu	1.93	
24	Tobacco and manufactured tobacco su	1.34	
26	Ores, slag and ash.	1.70	
27	Mineral fuels, oils & product of th	1.02	
29	Organic chemicals.	1.80	
30	Pharmaceutical products.	1.19	
32	Tanning/dyeing extract; tannins &	1.69	
33	Essential oils & resinoids; perf,		8.18
36	Explosives; pyrotechnic prod; match	1.28	
39	Plastics and articles thereof.		2.85
41	Raw hides and skins (other than fu	1.94	
42	Articles of leather; saddlery/harne	2.06	
46	Manufactures of straw, esparto/othe		121.80
50	Silk.	4.64	
54	Man-made filaments.	2.70	
55	Man-made staple fibres.	3.02	
56	Wadding, felt & nonwoven; yarns; tw		3.58
57	Carpets and other textile floor co	6.00	
58	Special woven fab; tufted tex fab;	1.44	
61	Art of apparel & clothing access,	1.94	
62	Art of apparel & clothing access, n	2.40	
64	Footwear, gaiters and the like; par	1.18	
68	Art of stone, plaster, cement, asbe	1.58	
71	Natural/cultured pearls, prec stone	4.46	
73	Articles of iron or steel.	1.30	
74	Copper and articles thereof.	1.09	
78	Lead and articles thereof.	1.46	
79	Zinc and articles thereof.	2.37	
89	Ships, boats and floating structure	1.63	

4.2 Stability Analysis; Export Specialization Analysis

4.2.1 Stability of Export Specialization

In his paper Krugman (1987), presented a stability in the specialisation pattern of countries predicting model, given the presence of economies of scale. His model was based on neoclassical point of view highlighting *"that the productivity of resources in each sector, in each country, depends on an index of cumulative experience ('learning-by-doing'), creating economies of scale at the level of the industry. As a result, if a pattern of specialisation is formed in the model (for example, by chance), it remains constant, with increases in relative productivity acting to lock the pattern in even further."*

Dosi et al. (1990) described how divergence/convergence in trade specialisation patterns might be related to overall growth performance. The essential premise is that if overall growth performance diverges, this is interpreted as a result of cumulative innovation, which is reflected in divergence in trade specialisation patterns. If, on the other hand, growth performance convergence is the major feature, this is mostly due to technological diffusion, which is represented in converging trade specialisation patterns.\.

Dalum, Laursen & Villumsen[27] stated that, the methodology for testing whether countries are stable across sectors and whether they tend to become more or less specialised intra-country i.e. cross-sectoral on one hand and the test of whether countries tend to converge within the same sector on the other hand are analogous. They employed a method first used in the context of specialisation by John Cantwell (1989) whose source of inspiration was a 'Galtonian' regression model presented by Hart & Prais (1956). The regression equation $\boldsymbol{RSCA_{ij}^{t2} = \alpha_j + \beta_j RSCA_{ij}^{t1} + \varepsilon_{ij}}$ is used to examine stability (and specialisation trends) country by country. It's worth noting that nothing is said on these grounds concerning the factors that influenced a country's original export specialisation pattern.

[27] Dalum, Laursen, and Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness.'"

Stability of Specialization of Country's Exports is done by using RSCA instead of Balassa (1965) RCA Index as it was suggested by Laursen (2015)[28] that the un-adjusted RCA has symmetrical problems. Because Balassa RCA Index received non-symmetrical criticisms, Laursen (2015) addressed the problem by suggesting RSCA Index [-1, 1]

According to him, a 'pure' RCA is non-comparable in either sides of unity. The country that RCA Index taking range of values 0 to 1 is classified as not specialized in that sector/commodity and values ranging from 1 to $+\infty$ implies that the country is specialized. He argued that using non-adjusted RCA in either regression analysis or some other statistical analysis imposes much more weight to values > 1 in comparison to the counterpart observations with RCA < 1.

Laursen (2015) also expressed the asymmetric problem in the context of regression analysis that the disadvantages of the Balassa measure is the inherent risk of lack of normality in its distribution because it takes values between zero and infinity with a (weighted) average of 1.0. A skewed distribution is likely to violate the assumption of normality of the error term in regression analysis and to produce unreliable t-statistics.

If the non-adjusted RCA is used to estimate export stability regression equation the estimates might be biased (an example of an application of a non-adjusted RCA (an example of an application of a non-adjusted RCA includes Crafts & Thomas (1986)[29]

Konstantakopoulou & Tsionas[30] employed Revealed Symmetric Comparative Advantage Index (RSCA) suggested by Laursen (2015) to deal with symmetrical problems encountered by RCA. The RSCA Index, is a transformation of the RCA Index that has the following form:

$$RSCA_k^i = (RCA_k^i - 1)/(RCA_k^i + 1) \ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Where; $-1 < RSCA_k^i < +1$

[28] Laursen, "Revealed Comparative Advantage and the Alternatives as Measures of International Specialization," 2015.

[29] Crafts and Thomas, "Comparative Advantage in UK Manufacturing Trade, 1910-1935."

[30] Konstantakopoulou and Tsionas, "Measuring Comparative Advantages in the Euro Area."

The RSCA's interpretation is that, a country with RSCA > 1 has CA for respective sector contrary to CD when *-1<RSCA<0*. On the other hand, a country is having neither CA nor CD when RSCA equals 0.

The RSCA is then used to investigate The Stability of Export Specialization Pattern of a country over a specified period. Generally, the stability of export specialization i.e. Specialization Trends is tested by convergence regression equation for each country as stated below;

$$RSCA_{ij}^{t2} = \alpha_j + \beta_j RSCA_{ij}^{t1} + \varepsilon_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (ii)$$

The dependent variable, the Revealed Symmetric Comparative Advantage of country *i,* sector/commodity *j* at period t_2 is regressed on the value of RSCA in period t_1 of the same country *i,* sector/commodity *j* ($t_1 < t_2$).

Therefore, to assess Country's Export Specialization Stability in this study, the following model is used:-

The Model: $RSCA_{ij}^{t2} = \alpha_j + \beta_j RSCA_{ij}^{t1} + \varepsilon_{ij}$

for t_1 is 2007 (immediately before Financial Crisis of 2009) and

t_2 is 2018 (immediately before COVID19 Pandemic)

Only 9 countries were analysed for Export Specialization Stability: India, Benin, Burkina Faso, Cote d'Ivoire, Ghana, Niger, Nigeria, Senegal and Togo. The reason is that the rest of the 7 ECOWAS countries has lots of missing data so doing regression analysis won't provide the valid results. Missing data countries includes Cape Verde, Gambia, Guinea, Guinea Bissau, Mali, Liberia and Sierra Leone

The Regression Coefficients α and β and ε_{ij} is the regression error are estimated by OLS Method using GRETL Software. The regression coefficients *(β value)* has 3 different interpretation as emphasized by Konstantakopoulou & Tsionas

For $\beta = 1$; indicates that the export specialization pattern of a country remains stable in that time period. Simply stated, the Comparative Advantage of the sectors from t_1 to t_2 remain unchanged, presenting no differentiation between the given time period

Secondly, if $\beta > 1$, signifies that the existing export specialization pattern of a country

is strengthened *(i.e. β-specialization)*. In other words, there is a tendency of a country towards being more specialized in the sectors/commodities that it was previously specialized in, and less specialized where initial specialization was low.

The case where *β values* lies between [0, 1] i.e. $0 < \beta < 1$, implies that there is *β-de-specialization* which means the country's export specialization pattern tends to change between periods. To make more sense, it means that on average, specialization on sectors with initial low RSCAs values tend to increase over time, while sectors with initial high RSCA decrease their values.

The term $(1 - \beta)$ is known as *"regression to the mean effect"*. When β is negative, the ranking of sectors is reversed, as sectors with RSCA below the average of the country during the first period are above the average in the second period, and vice versa.

From the above lines, this special case where $\beta < 0$ indicates that the ranking of sectors has been reversed[31] i.e. those RSCAs initially below the country average are, in the final year, above average and vice versa. Given the above listed line of reasoning, the test of cumulativeness (or 'stickiness') is whether β is significantly greater than zero. If $\beta \leq 0$, it cannot be rejected that the development of the trade specialization pattern of a country is either reversed or random, contrary to the hypothesis of cumulativeness.

Laursen (2015)[32] provided a generalization about the value of β. He stated that the size of β measures the stability of a country's specialization pattern between the two periods. A low β indicates a high degree of turbulence but if β is not significantly different from 1 then the pattern has remained unchanged, β^*/R^* (R^* is the regression correlation coefficient) measures whether the level of specialization has gone up or down between the two periods (an increase or a fall in the spread of specialization). If $\beta^*/R^* > 1$, specialization has increased; and if $\beta^*/R^* < 1$ then specialization has decreased

[31] Dalum, Laursen, and Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness.'"

[32] Laursen, "Revealed Comparative Advantage and the Alternatives as Measures of International Specialization," June 1, 2015.

Table 38. Empirical Results for eight ECOWAS countries plus India

COUNTRY	*α*	*β*	*R*	*β/R*
INDIA	−0.0230751	0.743851***	0.855810142	0.869177593
BENIN	−0.268857***	0.672721***	0.74943045	0.897643003
BURKINA FASO	−0.428734***	0.557711***	0.645639218	0.863812148
COTE d'IVOIRE	−0.143853***	0.795205***	0.823095985	0.966114542
GHANA	−0.376455***	0.573172***	0.666372268	0.860137835
NIGER	−0.150089***	0.819786***	0.841557485	0.974129534
NIGERIA	−0.283644***	0.680954***	0.683925435	0.995655324
SENEGAL	−0.098184**	0.838444***	0.811238559	1.033535685
TOGO	−0.181719**	0.628101***	0.556151059	1.129371221

From the above table, it is clear that ***all*** *β values* lies between [0, 1] i.e. $0 < \beta < 1$ for ***all*** nine countries where regression analysis were conducted; India, Benin, Burkina Faso, Cote d'Ivoire, Ghana, Niger, Nigeria, Senegal and Togo.

This means that all countries have *β-de-specialization*. All country's specialization pattern is not stable i.e. tends to change between periods as defined above. All countries tends to increase specialization on sectors with initial low RSCA values and decrease on those sectors with initial high RSCA value.

Konstantakopoulou & Tsionas[33], asserted that it is important to test the hypothesis that the *β-values* are significantly different from zero i.e. $\beta > 0$ because if $\beta \leq 0$, one cannot reject that the development in export specialization models was either due to chance or reversed.

Test of Hypothesis:

Null Hypothesis H0: $\beta \leq 0$

Alternative Hypothesis H1: $\beta > 0$

Table 25 shows the regression outputs of nine countries. Its evidently clear that the *β values* for all countries are significantly different from zero at 1% level of significance. Therefore, the null hypothesis of $\beta \leq 0$ is rejected for all countries. It can therefore be concluded that the evolution of the export specialization models in India and 8 countries of ECOWAS bloc cannot be attributed to random factors.

[33] Konstantakopoulou and Tsionas, "Measuring Comparative Advantages in the Euro Area."

With reference from the empirical data in presented in Table 25, the conclusion is that, export specialization has increased in all countries between the time period under study

4.2.2 Degree of specialization

Dalum, Laursen & Villumsen (1998)[34] explained how to extract/measure The Degree of Export Specialization from the regression analysis. This reveals the intensity/extent/speed of change in specialization over time.

According to Cantwell (1989 pp. 31-32), the situation where $\beta > 1$, this is not a necessary condition for an increase in the structure of a country's specialization. What is required is the examination of the RSCA variance fraction in the two sub-samples.

Hart (1976) specifically showed that:

$$\sigma^2{}_i{}^{t2}/\sigma^2{}_i{}^{t1} = \beta_i{}^2/R_i{}^2 \text{ thus } \sigma_i{}^{t2}/\sigma_i{}^{t1} = |\beta_i|/|R_i|$$

where σ^2 is the dispersion of RSCA and R_i's the square root of the coefficient of determination. If the dispersion remains unchanged, we have: $\beta = R$ with implication that the degree of specialization should remain stable between the two sub-periods contrary to when $\beta > R$, means that the degree of specialization increases (i.e. a country have *β-specialization*).

Furthermore, for $\beta < R$ the degree of specialization decrease between two sub-periods (i.e. *β-de-specialization*).

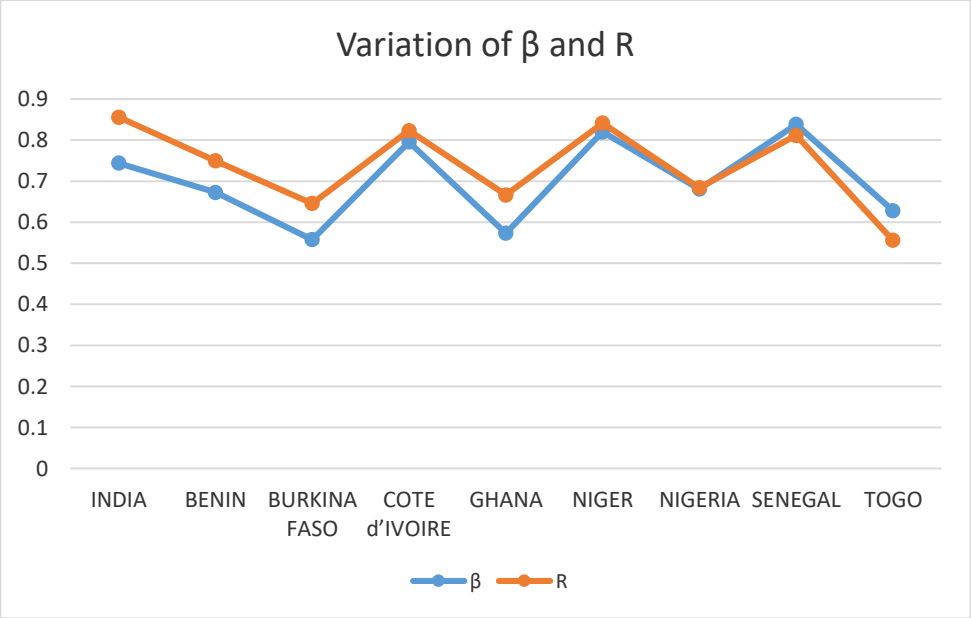
The results reveals that, $\beta > R$ (*β-Specialization*) for Senegal and Togo implying that the two country's degree of specialization increases between two sub-periods.

India and the rest 6 countries has *β-de-Specialization* as β appears to be lower than R. This implies that the degree of specialization for these countries decrease between two sub-periods.

β is almost equal to R for Cote d'Ivoire, Niger and Nigeria indicating that though they have *β-de-Specialization,* the degree of specialization is almost stable.

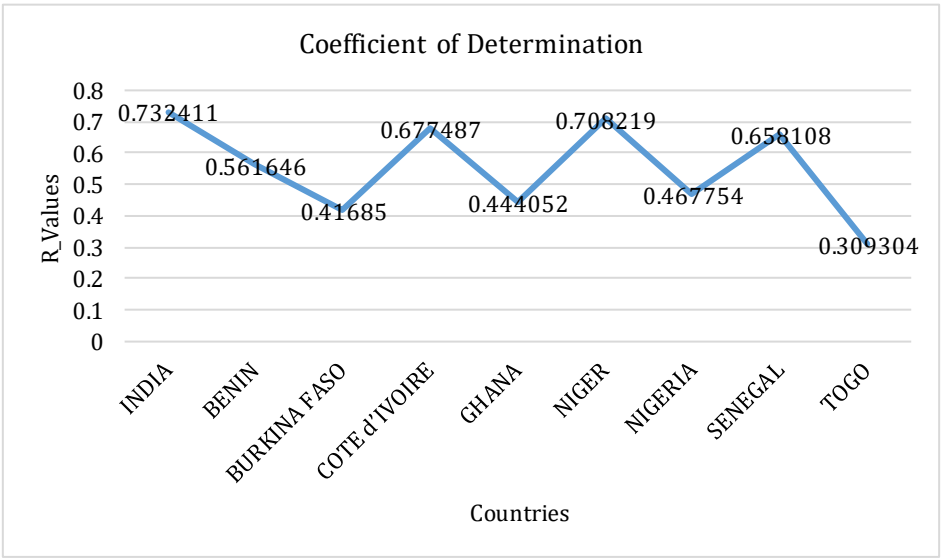
[34] Dalum, Laursen, and Villumsen, "Structural Change in OECD Export Specialisation Patterns: De-Specialisation and 'Stickiness.'"

Figure 4. Comparison of β and R for each country



The estimated Pearson correlation coefficient is a ***measure of the mobility of sectors up and down the RSCA distribution***. A high level of the coefficient indicates that the relative position of sectors is little changed, while a low value indicates that some sectors are moving closer together and others further apart, quite possibly to the extent that the ranking of sectors changes.

Figure 5. **Graphical representation of square root of R^2**



The graphical representation of square root of Pearson Coefficient of Determination shows that it ranges from the mini 0.309304 (Togo) to the max 0.732411 (India). The

relative position of sectors is little changed for India, Cote d'Ivoire, Niger and Senegal while some sectors are moving closer together and others further apart for Benin, Burkina Faso, Ghana, Nigeria and Togo which has lower values of R.

Table 39 summarizes these expressions used the trade specialization literature.

Table 39. Results summary.

B Value	**Export Specialization Pattern**		**Degree of Export Specialization**
$\beta = 1$ or $\beta = R$	No change	No change	No change
$\beta > 1$ or $\beta > R$	Specialization	Convergence	Increase
$0 < \beta < 1$ or $0 < \beta < R$	De-specialization	Divergence	Decrease

Alternatively, as shown in the table 39 above, the interpretation can be done based on the value of **β** only. For **$\beta > R$** implies that the value of **$\beta > 1$** and **$\beta < 1$** for **$\beta < R$.**

When **$\beta = 1$** the implication is that **$\beta = R$** which means that the country's Export Specialization Pattern has not changed over the specified period. In this study, there is no country which demonstrates this characteristic though some are too close to it. These are Cote d'Ivoire, Niger and Nigeria.

NB:

β-de-Specialization means the country exhibits Divergence in its Export Specialization Pattern and *β-Specialization* on the other hand implies Convergence between two time periods.

CHAPTER FIVE

FINDINGS SUMMARY AND CONCLUSIONS

5.1 Summary of Findings

5.1.1 India's Trade with ECOWAS

The Assessment of existence of Substantial Trade between India and ECOWAS Bloc has revealed that India is the first exports destination of ECOWAS followed by United States and Japan is the last destination. Additionally, ECOWAS sources its imports largely from China, United States and France. India holds fourth position as the source of ECOWAS imports.

These findings highlights the situation of the existing substantial trade between the two parties as India appears to be among the top trading partner of the ECOWAS as a bloc.

ECOWAS 10 years trade trend of exports and imports with World's top 10 Economies shows the results which are more or less similar to ECOWAS trade with The World *(as total).* This is a clear indicator that ECOWAS trades more with The Top 10 Economies than it does with the remaining countries/economies bearing in mind that India is among the World's top 10 Economies.

The most traded commodities that ECOWAS trades most with the World is **27.Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes** and in the least traded among the top 10 most traded commodities is **41.Raw hides and skins.** Ten years Bilateral trade data between India and ECOWAS Countries from 2010 – 2019, reveals that India has been experiencing Trade Deficit with ECOWAS countries. Though its Exports have been fairly rising *(not at high pace),* in this time period, the Imports appears to fluctuate and widen the deficit.

Imports from ECOWAS countries has been rising from 2010 before its fall from 2014 – 2016 where India experienced the lowest trade deficit. It then rose in 2017 even higher in 2018 creating the maximum ever experienced deficit in the period.

The important commodities traded have a salient feature of the presence of products that are both exported and imported with ECOWAS countries. Products with product codes **27, 52, 72** and **76** demonstrate this characteristic which implies that there is Intra-Industry trade that was difficult to be noticeable in HS 1 Classification because of its aggregation.

5.1.2 Trade Indicators Analysis; The RCA

The study has identified 39 out of 97 products in HS-1 Classification, India has Comparative Advantage as it has the mean RCA above 1.

The table 40 below shows these products.

Table 40. The 39 products the India has CA

Product Code	Product Description	Mean RCA	Product Code	Product Description	Mean RCA
2	Meat and edible meat offal	1.36	**52**	Cotton.	7.00
3	Fish & crustacean, mollusc & other	2.23	**53**	Other vegetable textile fibres; pap	5.04
9	Coffee, tea, matï and spices.	3.66	**54**	Man-made filaments.	2.70
10	Cereals	3.21	**55**	Man-made staple fibres.	3.02
12	Oil seed, oleagi fruits; miscell gr	1.03	**57**	Carpets and other textile floor co	6.00
13	Lac; gums, resins & other vegetable	10.30	**58**	Special woven fab; tufted tex fab;	1.44
14	Vegetable plaiting materials; veget	3.85	**61**	Art of apparel & clothing access,	1.94
17	Sugars and sugar confectionery.	2.07	**62**	Art of apparel & clothing access, n	2.40
23	Residues & waste from the food indu	1.93	**63**	Other made up textile articles; set	4.00
24	Tobacco and manufactured tobacco su	1.34	**64**	Footwear, gaiters and the like; par	1.18
25	Salt; sulphur; earth & ston; plaste	2.37	**67**	Prepr feathers & down; arti flower;	2.72
26	Ores, slag and ash.	1.70	**68**	Art of stone, plaster, cement, asbe	1.58
27	Mineral fuels, oils & product of th	1.02	**71**	Natural/cultured pearls, prec stone	4.46
29	Organic chemicals.	1.80	**72**	Iron and steel.	1.25
30	Pharmaceutical products.	1.19	**73**	Articles of iron or steel.	1.30
32	Tanning/dyeing extract; tannins &	1.69	**74**	Copper and articles thereof.	1.09
36	Explosives; pyrotechnic prod; match	1.28	**78**	Lead and articles thereof.	1.46
41	Raw hides and skins (other than fu	1.94	**79**	Zinc and articles thereof.	2.37
42	Articles of leather; saddlery/harne	2.06	**89**	Ships, boats and floating structure	1.63
50	Silk.	4.64			

Products that India form Perfect Trade Complementarity with ALL ECOWAS Countries. In these products shown in the table, India can enjoy a fully-fledged benefits through the exports of these commodities to all ECOWAS countries

Table 41. India form Perfect Trade Complementarity with ALL ECOWAS Countries

Product Code	Product Description	BEN	BF	CV	CI	GAM	GHN	GUN	MAL	NGR	NRA	SEN	SL	TG	IND
30	Pharmaceutical products.	0.12	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.01	0.07	0.00	0.00	1.80
32	Tanning/dyeing extract; tannins &	0.52	0.08	0.02	0.33	0.00	0.15	0.00	0.14	0.04	0.01	0.19	0.01	0.06	1.69
42	Articles of leather; saddlery/harne	0.01	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.01	0.01	2.06
54	Man-made filaments.	0.02	0.02	0.01	0.03	0.05	0.02	0.00	0.00	0.01	0.00	0.18	0.00	0.06	2.70
57	Carpets and other textile floor co	0.01	0.00	0.00	0.01	0.05	0.47	0.00	0.00	0.01	0.01	0.01	0.02	0.00	6.00
58	Special woven fab; tufted tex fab;	0.50	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.29	1.44
68	Art of stone, plaster, cement, asbe	0.07	0.01	0.00	0.06	0.00	0.01	0.00	0.00	0.02	0.00	0.16	0.02	0.02	1.58
73	Articles of iron or steel.	0.22	0.06	0.00	0.15	0.18	0.11	0.03	0.06	0.00	0.02	0.30	0.10	0.47	1.30
74	Copper and articles thereof.	0.04	0.00	0.01	0.03	0.07	0.08	0.00	0.03	0.01	0.05	0.49	0.01	0.05	1.09

The lists of the products in the table 41 are forming Perfect Trade Similarity between India and ALL ECOWAS Countries jointly. Since the trade is similar in these products, there is no room for mutual beneficial trade between the two parties as well as bilaterally between ECOWAS countries themselves.

Table 42. Products of Trade Similarity between India and ALL ECOWAS Countries jointly

Product Code	Product Description	BEN	BF	CV	CI	GAM	GHN	GUN	MAL	NGR	NRA	SEN	SL	TG	IND
6	Live tree & other plant; bulb, root	0.02	0.47	0.02	0.24	0.13	0.07	0.01	0.01	0.00	0.30	0.20	0.00	0.07	0.26
22	Beverages, spirits and vinegar.	0.20	0.24	2.86	0.11	0.49	0.33	0.01	0.39	0.10	0.05	0.29	0.94	5.90	0.13
35	Albuminoidal subs; modified starche	0.01	0.01	0.00	0.06	0.02	0.06	0.00	0.02	0.34	0.01	0.35	0.00	0.09	0.57
37	Photographic or cinematographic goo	0.01	0.00	0.00	0.00	0.09	0.08	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.08
38	Miscellaneous chemical products.	0.04	0.17	0.00	0.21	0.02	0.09	0.00	0.02	0.03	0.03	0.53	0.00	0.01	0.98
43	Furskins and artificial fur; manuf	0.05	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03
45	Cork and articles of cork.	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.92	0.00	0.00	0.01	0.01	0.08
47	Pulp of wood/of other fibrous cellu	0.01	0.00	0.00	0.02	0.33	0.02	0.00	0.00	0.10	0.01	0.00	0.00	0.02	0.01
48	Paper & paperboard; art of paper pu	0.07	0.01	0.00	0.46	0.02	0.26	0.00	0.02	0.00	0.01	0.55	0.00	0.18	0.35
51	Wool, fine/coarse animal hair, hors	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.68
59	Impregnated, coated, cover/laminate	0.02	0.01	0.00	0.09	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.46
60	Knitted or crocheted fabrics.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.45
66	Umbrellas, walking-sticks, seat-sti	0.21	0.01	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.06
70	Glass and glassware.	0.13	0.02	0.00	0.01	0.24	0.10	0.00	0.00	0.04	0.07	0.17	0.02	0.03	0.50

75	Nickel and articles thereof.	0.01	0.00	0.00	0.00	0.07	0.34	0.00	0.00	0.00	0.04	0.00	0.00	0.83	0.32
76	Aluminium and articles thereof.	0.07	0.01	0.00	0.03	0.02	0.68	0.00	0.01	0.01	0.14	0.19	0.00	0.05	0.87
80	Tin and articles thereof.	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.55	0.08	0.57	0.04	0.00	0.00	0.30
81	Other base metals; cermets; article	0.00	0.02	0.00	0.20	0.08	0.08	0.00	0.00	0.01	0.07	0.06	0.10	0.01	0.18
82	Tool, implement, cutlery, spoon & f	0.19	0.05	0.00	0.23	0.06	0.15	0.02	0.04	0.10	0.01	0.33	0.77	0.04	0.76
83	Miscellaneous articles of base meta	0.01	0.01	0.00	0.07	0.00	0.01	0.01	0.00	0.04	0.65	0.04	0.01	0.01	0.47
84	Nuclear reactors, boilers, mchy & m	0.16	0.08	0.00	0.06	0.02	0.05	0.03	0.07	0.04	0.01	0.10	0.15	0.07	0.37
85	Electrical mchy equip parts thereof	0.04	0.02	0.00	0.03	0.00	0.01	0.01	0.02	0.27	0.00	0.10	0.03	0.01	0.27
86	Railw/tramw locom, rolling-stock &	0.20	0.05	0.00	0.19	0.08	0.18	0.32	0.14	0.41	0.01	0.16	0.20	0.03	0.25
87	Vehicles o/t railw/tramw roll-stock	0.08	0.05	0.00	0.18	0.02	0.03	0.02	0.06	0.01	0.00	0.14	0.33	0.14	0.50
88	Aircraft, spacecraft, and parts the	0.02	0.15	0.00	0.40	0.00	0.03	0.03	0.18	0.26	0.10	0.43	0.00	0.04	0.52
90	Optical, photo, cine, meas, checkin	0.05	0.01	0.00	0.03	0.00	0.03	0.01	0.01	0.00	0.00	0.03	0.00	0.01	0.23
91	Clocks and watches and parts thereo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.11
92	Musical instruments; parts and acce	0.08	0.04	0.00	0.04	0.93	0.07	0.10	0.11	0.12	0.00	0.25	0.00	0.01	0.16
93	Arms and ammunition; parts and acc	0.01	0.06	0.00	0.46	0.00	0.06	0.00	0.42	0.01	0.00	0.42	0.00	0.00	0.26
94	Furniture; bedding, mattress, matt	0.15	0.12	0.00	0.04	0.02	0.08	0.01	0.05	0.01	0.01	0.12	0.02	0.19	0.29
95	Toys, games & sports requisites; pa	0.00	0.00	0.89	0.00	0.07	0.01	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.16
96	Miscellaneous manufactured articles	0.01	0.01	0.00	0.15	0.11	0.30	0.04	0.05	0.02	0.07	0.12	0.01	0.03	0.80

5.1.3 Export Specialization Pattern

The testing of hypothesis for *β values* revealed that for all countries are significantly different from zero at 1% level of significance. Therefore, the null hypothesis of $\beta \leq 0$ is rejected for all countries. It can therefore be concluded that the evolution of the export specialization models in India a

The interpretation was based on the comparison of *β and R values.* For $\beta = R$ implies that the degree of specialization should remain stable between the two sub-periods contrary to when $\beta > R$, means that the degree of specialization increases (i.e. a country have *β-specialization*). Furthermore, for $\beta < R$ the degree of specialization decrease between two sub-periods (i.e. *β-de-specialization*).

The results reveals that, $\beta > R$ (*β-Specialization*) for Senegal and Togo implying that the two country's degree of specialization increases between two sub-periods.

India and the rest 6 countries has *β-de-Specialization* as *β* appears to be lower than R. This implies that the degree of specialization for these countries decrease between two sub-periods.

β is almost equal to R for Cote d'Ivoire, Niger and Nigeria indicating that though they have *β-de-Specialization,* the degree of specialization is almost stable.

In general, ALL countries have ***β-de-specialization*** implying that specialization pattern is not stable i.e. tends to change between periods. Also, ALL countries tends to increase specialization on sectors with initial low RSCA values and decrease on those sectors with initial high RSCA value.

5.1.4 Degree of Export Specialization

The value of *β is greater than R (β-Specialization)* for Senegal and Togo implying that the two country's degree of specialization increases between two sub-periods. $\beta < R$ *(β-de-Specialization)* for India and the rest 6 ECOWAS countries. This implies that the degree of specialization for these countries decrease between two sub-periods. β is almost equal to R for Cote d'Ivoire, Niger and Nigeria indicating that though they have *β-de-Specialization,* the degree of specialization is almost stable.

5.2 Conclusion

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