DETERMINANTS OF INTRA-INDUSTRY TRADE BETWEEN ECOWAS AND EUROPEAN UNION

BY

DAMILOLA FELIX ARAWOMO
Matric No. 141640
B.sc (Econs) AAUA, M.Sc (Econs) Ibadan

A Thesis in the Department of Economics,
Submitted to the Faculty of the Social Sciences
in partial fulfilment of the requirements for the Degree of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN, NIGERIA.

NOVEMBER, 2014

ABSTRACT

Economic Community of West African States' (ECOWAS) total trade has reflected deficit in the last two decades. It was $1.42 billion in 1990, increased to $3.32 billion in 2000 and $6.24 billion in 2009. This trade imbalance in the ECOWAS region can be traced to the dominance of primary over manufactured products in the region's exports. However, the imbalance can be reversed with trade in similar products that is Intra-Industry Trade (IIT) between the region and her highest trade partner, (European Union (EU)). Empirical studies have examined IIT among developed countries (horizontal-IIT), while adequate attention has not been paid to it between developing and developed countries (vertical-IIT). This study, therefore, examined the extent and determinants of IIT in both final and intermediate products between ECOWAS and EU.

The Augmented Gravity Model, based on Flam-Helpman's North-South trade framework, was estimated to determine the factors affecting vertical-IIT between ECOWAS and EU. The model considered income distribution in partner countries, factor endowment, product differentiation, Foreign Direct Investment (FDI), relative country size, weighted distance, capital-labour ratio, exchange rate and tariff as determinants of vertical-IIT. The Grubel-Lloyd index, bounded by 0 and 1, was used to compute the dependent variable (extent of vertical-IIT). A closer to one Grubel-Lloyd index implied higher level of IIT. Data were collected from the World Integrated Trade Solution and World Development Indicators from 2001 to 2011. Fractional Logit Regression technique that took note of the nature of the dependent variable was estimated while controlling for heteroscedasticity. The estimations were done for both final and intermediate products. Hausman-test and LM-test were used to confirm the robustness of the model and statistical significance at $P \leq 0.05$.

Vertical-IIT in both final and intermediate products between ECOWAS and EU were low. Average vertical-IIT in final products between the two regions increased from 0.1 in 2001 to 0.3 in 2011, while that of vertical-IIT in intermediate products increased from 0.1 in 2001 to 0.2 in 2011. Income distribution, factor endowment, products differentiation and FDI improved vertical-IIT in final products. Specifically, if these factors were increased by

1.0%, vertical-IIT in final products would improve by 10.0% 4.0%, 4.0% and 11.1%, respectively. However, the coefficients of the weighted distance (-0.02) and tariff (-0.006) were indicative of inverse change in vertical-IIT in final products by 2.0% and 0.06% in response to 1.0% change in the two factors respectively. For the vertical-IIT in intermediate products, 1.0% change in factor endowment, product differentiation, income distribution and relative country size improved vertical-IIT by 5.9%, 2.2%, 4.1%, and 3.7%, respectively. The coefficients of FDI (0.19) implied that vertical-IIT in intermediate products increased by 19.0% in response to 1.0% change in FDI.

Product differentiation and foreign direct investment have positive and significant impact on intra-industry trade in final and intermediate products between Economic Community of West African States and European Union. It is important, therefore, to attract more multinational firms into the region. Efforts should also be made to improve on the level of products differentiation in the region.

Keywords: Intra-industry trade, Fractional logit model, Intermediate products, products differentiation.

Word count: 495

DEDICATION

To the Almighty God, for;

"even when I must walk through the darkest valley … you are with me; your rod and your staff reassure me" (Psalm 23:4; NET).

ACKNOWLEDGEMENT

All glory be to the Almighty God, Alpha and Omega, Beginning and The Ending, who has proven the meanings of His names in my life.

I would like to express my special appreciation to my supervisor Dr. Adeolu O. Adewuyi, you have been a tremendous mentor for me. Sir, accept my special appreciations for encouraging me to pursue this programme and also for allowing me grow under you as a researcher. Your advice on both research as well as on my career have been priceless. Also, I would like to thank the rest of member my thesis committee: Professor Olawale E. Ogunkola and Dr, Abiodun S. Bankole for the learning opportunities and critiques of my research work. I appreciate all academic and non-academic staff of the department of Economics University of Ibadan. Regards to my colleague in M.Sc and Ph.D programmes, from you all I have received wonderful inspirations, suggestions, and encouragement throughout the period of this programme.

Words cannot express how grateful I am to my parents Mr Anthony Oladele Arawomo and Mrs Alice Olayemi Arawomo for all of the sacrifices that you have made on me and my siblings. Your prayers and love sustained us thus far. My siblings (Mrs Oluwaseyi Alli, Olawale Arawomo, Barrister Tosin Arawomo, Oluwagbemi Arawomo) deserve much appreciation for their understanding. To my caring, loving, and supportive wife, Mrs Bisola Silva Arawomo, accept my deepest gratitude. Your encouragement when the goings became rough is much appreciated. It was a great comfort and relief to know that you were willing to endure the financial inadequacies occasioned by the commitment to the programme. My loving son Oluwadarasimi Emmanuel Arawomo is remembered, you came as a soothing balm in the cause of the programme.

I also appreciate fathers in the lord, church members, friends, relatives and neighbours, but time, space, and modesty does not permit me mention all names.

CERTIFICATION

I certify that this work was carried out by Damilola Felix ARAWOMO in the Department of Economics, University of Ibadan.

……

Adeolu O. Adewuyi

Dip. Coop. Studies, B.Sc., M.Sc., PhD. (Ibadan)
Supervisor and chairman, thesis committee
Senior lecturer, Department of Economics,
University of Ibadan, Nigeria

TABLE OF CONTENTS

List of Tables

List of Figures

List of Abbreviations

ACP	African Caribbean and Pacific
BEC	Broad Economic Classification
CET	Common External Tariff
CFA	Colonies Francaise d'Afrique (French Colonies of Africa)
EC	European Community
ECOWAS	Economic Community of West African States
EPA	Economic Partnership Agreement
EU	European Union
FLRM	Fractional Logit Regression Model
FTA	Free Trade Area
HIIT	Horizontal Intra-industry Trade
HS	Harmonised Commodity Description Coding System
IFS	International Financial Statistics
IIT	Intra-industry Trade
ISI	Import Substitution Industrialisation
ITER	Inter-industry Trade
LDCs	Less Developed Countries
LM	Lagrange Multiplier
MDGs	Millennium Development Goals
MNCs	Multinational Corporations
NEPAD	New Partnership for Africa's Development
NICs	Newly Industrialised Countries
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Square
QMLE	Quasi-Maximum Likelihood Estimation
SICT	Standard International Trade Classification
UEMUA	Union e´conomique et mone´taire de l'Afrique l'Ouest (West African Economic and Monetary Union)
UN COMTRADE	United Nation Commodity Trade Statistics
UNSD `	United Nations Statistical Division
VIIT	Vertical Intra-industry Trade
WAMZ	West Africa Monetary Zone
WCO	World Custom Organisation
WDI	World Development Indicators
WITS	World Integrated Trade Solution
WTO	World Trade Organisation

CHAPTER ONE

INTRODUCTION

1.0 Preamble and Statement of the Problem

International trade plays important roles in economic development of countries. It broadens the consumption baskets of consumers and enhances their purchasing power. It also facilitates producers' access to critical inputs not available locally at affordable prices, thereby becoming catalyst to increased output and employment. Equally, governments are able to generate more revenue for financing developmental projects (Markusen, 1995).

International trade has been broadly categorised into two: inter-industry trade (ITER) and intra-industry[1] trade (IIT). While ITER refers to international exchange of widely dissimilar goods, such as the export of cocoa in return for import of automobile, IIT is the simultaneous importing and exporting of similar products, for instance rice for rice[2]. In other words, ITER is trade between any two countries producing different goods (particularly between developed and developing countries). IIT could occur between countries at the same level of development such as those involving two developed nations (horizontal IIT) or between countries at different levels of development such as those occurring between developed and developing countries (vertical IIT).

[1] The definition of an "industry" is probably the most contentious issue in applied IIT research. Grubel and Lloyd (1975) define IIT as "trade in differentiated products which are close substitutes". Over time, it has become generally accepted that the relevant criterion is substitutability in production (rather than in consumption), since this is the aspect of industries that: (a) maps trade flows to production patterns; and (b) lies at the heart of the link between IIT and factor-market adjustment. Whilst statistical product classifications are inevitably imperfect in this respect, they are nevertheless largely guided by the correct criterion, an effort to group goods with similar input requirements.

[2] *IIT is defined as the simultaneous export and import of products, which are close substitutes in production and consumption. In empirical studies, researchers, on the other hand, define IIT as the simultaneous export and import of products, which belong to the same statistical product category*.

Most developing countries export primary products to developed nations and import manufactured products from them (ITER), hence, they are susceptible to cyclical deterioration of terms of trade. The Prebisch-Singer[3] hypothesis posits that ITER widens the income gap between developed and developing nations (Prebisch, 1950; and Singer, 1950). Most ECOWAS countries exchange raw materials they produce with manufactured goods produced by developed nations. It is therefore not surprising to observe that ECOWAS countries (except the oil-rich economies among them that experience periodic oil-boom) witness low income level and instability. Alternatively expressed, the gains from ITER are distributed unequally between nations exporting mainly primary products and those exporting mainly manufactured products. Undoubtedly, this gain has been in favour of manufactured products exporting countries.

The need to boost ECOWAS trade through IIT is very expedient because of its numerous advantages. One of the benefits is that it enables developing countries get out of the dislocations associated with ITER (Ruffin, 1999). Also, IIT produces extra gains from international trade, over and above those from ITER, because it allows countries benefit from larger markets than those permitted by engaging in ITER only. By engaging in IIT, a country can simultaneously reduce the number of products it produces and increase the variety of goods available to consumers (Krugman and Obstfeld, 2003). The pattern and intensity of IIT are likely to be connected to the structures of consumer preferences, than the pattern and intensity of ITER. By producing fewer varieties, a country can produce each on a large scale, with increased productivity and reduced costs. Also, the price elasticities of imports and exports from a given country are likely to be greater for IIT than for ITER. More specifically, IIT is more beneficial than ITER because it stimulates innovation and exploits economies of scale (Ruffin, 1999). Finally, IIT reduces the demands for protection because in any industry there are exports and imports, making it difficult to achieve unanimity among those demanding protection (Marvel and Ray 1987). However, tariff war and non-tariff barriers characterise ITER.

[3] Prebisch (1950) and Singer (1950) allege the long-term deterioration in the (net barter) terms of trade of developing countries.

In an attempt to use trade to facilitate economic growth, various governments in ECOWAS countries have entered into bilateral, regional and multilateral trade agreements with their trading partners. Among the regions that trade with ECOWAS, the European Union (EU) ranks the highest in terms of imports and exports. Since 1975, the (EU), under various Lome Conventions and Cotonou Agreements, has provided non-reciprocal trade preferences to products originating from their former colonies in Africa, the Caribbean and the Pacific Group of States (ACP) with the ultimate aim of promoting economic growth and development of these countries. The non-reciprocal trade preferences offered ACP countries granted them access to the EU[4] markets. After over two decades of experience under the Lome Conventions and Cotonou Agreements, the results controversial. The continued ITER that existed between ECOWAS and EU has resulted in perpetual exporting of primary products by the former to the latter despite the non-reciprocal trade relation between them. This implies that irrespective of the trade relations between ECOWAS and EU, if the trade between two regions remains inter-industry, the expected benefit of trade between them may continue to elude ECOWAS. Thus, the region may continue to witness terms of trade instability.

The EU and ECOWAS have recently been negotiating on the platform of Economic Partnership Agreement (EPA). The EPA is expected to be based on reciprocal trade between the two regions against the non-reciprocal arrangement. The objectives of the negotiation are to establish, in line with WTO rules, a Free Trade Area (FTA) between ECOWAS and the European Community; accord priority to development and poverty reduction; cooperate on trade-related issues; deepen integration process in ECOWAS and enhance market access for ECOWAS exports. The ECOWAS negotiation team has been entertaining fears that they may not benefit from the FTA when it is created. This fear appears to be premised on the fact that the pattern of trade between ECOWAS and EU is ITER. However, a preliminary analysis of the trade flows between ECOWAS countries

[4] The EU is a geopolitical entity covering a large portion of the European continent. It is founded on numerous treaties and has undergone expansions that have taken it from six member states in 1951 to 27 presently (2012), which comprise majority of states in Europe.

and EU between 2001 and 2011 reveals some elements of IIT involving few ECOWAS countries especially Nigeria, Ghana and Cote d'ivore. Meanwhile, the extent of such trade is yet to be established. Incidentally, these ECOWAS countries have capacity to expand their manufacturing base, which if exploited can enhance export. The manufacturing export potential of foreign companies that have affiliates in these countries can be fully exploited.

Bearing in mind that IIT is more beneficial to developing regions like ECOWAS, it is imperative to address some pertinent research questions as regards the form of trade. These include; how can income instability of the ECOWAS countries be reversed? What is the extent of the IIT between selected ECOWAS countries and the highest trade partner - EU? What are the determinants of IIT between these ECOWAS countries and EU? Are these IIT determinants in any way similar to those of ITER? Can a deep understanding of these determinants assist to increase ECOWAS-EU trade?

1.2 Objectives of the Study

The broad objective of this study is to examine IIT in final and intermediate products between ECOWAS countries and EU. Specifically, this study seeks to:

(1) analyse the extent of IIT in both final and intermediate products between selected ECOWAS countries and EU.

(2) investigate the determinants of IIT in final products between selected ECOWAS countries and EU.

(3) examine the determinants of IIT in intermediate products between selected ECOWAS countries and EU.

1.3 Justification for the Study

The justifications for this study are derived from the gaps observed in the literature: empirically, theoretically and methodologically. Previous studies have shown that most of the empirical studies on IIT have been conducted between developed

countries/regions[5] (horizontal IIT) due to the belief that IIT only takes place between countries with similar factor endowments. However, it has also been revealed by Havrylyshyn and Civan (1983), Lee (1989), Manrique (1987), Lundberg (1982), Balassa and Bauwens (1982), Tharakan and Kerstens (1995), Clark and Stanley (1999), as well as Sichei and Harmse (2004) that IIT between developed and developing countries (vertical IIT) is not negligible. These studies are very few, dated and exclude the ECOWAS[6]. They are dated because a lot of developments have occurred in the world including developing countries after the last study in 2004. Besides, they are predominantly concerned with IIT in final goods neglecting the intermediate products which dominated exports of developing countries. Thus, the common belief requires further examination and more empirical work is warranted. This is part of the gaps this study seeks to fill.

Theoretically, Flam and Helpman (1987) assert that the theory of north-south trade based on vertical product differentiation is the most suitable to examine IIT between developing and developed economies. So far, efforts have not been made to re-examine the empirical results obtained in the previous studies done for developing countries using this theory. The empirical studies on IIT between developed and developing economies have either used inappropriate theories or multiples of irreconcilable theories ((Manrique (1987), Lundberg (1982), Balassa and Bauwens (1988a), Tharakan and Kerstens (1995), Clark and Stanley (1999)). The reason was because most previous authors did not separate IIT into vertical and horizontal component. For instance, some authors[7] adopted Neo-Chamberlinian model[8] to examine (ITT) between developed and developing countries and did not categorise it. Thus this study adopts north-south model based on

[5] This is known as horizontal IIT. Some of these studies include Balassa (1966), Becuwe and Mathieu (1992), Clark, Fullerton and Burdorf (2001), Crespo and Fontoura (2001), Faustino and Leitão (2007).
[6] Intra-industry trade between unequal partners has been described as vertical intra-industry trade.

[7] Nilsson (1999), Clark and Stanley (1999), Manrique (1987) and Tharakan and Kerstens (1995) Sichei and Harmse (2004)

[8] Neo-Chamberlinian model of Helpman and Krugman (1985) is horizontal IIT that assumes same level of development for the trading partners.

vertical product differentiation to examine the existence and determinants of IIT in final and intermediate products between EU and ECOWAS. The expected findings of this study are capable of reinforcing the need and importance of north-south IIT as well as alter the traditional views of trade between developing and developed countries.

Previous studies used over-aggregated trade flows data[9] and estimated the models with inappropriate estimation technique. I filing this gap, I used more disaggregated north-south trade data at 6-HS digit level[10]. Falvey (1981) opined that spurious IIT may emerge as a result of inappropriate statistical aggregation. All the previous studies on vertical-IIT[11] between unequal partners used available data of between 2 to 4-digits SITC[12] product categories. In addition, this study used the most recent trade decomposition approach developed by Hine, Greenaway and Milner (1998) to separate IIT into vertical and horizontal, an area most of the previous studies neglected. Second, the Factional Logit Regression Model (FLRM) of Papke and Wooldridge (1996) designed to capture the characteristics of the dependent variables that are bounded between 0 and 1 was used in this study. Majority of past studies on determinants of IIT used either conventional OLS regression analysis, panel data analysis, probit, or logit. Since the dependent variable (index of IIT) ranges between 0 and 1, the coefficients from the conventional OLS regression will be biased and inconsistent. Also, probit and logit analysis will not be appropriate since IIT index will not take either 0 or 1 values. Moreover, inconsistent results were obtained in previous studies; this might be due to over aggregation of data or

[9] The more products are grouped together into an "industry", the higher the probability of overlap between exports and imports of that industry (sectoral aggregation bias).

[10] The Harmonised Commodity Description and Coding System (HS) is an internationally standardised system of names and numbers for classifying traded products developed and maintained by the World Customs Organisation (WCO), an independent intergovernmental organisation with over 170 member countries based Brussels Belgium. The HS is organised into 21 sections and 96 chapters, accompanied with general rules of interpretation and explanatory notes. As of October 2012, there are 206 countries or territories applying the HS worldwide.

[11] The definition of an "industry" requires a choice not only about the level of statistical aggregation but also about the classification scheme to adopt.

[12] The Standard International Trade Classification (SITC) is a classification of goods used to classify the exports and imports of a country to enable comparing different countries and years. The classification maintained by the United Nations is currently at revision four, which was promulgated in 2006.

inappropriate estimation technique. The present study sought to ascertain the proper directions of the drivers of IIT.

The policy relevance of this study could be discussed in three main areas. First, the outcome could form the basis upon which tariff policies will be articulated in the selected ECOWAS members. IIT should be higher; the less the variance of countries' tariff rates (Lee and Han, 2008). Second, this study could equally be a basis for the formulation of policies around foreign direct investment (FDI) in the ECOWAS countries. The impact of FDI on IIT could indicate whether inward FDI complements or substitutes exports. Another policy implication of this study lies in its ability to furnish the ECOWAS countries information about products they exchanged with EU that could aid the on-going EPA negotiations.

1.4 Scope of the Study

Issues of bilateral trade are wide in scope, especially IIT. Notably, this study concentrates on the extent and determinants of IIT in final and intermediate products between ECOWAS countries and EU as a group[13]. Hence, this study does not cover horizontal and marginal IIT. The study covers 2001 to 2011 and industries ECOWAS countries have capacity to produce: beverages and tobacco, crude materials, mineral fuel lubricant, animals and vegetable, chemicals, and manufacture goods. The study equally concentrates on Nigeria, Ghana and Cote d'Ivoire – the three most industrialised countries in ECOWAS that accounted for over 89 per cent of exports, 75 per cent of imports and 80 per cent of output of the region. (COMTRADE Database, 2012)

1.5 Organisation of the Study

After this introductory chapter, the rest of the study is organised into five chapters. Chapter 2 presents the background to the study divided into three sections. The first dwells on the comparative analysis of macroeconomic performance of the selected ECOWAS countries, the second presents the trade policies and trade agreements

[13] The EU is taken as a group because they usually negotiate with ECOWAS countries as a group and not individual countries.

between ECOWAS and EU. The third discusses the trend of ECOWAS trade with the EU. The review of past literature is presented in chapter 3, along three broad categories of theories, methodologies and empirical evidence. Chapter 4 is on the theoretical framework and methodology. Chapter 5 is on the presentation and discussion of results based on the three objectives of the study. Lastly, chapter 6 provides the summary, conclusion, recommendations as well as limitation of the study. Areas of future research are also suggested.

CHAPTER TWO

ECOWAS AND EU: ECONOMIC PERFORMANCE, TRADE FLOWS AND TRADE AGREEMENTS

2.1 Introduction

This chapter describes in a comparative manner the macroeconomic performance, structure of output and comparative advantage of ECOWAS and EU. It also provides a summary of trade policies and trade agreements between the two regions. Additionally, it discusses their performances. The discussions contain certain elements which are potential trade determinants, the various conventions and agreements between the two regions, ECOWAS trade with the EU, and the rest of the world, sectoral composition of trade between the two regions, and some specific products in which the ECOWAS countries have IIT with the EU.

2.2 Comparative Analysis of Macroeconomic Performance

Previous empirical studies have identified a number of macroeconomic factors that are capable of explaining IIT. Some of the factors include: average level of development of the trading partner (usually measured by per capita income, PIC), the differences in the trading partners' level of development (measured by absolute difference of per capita GDP), average market size of the trading partner (measured by average gross domestic product, GDP), differences in partners' market sizes (measured by absolute difference of the GDP), exchange rates, trade barriers such as transport costs. All the above mentioned macroeconomic trade determinants are country specific. Other determinants are: product differentiation (usually measured by number of tariff position), FDI, bilateral exchange rate, etc. These macroeconomic performance variables of ECOWAS and EU are discussed next.

2.1.1 Real Gross Domestic Product (RGDP) of the ECOWAS and EU

The RGDP of the ECOWAS countries has been very small compared to high income countries as contained in Table 2.1 which shows the average RGDP of Nigeria, Ghana and Cote d'Ivoire. Also, contained in the table is average RGDP of ECOWAS and EU. The real GDP of the three countries put together is above 75 per cent of that of all ECOWAS countries between 2001 and 2011. Although the three countries consistently grew their RGDP during the period 2001 to 2011, the growth in Cote d'ivoire is slower. In terms of magnitude, Nigeria dominated the RGDP in ECOWAS, as her RGDP is several multiple of ECOWAS average. ECOWAS average RGDP of $21.0 billion in 2001 increased to $37.50 billion in 2011. Comparatively, the average RGDP in the EU is several multiples of that of ECOWAS between 2001 and 2011. The average real GDP of EU rose from $252 billion in 1990 to $314 billion in 2000 and $365.6 in 2011. This shows a very wide gap in the level of development between ECOWAS and EU. Table 2.1 equally shows the continuous widening of the level of development in the two regions.

Table 2.1. RGDP of the ECOWAS Countries and the EU. (Billion dollars)

Countries	Cote d'Ivoire	Ghana	Nigeria	ECOWAS Average	EU Average
2001	10.4	5.2	47.4	21.0	321.1
2002	10.3	5.4	48.1	21.3	325.4
2003	10.1	5.7	53.1	23.0	330.0
2004	10.3	6.0	58.7	25.0	338.4
2005	10.4	6.4	61.9	26.2	344.9
2006	10.5	6.8	65.7	27.7	356.4
2007	10.7	7.2	70.0	29.3	367.7
2008	10.9	7.8	74.2	31.0	368.7
2009	11.3	8.1	79.4	32.9	352.4
2010	11.6	8.8	85.6	35.3	360.2
2011	11.1	10.0	91.3	37.5	365.6

Source: The World Bank (2012), World Development Indicators, Database

2.1.2 Growth Rate of GDP in ECOWAS and EU

The average GDP growth in ECOWAS witnessed a high level of fluctuations from 2001 to 2011 with the region recording 1.52 per cent growth rate in 2011. As regards the growth of output in the selected countries, out of the three ECOWAS countries, only Cote d'Ivore recorded economic decline in her domestic output between 2002 and 2003, while Ghana and Nigeria recorded appreciable growth in their output as shown in Table 2.2. From 2002 to 2006, output growth improved greatly ECOWAS, with the three countries recording substantial output growth. Although the growth of Cote d'Ivore was slower than that of Nigeria and Ghana, Cote d'Ivore was however sustained the growth till 2010. The growth of real GDP in Nigeria and Ghana remain substantial till 2011, this was however not the case in Cote d'Ivore as it declined to -4.7.

A number of reforms were embarked upon in the region such as privatisation, liberalisation and regional integration. Probably as a result of the reforms, the countries, as seen in Table 2.2, display wide differences in terms of economic growth. This analysis shows that the average output growth performance has been less than the 7 per cent for ECOWAS required for poverty reduction as recommended by MDGs[14] and NEPAD[15]. However, between 2003 and 2011, Ghana and Nigeria emerged as ECOWAS growth drivers.

The performance of Nigeria's output growth either positively or otherwise, could determine what happens to the region in general. The poor performance of GDP growth in ECOWAS is not unconnected with the different unfavourable structural and economic factors, the most important being the continuing deterioration terms of trade, and the political instability in the region, especially Nigeria. An appreciable increase in the EU output growth was again recorded between 2005 and 2007, but

[14] The Millennium Development Goals (MDGs) there are eight international development goals officially established following the Millennium Summit of the United Nations in 2000 and the adoption of the United Nations Millennium Declaration. All 193 United Nations member states and at least 23 international organisations have agreed to achieve these goals by the year 2015.

[15] The New Partnership for Africa's Development (NEPAD) is a programme of the Africa Union (AU) adopted in Lusaka, Zambia in 2001.

Table 2.2. ECOWAS States Average Annual Growth Rate of Gross Domestic Product (%)

Countries	Cote d'Ivoire	Ghana	Nigeria	ECOWAS Average	European Union Average
2001	0.0	4.0	3.1	2.4	2.2
2002	-1.4	4.5	1.6	1.5	1.3
2003	-1.6	5.2	10.3	4.7	1.4
2004	1.8	5.6	10.6	6.0	2.5
2005	1.3	5.9	5.4	4.2	1.9
2006	0.7	6.4	6.2	4.4	3.3
2007	1.7	6.5	6.5	4.9	3.2
2008	2.3	8.4	6.0	5.6	0.3
2009	3.8	4.0	7.0	4.9	-4.4
2010	2.4	8.0	7.8	6.1	2.2
2011	-4.7	14.4	6.7	5.5	1.5

Source: The World Bank, World Development Indicators, (2012) Washington

declined to 1.52 per cent in 2011. It is remarkable that the output growth rate in ECOWAS was higher than that of EU throughout 2001 to 2011.

2.1.3 Per Capita GDP in ECOWAS and EU.

The growth of GDP is not enough to analyse the performance of an economy in terms of development, the need to consider its impact on the masses is imperative. It is therefore important to examine the performance of GDP per capita in ECOWAS. The average GDP per capita of the ECOWAS increased from $418.1 in 2001 to $504.3 in 2011. Cote'd Ivoire has the highest GDP per capita between 2001 and 2010, though it declined to $548.7 in 2011 as presented in Table 2.3.

Also remarkable is the consistent increase in the GDP per capita of Ghana, it increased from $263.7 in 2001 to $402 in 2011. Ironically, despite the high real GDP in Nigeria, the country's per capita is very low. Although Nigeria's per capita increases in the last decade, it is still very low. Furthermore, the discouraging values of ECOWAS' GDP growth and GDP per capita could be explained by the region's frequent disruptions in electricity supply, with adverse effects on the operations of the industrial sector.

It must also be emphasised that several countries in the region have been victims of armed conflicts and political instability over the past few years, wreaking havoc on their economies. Even countries like Cote d'Ivoire which had remained stable in the past, were affected. The reverse is the case of the EU; the region grew its GDP per capita from $14,417 in 1990 to $19,599 in 2011

Table 2.3. ECOWAS States Average Annual GDP per Capita ($ Dollars)

Countries	Cote d'Ivoire	Ghana	Nigeria	Average ECOWAS		Average EU	
	US $	US $	US $	US $	Average Growth	US $	Average growth
2001	616.5	263.7	374.2	418.1	-0.4	17890.0	2.0
2002	597.5	268.9	370.8	412.4	-1.4	18075.1	1.0
2003	579.0	276.1	399.1	418.0	1.4	18250.3	1.0
2004	580.2	284.5	430.6	431.8	3.3	18628.9	2.1
2005	578.0	294.1	442.7	438.3	1.5	18905.4	1.5
2006	572.3	305.4	458.6	445.5	1.6	19449.5	2.9
2007	572.1	317.4	476.2	455.2	2.2	19978.8	2.7
2008	574.9	336.0	492.3	467.8	2.8	19941.9	-0.2
2009	585.6	341.2	513.8	480.2	2.7	18997.4	-4.7
2010	587.9	359.9	540.2	496.0	3.3	19359.3	1.9
2011	548.7	402.3	561.9	504.3	1.7	19599.7	1.2

Source: The World Bank, World Development Indicators, (2013) Washington

2.1.4 Foreign Direct Investment in ECOWAS and EU

Foreign Direct Investment is an important determinant of trade, especially IIT in intermediate and final products. Table 2.4, shows the net inflows of FDI, (the balance of inward FDI and outward FDI) of the ECOWAS countries. Between 2001 and 2011 there has been tremendous increase in the inflow of FDI to the ECOWAS countries compared to the outflow. As shown in Table 2.4, Ghana and Nigeria have positive net flow of FDI between 2001 and 2011. Cote d'Ivore also has positive FDI net inflow between 2001 and 2010. Expectedly, Nigeria attracted the highest net inflow of FDI in the period. The consistent increase in Nigeria's net inflow of FDI began in 2001 and continued till 2011. According to UNCTAD database, Nigeria's FDI inflow reached $8 billion in 2011, making the country the 19th greatest recipient of FDI in the world. It is noteworthy that, although, there was consistent increase in net inflow to ECOWAS, the quantity is quite low as a region. Although Nigeria's highest inflow of FDI comes from America through various oil companies that have affiliates in Nigeria, over 30 per cent of Nigeria's FDI inflows come from the EU. FDI flow from EU to Nigeria is majorly in machinery and equipment, chemical and chemical products, food, beverages and tobacco industries. A good per centage of Ghana's FDI inflows are equally from EU and are in food, beverages and tobacco as well as chemical and chemical products industries.

The average net inflows of FDI to EU showed negative between 2001 and 2011. This signifies that the region has higher out flow of FDI in the period than inflow. Expectedly the greater proportion of the region's FDI outflows moved to the developing countries, ECOWAS inclusive.

Table 2.4: Foreign direct investment, net inflows (Million US$)

Countries	Cote d'Ivoire	Ghana	Nigeria	Average ECOWAS	Average EU
2000	234.70	165.90	1140.14	513.58	-4255.09
2001	272.68	89.32	1190.63	517.54	-1667.91
2002	212.63	58.93	1874.04	715.20	1736.96
2003	165.35	136.75	2005.39	769.16	-1354.33
2004	282.98	139.27	1874.03	765.43	-5890.57
2005	311.92	144.97	4967.90	1808.26	-4163.34
2006	318.86	636.01	4534.79	1829.89	-4450.69
2007	426.78	1383.18	5167.44	2325.80	-13439.51
2008	446.15	2714.92	7145.02	3435.36	-16573.83
2009	380.87	1423.91	7029.70	2944.83	-2382.10
2010	446.15	2527.35	5133.47	2702.32	-4515.42
2011	446.15	2527.35	8025.11	3666.20	-4531.21

Source: The World Bank, World Development Indicators, (2012) Washington

Table 2.5: European Union Companies that have Affiliates in Selected ECOWAS Countries.

Industry	EU Companies that have Affiliates in Nigeria	EU Companies that have Affiliates in Ghana	EU Companies that have Affiliates in Cote d'Ivoire
Chemical and Chemical Products	PZ Cussons PLC, Astrazeneca PLC, Air Liquide Sa Etu Exploit Procedes Gc, Linde AG, Stichting Administratiekantoor Unilever N.V., Sulzer AG, Novartis AG, Wishart Investments Inc. , Reckitt Benckiser PLC.	PZ Cussons PLC , Air Liquide Sa Etu Exploit Procedes Gc, L'oreal, Basf Se, Astrazeneca PLC,	Unilever Plc, Syngenta Ag, , Ub France Sa, Sigmakalon (Bc) Uk Ltd, Yara International Asa, Compagnie Merieux Alliance , Bayer Ag, And Royal Dutch Shell PLC
Food, Beverages and Tobacco	Nestlé S.A., L'Arche Holding SA, Zuivelcoöperatie Friesland Foods U.A, Wishart Investments Inc, british American Tobacco (Investments) LTD , Lac B.V, Cadbury Schweppes P L C	Unilever PLC , Cadbury Schweppes PLC, Sabmiller PLC, Walther Schröter (GmbH & Co.), Aarhuskarlshamn AB (Publ), L'Arche Holding SA, british American Tobacco (South America) LTD , Diageo PLC.	Bolton Alimentari spa, Nestlé s.a., Jacobs Stiftung, Cemoi, Ste Financiere Alimentaire, Conserveries Des Cinq Oceans, Aarhuskarlshamn Ab (Publ) , Evialis.
Textiles, Clothing and Leather	Curtidos Codina Sa, Sulzer Ag, Wishart Investments Inc.	Go Acquisition B.V., CFAO	U.A.C. Holdings LTD, CFAO,
Rubber and Plastic Products	Crown Holdings, Inc, Michelin ET CIE, Sulzer AG, Invensys Plc		Crown Holdings, Inc, Cfao, Michelin Et Cie, Ce Carnaud Metalbox Group Services, Lammelin Textiles Et Industrie.
Metal and Metal Products	Astrazeneca Plc, Sulzer Ag, Crittall Holdings LTD, Wishart Investments Inc,		Crown Holdings, Inc, , Unilever Plc , Ce Carnaud Metalbox
Other Manufacturing	Unilever Plc, John Holt Group Ltd, Sbm Marine Ltd, Schneider Electric Sa, Curtidos Codina SA, Sulzer AG, .	Ppr , Basf SE, Go Acquisition B.V.	Unilever PLC, Geodis, Royal Dutch Shell Plc , Getma International
Non-metallic Mineral Products	HeidelbergCement AG, Etergyp SA, Sulzer AG, SOCIETE LAFARGE		Ce carnaud Metalbox Group Services, Royal Dutch Shell PLC, Chanic Sa, Ce Carnaud Metalbox Group Services,
Mining and quarrying		Stanley Plumbing LTD, Adamus Resources Limited, Cluff Resources LTD	

Source: International Trade Centre (ITC) Data Base: www.trademap.org

2.1.5 The Exchange Rate of ECOWAS countries and EU

The exchange rate of ECOWAS countries against the US dollars is presented in Table 2.6. It is remarkable to note that the West African Economic and Monetary Union (WAEMU)[16] countries use the West African CFA franc as their currency. The West African CFA[17] franc consistently depreciated in 2000. Although, the West African CFA francs slightly appreciated against the US dollar in the last decade, the exchange rate of the currency remained high against the US dollar. The Ghana cedis consistently remained the weakest currency against US dollars in ECOWAS. 14186 cedis exchanged for 1US dollar in 2009. Nigerian currency Naira remained one of the strongest currencies in ECOWAS. The currency got depreciated against US Dollar to ₦ 149 in 2009.

[16]Union Économique et Monétaire Ouest Africaine, UEMOA is the French name of the West African Economic and Monetary Union (WAEMU) (Union Économique et Monétaire Ouest Africaine, UEMOA. The countries include: Benin, Burkina Faso, Cote d'Ivore, Guinea, Guinea Bissau, Mali, Niger, Senegal and Togo.

[17] West Africa and Central Africa regions use the CFA franc, the two currencies are guaranteed by the French treasury. Although the two CFA franc are theoretically separate, they are effectively inter changeable. Both CFA francs have a fixed exchange rate to the Euro: 100 CFA francs = 1.

Table 2.6: ECOWAS Counties Real Exchange Rates to United States Dollars (Local Currencies)

COUNTRIES	Cote d'Ivoire (CFA Franc)	Ghana (Cedis)	Nigeria (Naira)
2000	704	7047	109
2003	519	8852	136
2006	498	9235	128
2007	454	9704	117
2008	471	12141	132
2009	455	14186	149
2010	472	Na	150
2011	495	Na	154

Source: International Momentary Fund, Trade Direction (1994, 2004 and 2010)

2.1.6 Trade Tariff in ECOWAS-EU Trade

The numerous advantages of international trade have been emphasised in terms of increasing the number of goods domestic consumers can choose from, decreasing the cost of those goods through increased competition, and allowing domestic industries to ship their products abroad. While all these advantages seem desirable, free trade is not widely accepted as completely beneficial to all parties. The tariff is a sort of cost on trade that raises the price of traded products. The trade tariff imposed by Ghana on goods imported from EU is presented in Table 2.7. In the late 1990s and the early 2000, Ghana imposed high tariff on mineral fuels and lubricants products imported from EU. However, there was drastic reduction in tariff imposed by Ghana on EU imports from 34.33 per cent in 1999 to 11.31 per cent in 2011.

Conversely, while the tariffs Ghana imposed on food and live animals majorly increased from 14.3 per cent to 18.6 per cent, manufactured goods, crude materials and inedible, chemicals, as well as animals and vegetable all had marginal increase. Ghana's tariffs on beverages and tobacco imported from EU were not only low but also remained constant at 20 per cent. Comparatively, trade tariff imposed by Ghana on imports from EU in the various sectors are higher than that of Cote d'Ivoire except in manufacturing goods. Of particular interest is the low tariff Ghana imposes on products of mineral fuels, crude materials, inedible and chemicals. It is equally remarkable that Ghana increased her trade tariff imposed on food and live animal products, beverages and tobacco, chemical products imports from EU in 2007. The tariff increase was however not sustained, as they substantially declined in subsequent years.

The tariffs imposed by Nigeria on products being imported from the EU were higher than what Ghana and Cote d'Ivoire imposed in the same period. Nigeria's trade policy has been used as a tool to foster growth. Aside using trade tariff as a source of revenue, Nigeria has been using it to protect domestic industries, and discouraging the consumption of certain commodities. For instance, Nigeria has placed high tariff on beverages and tobacco since early 1990s, however there was a decline in tariff Nigeria imposed on EU imports from 81.6 per cent to 19.7 per cent. The sectors in which Nigeria has comparative advantages in terms of natural resources and products

Table 2.7. Ghana Trade Tariff on Products Imported from EU (Simple Average, %)

	Food and live animals	Beverages and tobacco	Crude materials, inedible,	Mineral fuels, lubricants	Animal and vegetable	Chemicals	Manufact goods
2001	17.93	20	12.42	28.76	18.71	11.84	14.23
2002	17.88	20	13.12	28.76	18.38	11.73	14.03
2003	17.8	20	12.81	32.28	18.38	11.73	14.03
2004	17.8	20	12.81	32.28	18.38	11.73	14.03
2005	17.8	20	12.81	32.28	18.38	11.73	14.03
2006	17.8	20	12.81	32.28	18.38	11.73	14.03
2007	18.6	20	13.18	11.31	18.97	12.17	14.62
2008	18.6	20	13.18	11.31	18.97	12.17	14.62
2009	18.6	20	13.18	11.31	18.97	12.17	14.62
2010	18.6	20	13.18	11.31	18.97	12.17	14.62
2011	18.6	20	13.18	11.31	18.97	12.17	14.62

Source: **World Integrated Trade Solution, Data Base (WITS)**

Table 2.8. Cote d'Ivoire's Trade Tariff on Products Imported from EU

	Food and live animals	Beverages and tobacco	Crude materials, inedible,	Mineral fuels, lubricants	Animal and vegetable	Chemicals	Manufact. goods
2001	17.10	17.50	7.58	6.56	14.76	7.14	15.4
2002	17.10	17.50	7.58	6.56	14.76	7.14	15.4
2003	17.56	18.72	6.69	6.79	14.48	7.20	15.5
2004	17.68	18.54	7.12	7.07	15.38	7.23	15.49
2005	17.69	18.61	7.09	7.17	15.28	7.19	15.58
2006	17.73	18.68	6.85	7.37	13.83	7.45	15.53
2007	20.00	20.00	6.85	7.37	13.83	18.75	15.53
2008	17.82	17.96	6.35	6.70	13.83	7.49	15.52
2009	17.82	17.96	6.35	6.70	13.83	7.49	15.52
2010	17.82	17.96	6.35	6.70	13.83	7.49	15.52
2011	17.82	17.96	6.35	6.70	13.83	7.49	15.52

Source: **World Integrated Trade Solution, Data Base (WITS)**

Table 2.9. Nigeria's Trade Tariff on Products Imported from EU

	Food and live animals	Beverages and tobacco	Crude materials, inedible,	Mineral fuels, lubricants	Animal and vegetable	Chemicals	Manufact. goods classified
2001	46.52	89.90	17.57	21.49	33.51	19.75	28.80
2002	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2003	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2004	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2005	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2006	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2007	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2008	44.1	81.61	17.01	17.27	31.04	17.79	29.02
2009	14.57	19.65	6.720	6.48	12.44	7.6	14.05
2010	14.57	19.65	6.72	6.48	12.44	7.6	14.05
2011	14.57	19.65	6.72	6.48	12.44	7.6	14.05

Source: **World Integrated Trade Solution, Data Base (WITS)**

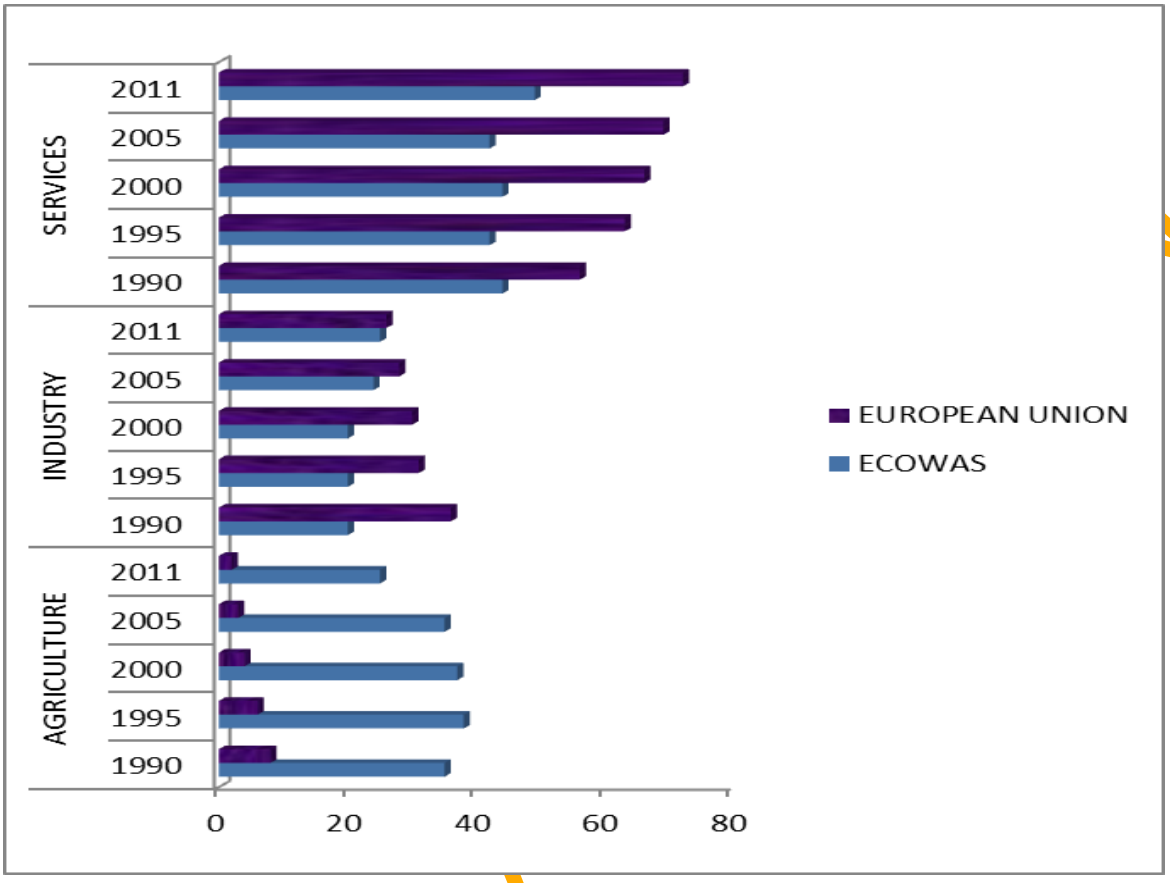
were equally protected with high trade tariff, some of such are Food and live animals, Animal and vegetable. Manufactured goods equally have high tariff imposed on goods imported from EU. In order to protect the infant manufactured goods. Crude materials, inedible, chemicals and crude materials, inedible products imported from EU by Nigeria faces relatively low trade tariff. This implies that Nigeria encourages higher importation of these products.

2.2 Structure of Output and Comparative Advantage between ECOWAS and EU

This sub-section examines the structure of output of ECOWAS countries in order to show their potentials compared to the EU. The structure of output of ECOWAS and EU is presented in Table 2.10. The Table shows the per centage contribution of agriculture, industry and services sectors to the GDPs of the two regions. In ECOWAS, the contribution of agriculture to GDP remains over 30 per cent between 2001 and 2009, except in 2011 that it declined to 25 per cent. The industry sector's GDP ranged between 19 and 25, while services contribution to GDP stayed above 40 per cent in the same period.

It is also remarkable, that while the share of industry and services in GDP were increasing in the last decade that of agriculture consistently declined. A closer look at Table 2.10 reveals that four of the ECOWAS countries have Agriculture dominated other sectors, they include, especially Ghana. Meanwhile, the ECOWAS countries that have substantial proportion of their GDP come from Industrial Sector are Cote d'Ivoire, Nigeria, Ghana, Guinea, Senegal, Sierra Leone and Togo. Also remarkable is that all the ECOWAS countries have high service sector contribution to the GDP, except Liberia and Sierra Leone.

Figure 2.1. Structure of Output of ECOWAS and EU



Source: Underlying data from World Development Indicators (WDI) database (2012)

Table 2.10 Structure of Output in ECOWAS (Per centages)

Sectors	AGRICULTURE			INDUSTRY			SERVICES		
Country	**2000**	**2005**	**2011**	**2000**	**2005**	**2011**	**2000**	**2005**	**2011**
Cote d'Ivoire	24	23	24	25	26	25	51	51	50
Ghana	40	41	32	27	27	19	32	32	49
Nigeria	43	33	34	39	44	34	21	24	Na
ECOWAS	**37**	**35**	**25**	**20**	**24**	**25**	**44**	**42**	**49**
EU	**4**	**3**	**2**	**30**	**28**	**26**	**66**	**69**	**72**

Source: The World Bank, World Development Indicators, (2012) Washington.

For EU, the contribution of agriculture to GDP consistently declined from 3 per cent in 2001 to 2 per cent in 2011. Similarly, share of industry in GDP declined to 26 per cent in 2011 from its value of 37 per cent in 2011. However, contribution of service to GDP increased from 56 in 72 per cent in 2011. Comparatively, although the contribution of agriculture to GDP declined in the two regions majorly in the last one decade, the magnitude of agricultural contribution to GDP in ECOWAS is several multiples of that of EU. As regards the industry, while its contribution to GDP was increasing in ECOWAS, it was declining in EU. However, the contributions of industry sector to GDP in the two regions are around 25 per cent. Service sector's contribution to GDP is far higher in EU compared to ECOWAS.

2.3 Trade Policies and Trade Agreements between ECOWAS and EU

ECOWAS countries have undergone different trade regimes. The different trade policy regimes in the region are informed by the unilateral, bilateral and multilateral trade arrangements and trade policy initiative the ECOWAS countries or body engaged in. Between 960 and mid-1980, majority of West African countries implemented restrictive trade policies for the sake of promoting industrialisation through industrial protection with a high level of tariff and non-tariff barriers. There are a couple of bilateral trade arrangements between individual ECOWAS countries and the EU, under the non-reciprocal agreement.

The Lome Convention

The first was the Lome Convention, which set out the principles and objectives of the EU cooperation with the African, Caribbean and Pacific Group of States (ACP)[18]. The main characteristics of the Lome Convention are the partnership principle, the contractual nature of the relationship, and the combination of aid, trade as well as political aspects, with its long-term perspective (5 years for Lome I, II, and III, and ten

[18] The African Caribbean and Pacific Group (ACP) is a group of 77 countries in Africa, the Caribbean, and the Pacific that was created by the Georgetown Agreement in 1975. The groups' main objectives are sustainable development and poverty reduction within its member states, as well as their greater integration into the World economy. All the member states, except Cuba, are signatories to the Cotonou Agreement with the EU. The groups in the ACP are: Caribbean group, East and South African group, Pacific group, West African group, Southern African group, Central African group and East African group.

for Lome IV). The first Lomé Convention (Lomé I), which came into force in April 1976, was designed to provide a new framework of cooperation between the then European Community (EC) and developing ACP countries, in particular former British, Dutch, Belgian and French colonies. It had two main aspects. First, it provided for most ACP agricultural and mineral exports to enter the EC free of duty. Preferential access based on a quota system was agreed for products, such as sugar and beef, in competition with EC agriculture. Second, the EC committed 3 billion Euro for aid and investment in the ACP countries.

The Main Characteristics of the Lome Convention are:

- The non-reciprocal preferences for most exports from ACP countries to EC
- Equality between partners, respect for sovereignty, mutual interests and interdependence
- The right of each state to determine its own policies
- Security of relations based on the achievements of the cooperation system.

The convention was renegotiated and renewed three times. Lomé II (January 1981 to February 1985) increased aid and investment expenditure to 5.5 billion Euro. Lomé III came into force in March 1985 (trade provisions) and May 1986 (aid), and expired in 1990; it increased commitments to ECU 8.5 billion. Lomé IV was signed in December 1989. Its trade provisions cover the ten years, 1990 to 1999. Aid and investment commitments for the first five years amounted to 12 billion Euro which lasted several years. The Lome IV had a review between 1994 -1995, in the context of major economic and political changes in ACP counties, in Europe and the international environment. The main amendments introduced are:

- The aspect for human rights, democrat principles and the rule of law become essential elements of the Convention.
- Phased programming is introduced, with the aim of increasing flexibility and improving performance of ACP countries.

The Cotonou Agreement

The expiry of the Lome IV in the new millennium was the opportunity for deeper changes to ACP-EU cooperation. In spite of Lome's successes, ACP-EU cooperation could do better and needed to adapt to a different geostrategic situation after the demise of the East-West power bloc. The Cotonou Agreement is a treaty between the EU and the ACP countries. It was signed in June 2000 in Cotonou, by 78 ACP countries except Cuba and the then fifteen Member States of the EU. It entered into force in 2003 and is the most recent agreement in the history of ACP-EU Development Cooperation. The Cotonou Agreement is aimed at the reduction and eventual eradication of poverty while contributing to sustainable development and to the gradual integration of ACP countries into the world economy. The revised Cotonou Agreement is also concerned with the fight against impunity and promotion of criminal justice through the International Criminal Court. The Cotonou Agreement replaced the Lomé Convention which had been the basis for ACP-EU development cooperation since 1975. The Cotonou Agreement, however, is much broader in scope than any previous arrangement has ever been.

Economic Partnership Agreement (EPA)

On the expiration of the non-reciprocal agreement between the ACP countries and the EU, a reciprocal[19] agreement called Economic Partnership Agreement (EPA) is being negotiated between the two parties. This negotiation has necessitated the conclusion of the arrangement to move ECOWAS into a common market. Therefore the issue of adopting and implementing a common external tariff (CET) in the ECOWAS becomes very important. With the adoption of CET, the tariff regime in African countries becomes further liberalized. EPA is a scheme to create a free trade area (FTA) between the European Commission of the EU and the ACP countries. They are a response to continuing criticism that the non-reciprocal and discriminating preferential trade agreements offered by the EU are incompatible with WTO rules.

[19] The WTO has since declared non-reciprocal trade agreement between ECOWAS and EU as discriminating and so insist that trade between any two regions must be reciprocal. This then implies that the ECOWAS countries must allow EU imports on the same preferential terms that its own exports to the EU have enjoyed since the mid 1970s.

The EPAs are a key element of the Cotonou Agreement, the latest agreement in the history of ACP-EU development cooperation and are supposed to take effect in 2008. Due to the continuing WTO incompatibility of previous arrangements, the EPAs' key feature is reciprocity and their non-discriminatory nature. They involve the phased out removal of all trade preferences which have been established between the EU and ACP countries since 1975 as well as the progressive removal of trade barriers between the partners. In order to fulfill the criterion of being a non-discriminatory agreement, the EPAs are open to all developing countries, thereby effectively terminating the ACP group as the main development partner of the EU. The establishment of a reciprocal trade agreement confronts the EU with the problem of how to reconcile the special status of the ACP group with the EU's obligations to the WTO. The solution proposed for this dilemma is an agreement which is only as reciprocal as necessary to fulfill WTO criteria.

2.4 Performance of ECOWAS Trade

The major trading partners of ECOWAS are China, United States, and the European countries. However, European countries' trade with the ECOWAS surpass those of other trade partners. Table 2.11, shows the average value of goods and services that ECOWAS countries to other countries of the world while Table 2.12 shows the value of goods and service the countries in the region import from countries of the world. It must be remarked that value of goods and services that the ECOWAS countries export to other countries outweigh their imports from the rest of the world over the last few decades. Nigeria was the highest exporting country in ECOWAS over between 1990 and 2011. The country is equally the only ECOWAS country that has positive trade balance as the values of the country's export remain consistently higher than the import values in the past years. Cote d'ivoire and Ghana are equally major countries that trade substantially with other countries of the world.

Appreciable increase was recorded in Cote d'Ivore exports of goods and services to the World as her export rose from $4.41 billion in 2001 to $10.89 billion in 2008. Although, Cote d'ivore's exports to the World declined in 2008 and 2010, her export rose to $10.53 billion in 2011. The rate of increase in Ghana's exports of goods and services to the

countries of the world is quite high. Ghana's exports of goods and services to the world increased from $2.40 billion in 2001 to $14.59 billion in about two decades as shown in Table 2.11. The dominance of Nigeria in ECOWAS exports to the world could be established in the fact that the country grew her exports of goods and services from $2.647 billion in 2001 to nearly $100 billion in 2011. A comparison of ECOWAS and EU average exports of goods and services showed a great disparity as the exports of EU is several multiples of that of ECOWAS.

As regards the imports of goods and services by the selected ECOWAS countries, larger per centage of the import is from their traditional trade partner, EU. Recent data from the Trade Map shows that China is gradually taking over from the EU countries as the major source of Nigeria imported of goods and services. Nigeria is not just the highest importing country in ECOWAS; it imported over 50 per cent of the sub-region between 2001 and 2011.More precisely, Nigeria grew her imports of goods and services from $15.50 billion in 2001 to over $60 billion in 2011. Substantial increase was equally recorded between 1990 and 2011 as the Ghana received over $17.52 billion goods from countries of the World in 2011 as against $3.44 billion in 2001. Although the rate of growth in Cote d'Ivoire's imports of goods and services was not as high as that of Nigeria and Ghana, the country was able to increase her imports of goods and services from $3.35 billion in 2001 to $9.77 billion in 2011.

Table 2.11 Exports of ECOWAS Countries to the World (Billions of U.S Dollars)

Country	Cote d'Ivoire	Ghana	Nigeria	Average ECOWAS	Average EU
2001	4.41	2.40	20.64	9.15	114.45
2002	5.75	2.62	18.84	9.07	122.42
2003	6.30	3.10	28.89	12.76	146.09
2004	7.52	3.49	38.61	16.54	174.74
2005	8.35	3.91	52.24	21.50	189.43
2006	9.14	5.14	62.96	25.75	214.88
2007	9.47	6.04	68.06	27.86	252.15
2008	10.89	7.14	86.40	34.81	278.97
2009	9.72	7.61	62.23	26.52	222.20
2010	9.32	9.46	74.61	31.13	242.42
2011	10.53	14.59	98.65	41.26	282.28

Source: The World Bank, World Development Indicators, (2012) Washington

2.12 Imports of ECOWAS Countries to the World (Billions of U.S Dollars)

Countries	Cote d'Ivoire	Ghana	Nigeria	Average ECOWAS	Average EU
2001	3.53	3.44	15.50	7.49	112.06
2002	3.84	3.38	19.24	8.82	117.36
2003	4.80	4.32	27.36	12.16	141.03
2004	6.09	5.36	27.28	12.91	168.98
2005	7.13	6.62	34.85	16.20	186.02
2006	7.36	8.30	40.73	18.80	212.59
2007	8.30	10.06	43.04	20.47	248.75
2008	9.09	12.69	61.01	27.59	277.66
2009	7.87	10.99	48.37	22.41	216.28
2010	8.27	13.26	61.49	27.67	237.21
2011	9.77	17.52	63.88	30.39	275.44

Source: The World Bank, World Development Indicators, (2012) Washington

2.4.1 Performance of ECOWAS Trade with EU

This section describes the extents, nature and dynamics of trade between ECOWAS countries and EU. The EU remains the major trading partner of ECOWAS countries in last few decades. The export of goods and services from ECOWAS to EU represents about 35 per cent of the region's exports to the world in 2001, though this increased to 50 per cent in 2005, it stood at about 30 per cent in 2007. As at 2011, there were 27 member countries of the EU, however, only 15 of them engage in substantial trade with ECOWAS countries. These EU countries that are ECOWAS major trading partners include: France, United Kingdom, Belgium, and Italy. Others are Greece, Germany, Sweden, Netherlands, Austria, Ireland, Poland, Spain, Portugal, Romania and Cyprus. These countries export their products to ECOWAS countries and equally imports from them. The value of exports from ECOWAS to EU has increased substantially in recent time, particularly between 2001 and 2007. The growth rate of ECOWAS imports from EU between 2001 and 2011 is 28.3 per cent. Table 2.13, shows that the value of ECOWAS's export to EU increased from $11475 million in 2001-2005 to almost doubled between 2006 and 2011, at the value of $19530 million. Nigeria, Cote d'Ivore and Ghana account for about 90 per cent of ECOWAS export to EU.

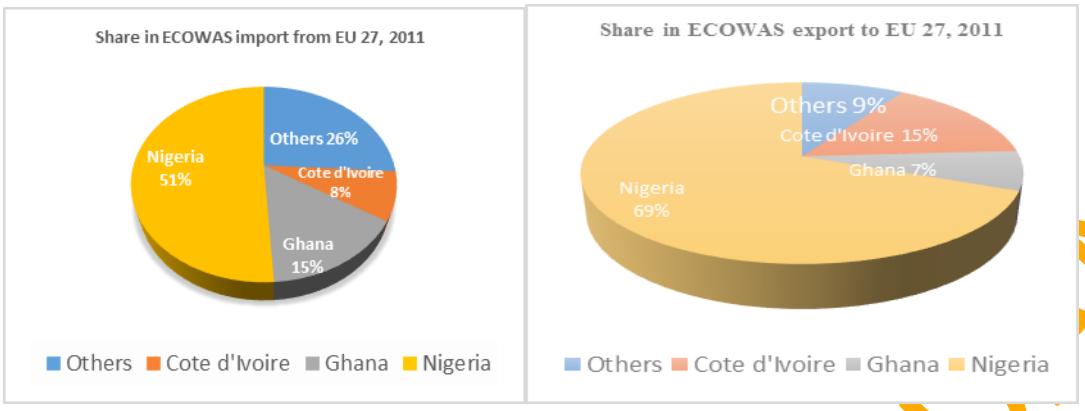
Table 2.13 also shows that Nigeria's export to EU is always half of the total ECOWAS export to the EU, and has increased tremendously in the last two decades $12,153 million in 2006-2011. Nigeria's share in ECOWAS exports to EU stands 2010. As regards ECOWAS imports from EU, a large percentage of ECOWAS import comes from EU. The average percentage of ECOWAS import from EU in her total import from the World is about 40 per cent over the years. Similar to the case of ECOWAS exports to EU, Nigeria remains the highest importer from EU as shown in Table 2.14. Her import from EU is about half of total ECOWAS import from EU. Nigeria's import from EU was $9197 million in the period 2001-2005. The country's an 68 per cent in 2010. Cote d'Ivore is another major exporter to EU, and her export value has increased from $1244 million in 1991-2164 to $2164 million in 2010. The export performance of Ghana is equally encouraging in the last two decade.

Table 2.13 ECOWAS Exports of Goods to EU (Million $)

YEARS	1991-1995	1996-2000	2001-2005	2006-2011	Growth Rate 2000/2011	Share in total EU exports from the World (2011)	Share in ECOWAS exports to EU -27 (2011)
COTE DIVORE	1844	2227	2759	3642	5.3%	0.29%	15.19%
GHANA	609	906	981	1353	32.9%	0.1%	6.89%
NIGERIA	3850	4250	5877	12153	40.1%	0.97%	68.93%
OTHERS	1632	1527	1858	2382	8.1%	0.05%	8.99%
TOTAL ECOWAS	**7935**	**8910**	**11475**	**19530**	**28.3%**	**1.41%**	**100%**

Source: International Momentary Fund, Trade Direction (1994, 2004 and 2011)

Figure 2.2. Share in ECOWAS Trade with the EU (Exports and Imports)



Source: World Integrated Trade Solution (WITS) database, 2012

Table 2.14 ECOWAS Imports of Goods from EU ($ Million)

	1991-1995	1996-2000	2001-2005	2006-2010	Growth Rate 2000/2010	Share in ECOWAS imports from EU -27 (2011)
COTE D'IVOIRE	1443	1127	1503	1744	16.1%	7.89%
GHANA	1281	1251	1752	3182	24.5%	14.14%
NIGERIA	4011	5972	9197	10661	15.9%	51.2%
OTHERS	5763	4865	6213	7523	3.2%	25.8%
TOTAL ECOWAS	**12498**	**13215**	**18665**	**22110**	**18.5%**	**100%**

Source: International Momentary Fund, Trade Direction (1994, 2004 and 2011)

There was remarkable increase in Nigeria's import from EU, the value increased to $10661 million in the period 2006-2011. Cote d'Ivore is another major importer from EU among the ECOWAS countries. The country imported goods and services worth $18665 million in 2001-2005 and increased to $22110 in 2006-2011. The general trend in ECOWAS import from EU is that there were consistent increases in the all the ECOWAS countries import from EU. It will be instructive to emphasise that the trade balance between ECOWAS and EU is quite high. The ECOWAS countries imports from EU were higher than their exports to the region. Comparison of ECOWAS export to EU and import from the region shows that all the ECOWAS countries have high trade deficit with EU except Nigeria.

The sectoral composition of ECOWAS's exports to European countries is presented in table 2.15. The dominance of the agriculture, mineral fuel and crude materials in ECOWAS exports to EU can be noticed. The share of agricultural export in the total trade declined between 2000 and 2011. Conversely, the substantial portion of ECOWAS imports from EU is in the manufacturing sector. Also to be noted is that there is an appreciable increase in ECOWAS export of manufacturing goods to EU. This shows the possibility of increase in IIT between ECOWAS and EU. Equally remarkable is that a large proportion of the ECOWAS exports in manufacturing product to EU could be in intermediate products. Based on SITC product group categorisation the ECOWAS Exports to EU shows that in 2011 larger percentage of the products are in categories of Mineral fuels, lubricant and related materials. Food and life animals

Table 2.15. Sectoral Composition of Trade between ECOWAS and EU (%)

Trade Type	Years	Agriculture	Chemicals	Manufacture	Mineral fuel	Crude materials	Total
ECOWAS Exports to EU	1990-1999	33.3	0.4	17.8	34.4	14.1	100
	2000-2004	19.4	1.6	38.9	29.5	10.5	100
	2005-2009	22.1	2.7	52.4	10.9	11.8	100
	2009-2011	15.9	1.8	36.5	35.9	9.9	100
ECOWAS Imports from EU	1990-1999	14.5	0.5	65.3	3.1	1.8	100
	2000-2004	11	0.5	68.6	2.7	1.8	100
	2005-2009	7.7	0.3	74.7	2.4	1.2	100
	2009-2011	8.3	0.5	71.2	5.8	1.2	100

Source: Authors Computation, Underlying Data from World Integrated Trade Solution, Data Base (WITS)

Figure 2.3: SITC Categorisation of ECOWAS Exports to EU (%, 2011)

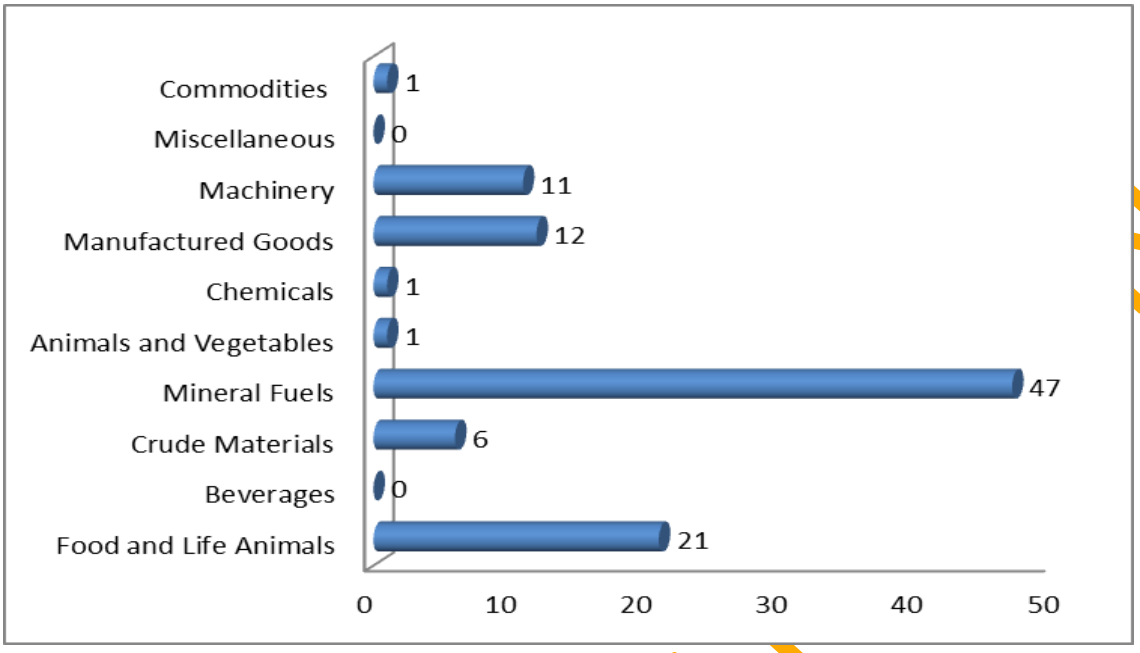
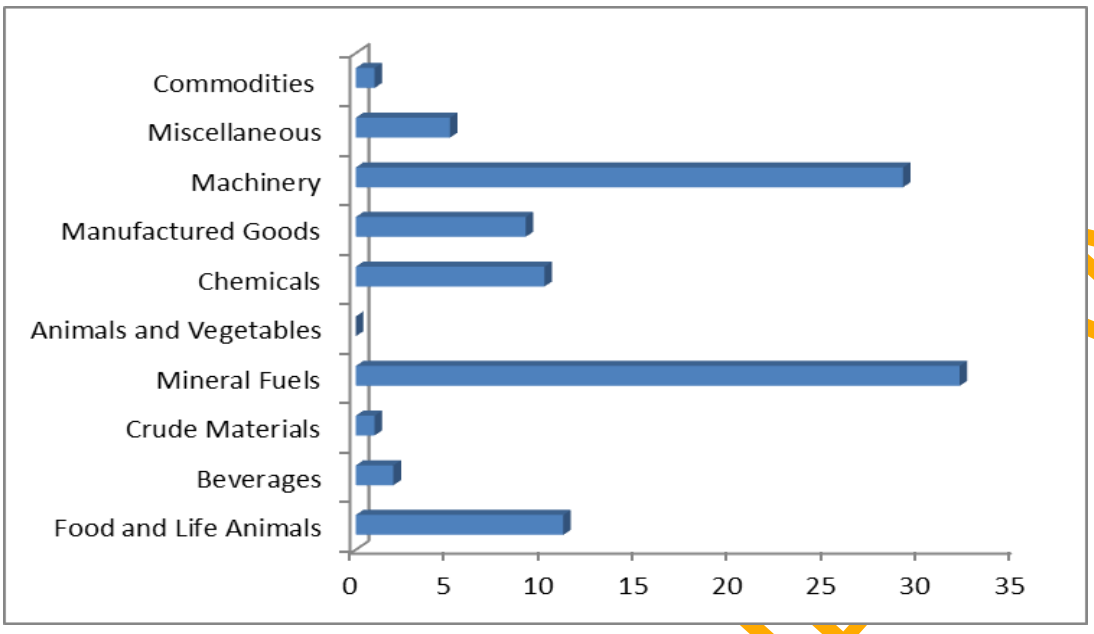


Figure 2.4: SITC Categorisation of Imports of ECOWAS from EU (%, 2011)



2.4.2 Specific Products/Industries in which ECOWAS has IIT with EU.

The type of trade that is expected to exist between the developing countries and developed economy especially in manufacturing products is the ITER. However, a glance at the flows of trade between ECOWAS countries and the EU revealed that intra-industry has been found to exist in products in the trade between ECOWAS and EU.

A closer look at the regions trade flows further show that there is a growing proportion of intra- industry trade. Some of the industries in which IIT occurred between ECOWAS and EU includes food and live animals, crude materials, chemicals, and manufactured products. It must be noted that IIT exist only between few of the ECOWAS member countries EU. The few ECOWAS countries that have been manifesting IIT with the EU includes: Cote d'Ivore, Ghana, Nigeria, Senegal, Seirra Leone, Guinea, Gambia, Burkina faso and Togo

It must however been emphasised that only Nigeria, Cote d'Ivore, and Ghana have quite substantial part of their trade with EU to be intra-industry. Incidentally, these are the emerging ECOWAS countries. With (Six-digit SITC) level of aggregation, the trade flows between Nigeria and EU showed that majority of the products are ITER in nature. However, out of the products traded between Nigeria and EU, about 300 products that are intra-industry in nature. Moreover, over 100 of them are manufactured products. Table 2.16, shows some products in which Nigeria has IIT with EU.

Ghana is another ECOWAS country that has IIT with EU. There are also about 300 products in which Ghana has IIT with the EU. Few of the product in which there is occurrence of intra-industry between the Ghana and EU are presented in table 2.16. Most of these goods are manufacturing products. The increased occurrence of IIT between Ghana and EU countries suggest the fact that the country is making appreciable efforts to diversify the production from crude commodities to manufacturing products.

Table 2.16. Products in which Nigeria has IIT with EU ($ 000)

Product code	Product label	Imports			Exports		
		2008	**2009**	**2011**	**2008**	**2009**	**2011**
732690	Articles, iron or steel, nes	109313	33289	256734	196615	202849	567842
271019	Light petroleum distillates nes	97053	114496	153824	329784	253172	437302
390110	Polyethylene having a specific gravity of less than 0.94	27637	80903	23024	55478	4646	279032
271011	Aviation spirit	41278	43769	21977	172	0	56923
490290	Newspapers, journals and periodicals, nes	319	46429	48960	5084	2703	32858
240220	Cigarettes containing tobacco	9883	5280	6984	2043	3251	16084
490191	Dictionaries and encyclopaedias, and serial instalments	906	2419	114	261	1457	6384
731029	Cans, iron or steel, capacity <50 litres nes	1111	202	2298	1101	1109	5583
490300	Children's picture, drawing or colouring books	850	45	1158	234	277	2877
390120	Polyethylene having a specific gravity of 0.94 or more	8698	64542	1974	4840	133955	2278
760612	Plate,sheet or strip,aluminium alloy,rect or sq,exceeding 0.2mm thick	2950	4423	1713	11892	2562	2032
401290	Solid o cushiond tires,interchangeable tire treads&tire flaps	12	5329	644	2504	2051	2005
392310	Boxes, cases, crates & similar articles of plastic	768	1135	326	4400	260	1708
490110	Brochures, leaflets and similar printed matter, in single sheets	3430	6303	2064	11141	192	1558
030510	Fish meal fit for human consumption	8275	4548	7809	16315	7640	1512

Source: **World Integrated Trade Solution, Data Base (WITS)**

Table 2.17. Products in which Ghana has IIT with EU ($ 000)

Product code	Product label	Imports			Exports		
		2007	**2008**	**2011**	**2007**	**2008**	**2011**
271011	Aviation spirit	15823	50933	35098	7294	24960	1
030379	Fish nes, frozen, excluding heading, livers and roes	6622	9583	7408	8012	9776	5613
740811	Wire of refind copper of which the max cross sectional	5605	7748	6460	90	36	128
901890	Instruments and appliances used in medical, nes	13461	19493	5887	251	31	314
040590	Fats and oils derived from milk nes	446	8	2642	28	64	326
151190	Palm oil and its fractions refined	1498	0	2444	956	1043	1333
940360	Furniture, wooden, nes	577	1339	2071	30	28	71
330499	Beauty or make-up preparations nes;	816	1498	1492	76	24	8
220300	Beer made from malt	281	596	555	118	94	75
151110	Palm oil, crude	3262	577	553	55	95	671
151590	Veg fats&oils nes&their fractions,refind	62	66	492	191	6095	2600
200941	Pineapple juice, unfermented, whether or not	101	144	459	217	280	0
210410	Soups and broths and preparations thereof	22	58	422	87	216	121
442190	Wood articles nes	41	225	169	337	378	708
940390	Furniture parts nes	81	223	167	3270	910	0
220600	Fermented beverages nes	150	387	157	414	101	92

Source: **World Integrated Trade Solution, (WITS) Data Base**

Table 2.18. Products in which Côte d'Ivoire has IIT with EU ($ 000)

Product code	Product label	Imports			Exports		
		2007	2008	2009	2007	2008	2009
160420	Fish prepared or preserved, except whole or in pieces	444	402	73	154818	163888	127634
180620	Chocolate&other food preparations containg cocoa	28	17	5	69969	128016	79280
271019	Light petroleum distillates nes	28127	27057	34963	78266	95823	44957
180632	Choc&food prep cntg cocoa in blocks,slabs/bars,not filld	474	337	215	882	25030	31707
210111	Coffee extracts, essences, concentrates	124	59	32	29711	32389	29107
481910	Cartons, boxes and cases, of corrugated paper or paperboard	993	1441	8294	24941	20949	24491
080430	Pineapples, fresh or dried	0	0	0	38688	28653	21415
030343	Skipjack or stripe-bellid bonito,frozen ex headg	11190	14712	15966	1527	3187	17019
901890	Instruments and appliances used in medical or veterinary	4210	4295	4551	10	22	11642
030342	Tunas, yellowfin, frozen excluding heading No 03.04, livers	26677	19657	21193	473	495	9150
160414	Tunas,skipjack&Atl bonito,prepard/preservd,whole/in pieces,ex	213	228	97	980	10867	7969
151190	Palm oil and its fractions refined but not chemically modified	8	31	0	148	2181	4616
300490	Medicaments nes, in dosage	85974	115408	77264	3088	3554	3433
080111	Coconuts, dessicated	5	7	0	2165	2568	2804
283640	Potassium carbonates	2265	2670	6900	2081	1605	1973
442190	Wood articles nes	141	177	515	791	1275	1847

Source: **World Integrated Trade Solution, (WITS) Data Base**

Based on (Six-digit SITC) level of aggregation, Cote d'ivoire has IIT with EU in about 300 products/industries. Most of the products the country has IIT with EU were manufacturing products. Though this is unexpected of the kind of trade between the two regions given the difference in the level of technology, IIT has continued to grow rapidly between them.

CHAPTER THREE
LITERATURE REVIEW

3.0 Introduction

Several theories have evolved in international trade to explain the existence, causes or determinants of trade. International trade has been broadly divided into two: ITER and IIT. Meanwhile, this study focuses on IIT both intermediate and final products. The development of IIT (IIT) literature has evolved in three main areas in the last four decades, these include: determining the existence of and measuring the magnitude of the phenomenon, developing theoretical explanations for its existence and, finally, evaluating the determinant factors arising from the theory. This trio development is applicable to IIT intermediate and final products. This review of literature is divided into three categories; theories, methodologies, and empirical results. Summary of the review of previous studies is presented in Appendix 3. However, an objective characterisation of theory, methodology and major empirical finding is provided in sections below.

3.1 Theoretical Review

IIT can occur in two major industry levels. There could be the exchange of final goods for final goods, and the exchange of intermediates for intermediates. Each of these exchanges (final goods and intermediate products) can either be horizontal or vertical. The theoretical underpinnings of this phenomenon are discussed below.

3.1.1 The Theories of IIT in Final Products

Over the last 20 years, a set of new theories has been put forward to complement and/or substitute for the simple H-O-S model. Accordingly, one would expect one-way trade between countries with different factor endowments (North-South Trade) to be most prevalent in the H-O-S model (Nillson, 1997). However, the H-O-S model seemed incapable of explaining certain significant empirical findings about the world economy. This incapability of the H-O-S paradigm in explaining two-way North-North trade was the starting point of the emergence of a new trade theory, namely IIT theory (IIT). The

theoretical literature on IIT is very extensive. It is possible to distinguish two types of IIT, horizontal and vertical. Horizontal IIT (HIIT) arises when there is a two-way trade in products of similar quality with different attributes (horizontally differentiated products). The two sets of models are different in their predictions. While HIIT is likely to take place between countries with high and similar per capita incomes (North-North IIT), VIIT is likely to take place between countries at different levels of per capita incomes (North-South IIT) (Hellvin, 1996).

3.1.1.1 Models of Vertical IIT in Final Products.

The distinction between vertical and horizontal models is an important one. HIIT models are usually expressed as a way of explaining IIT flows between two developed countries/regions. However, IIT between developed and developing countries (VIIT) may be expected to be of a different kind and caused by other factors than IIT between two developed countries. That is to say, VIIT models require a modification of the usual explanations. An essential and innovative element in VIIT models is the postulation of vertical product differentiation by quality as the crucial determinant of IIT between developed and developing countries. There are three major theories in VIIT. They include Neo-H-O model, Natural Oligopoly and Vertical Differentiation as well model of North- South and Vertical Product Differentiation.

i. Neo-Heckscher-Ohlin Model

This approach can be considered as an alternative to that of modelling IIT as a consequence of scale economies and monopolistic competition. The first study this approach is Falvey (1981). Falvey (1981) attempts to minimise the departure from the traditional H-O-S theorem by modifying the standard framework in a minor fashion. In the traditional 2 × 2 × 2 H-O-S model, two factors are used to produce two commodities in two countries. This model assumes that differential factor endowments that cause autarkic factor price differences between the potential trading partners are the reason for trade. There is also the assumption of constant returns to scale in the H-O-S model. Falvey (1981) retains these two central assumptions of traditional theory. However, for the sake of extending the H-O-S model, he makes two crucial modifications. First, he

assumes that one of the two factor inputs used in each industry (capital) is specific to that industry, second each industry is no longer assumed to produce a single homogenous product, but can produce a range of products using as inputs labour and its own industry specific capital, in other words, at least one industry is assumed to produce a differentiated commodity. The commodity concerned is vertically, differentiated with respect to quality (Greenaway, 1987).

Falvey (1981), after touching upon his basic modifications, constructs the closed economy features of the Neo-Heckscher-Ohlin model. The industry under consideration is assumed to posses a given stock of capital (K) and to be able to hire labour (L) at the given wage rate (w). Using the services of K and L , the industry can produce a range of products, which will be referred to as different 'qualities'. On the supply side, product quality is determined by the capital-labour ratio (α) used in the production. Higher quality products require more capital intensive techniques and therefore have higher prices. On the other hand, from the demand side, demand for each quality is taken to be a function of the prices of all qualities and total consumer income. Consumers are assumed to prefer high quality to low quality products. Since, However, choice is income constrained, some consumers will initially be confined to some low quality variety with substitution towards higher qualities resulting from income increases (Greenaway, 1987).

Trade conditions of the neo Heckscher-Ohlin model are again explained by Falvey (1981). According to Falvey (1981) trade takes place in a two-country (home and foreign) world, in each of which the industry under consideration has a given capital stock (K *and* K^*, respectively) and faces given wage rates (w *and* w^*, respectively). Capital is industry specific and internationally immobile, but is freely mobile in the production of this industry's various qualities in each country. The returns to capital (r *and* r^*, respectively) adjust so as to maintain the full employment of the two capital stocks. Each industry is assumed to be perfectly competitive. Then, for any given returns to capital in the two countries, domestic production costs (c) and foreign production costs (c^*) for a given quality i α can be represented as

$$c = w + \alpha_i r \quad (1)$$

$$c^* = w^* + \alpha_i r^* \quad (2)$$

It is assumed that the home (foreign) country is relatively well endowed with capital (labour) resulting in $w^* < w$ and $r^* > r$. Given these autarkic factor price differences the home country will enjoy a comparative advantage in a range of high quality products while the foreign country enjoys a comparative advantage in a range of low quality products. To see this Falvey (1981) identifies the 'marginal quality' 1 α , such that

$$c(\alpha_1) - c^*(\alpha_1) = 0 \quad (3)$$

$$w + \alpha_i r = (w^* + \alpha_i r^*) = 0 \quad (4)$$

and correspondingly

$$\alpha_1 = \frac{w - w^*}{r^* - r} \quad (5)$$

$$c(\alpha_i) - c^*(\alpha_i) = \frac{w - w^*}{\alpha_1}(\alpha_1 - \alpha_i) \quad (6)$$

It can be seen from 2.24 that the home country has a comparative advantage whenever

$$\left(c(\alpha_1) - c^*(\alpha_1)\right) \prec 0 \quad (7)$$

$$w^* \prec w, \frac{\left(w + w^*\right)}{\alpha_1} \succ 0 \qquad (8)$$

$$\left(c(\alpha_1) - c^*(\alpha_1)\right) \prec 0 \text{ if and only if } \alpha_i \prec \alpha_i \qquad (9)$$

From 2.24 it is apparent that the home country has a comparative advantage in those qualities which require more capital-intensive techniques than the marginal quality, and is at a comparative cost disadvantage in the other (lower) qualities. Therefore, the higher wage home country will specialise and export those qualities above the margin $\alpha_i \succ \alpha_1$, and import the below marginal qualities $\alpha_i \prec \alpha_1$. Since higher quality requires higher capital-intensity in production, the capital abundant country exports relatively high quality products while the labour abundant country exports relatively low quality products and IIT occurs as a consequence of countries' specialisation in the production of different varieties (Torstensson, 1996).

An extension of this work can be found in Falvey and Kierzkowski (1987). IIT is derived in a manner similar to that described above. One extension is that the capital-abundant country will have a comparative advantage in higher quality goods and this advantage will become larger as one moves up the quality spectrum. Further, the model implies that vertically differentiated products will be distinguishable in terms of quality and price. The Falvey and Kierzkowski models are of importance since many international markets are characterised by IIT in vertically differentiated goods.

ii. Natural Oligopoly and Vertical Differentiation

In series of studies (Shaked and Suttan 1982; 1983; 1984), the case of 'natural oligopoly' and trade in vertically differentiated products was examined. They focused on situations where the number of firms that can enter a market with new, higher-quality varieties is

bounded by the demand and supply characteristics of the market. According to Shaked and Suttan (1984), large numbers of qualities would be available if the income range is wide, fixed (R&D) costs associated with quality improvements are low; and average variable costs rise sharply as a result of quality improvements. By contrast, if unit variable cost does not rise sharply with quality[20] then an upper bound exists to the number of firms that can survive with positive market shares, and prices in excess of unit variable cost. This later situation is referred to as the 'natural oligopoly' case (Shaked and Suttan,1984).

Basic autarky and trade features of the Shaked and Suttan model are explained by Williamson and Milner (1991) by reference to Shaked and Suttan (1982; 1983; 1984). In the Shaked and Suttan model, under autarky conditions, only two home firms producing distinct qualities can survive, given the country's income distribution. The reason for this is that competition on quality drives all firms to produce the highest quality possible, but (Bertrand) price competition between similar qualities drives price to marginal cost and causes the exit of firms. According to Williamson and Milner (1991), the Shaked and Suttan model analyses the impacts of the opening up of trade under two different approaches: identical economies and different economies approaches.

If the two economies are identical in all respects, their combined market will still support only two firms. Given the competition in quality and in price as discussed above, the number of firms that can be supported is independent of market size. When trade opens up, two of the firms will exit and two will remain to serve the joint market. A priori, it is impossible to predict the direction and type of trade involved in this case. However, in the event that one firm from each country exists, the result will be IIT in vertically differentiated products. But, if the two economies are different, differences in income distribution facilitates a larger number of firms in the post-trade equilibrium, with the higher (average)-income country specialising in a range of higher quality products and

[20] This case is likely to be relevant in situations where the main burden of quality improvements falls on fixed costs, rather than increases in labour and raw material inputs

the lower (average)-income country specialising in lower-quality products. Since trade drives down prices in general and consumers prefer higher quality, it is lowest-quality firms that tend to be driven from the market. Thus, all other things being equal, VIIT is more likely, the greater the degree of taste overlap between economies. The opening up of two-way trade will be welfare improving in both of the above cases, since competition will drive down prices, while market expansion will induce overall quality improvement. As a result, according to the Shaked and Suttan model, the more dissimilar the economies are, the larger the number of producers will be and the more the distribution of income becomes closer, the lower the number of firms in the combined economy.

iii. Model of North-South and Vertical Product Differentiation

Flam and Helpman (1987) developed a model of North-South trade based on vertical product differentiation (that is, differentiation according to quality). They assumed that two commodities exist: homogeneous product and a vertically differentiated product. The homogenous products can be consumed in every desirable quantity, whereas the consumer can choose the quantity of differentiated product from those available in the market. The North produces and exports high quality, high cost varieties, while the South exports low quality, low cost varieties. Given an overlap in income distribution, there exists IIT. The Flam and Helpman (1987) opine that the higher the relative income of the North and the larger the share of income of southern individuals that consume imported varieties, the larger is the share of IIT. They predicted further that the share of IIT depends on relative country size, on income distribution in both trading countries.

3.1.1.2 Models of Horizontal IIT in Final Products

The models of HIIT explicitly introduce economies of scale and imperfect competition in the analysis of trade. Therefore, a fairly large per cent of HIIT takes place under 'monopolistically competitive' markets. The models of HIIT in 'monopolistically competitive markets' have in common explicit assumptions of increasing returns to scale, free entry and exit and an assumption that consumer preferences are sufficiently diverse to ensure that a large number of single product firms can co-exist in the final equilibrium

(Greenaway, 1983). These models can be categorised as 'neo-Chamberlinian[6]' 'neo-Hotelling' and 'Reciprocal Dumping Model'. All these models exist under conditions of 'monopolistic competition'. However, the treatment of consumer preferences differs between these three models.

i. Neo-Chamberlinian models

The neo-Chamberlinian works of Dixit and Stiglitz (1977), Krugman (1979, 1980), Lancaster (1980), Lawrence and Spiller (1983) and Helpman and Krugman (1985) developed a setting of differential factor endowments and monopolistic competition. Under these models, goods are horizontally differentiated – that is, their characteristics differ (this differential may be perceived or real). The demand for greater variety of goods on the part of the consumers, free entry and exit, and decreasing production costs over the relevant range of output combine to generate IIT in differentiated commodities. The Krugman (1979) model assumes an economy has one fixed factor of production (labour), which is fixed in supply. There are a large number of firms, each producing a different variety of the same good. It is assumed that all individuals have the same utility function and that all varieties enter the utility function symmetrically such that the consumption of one more unit of any variety has the same marginal utility.

In order to increase total utility, more varieties must be consumed without increasing total consumption, and welfare can increase as long as different varieties are consumed. The symmetry of the model ensures that in equilibrium, each firm will produce the same quantity of their chosen variety and each will sell at the same price. Now assume another economy that is identical to the first in every way. When the economies open to trade, assuming transportation costs to be zero, two firms are now producing the same product, but one of the firms will change its variety to one which is not produced elsewhere (it is assumed in the model that altering one's product specification is costless). Each firm can sell the same quantity of the new variety as it sold of the old. A given variety will be produced in only one country, where half is sold in the home market and the other half will be exported. The model is indeterminate however, as to which variety is produced in which country. Consumer's utility shall increase as they face a wider choice. The

Krugman model illustrates that trade between identical economies where consumers demand greater variety, there are decreasing costs of production, and where there is free entry and exit, there will be welfare increasing IIT.

ii. Neo-Hotelling models

These models build on the work of Lancaster (1980) and Helpman (1981), and suggest that IIT opens up as a consequence of preference diversity and decreasing costs. Products are assumed to be horizontally differentiated and consumer preferences are uniformly distributed around a 'spectrum'. Each consumer has an ideal variety, the closer their consumption is to the 'ideal' the more they are willing to pay; the further, or less ideal the variety, the less they are willing to pay for the good. Preferences for variety differ between consumers. He who creates this situation under autarkic equilibrium and calls it perfect monopolistic competition. To capture IIT, Lancaster assumes two economies, operating as above, identical in every way.

In autarky, equilibrium would be the same in every, with the same varieties and quantities being produced in each. Assuming no trade barriers, if trade opens-up between the two countries, effectively one large market is being created to replace the original two-smaller markets. However, the factors of production are not free to move between the countries. Each differentiated variety is produced by only one firm, and in only one country. Half of the domestic consumers shall prefer an imported variety, the other half a home produced variety. The final distribution of varieties along the spectrum will be such that each domestic variety shall be evenly positioned between two imported varieties. The average distance between varieties on the spectrum decreases post trade, while the total number of varieties produced shall be higher.

iii. Reciprocal Dumping Model

This model developed by Brander and Krugman (1983) assumes two-countries which are identical in every respect, with one producer of an identical commodity in each. Each firm displays Cournot behaviour, that is, the assumption that each firm knows what its rival produces, takes the rivals' output as given, and selects its own output so as to

maximise its own profit. The assumption of constant marginal costs allows the markets to be segmented, and each firm chooses the profit maximising output in each market separately. IIT in identical commodities shall result from Cournot behaviour, (where each firm will produce half the output in each country). The results of the model are very similar to the standard Cournot duopoly model; the only difference is that the producers are located in different countries. The reciprocal dumping model extends the above to include transport costs. These increase the marginal cost of exporting, and thus the export price. The volume of a firms' exports decreases, resulting in a cost advantage for the domestic producers and increase in their volume of sales. Each firm's output in each market will be set at the point where MC=MR, although MC is greater in the export market, much of the increase in transportation costs are absorbed by the firm.

3.1.1.3 Concluding Remarks on Review of Theories of IIT in Final Products

Various approaches to the explanation of the two-way international exchange in final product of horizontally and vertically differentiated goods have been outlined in sections 3.1.1.1 and 3.1.1.2 respectively. The models discussed are capable of explaining the different sources and determinants of IIT and the different market structures that allow the emergence of total, vertical and horizontal IIT types. However, it is quite difficult to merge the predictions of these models under the same context (a single model), because they vary in their assumptions regarding consumer preferences, returns to scale, entry conditions, product differentiation and cost conditions. However, since the present study is between ECOWAS (developing region) and EU (developed region) theory of vertical IIT will be more applicable. Moreover, the Shaked and Suttan model (Natural Oligopoly and Vertical Differentiation) is essentially based on games theory approach, hence only suitable for analysing the existence of Vertical IIT and not for its determinants. The model of north-south and vertical product differentiation that is capable of examining the existence and the determinants of Vertical IIT is thus more applicable to the present study.

3.2 Review of Methodologies Used in Previous Studies

The review of methodology will be sub-divided into the following: separating trade flows into intermediate and final products, measurement of intra-industry, disentangling IIT into vertically and horizontally differentiated products, measurement of some explanatory variables and model estimations adopted in the previous studies.

3.2.1 Review of the Methods of Separating Trade Flows into Intermediate and Final Products

The separation of trade flows into final and intermediate products depends on the digit level of the trade flows. In trade data, numbering systems (codes) are used to identify commodities. These commodity codes are hierarchical, in that the longer the digit of the code the more specific is the commodity. There are three approaches often used in the literature to select the intermediate goods from the total trade flows. First, Yeats (2001), Schuler (1995), Keller (1999), and Kol and Rayment (1989) propose that trade in goods identified as parts or components should be considered to be trade in intermediate goods. Another method is to focuses only on individual SITC 7 group to measure the growing importance of trade in components in international trade, because this industry group consists solely of parts and components (Yeats (2001)). The last method adopted by Turkcan (2003) is to use the Broad Economic Categories Classification Scheme (BEC, 1986). The BEC includes 19 basic categories, including: Categories classified as capital goods, consumption goods, and intermediate goods (111, 121, 2, 3, 42, and 53) etc. BEC scheme has a little limitation. That is some of the categories such as food products (112, 122), fuel goods (321), and capital goods (41, 51) could be consumed directly by consumers, or used as intermediates in the related industry. However, Turkan (2003) maintained that the use of BEC remained the best method of identifying intermediate products.

Table 3.1 Broad Economic Categories Classification Scheme (BEC, 1986)

Commodity Categories	Classes
111. Mainly for industry	Intermediate goods
112. Mainly for household consumption	Final Goods
121. Mainly for industry	Intermediate goods
122. Mainly for household consumption	Final Goods
21. Primary	Intermediate goods
22. Processed	Intermediate goods
31. Primary	Intermediate goods
32. Processed	Intermediate goods
321. Motor Spirit	Intermediate goods and Final goods
322. Other	Intermediate goods
41. Capital goods (except transport equipment)	Final Goods
42. Parts and accessories	Intermediate goods
51. Passenger motor cars	Intermediate goods and Final goods
53. Parts and accessories	Final Goods
61. Durable	Final Goods
62. Semi-durable	Final Goods
63 Non-durable	Final Goods

Sources: John Haveman's web page:

http://www.macalester.edu/research/economics/PAGE/HAVEMAN, Retrieved 09/10/12

3.2.2 Measurement of IIT

Early attempts to measure the phenomenon of IIT was led by Verdoorn (1960), Balassa (1966), and Grubel and Lloyd (1975) (Grubel 1981). Verdoorn (1960) pioneered the development of the index used to measure IIT. In what he described as the Verdoorn's index, he used equation (10), which is the ratio of exports to imports of the same product group to measure IIT.

$$\text{That is: } V_i = \frac{X_i}{M_i} \qquad (10)$$

where, *Vi* is the Verdoorn's index, *Xi* is the exports of commodity group *i*, and *Mi* is the imports of commodity group *i*. If the Verdoorn's index is closer to 1, it indicates that the commodity group is involved in higher levels of IIT. The argument against Verdoorn index is that it does not identify the extent of IIT in a particular product group.

Balassa (1966) proposed an index of IIT that measured the degree of trade overlap - simultaneous import and export - of goods within an industry:

$$Bj = \frac{|X_i - M_i|}{(X_i + M_i)} \qquad (11)$$

where $i \equiv$ commodity within industry *j*. This index, the ratio of net trade to gross trade, ranging from 0 to 1, with 0 representing "perfect" trade overlap, and therefore pure IIT, while 1 represents pure ITER. In order to calculate the degree of IIT for all industries (country level), Balassa took an unweighted average for each B_j:

$$B = \frac{1}{n}\sum B_j \qquad (12)$$

where n ≡ number of industries. This can be generalised to be a weighted index:

$$B = \sum w_j B_j \qquad (13)$$

where $w_j \equiv$ industry j's share of total trade.

However, Grubel and Lloyd (1975) argue that Balassa's index of IIT should be treated as a measure of ITER. Since, it fails to take into account the individual industries' share in total trade or to correct for aggregate trade imbalances. Hence, they proposed an alternative index to measure the extent of IIT.

The groundbreaking work of Grubel and Lloyd (1975) developed the Grubel and Lloyd index. They calculated IIT based on the difference between the trade balance (difference between exports X, and imports, M) of the industry or product *i*, (Xi – Mi) and the total trade of the same industry or product (Xi + Mi). The G-L index measures the share of IIT of industry *i* for a given country *j* as:

$$GLIIT_{ij} = \sum_{i=1}^{n} GL_i = 1 - \frac{\left|X_{ij} - M_{ij}\right|}{\left(X_{ij} + M_{ij}\right)} \qquad (14)$$

where *Xij* and *Mij* are home country's exports of industry *i* to country *j* and home country's imports of industry *i* from country *j*, respectively. Thus, GLIIT*ij* index in (14) measures the intensity or proportions of IIT in industry *i*. If all trade in industry *i* is IIT, that is, $Xij = M\,ij$, then GLIIT*ij* = 1. Similarly, if all trade in industry *i* is ITER, that is, either *Xij* = 0 or *M ij* = 0, then GLIIT*ij* = 0. Thus, the index of IIT takes values from 0 to 1 as the extent of IIT increases, that is, $0 \leq \text{GLIIT}ij \leq 1$. The IIT index in Eq. (14) can be modified to measure the IIT in all products in country *j* as a weighted measure of the GLIIT*ij* 's and can be written as

$$GLIIT_{ij} = \frac{\sum_{i=1}^{n}(X_{ij} + M_{ij}) - \sum_{i=1}^{n}\left|X_{ij} + M_{ij}\right|}{\sum_{i=1}^{n}(X_{ij} + M_{ij})} \qquad (15)$$

where *n* is the number of industries at a chosen level of aggregation.

Several criticisms have been made against the original GL index. A common criticism stems from their definition of what constitutes an industry. Early studies on IIT choose some digit level of the Standard International Trade Classification (SITC) to define their

industries. When IIT was measured this way there were several critics such as Finger (1975), Lipsey (1976), Gray (1988) and Rayment (1983) who regarded the observed IIT, or the greater part of it as spurious as a result of inappropriate statistical aggregation.

Aquino (1978) and Balassa (1986a), among others, have suggested adjusted measures to correct this deficiency of Grubel and Lloyd (1975), although many empirical economists prefer and continue to use the Grubel and Lloyd index, otherwise known as unadjusted G-L index. The bias of the unadjusted G-L index includes its ignoring trade imbalances, and not having to choose the 'correct' disaggregation level of data. Aquino (1978) suggests that the G-L index be adjusted with estimates of what the values of exports and imports of each commodity would have been if total exports had been equal to total imports. Aquino (1978) and Balassa (1986), proposed to adjust the index by incorporating overall trade imbalance as follows:

$$AGLIIT_{ij} = \frac{\sum_{i=1}^{n}(X_{ij}+M_{ij}) - \sum_{i=1}^{n}\left|X_{ij}-M_{ij}\right|}{\sum_{i=1}^{n}(X_{ij}+M_{ij}) - \left|\sum_{i=1}^{n}X_{ij} - \sum_{i=1}^{n}M_{ij}\right|} \qquad (16)$$

where $AGLIIT_{ij}$ is the adjusted IIT index. Since this adjusted measure of IIT index incorporates the total trade imbalance, it is measured with respect to total balanced trade. However, no consensus exists among scholars on how to adjust for trade imbalance when measuring IIT hence the continuous use of the unadjusted G-L index.

3.2.3 Review of the Methods of Disentangling IIT in Vertically/Horizontally Differentiated Products

Thus far, we have only differentiated between one- and two-way trade types. We now move to disentangle HIIT and VIIT. Within a given commodity classification that experiences two-way trade, products may or may not differ in their quality. In models of IIT, horizontal product differentiation is characterized by products with similar quality levels, with different attributes, while vertical differentiation is characterised by products with significantly different quality levels. According to Stiglitz (1987), empirical work that has disentangled IIT has assumed that prices represent quality, even under imperfect

information. From this assumption, differences in the unit values (UV) or prices of these commodities can be assumed to represent these quality differences. Unit values have been defined for each commodity classification as the value of trade divided by the quantity traded, giving an average price of the goods traded in this category. Clearly, the more disaggregated the classification system, the better this method will be in capturing the price of the commodities. A classification system such as the 6-digit Harmonised Tariff Schedule with 6000 commodity classifications will capture this well. The categories are so specific that different commodities will have different quantity measures: litres, kilogramme, number, etc. while the SITC classification system is more general and uses tonnes as its quantity variable for all commodity categories.

Abd-el-Rahman (1991) pioneered the study of how to separate IIT into vertical and horizontal. He divided trade flows into two types: IIT in vertically differentiated products, and IIT in horizontally differentiated products they separated trade flows into vertical and horizontal on the basis of calculated unit values[21] of the involved products. According to him, trade flows are defined as vertically differentiated when relative unit values are outside this range 0.85 and 1.15. Sometimes, a higher than 15%, difference in unit values is accepted for calculations. IIT is considered to be a VIIT if the following criteria are met:

$$\frac{UV_i^x}{UV_i^m} \leq 1-\alpha \text{ or } \frac{UV_i^x}{UV_i^m} \geq 1+\alpha \qquad (17)$$

IIT is horizontal trade when:

$$1-\alpha \leq \frac{UV_i^x}{UV_i^m} \leq 1+\alpha \qquad (18)$$

[21] Unit value is calculated by dividing the monetary value of ECOWAS country's imports and export from EU by their corresponding quantities.

UV_i^x: unit value of exports for a product from industry i UV_i^m: unit value of imports for a product from industry i. α is the threshold for the range, $\left(\frac{UV_i^x}{UV_i^m}\right)$ is the deviation of relative unit values of exports.

Abd-el-Rahman's (1991) study was followed by the seminal works of Fontagné and Freudenberg (1997) done for the European Commission (1997). Fontagn´e, and Freudenberg (1997) have suggested a modified criteria that preserves the relative nature of the threshold:

$$\frac{1}{1-\alpha} \leq \frac{UV_i^x}{UV_i^m} \leq 1+\alpha \qquad (19)$$

for horizontal product differentiation, and:

$$\frac{UV_i^x}{UV_i^m} \succ 1+\alpha \text{ or } \frac{UV_i^x}{UV_i^m} \prec \frac{1}{1-\alpha} \qquad (20)$$

In terms of the choice of the threshold, Fontagné and Freudenberg (1997) and Abd-el-Rahman (1991) also differ a little. Fontagné and Freudenberg (1997) used 15 per cent threshold with the assumption that price differences reflect only differences in quality (the assumption of perfect information), such that a consumer will not purchase a similar, or lower, quality good at a higher price. However, Greenaway, Hine, and Milner, (1998) emphasised the case of imperfect information and that the 15 per cent threshold may be too narrow hence, the choice of the 25 per cent threshold.

3.2.4 Measurement of some the Explanatory Variables

3.2.4.1 Product Differentiation

An empirical measure of product differentiation in international trade flows was first suggested and used by Hufbauer (1970). Theoretical and empirical studies of IIT have

stressed the importance of product differentiation as one of the determinants of IIT (Byun and Lee, 2005; Faustino and Leitão, 2007; Chang, 2009). A difference can be made between vertical and horizontal product differentiation (Faustino and Leitãlo, 2007). Balassa and Bawens (1987) and Hu and Ma (1990) use the Hufbauer (1970) index as a proxy for the degree of product differentiation.

$$\text{The Hufbauer index} = \frac{\alpha_{ij}}{\mu_{ij}} \tag{21}$$

where α_{ij} stands for the standard deviation of export unit values for shipments of good i to country j , and μ_{ij} represents the unweighted mean of those unit values. The Hufbauer index has been modified by Fontágne, *et. al.*, (1997) as follows:

$$\text{The Hufbauer index} = \sum_{i=1}^{n}\left[\frac{Value_{ij}}{Value_{j}}\left(\frac{MAX\,(UV_{ij})}{MIN(UV_{ij})}\right)\right] \tag{22}$$

where The Hufbauer index = degree of product differentiation, $Value_{ij}$ = export value of host country, that is value of trade for good I in industry j, $Value_{j}$ = unit value of exports, that is value of trade in industry j, $MAX(UV_{ij})$ = the highest unit value of export of good i in industry j, while $MIN(UV_{ij})$ = the lower unit value of export of good I in industry j. The computed degree of the Hufbauer index measure is equal to or greater than 1, where values close to 1 indicate low degrees of product differentiation and values further away from 1 is conversant with higher degrees of product differentiation (vertical). According to Fontágne, *et. al.*, (1997), the index provides an average unit value dispersion of export unit values for a given product aggregated over the sum of all products within a given industry and is a measure of vertical differentiation of a product

3.2.4.2 Geographic distance (DIST)

Geographic distance is typically used as a proxy for transport costs, insurance costs, delivery times and market access barriers. Many studies use kilometres or miles to

measure geographic distance between the capital cities of trading partners. Since the commonly used distance variable (Lee, 1992; Hu and Ma, 1999; Sharma, 2004; Veeramani, 2007) is time invariant, it could not be used in fixed effects (FE) models. The alternative is to adopt the weighted distance variable which varies over time (Balassa, 1986; Stone and Lee, 1995) as a proxy for geographical distance between countries *i* and *j*, where the weight is the ratio of GDP of country *j* to the sum of total GDPs of all its trading partners and is computed as follows:

$$WDISTij = \frac{DIST_{ij} * GDP_{ij}}{\sum_{j=1} GDP_t} \qquad 23$$

3.2.5 Review of Methods of Analysis

Various estimation techniques have been employed in examining the determinants of IIT. Studies, such as Burange and Chaddha (2008), McMahon (2003), Havrylyshyn and Civan (1985) and Havrylyshyn and Kunzel (1997) employed descriptive methods of analysis. A handful of studies have used the ordinary least squares (OLS).

However, since the dependent variable is the Grubel Llord index which ranges between 0 and 1, using OLS will cause some econometric problems. The regression equation estimated using the OLS could not predict values outside the intra-industry index range and there could be the problem of heteroscedasticity. Therefore, a number of studies ((Lee and Lee (1993), Musonda (1997) and Tharakan and Kerstens (1995)) have argued that a logistic transformation is appropriate since the dependent variable varies from 0 to 1. However, OLS with logistic transformation also has some problems. First, if the GL index is equal to zero or one, then the dependent variable is not defined, and there are missing values in the dependent variable. This characteristic of the data would make OLS with a logistic transformation awkward because the estimation method would cause much of the data to be lost. Second, it is difficult to interpret the coefficient estimates of explanatory variables even if there are no missing values in the dependent variable. Papke and Wooldridge (1996) proposed an alternative estimation method: the Factional Logit Regression Model (FLRM). They designed this model to capture the

characteristics of the dependent variables that are bounded between 0 and 1. Most studies that were between regions and their trading partners adopted panel data analysis techniques. Kandogan (2003), Manrique (1987), Shahbaz and Leitao (2010), Sichei and Harmse (2004), Zhang, Witteloostuijn and Zhou (2005), all adopted panel data.

3.3 Empirical Review

As emphasised in the introductory chapter, empirical studies on IIT could be between a developed country and another developed country, and could also be between developed country and a developing one. Although, this present study concentrates on trade between a developed region (EU) and a developing region (ECOWAS), this sub-section is devoted do a holistic review of past empirical studies conducted on IIT, such as: between two developing countries, between two developed countries another developed country and lastly between individual or regional developing countries and their individual or regional developed trading partners' countries. It must also be emphasised that the major empirical issues around the area of IIT are: existence of such trade, measurement of the magnitude of the type of trade and the determinants of the kind of trade.

3.3.1 Existence and magnitude of IIT

The phenomenon of IIT has received increasing attention since Verdoon (1960) and Balassa (1960) found evidence of increasing IIT during the years following customs union formation in Europe. Grubel and Lloyd (1975) estimated that 71 per cent of the increase in trade between EEC countries from 1959 to 1967 was intra-industry. The IIT among developing countries is horizontal IIT; despite the fact that such studies were on developing countries. They are horizontal because the countries involved have similar levels of development. The existence and extent of IIT among the developing countries was first subjected to empirical study by Musonda (1997). The study confirmed the existence of IIT among developing countries. Specifically, his result shows that IIT exists among members of the Common Market for Eastern and Southern Africa (COMESA).

Other empirical studies that examined the existence and magnitude of IIT in developing countries are those on IIT between developed and developing countries, these are the cases of vertical IIT between single developing countries and their developed trading partners or a regional body in developing counties and the trading partners in developed economies. As regards IIT between single developing economies and developed trading partners, empirical analysis of existence and magnitude of the trade showed mixed results. The study of Lee and Lee (1993) was about the first, they measured the share of IIT in Korea's trade of manufactures with her trading partners from 1977 to 1986 and found that the share of IIT increased from 0.350 in 1977 to 0.502 in 1985, but declined to 0.421 in 1986. Other studies in this group of that found increase in IIT are Mc Mahon (2003) for South Korea and the EU, Burange and Chaddha (2008) for India manufacturing sector.

Others are the study of Gebreselasie and Jordaan (2009) whose result showed that intraindustry trade constitutes a significant proportion of South Africa's manufacturing trade with the rest of the world. However, Rasekhi (2008) reports low but increasing IIT types for agricultural products of Iran. Specifically, that the two way trade of Iran's agricultural products is estimated to be about 2.73-5.98 presents during the time period. Empirical analysis on the existence and extent of IIT was equally extended to regional developing countries and their trading partners. Nilsson (1999) was first in the category and his result indicated that IIT between the EU countries and the developing countries had greatly increased.

Table 3.2. Topology of Products Based Studies on Existence of IIT

SN	Author	Scope Data/Sample	Industry/Sector	Sub-Sector/Countries	Results
1	Clark and Stanley (1999)	Between Developing Countries and the United States 1992 data	Products Sector	Food	**0.3231**
				Tobacco	**0.0010**
				Textile	**0.5271**
				Paper	**0.2870**
				Chemical	**0.3760**
				Petrol	**0.7152**
				Leather	**0.2070**
				Rubber	**0.7240**
				Stone	**0.5120**
				Metals	**0.630**
2	Hu and Ma (1999)	China and Trading Partners	Products	Chemicals	**0.002**
				Leather manufactures	**0.8120**
				Wood	**0.0001**
				Textile yarn	**0.9240**
				Iron, steel	**0.0003**
3	Lee and Lee (1993)	Korea 1977 – 1986	Manufacturing Products	Manufactures of silve	**0.9820**
				Paper and paperboard	**0.9700**
				Articles of rubber	**0.9650**
4	McMahon (2003)	The EU and South Korea 1990-2001	Top 500 imports and exports	Food and Live Animals	**0.3424 - 0.4512**
				Beverages and	**0.4100 – 0.6200**
				Crude materials	**0.4900 – 0.6400**
				Chemicals	**0.5400 – 0.5523**
				Manufactured	**0.4300 – 0.5700**

Source: Authors Compilation from Extensive Literature

Table 3.3. Topology of Country Based Studies on Existence of IIT

S/N	Author	Scope	Industry/	Sub-Sector/Countries	Results
1	Bernhofen	Germany/US	Chemical	Chemical/Petrol	**0.7409**
2	Damoense and Jordan (2007)	South Africa 2000-2004	Auto mobile Industry	USA	**0.540**
				Japan	**0.749**
				China	**0.071**
				Germany	**0.430**
				UK	**0.502**
				France	**0.205**
				Italy	**0.183**
3	Ekanayake (2009)	United States and NAFTA	Products	Trinidad and Tobago	**0.0020**
				United States	**0.4704**
4	Gabrisch (2006)	EU and Accession Countries	Products	1999	**0.8721**
				2000	**0.8181**
				2004	**0.8012**
5	Havrylyshyn and Civan (1985)	Among Developing Countries	Products	Industrialised	**0.5760**
				Industrial	**0.4200**
				Developing	**0.2267**
6	Liao (2006)	North and South 1988-2003	All Products	Maximum	**0.9132**
				Minimun	**0.0321**
7	Manrique (1987)	Developed and Developing	Manufact uring	Maximum	**0.3312**
				Minimun	**0.2080**
8				Africa	**0.1470**
				Nigeria	**0.0340**
				Cote d'Ivoire	**0.2270**
9	Hu and Ma	China/EU	Manufact	Manufacturing	**0.8450**
10	Fidrmuc,	CEECs/EU	All	All Products	**0.6880**
11	Ekanayake, et	US/Spain	All	All Products	**0.3404 – 0.4056**
12	Crespo and	Purtugal/All	All	All Products	**0.5011 – 0.7600**
13	Becuwe and	France/World	Automobi	Automobile	**0.4566 – 0.8561**

Source: Authors Compilation from Extensive Literature

Table 3.4 Topology of Studies on the Existence of IIT in Intermediate Products

SN	Author	Scope	Industry/S	Sub-Sector/Countries	Results
1	Türkcan (2005)	Turkey and Selected OECD Countries 1985-2000	Manufacturing Sector	World	**0.35**
				OECD	**0.19**
				Austria	**0.22**
				Germany	**0.28**
				Spain	**0.19**
				United	**0.19**
				Italy	**0.18**
				Japan	**0.11**
				Netherlands	**0.24**
				Sweden	**0.13**
				USA	**0.19**
2	Türkcan and Ateş (2008)	United States 1989-2006	Auto-industry	Zealand	**0.83**
				Norway	**0.54**
				Philippines	**0.988**
				Poland	**0.64**
				Portugal	**0.982**
				Singapore	**0.757**
				Spain	**0.937**
				Sweden	**0.189**
				Thailand	**0.252**
				Turkey	**0.536**
3	Türkcan (2009)	Austria 1996-2006	Auto-industry	Zealand	**0.04**
				Norway	**0.19**
				Poland	**0.46**
				Portugal	**0.64**
				Republic	**0.52**
				Spain	**7.46**
				Switzerland	**1.06**
				Sweden	**1.19**
				Turkey	**0.15**

Source: Authors Compilation from Extensive Literature

Also in this group is Clark and Stanleys (1999) study that measured the extent of IIT between developing and developed countries they found that there has been substantial increase in IIT between the two regions. Gabrisch (2006) also reported increased IIT between EU and Accession Countries.

3.3.2 Studies on Determinants of IIT Conducted among Developing Countries

The IIT among developing countries is horizontal type of IIT. Lee and Lee (1993) study was the first empirical in this area. They provided an empirical analysis of IIT (IIT) in Korea's foreign trade. First, they measured the share of IIT in Korea's trade of manufactures and found increasing IIT. Testing the hypotheses regarding country characteristics of IIT they found a negative correlation with differences in per capita incomes and with "economic distances" between Korea and its trading partners. Also, they found positive correlation with the trade intensity between Korea and its trading partners and with the existence of a common cultural background.

Another empirical analysis in the area of horizontal intra-industry in the developing economies is that of Musonda (1997). The study used available bilateral trade data of 4-digit SICT product category between members of the COMESA to examine IIT among the countries in the region. He sought to know whether IIT exists among countries in the region. The study confirmed that such trade exist and determined by the same factors as found in other regions. The principal determinant is distance, which has a significant negative relationship with IIT. Other factors include per capita income and language.

The features and determinants of Chinese IIT between 1992 and 2001 transition periods for 50 of China's trade partners by Zhang, Witteloostuijn, and Zhou (2005) was examined. They disentangled TIIT into VIIT vis-à-vis HIIT, using data at the four-digit SITC level. The findings indicate that Chinese bilateral intra- industry trade, particularly VIIT, increased significantly during this transition period. VIIT appears to be positively related to differences in consumer patterns. HIIT is negatively related to these differences. In addition, they found that FDI has played an important role in determining IIT, especially VIIT. Other significant IIT drivers identified by Zhang, Witteloostuijn,

and Zhou (2005) are geographical distance, economic size, trade openness and trade composition.

Ofa, Spence, Mevel and Karingi (2012) examined export diversification and IIT in 49 African economies. Their results indicated that while export diversification and IIT in Africa are generally low, there are exception cases. In addition, a positive correlation between export diversification and IIT is found for the sample of African countries. This has implication for policy dialogue suggesting that any future trade policy designed to favour export diversification has positive implications for IIT and vice versa. Other findings showed two important contributions to the direction of current trade policy dialogue on boosting Intra-African trade. First, export diversification and IIT policies should not be treated in isolation. Second, they identify constraints towards export diversification and IIT in Africa crucial towards better understanding and subsequently developing effective programme of actions for boosting Intra-African trade.

3.3.3 Determinants of IIT Conducted on Single Industry.

Rasekhi (2008) studied IIT types of Iran's agricultural products. In this study, indices of IIT developed by Grubel and Lioyd, Fontagn'e and Freudenberg's were used for estimating agricultural IIT between 1997 and 2003. Results indicate low but increasing IIT types for agricultural products of Iran. Specifically, two way trade of Iran's agricultural products is estimated about 2.73-5.98 presents during the time period. It was reported in the study that an important part of this IIT is devoted to VIIT and that, it seems foreign trade in agricultural products of Iran is mainly dependent on traditional comparative advantages, rather than new determinant factors such as product differentiation and economies of scale.

Attempt was made by Gebreselasie and Jordaan (2009) to ascertain the level of South Africa's IIT. He used OLS regression analysis to determine the significance of IIT in South Africa's manufacturing trade. South Africa's manufacturing trade is reasonably explained by the world share and similarity of South Africa and its trading partner countries. The study also shows that the responsiveness of South Africa's bilateral

manufacturing trade to these variables is sound evidence that IIT constitutes a significant proportion of South Africa's manufacturing trade with the rest of the world. Burange and Chaddha (2008) made an attempt to assess the growth in India's IIT for manufacturing sector from 1987 to 88 and 2005 to 06. Coupled with the growth in IIT at the multilateral level, the study considered the growth in IIT with respect to the various country groups. The change in the trade flows owing to IIT as reflected by marginal IIT (MIIT) is also evaluated. The results reveal that while IIT has expanded, the growth rate has been low. This is also reflected in the growth in MIIT for India. Nevertheless, it was reported that certain manufacturers are doing extremely well on the IIT front.

Sichei and Harmse (2004) tested the determinants of IIT in services between South Africa and United States between 1994 and 2002 using panel data of 8 service industries. The novelty of this study is in attempting to find the empirical determinants of South Africa-US IIT in services. The study finds that empirical results support the modern trade theories with regard to dissimilarities in demand structure, degree of market openness and economies of scale. First, the dissimilarities in demand structure between South Africa and the United States reduce the level of trade in differentiated services. Second, economies of scale play certain roles in determining the level of IIT in some services: research & development and testing services; travel; education and training services; telecommunications; business, professional and technical services.

Tharakan and Kerstens (1995) combined case study approach and econometrics to analyse the IIT of one particular industry, that is, the toy industry. Specifically, they endeavoured to verify whether such IIT in that industry is of a 'vertical' or 'horizontal' nature. In general, imports of toys into EC countries are much greater than their exports. This is particularly so when they consider the trade flows between the EC countries and the low income countries. Nevertheless, in a number of products there is important bilateral intra- industry trade between the two groups of countries. There is also increasing relocation of production from Europe to South East Asia.

Shahbaz and Leitão (2010) analysed Pakistan's IIT during between 1980 and 2006. This study used country-specific characteristics as explanatory variables. The results indicate that IIT is a negative function of the difference in GDP per capita between Pakistan and her trade partners. Statistically strong evidence is also found in favour of the idea influenced by the similarity in demand. They also introduced an economic dimension; this proxy confirms the positive effects of IIT. This result reveals the importance of economies of scale and the variety of differentiated products. The results also confirmed the hypothesis that trade increases if the transportation costs decrease.

3.3.4 Determinants of IIT Conducted between Developing and Developed countries.

There are few empirical studies on IIT between developing and developed countries. In this group is Clark and Stanley (1999), who identify country and industry-level determinants of IIT between the United States and developing countries. IIT was found to decline with greater differences in relative factor endowments. Economic size and trade orientation of the developing countries influence IIT in a positive way. Distance exerts a negative effect on IIT. Results show IIT occurs in nonstandard, made-to-order, vertically differentiated, labour intensive products produced by large globally integrated industries. No empirical support was provided for the role of scale economies in determining North-South IIT.

Mc Mahon (2003) reviewed literature underlying the theory and measurement of IIT. Empirical findings on the level of IIT between South Korea and the EU were presented by the study. His results are based on the top 500 imports and exports between the EU and South Korea gathered from the Korea International Trade Association (KITA) database between 1990 and 2001, and tested using the Grubel and Lloyd index of IIT and the Brülhart 'A' index of MIIT. Nilsson (1999) analysed determinants of IIT between EU countries and the developing countries. The study examined that EU IIT with the developing countries have greatly increased. Nilsson (1997) analysed the EU's IIT between 1980 and 1992 using a new measure of IIT. The empirical results confirm the hypotheses that IIT increases with greater capital intensity in production and with larger

average market size, and decreases with differences in factor endowments and a greater difference in economic size. Transport and transaction costs are also found to negatively affect EU IIT with the developing countries.

Sunde, Chidoko and Zivanomoyo (2009) investigated the determinants of intra industry trade between Zimbabwe and its trading partners in the Southern African Development Community (SADC) region using modified gravity model. The study also proved that similarity in per capita income is not the main determinant of IIT between Zimbabwe and its SADC trading partners. It was reported that intra industry trade does not necessarily take place among countries with similar economic structures and level of development. The results of the study show that per capita income, trade intensity, distance, exchange rate and gross domestic product explain IIT (IIT) between Zimbabwe and its SADC trading partners.

Zhigang (1999) examined the characteristics of the trade partners that influence China's IIT and linked the pattern of IIT of different industries to different types of economies. There upon, he identified which factor is more important in the IIT, for different types of economies in the long run. First, IIT is becoming important in China's foreign trade, especially for manufactures. As the foreign trade expanded, the share of IIT moved upward in the trade with its principal trade partners, namely the DMEs and NICs. Among the determinants of IIT, the market size and income level, are the most important ones to China, especially for the manufactures. The roles of other factors to China's IIT are usually indirect and implicit.

Liao (2006) examined the North-South IIT on a 4-digit aggregated trade flows level. By building a differentiated-product and North-South trade model, he illustrated that the IIT between North and South is determined by country-specific as well as industry-specific variables. Specifically, sectoral IIT (IIT) index is jointly determined by similarity of GDP between countries, marginal cost, elasticity of substitution of consumers, and industrial tariffs from both countries. The question addressed in this study is the specification of consumers' perception toward similar Northern and Southern products,

and how the perception affects the IIT. In this study, consumers' perception is defined as the elasticity of substitution between products made in different "countries of origin". Controlling the quality difference between Northern product and Southern products, they identify the substitutability between these two products from consumers' perspective.

Hu and Ma (1999) measured the extent of the international IIT of China, and tested empirically various country-specific and industry-specific hypotheses concerning the determinants of vertical and horizontal IIT between China and her major trading partners. It is revealed by Hu and Ma (1999) that China has possessed the prerequisite of IIT and that China's IIT follows similar patterns of those in developed countries as China is moving towards a market-oriented economy. Manrique (1987) focused on the trade between an industrial country, (the United States - US), and a subset of LDCs, (the newly industrialised countries - NICs). Specifically, he presented calculations of the share of IIT in the manufactured goods trade of the United States and the NICs for the years 1967, 1972, 1977, and 1982 and found that IIT was present even before these LDCs were designated as NICs in the late 1970s and the proportion of US-NIC trade has that is intra-industry in nature has increased.

Kandogan (2003) analysed trends in different components of trade of transition countries to explain the cross-country differences. The paper points out the important distinction between determinants of ITER and IIT (IIT), as well as horizontal and vertical IIT. Using varieties of gravity models, it is shown that variables from increasing Returns Trade Theory, such as scale economies, similarity of income levels, and number of varieties produced play important roles in IIT, especially in horizontal IIT. Whereas factors such as comparative advantage, dissimilarity in income levels and having more developed trade partners from Heckscher–Ohlin Trade Theory are crucial in determining ITER and vertical IIT to a lesser degree.

Balassa and Bauwens (1988a) examined the determinants of international trade in manufactured goods in 152 industries among 38 major exporters of manufactured goods in a combined inter and IIT framework of a multi-country and multi-industry model. It

has considered the impact on bilateral trade in individual industries of the factors affecting inter-industry and intra-industry specialisation, together with that of gravitational factors. The relative capital intensity of exports is positively correlated with relative capital abundance. The results show that trade between any two countries is positively correlated with their average per capita income and country size and negatively correlated with inter-country differences in these variables. Also, product differentiation tends to increase IIT, where as product standardization tends to reduce it. Finally, offshore assembly has a positive impact on IIT.

Glejser, Goossens and Vandeneede (1981) made a distinction between supply (export) specialisation and demand (import) specialisation, both of which can occur between activity sectors or inside them. It shows that intra-industry export specialisation mostly characterised high-wage countries whereas low-wage nations tended to achieve inter-industry export specialisation. Intra-industry import specialisation on the other hand, was the rule everywhere except in the very low-wage countries. Finally, the drift to intra-industry export specialisation slowed down from 1970 to 1973 as compared to 1959 to 1970 inside (but not outside) the EEC.

Bano (2009) analysed intra-industry and inter industry trade between New Zealand, Australia and selected Asia-Pacific nations during the period 1990 and 2009, (a period of trade liberalization). The Grubel-Lloyd and Aquino indices are used to calculate the intensity of IIT (IIT) at the 3-digit SITC level. IIT index was estimated across industries and trading partners to show the strength of trade relations between New Zealand and the other countries. The results suggest that removal of trade barriers through bilateral and multilateral negotiations has enhanced IIT and the intensity of trade.

3.3.5 Determinants of IIT in Intermediate Products

The increased importance of fragmentation in world trade has created an interest among trade economists to explain the determinants of trade in intermediate goods. To the best of the researcher's knowledge, there are very few empirical studies on determinants of

IIT in intermediate products. Moreover, Turkcan (2003) [22] is the first attempt to conduct an empirical study of IIT in intermediates. The study focused on determinants of IIT in intermediate products between the US and selected OECD countries. His result shows that VIIT is determined by economies of scale, the size of market, and FDI. Particularly, differences in value added per establishment, a proxy for economies of scale, are found to have a negative impact on VIIT. As regards the HIIT, his result shows that it is positively affected by the size of the two markets and FDI, while it is negatively affected by dissimilarity of human capital endowments and distance variables. These findings are consistent with our expected signs, with the exception of FDI.

Türkcan (2005) also drew out country-specific and industry-specific hypotheses from the IIT literature and put them forward to investigate the IIT in final and intermediates between Turkey and other selected OECD countries between 1985 and 2000. The results indicate that the determinants of IIT for final goods are not significant different from those for intermediate goods. Finally, the results suggest that country-specific rather than industry-specific variables are the central determinants of IIT in final and intermediate goods between Turkey and OECD.

Bouwmeester, and Oosterhaven (2008) analysed the relationship between three types of trade specialisation for 1990 to 2000. For nine East-Asian countries and the United States, the developments in international fragmentation, export specialisation and intra-industry specialisations are investigated. Asian countries, specifically China, now play a larger role in international trade. The formation of production networks and international fragmentation of production processes in this region has not gone unnoticed. This study endeavours tries to establish a link between the extent of international fragmentation, comparative advantage, and intra-industry specialisation using the Asian-Pacific input-output Tables of 1990, 1995 and 2000. The results show an increase in the extent of

[22] Türkcan was the first to examine the trend, magnitude and determinants of IIT in intermediate products. His first study on the topic was a dissertation submitted to the Graduate Faculty of North Carolina State University in partial fulfilment of the requirements for the Degree of Doctor of Philosophy. And subsequently, he has published widely as reflected in this literature review.

international fragmentation in all countries, concentrated in the 1995 to 2000 period. Relative international fragmentation shares are compared to relative export specialisation shares to test whether international fragmentation can be explained using (neo-) classical trade theory. Evidence is presented of a positive relationship between these two variables. A comparison of international fragmentation with the results of the intra-industry specialisation measure does not indicate a relationship, leaving less room for new trade theory explanations of international fragmentation. These results suggest that international fragmentation follows comparative advantages and takes place when factor cost differentials can be exploited.

Türkcan and Ateş (2009) analysed the extent of IIT in the U.S. auto-industry trade by decomposing the U.S. auto-industry trade into one-way trade, VIIT and HIIT in final and intermediate good categories. Secondly, the paper analysed the development of the U.S. VIIT in auto part industry, as an indicator for international fragmentation of production, and test empirically, various country-specific factors drawn from fragmentation literature using newly developed panel econometrics techniques and more recent data period from 1989 to 2006. The results show that a substantial part of IIT in U.S. auto-parts industry was VIIT and econometric results support the hypothesis drawn from the fragmentation literature.

Türkcan (2009) examined the extent of IIT in Austria's auto-parts trade by decomposing Austria's auto-parts trade into one-way trade, VIIT and HIIT. Then development of the VIIT in the auto-parts industry, as an indicator for international fragmentation of production process between Austria and its 29 trading partners, is examined and various country-specific factors suggested by fragmentation literature are tested using newly developed panel econometrics techniques and more recent data from 1996 to 2006. The results show that a substantial part of IIT in the Austrian auto parts industry was VIIT and the econometric results mainly support the hypothesis drawn from the fragmentation results. In particular, the findings show that the extent of Austria's VIIT in auto-parts is

positively correlated with average market size, differences in per capita GDP, and foreign direct investment while it is negatively correlated with distance.

Leitão, Faustino, and Yoshida (2010) analysed VIIT within Portugal's automobile parts and components industry, this study adds new empirical evidence for the international fragmentation of the production process. For trade partner countries, they choose the EU countries, the BRICs, and the US between 1995 and 2005. From panel data analysis, the empirical evidence supports the notion that shorter geographical distance, dissimilar income levels, and dissimilar endowments between two economies lead to a higher VIIT of automobile components. In addition, their results also confirm the hypothesis that automobile (assembly) production in each country promotes higher VIIT of auto parts, while economic integration in the style of the EU and similarity in culture do not magnify the VIIT of the parts and components industry. They conclude that income differences between trade partner countries are an important driver via the international fragmentation of production of a higher VIIT.

CHAPTER FOUR
THEORETICAL FRAMEWORK AND METHODOLOGY

4.0 Introduction

This chapter discusses the theoretical framework and the methodology employed in this study. Several intra-industry theories were reviewed in the previous chapter. The model of north-south trade based on vertical product differentiation was found suitable to examine the determinants of IIT between developing region (ECOWAS) and developed region (EU) as presented. The methodologies adopted for measuring the extent of IIT and estimating the model whose dependent variables ranges between 0 and 1 are discussed in this chapter.

4.1 Theoretical Framework

The model of North-South Trade is based on vertical product differentiation adopted to estimate the determinants of IIT in final and intermediate products. The choice of model is premised on the idea that it does not only explain the possibility of the existence of VIIT between developed and developing economies; but equally outlines the possible determinants of the type of trade. The model assumes that two commodities exist: homogeneous product and a vertically differentiated product. The homogenous products can be consumed in every desirable quantity, whereas the consumer can choose the quantity of differentiated product from those available in the market. Consumer preferences are represented by a quasi-concave utility function u(y, z), where y is the quantity of the homogeneous product and z is the quantity of the differentiated product. Larger values of z represent higher quality. All individuals are identical except for income levels. An individual with income level *I*, chooses a consumption level of the homogeneous product and a quality level of the differentiated product to solve the following constraint optimisation problem:

$$\max\ u(y,\ z) \qquad (24)$$

subject to

$$p(y) + p(z) \leq I$$

$$y \geq 0 \qquad z \in Z$$

where $p(z)$ is the price of quality z, the price of the homogeneous product is one, and Z is the set of qualities available in the market. Also assumed is that two countries exist: North and South. One unit of labour produces one unit of the homogenous product in both countries. However, labour input per unit output of the differentiated products differs across countries. Let a(z) and a*(z) be labour input per unit output of quality z in the North and South respectively. These functions are convex and increasing in z. The North has comparative advantage in high quality products; that is $\frac{a(z)}{a^*(z)}$ is declining in z.

Now, assuming the South produces the homogeneous product, its wage rate is equal to one (in terms of the homogeneous product) and the North's wage rate w is at least as large as one. The supply price of quality z is:

$$p(z) = \min[wa(z),\ a^*(z)] \qquad (25)$$

Given the structure of comparative advantage, and that the South is the supplier of low quality products while the North is the supplier of high quality products. The breakeven point in the chain of comparative advantage is a quality $\bar{z}$ that satisfies $wa(\bar{z}) = a^*(\bar{z})$.

The following equation is used to specify the functional forms of the utility and unit labour input:

$$u(y, z) = ye^{\alpha z} \qquad (26)$$

$$a(z) = \frac{e^{\gamma z}}{A} \qquad (27)$$

$$a^*(z) = \frac{e^{\gamma^* z}}{A^*} \qquad (28)$$

Equation 26 is the utility function, while 27 and 28 are units of labour input functions in the North and South respectively. The productivity parameters of the model are represented by A and A* respectively. With $\alpha > 0$ and $\gamma^*, \gamma > 0$, the North has comparative advantage in high quality products if and only if $\gamma^* > \gamma$. The utility function (equation 26) has the property that the marginal rate of substitution between z and y depends only on y. This implies that individuals with higher income consume more of

the homogenous product and a higher quality differentiated product. Hence, if there exists an income level at which a southern-produced quality is demanded, and higher income level at which a northern-produced quality is demanded, then there exists an intermediate income level denoted by I_d at which the consumer is indifferent between the consumption of a southern-produced quality z^- and a northern-produced quality z^+. From this analysis, no demand exists for qualities in the range (z^-, z^+).

Using the first-order conditions to solve equation 24, the functional forms 26 – 28, and the pricing equation 25, we obtain

$$I = we^{\gamma z}\left(1+\frac{\gamma}{\alpha}\right)\Big/A \qquad \text{for} \quad I \geq I_d \qquad (29)$$

$$I = e^{\gamma^* z}\left(1+\frac{\gamma^*}{\alpha}\right)\Big/A^* \qquad \text{for} \quad I \leq I_d \qquad (30)$$

Expressing (29) and (30) in logarithms and make Z the subject of formula, we have (31) and (32)

$$z^+ = \frac{1}{\gamma}\left[\log\frac{\alpha}{\alpha+\gamma} + \log I_d + \log A - \log w\right] \qquad (31)$$

$$z^- = \frac{1}{\gamma^*}\left[\log\frac{\alpha}{\alpha+\gamma^*} + \log I_d + \log A^*\right] \qquad (32)$$

Since $p(z) = we^{\gamma z}/A$ for $z \geq z^+$ and $p(z) = e^{\gamma^* z}/A$ for $z \leq z^-$, equation 29 implies that individuals with income above I_d who buy northern-produced varieties spend a share $\alpha/(\alpha+\gamma)$ of income on the differentiated product, while individuals with income below I_d who buy southern-produced varieties spend a share $\alpha/(\alpha+\gamma^*)$ of income on the differentiated product. This feature of our demand system makes it most convenient to derive further expression. From the definition of I_d (equation 33), it satisfies $u\left[I_d - p(z^+), z^+\right] = u\left[I_d - p(z^-), z^-\right]$, which with the help of equations 25 – 28 and 29 – 30 yields

$$I_d^{\alpha(1/\gamma - 1/\gamma^*)} = Bw^{\alpha/\gamma}\left(A^{*\alpha/\gamma^*}/A^{\alpha/\gamma}\right) \qquad (33)$$

where

$$B \equiv \frac{\gamma^* \alpha^{\alpha/\gamma^*} (\alpha+\gamma)^{(\alpha+\gamma)/\gamma}}{\gamma \alpha^{\alpha/\gamma} (\alpha+\gamma^*)^{(\alpha+\gamma)/\gamma^*}}$$

Equation 33 describes the equilibrium relationship between I_d (intermediate income level in the two countries) and the North's wage rate w (the South's wage is equal to one). This relationship depends on the productivity parameters A and A*.

Every country is populated by a continuum of individuals, and a nondegenerate distribution of skills in the population exists. This is represented by the income classes. The set of income classes is chosen to be the unit interval $[0,1]$. Since northern and southern produced varieties are consumed in both countries, there exists an income class h_d in the North and an income class h_d^* in the South, such that individuals who belong to them earn precisely I_d. Hence,

$$I_d = \frac{wLf(h_d)}{Nn(h_d)} \qquad (34)$$

$$I^*_d = \frac{L^* f^*(h_d^*)}{N^* n^*(h_d^*)} \qquad (35)$$

Northern individuals in income class (h_d, 1) and southern individuals in income classes (h_d^*, 1) consume northern-produced differentiated products, and each one of them spends a proportion $\alpha/(\alpha+\gamma)$ of personal income on the differentiated product. Hence, total spending on northern varieties is the share $\alpha/(\alpha+\gamma)$ of the aggregate income of these two groups, which is $[1-F(h_d)]wL + [1-F^*(h_d^*)]L^*$, where F(.) is the cumulative distribution function associated with f(.) and similarly for F*(.). Therefore, equilibrium in the northern labour market requires $\frac{\alpha}{\alpha+\gamma}\left([1-F(h_d)]wL + [1-F^*(h_d^*)]L^*\right) = wL$, which reduce to:

$$wL[\gamma + \alpha F(h_d)] = \alpha L^*[1-F^*(h_d^*)] \qquad (36)$$

Equation 34 - 36 constitutes a set of equilibrium conditions that determine I_d, w, h_d, and h_d^*.

In the central case the pattern is as follows: the North exports high quality differentiated products and imports low quality differentiated products as well as the homogeneous

product and vice versa for South. Due to the fact that the South imports only differentiated products, only individuals in income classes above h_d* purchase imported varieties, and each of these individuals spends a share $\alpha/(\alpha+\gamma)$ of personal income on the differentiated product, the volume of trade (VT) can be represented by

$$VT = 2\frac{\alpha}{\alpha+\gamma}\left[1-F^*(h_d^*)\right]L^* = \frac{\alpha}{\alpha+\gamma}\left[\gamma+\alpha F(h_d)\right]wL \qquad (37)$$

The fact that the north exports only differentiated products and the south exports homogenous and differentiated products, and trade is balanced, implies that IIT exists, and the volume of IIT equals twice southern exports of differentiated products. Varieties produced in the South are consumed by northern individuals whose income is not larger than I_d; that is, by individuals in income class $h \leq h_d$. Each one of these individuals spends a share $\alpha/(\alpha+\gamma)$ of personal income on the differentiated products. Hence, the volume of IIT is $2\alpha F(h_d)wL/(\alpha+\gamma)^*$, and the share of IIT is:

$$S_{i-i} = \frac{\alpha+\gamma}{\alpha+\gamma^*}\frac{wL}{L^*}\frac{F(h_d)}{1-F^*(h_d^*)} = \frac{\alpha+\gamma}{\alpha+\gamma^*}\frac{\alpha F(h_d)}{\gamma+\alpha F(h_d)} \leq \frac{\alpha}{\alpha+\gamma^*} \qquad (38)$$

We can see that the share of IIT depends on relative country size, comparative advantage, income distribution in countries, and the level of differentiation. In addition some other control variables in bilateral trade literature used in previous studies (Stone and Lee 1995, Manrique 1987) will be included. Such variables include distance, trade tariff, and exchange rate. Since the same model is applied to IIT in both final and intermediate products, however, inward FDI and capital-labour ratio that are peculiar to IIT in intermediate products are taken account of. The inclusion of trade tariff and exchange rate is to examine trade polices impact on IIT. Moreover, FDI and capital-labour are included in this model to examine the role of multinational corporations in changing the endowment of the developing countries.

4.2. Methodology

In the introductory section, three objectives were set for this study they include: analysing the extent of IIT in final and intermediate products and examining their

determinants. The subsection describes the methodological approaches with which the three objectives will be achieved.

4.2.1 Measures IIT

The first objective of this study was examined using unadjusted and adjusted Grubel-Lloyd (G-L) index of IIT (equation 15 and 16 respectively) [23]. These IIT indices measure the extent of IIT between ECOWAS and EU in final and intermediate products. They will be used to measure the extent of IIT between each of Nigeria, Ghana and Cote d'Ivore and the EU. Moreover, Greenaway, Hine and Milner (1995) methodology (equation 19) was equally employed to separate the IIT into VIIT and horizontal IIT, since our interest is in vertical IIT in both final and intermediate products.

4.2.2 Model Specification

4.2.2.1 The Gravity Model: IIT

The variables contained in the estimable equation (23) of the North-South theory of Flam and Helpman (1987) are already looking like the standard Gravity Model. The Modified Standard Gravity Model will therefore be used to estimate IIT between ECOWAS and EU. The modification to gravity equation will be based on the inclusion of variables predicted by the North-South theory of Flam and Helpman (1987) to reflect the IIT determinants. Such variables include relative country size, income distribution in both countries, income distribution and the level of differentiation. It should be noted that the

[23] For easier reference, equations 15, 16 and 19 which are unadjusted Grubel Lloyd, adjusted Grubel Lloyd and Greenaway, Hine and Milner (1995) respectively are as follows:

$$GLIIT_{ij} = \frac{\sum_{i=1}^{n}(X_{ij}+M_{ij}) - \sum_{i=1}^{n}\left|X_{ij}-M_{ij}\right|}{\sum_{i=1}^{n}(X_{ij}+M_{ij})} \quad \text{.....(15)}$$

$$AGLIIT_{ij} = \frac{\sum_{i=1}^{n}(X_{ij}+M_{ij}) - \sum_{i=1}^{n}\left|X_{ij}-M_{ij}\right|}{\sum_{i=1}^{n}(X_{ij}+M_{ij}) - \left|\sum_{i=1}^{n}X_{ij} - \sum_{i=1}^{n}M_{ij}\right|} \quad \text{.....(16)}$$

$$\frac{1}{1-\alpha} \leq \frac{UV_i^x}{UV_i^m} \leq 1+\alpha \quad \text{..... (19)}$$

These index were earlier reviewed in the literature review section

trade flows can be separated into finished and intermediate products. In the light of this IIT between the three ECOWAS countries and EU will be estimated for the finished and intermediate products

The Modified Standard Gravity Model takes the following form:

$$FIIT_{ijt} = b_0 + b_1 AVEP_{ijt}, + b_2 DIFFGDP_{ijt} + b_3 AVEPCI_{ijt} + b_4 DIFF + b_5\, DIST_{ijt\,t} + b_6\, TARIFF_{ijt} + b_7\, EXCH_{ijt} + b_8 FDI_{ijt} + U_{ijt} \quad (39)$$

$$NIIT_{ijt} = b_0 + b_1 AVEP_{ijt}, + b_2 DIFFGDP_{ijt} + b_3 AVEPCI_{ijt} + b_4 DIFF + b_5\, DIST_{ijt\,t} + b_6\, TARIFF_{ijt} + b_7\, EXCH_{ijt} + b_8 FDI_{ijt} + b_9 CLR + U_{ijt} \quad (40)$$

Where:

$FIIT_{ijk}$ is IIT for final products between country i and j,

$NIIT_{ijk}$ is the IIT for intermediate products between country i and j.

$AVEP_{ij}$ is the average population of the home country reflecting the average market size[24].

$DIFFGDP_{ij}$ is difference in gross domestic product (GDP) between the two countries i and j reflecting differences in factor endowment between country i and j,

$DIFFPCI_{ij}$ average per capita income of the two countries i and j reflecting the income distribution in both trading countries,

$DIST_{ij}$ is the distance between the two trade partners. According Hu and Ma, (1999), Sharma, (2004), and Veeramani, (2007), this study adopts the weighted distance variable which varies over time as a proxy for geographical distance between trade partners *i* and *j* computed with equation 23.

$TARRIF_{ij}$ is the bilateral average level applied of MFN tariff rates for HS 6 digit level (WTO, 2011).

$EXCH_{ij}$ is real effective exchange rate between i (each ECOWAS country) and j,

$DIFF_{ij}$ is product differentiation[25] proxy measured as the coefficient of variation of unit

[24] Some authors used average GDP between trading partners as proxy for average market size.

[25] Hufbauer (1970) index modified by Fontágne, *et. al.*, (1997) will be used as proxy for the degree of Product Differentiation

values of ECOWAS countries' exports. The Hufbauer index modified by Fontágne, *et. al.*, (1997) (equation 22) will be used to proxies product differentiation.

CLR_{ij} is the capital –labour ratio of the home country.

FDI_{ijt} is the inward FDI from j to i.

Table 4.1. A prior Expectation of the Variables

Variables	Explanatory Variables	Proxy	Final IIT	Intermediate IIT
AVEP	Average market size	Average Population[26] between i and j	+	+
DIFFGDP	Factor endowment	Differences in GDP between *i* and *j*	+	+
DIFFPC	Reflecting their income distribution in both trading countries	Difference in per capita income of the two countries	+	+
DIST	Geographic distance	Weighted distance between capital cities of *i* and *j*	-	-
FDI	Foreign direct investment	Inward FDI as a% of gross fixed capital formation (GFCF)	+	+
DIFF	Product differentiation	Revised Hufbauer index as a measure of degree of product differentiation	+	+
EXCH	Exchange Rate	Average of total vehicle production (units) between *i* and *j*	-	-
CLR	Capital –labour ratio	capital –labour ratio	-	+
Tariff	Tariff	Tariff	-	-

Source: Author's Compilation from Literature Review

[26] The proxy for average market size could either be average population or the average GDP. Some authors like Musonda (1995) used the average GDP; this present study used average population in order to solve the problem of collinearity in the model.

4.2.3 Estimation Technique.

Conventional Panel Data Analysis and Panel Data Factional Logit Regression techniques will be applied in this study. Each of these estimation techniques are discussed below.

4.2.3.1 Panel Data and Fractional Logit Regression Analyses

The panel data analysis is adopted in this study since it involves groups (trading partners), products and period which can fit into cross sectional and time series dimensions. Panel data will take the heterogeneity of each cross-section into consideration, allow for more variability and less collinearity among variables, more degrees of freedom and more efficiency (Gujarati, 2005) than the pure cross sectional or time series analysis. Given that the endogeniety problem is less likely to occur in the model to be estimated, static panel data analysis (fixed and random effects models) is appropriate..

However, since the dependent variable for this study is the IIT index[27] which ranges between zero and one, in a fractional response form, the use of OLS panel would lead to some econometric problems, some of which is the heteroscedasticity problem. A solution comes from an estimator specifically constructed to deal with proportions data. Papke and Wooldridge (1996) proposed an alternative estimation method: the Fractional Logit Regression Model (FLRM) using Quasi-Maximum Likelihood Estimation (QMLE). This model captures the characteristics of the dependent variable that are bounded between 0 and 1[28].

The application of the fractional logit[29] regression model to panel data is important and appropriate in this thesis. It requires that the number of panels (i.e., in an industry) is finite and each panel is represented in our sample; an unconditional fixed-effects model can be used which simply includes an indicator variable for each panel (see *Hardin* and *Hilbe* 2001, p. 195). The simple fractional logit regression model and a fixed effect

[27] Measured with Grubel Lloyds Index

[28] The only limitation of this estimator is that it is only applicable to pool panel and fixed effect.

[29] John Mullahy (Professor of Economics, Trinity College, Hart-ford, Connecticut), provided the **STATA** command in which he dabbed the method of quasi-MLE with a logistic mean function "fractional logit".

version of the fractional logit regression model are applied to see the effects of controlling for unobserved heterogeneity.

4.2.4 Methods of Analysis.

Two different analyses will be done in this study, country level and panel data. Equation 39 that has its dependent variable as the IIT index calculated using the ECOWAS and EU trade flows based on the final products will be estimated for each of the three selected ECOWAS countries: Cote d'ivore, Ghana and Nigeria. The same equation 39 will also be estimated using a panel of the three selected ECOWAS countries. Also, in line with the objectives of this study, equation 40 (whose its dependent variable is the IIT index calculated using the ECOWAS and EU trade flows based on intermediate products) will also be estimated for each of the three selected ECOWAS countries and on the panel of the three countries.

4.2.5 Definition and Sources of Key Variables.

The variables used to estimate the equations 39 and 40 are discussed in this section; this is done along with the sources of the various variables.

a. Index of IIT in final products and index of IIT in intermediate product: the two are dependent variables for the model that will be computed using the unadjusted Grubel Lloyd index of IIT. It must be noted that the Fontagné and Freudenberg, (1998) index had previously been used to separate IIT into vertical and horizontal patterns, since vertical IIT is the focus of this study. The computed shares of vertical IIT type would lie between 0 and 1. Moreover, the computation will be done for final and intermediate products.
b. Average market size: Average population was used as proxy to this variable in line with the studies of Helpman (1981) and Musonda (1997). It must be noted however, that some studies, such as Balassa (1986a) and Balassa and Bauwens (1988) used average GDP per capita to proxy average market size.
c. Differences in factor endowment: Differences in GDP of the trading countries was used to proxy differences in factor endowment.

d. Average income distribution in both trading countries: This is proxied with differences in per capita GDP.

e. Distance between the trading partners: The distance between the two trading countries is usually used to in trade models. According to Hu and Ma, (1999), Sharma, (2004), and Veeramani, (2007), this study adopts the weighted distance variable which varies over time as a proxy for geographical distance between countries *i* and *j* computed with equation 23. This is time variant and useful in fixed effects (FE) models.

f. Trade tariff: the tariff variable used is the bilateral average level applied MFN tariff rates for HS 6 digit level (WTO, 2011).

g. Exchange rate: real effective exchange rate

h. Product differentiation proxy measured as the coefficient of variation of unit values of ECOWAS countries' exports. The Hufbauer index modified by Fontágne, *et. al.*, (1997) (equation 22) will be used to proxies product differentiation. and

i. capital –labour ratio.

The international trade flows between the selected ECOWAS countries and EU, and their tariff will be sourced from World Integrated Trade Solution (WITS). Other data for this study will be collected from World Development Indicators (WDI) and International Financial Statistics (IFS). The geographical distance data between the U.S and its trading partners is taken from John Haveman's web page[30].

[30] The web address is http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeConcordances.html#gravity.

CHAPTER FIVE
EMPIRICAL ANALYSIS

5.0 Introduction

Broadly, this empirical analysis is divided into three subsections: preliminary results, presentation of the main results and the discussion of results. The preliminary result is first presented to describe the process of separating the trade flows into vertical and horizontal trade, and separating the vertical trade flows into final and intermediate products. Also in the preliminary results is the correlation result of the variables in the estimated models. The result of the index of IIT is subsequently presented to examine the extent of IIT between the selected ECOWAS countries and EU. The researcher presented the result of gravity models estimated to examine the determinants of intra-industry in final and intermediate products is then presented. Lastly, the robust discussion of the various results presented was addressed.

5.1 Preliminary Results

5.1.1 Measurement of the Extent of IIT between ECOWAS and EU

As regards the measurement of the extent of IIT, previous studies did not settle the appropriateness of the use of either unadjusted Grubel Lloyd index or the adjusted Grubel Lloyd index. The two indices were explored in this study for the purpose of comparison. Originally, the scope of this study is 1990 to 2011, however, the 6-HS digit trade flows started from 1996. It must be noted also that the trade between the selected ECOWAS countries and the EU between 1996 and 2000 is majorly in ITER rather than IIT. Resultantly, this study reports the IIT between the selected ECOWAS countries and EU from 2001 to 2011.

5.1.2 Separating Trade Flows into Vertical and Horizontal Trade

The bilateral trade flows data used in this dissertation cover 2001 and 2011, and was obtained from World Integrated Trade Solution (WITS) database based on the UN

Table 5.1. Summary of the Trade Flows between the Selected Countries and EU (2011)

	Cote d'Ivore	Ghana	Nigeria
Total Products in 6-HS digit	5209	5209	5209
Number of Products Traded with EU	3634	3867	2832
Number of Horizontal Products	573	623	834
Number of Vertical Products	3061	3244	1998
Number of Products that is IIT	273	253	247
➢ **Intermediate Products**	156	182	142
➢ **Final Products**	**117**	**71**	**105**

Source: Author's Computations, Underlying Data from World Integrated Trade Solution

COMTRADE maintained by the United Nations Statistical Division (UNSD). This database detailed commodities and partner countries. The data are classified by the harmonised system (HS), which contains about 5209 product items at the 6-digit. The use of the 6-HS digit trade flow, which is more disaggregated, compared to the previous studies that used 4-HS digit (2440 product items), was to prevent spurious values of IIT. The most recent method of disentangling trade flows in vertical and horizontal trade developed by Greenaway, Hine and Milner (1995) was used to extract the vertical products from the trade flows. According to Greenaway, Hine and Milner (1995), trade flows are vertically differentiated when relative unit values are outside the range of 0.75 and 1.25.

The relative unit values between the ECOWAS countries and EU were calculated. The calculated relative unit values for all the trade flows between the three selected countries and EU shows that there are more of vertical products than horizontal products. Precisely, 3061 products of Cote d'Ivore trade flows are vertically differentiated. While Ghana's vertical products are 3244, that of Nigeria was 1998.

5.1.3 Categorising the Trade Flows into Final and Intermediate Products

This study examines the extent and determinants of IIT in final and intermediate products. I then needed to separate the products into the two categories. Three methods were suggested in the literature to separate trade flows into final and intermediate products. Yeats (2001) suggested that trade in goods identified as parts or components should be considered to be intermediate goods. Schuler (1995) had earlier used products on individual SITC7 groups. I employed the method used by Turkcan (2003). This method involves the mapping of the United Nations Broad Economic Categories classification to HS revision 1. In order to select the intermediate goods from this trade data, the researcher concord from the BEC codes to the HS rev.1 codes using a correspondence table published by the United Nations.[31] BEC in terms of the Harmonised System, Revision 1, maps the goods according to the classes as shown.

[31] The concordances table from BEC to HS Rev.1 is acquired from the United Nations publication: "Standard International Trade Classification" Series M, No.34/Rev.1.

When this was done to the selected countries' trade flows with the EU, I was able to separate the trade flows into intermediate and final products.

5.1.4 Bivariate Relationship among Variables

The results of the correlation among the variables in the models are discussed in this section. The results are divided into two, one for the final IIT model and the other for IIT in intermediate products model. For each of the two models, the correlation results are presented for ECOWAS, Nigeria, Ghana and Cote d'Ivoire. While the result of pairwise correlation of the final IIT model is presented in Table 5.2, the other is in Table 5.3. Beginning with the final intra-industry trade model, the bivariate relationship between each pair of average market size *(AVEP)*, factor endowment (*DIFFGDP*), income distribution *(DIFFPC)*, weighted geographic distance *(DIST)*, product differentiation (*PRODDIFF*), real effective exchange rate *(EXCH)*, trade tariff (*TARIFF*) and final IIT index (*FIIT*) are tested.

For ECOWAS data set, the relationship between final IIT index and each of average market size, income distribution, weighted geographic distance, trade tariff and product differentiation are positive. Conversely, negative relationship is shown between final IIT index and each of factor endowment and real effective exchange rate. None of the variables have relationship that is too high to cause multicollinearity in the model. While the direction of the relationship between final IIT index and others may not be consistent with a priori expectation, the correct signs will be tested in the regression analysis. It could also be seen that the intra relationship among other variables are equally not too high. For Nigeria data set, the relationship between final IIT index and each of the variables are positive except real effective exchange rate that has negative relationship. The magnitude of the relationship is not too high to cause any econometrics problem in the model. The inter relationship of the variables equally show similar result. As regards Ghana data set, the relationship between final IIT index and each of the other variables indicate that only trade tariff has negative relationship, while others produce positive relationship.

Table 5.2 Results of correlation among variables (final intra-industry model)

	AVEP	DIFFGDP	DIFFPC	DIST	EXCH	TARIFF	PRODDIF	FIIT
ECOWAS FINAL PRODUCTS								
AVEP	*1.000*							
DIFFGDP	*0.441*	*1.000*						
DIFFPC	*0.451*	*0.464*	*1.000*					
DIST	*0.756*	*0.413*	*0.666*	*1.000*				
EXCH	*0.781*	*0.210*	*0.734*	*0.677*	*1.000*			
TARIFF	*-0.212*	*-0.612*	*-0.266*	*-0.487*	*-0.378*	*1.000*		
PRODDIF	*0.0610*	*-0.112*	*0.184*	*0.265*	*0.094*	*-0.048*	*1.000*	
FIIT	*0.591*	*-0.186*	*0.401*	*0.608*	*-0.075*	*0.090*	*0.576*	*1.000*
NIGERIA FINAL PRODUCTS								
AVEP	*1.000*							
DIFFGDP	*0.695*	*1.000*						
DIFFPC	*0.696*	*0.840*	*1.000*					
DIST	*0.579*	*0.413*	*0.639*	*1.000*				
EXCH	*0.581*	*0.515*	*0.656*	*0.915*	*1.000*			
TARIFF	*-0.013*	*0.007*	*-0.010*	*0.024*	*-0.018*	*1.000*		
PRODDIF	*0.038*	*-0.128*	*0.017*	*0.153*	*-0.222*	*0.275*	*1.000*	
FIIT	*0.272*	*0.117*	*0.258*	*0.316*	*-0.280*	*0.154*	*0.307*	*1.000*
GHANA FINAL PRODUCTS								
AVEP	*1.000*							
DIFFGDP	*0.597*	*1.000*						
DIFFPC	*0.598*	*0.794*	*1.000*					
DIST	*0.465*	*0.694*	*0.640*	*1.000*				
EXCH	*0.460*	*0.732*	*0.778*	*0.451*	*1.000*			
TARIFF	*0.549*	*0.566*	*0.535*	*0.624*	*0.300*	*1.000*		
PRODDIF	*0.184*	*0.213*	*0.161*	*0.402*	*0.054*	*0.382*	*1.000*	
FIIT	*0.092*	*0.093*	*0.090*	*0.094*	*0.065*	*-0.007*	*0.074*	*1.000*
COTE DÍVOIRE FINAL PRODUCTS								
AVEP	*1.000*							
DIFFGDP	*0.494*	*1.000*						
DIFFPC	*0.699*	*0.694*	*1.000*					
DIST	*0.538*	*0.600*	*0.523*	*1.000*				
EXCH	*0.608*	*0.439*	*0.520*	*0.438*	*1.000*			
TARIFF	*0.336*	*-0.378*	*-0.330*	*-0.590*	*-0.384*	*1.000*		
PRODDIF	*-0.038*	*-0.038*	*-0.040*	*0.036*	*-0.122*	*0.240*	*1.000*	
FIIT	*0.338*	*0.339*	*0.342*	*0.118*	*0.352*	*-0.073*	*-0.384*	*1.000*

Source: Author's computation: underlying data from World Integrated Trade Solution (WITS) and World Development Indicator (WDI)

Table 5.3. Results of correlation among variables (intermediate IIT model)

ECOWAS INTERMEDIATE PRODUCTS

	AVEP	CLR	DIFFGDP	DIFFPC	DIST	EXCH	FDI	TARIFF	PRODDIF	NIIT
AVEP	*1.000*									
CLR	*0.233*	*1.000*								
DIFFGDP	*0.441*	*0.516*	*1.000*							
DIFFPC	*0.451*	*0.032*	*0.464*	*1.000*						
DIST	*0.756*	*0.215*	*0.413*	*0.666*	*1.000*					
EXCH	*0.781*	*0.140*	*0.210*	*0.734*	*0.677*	*1.000*				
FDI	*0.442*	*-0.433*	*-0.484*	*0.432*	*0.372*	*0.378*	*1.000*			
TARIFF	*0.716*	*0.077*	*-0.080*	*0.625*	*0.580*	*0.733*	*0.546*	*1.000*		
PRODDIF	*0.061*	*-0.468*	*-0.112*	*0.183*	*0.265*	*0.090*	*0.427*	*0.057*	*1.000*	
NIIT	*0.212*	*-0.197*	*0.611*	*0.265*	*-0.487*	*-0.378*	*0.366*	*-0.040*	*0.075*	*1.000*

NIGERIA INTERMEDIATE PRODUCTS

AVEP	*1.000*									
CLR	*0.556*	*1.000*								
DIFFGDP	*0.595*	*0.412*	*1.000*							
DIFFPC	*0.696*	*0.530*	*0.640*	*1.000*						
DIST	*0.679*	*0.501*	*0.413*	*0.539*	*1.000*					
EXCH	*0.481*	*0.630*	*0.515*	*0.656*	*0.615*	*1.000*				
FDI	*0.608*	*0.434*	*0.590*	*0.587*	*0.614*	*0.511*	*1.000*			
TARIFF	*0.340*	*0.366*	*0.091*	*0.316*	*0.438*	*0.398*	*0.367*	*1.000*		
PRODDIF	*-0.028*	*0.190*	*-0.204*	*-0.052*	*0.114*	*0.095*	*0.023*	*0.104*	*1.000*	
NIIT	*0.009*	*-0.026*	*0.010*	*0.007*	*-0.021*	*-0.015*	*0.016*	*0.147*	*0.176*	*1.000*

GHANA INTERMEDIATE PRODUCTS

AVEP	*1.000*									
CLR	*0.700*	*1.000*								
DIFFGDP	*0.597*	*0.664*	*1.000*							
DIFFPC	*0.698*	*0.729*	*0.994*	*1.000*						
DIST	*0.665*	*0.296*	*0.894*	*0.840*	*1.000*					
EXCH	*0.760*	*0.783*	*0.732*	*0.778*	*0.451*	*1.000*				
FDI	*0.789*	*0.211*	*0.618*	*0.764*	*0.632*	*0.450*	*1.000*			
TARIFF	*-0.093*	*-0.035*	*-0.095*	*-0.091*	*-0.097*	*-0.067*	*-0.110*	*1.000*		
PRODDIF	*0.166*	*-0.192*	*0.196*	*0.143*	*0.387*	*-0.027*	*0.416*	*0.061*	*1.000*	
NIIT	*0.294*	*0.251*	*0.292*	*0.295*	*0.248*	*0.191*	*0.146*	*-0.036*	*-0.234*	*1.000*

COTE DÍVOIRE INTERMEDIATE PRODUCTS

AVEP	*1.000*									
CLR	*0.097*	*1.000*								
DIFFGDP	*0.694*	*0.053*	*1.000*							
DIFFPC	*0.699*	*0.102*	*0.694*	*1.000*						
DIST	*0.536*	*-0.412*	*0.599*	*0.521*	*1.000*					
EXCH	*0.506*	*0.156*	*0.637*	*0.518*	*0.435*	*1.000*				
FDI	*0.524*	*0.103*	*0.629*	*0.411*	*0.721*	*0.561*	*1.000*			
TARIFF	*-0.336*	*0.162*	*-0.380*	*-0.330*	*-0.599*	*-0.385*	*-0.412*	*1.000*		
PRODDIF	*-0.015*	*-0.020*	*-0.016*	*-0.019*	*0.072*	*-0.072*	*0.085*	*-0.168*	*1.000*	
NIIT	*0.112*	*0.138*	*0.131*	*0.110*	*0.236*	*0.145*	*0.133*	*-0.165*	*0.240*	*1.000*

Source: Author's computation: underlying data from World Integrated Trade Solution (WITS) and World Development Indicator (WDI)

The values of the correlations among the variables are low enough for healthy a model. Lastly, in the Cote d'Ivoire data set, the relationship between final IIT index and the variable only product differentiation and trade tariff have negative relationship.

The result of pairwise correlation of the intermediate IIT model is presented in Table 5.3. The result shows the relationship between the index IIT in intermediate product *(NIIT)* and each of average market size *(AVEP)*, factor endowment (*DIFFGDP*), income distribution *(DIFFPC)*, weighted geographic distance *(DIST)*, product differentiation (*PRODDIFF*), real effective exchange rate *(EXCH)*, trade tariff (*TARIFF*), capital – labour ratio *(CLR)* and inward foreign direct investment (*FDI*). The correlation analysis was carried out for four data set: ECOWAS, Nigeria, Ghana and Cote d'Ivoire.

Beginning with the ECOWAS, the relationship between index IIT in intermediate product and each of capital –labour ratio, weighted geographic distance, real effective exchange rate and trade tariff are negative and low. However, each of average market size, factor endowment, income distribution, product differentiation and inward foreign direct investment produce positive relationship with index IIT in intermediate product. For Nigeria data set, index IIT in intermediate product has positive relationship with all the variables except capital-labour ratio, weighted geographical distance, and real exchange rate. The Ghana data set revealed that the relationship between index IIT in intermediate product and each of the other independent variables produces low correlation coefficient. Moreover, the index IIT in intermediate product has positive relationship with all the variable except trade tariff and product differentiation. Lastly on the Cote d'Ivoire data set, the index IIT in intermediate product has positive relationship with each of the independent variables except trade tariff.

5.2 Presentation of the Results

5.2.1 Extent of IIT between ECOWAS and EU

Grubel and Lloyd index, otherwise known as unadjusted G-L index and the adjusted Grubel and Lloyd index were used in this thesis. The Grubel and Lloyd index is the most widely used method for calculating IIT index. An important criticism of the Grubel–Lloyd index is that it is not independent of the trade balance. The upper bound of the index is negatively related to the size of the trade balance, meaning a larger imbalance is associated with lower reported IIT. Aquino (1978) suggested an adjustment, which has fallen out of favour following a critique by Greenaway and Milner (1986) meaning the issue remains empirically unresolved. Both methods are employed in this study. The results showed that the IIT calculated by Adjusted Grubel and Lloyd index (presented in Appendix 1) gave values that are outrageous and hence, likely inflated. IIT calculated with Unadjusted Grubel and Lloyd is thus analysed and used for estimation in this study.

5.2.1.1 Final Products

As earlier mentioned, the final products were separated from the intermediate products before the computation of IIT. The computed Grubel Lloyd IIT in final products for Ghana, Cote d'Ivoire and Nigeria were reported in Tables 5.4, 5.5 and 5.6 respectively. The IIT is computed in the first 15 chapters of the harmonised System Code of the three countries. These are the products in which the ECOWAS countries have the capacity to produce.

(i) Ghana's IIT in Final Products

The emergence of IIT between Ghana and EU occurred in 2001. However, IIT between Ghana and EU was less than 0.1 in 2001. Ghana's IIT with EU increased to 0.09 in 2003. Consistent increase was recorded by Ghana in her IIT with EU till 2011. The computed value of IIT between Ghana and EU was 0.27 in 2011. Ghana does not have IIT with EU in animal or vegetable fats and mineral products sectors through the period 1990 and 2011. This implies that the trade between Ghana and EU in the sectors are wholly inter-industry in the period. However, the base metals and articles sector has the highest IIT occurrence between 2001 and 2011. The value of IIT in the base metals and articles

sector was 0.28 in 2001 and it increased to 0.43 in 2011. Some of the specific products in which IIT occurred between Ghana and EU in final products are bells, gongs and the like, stranded wire, ropes and cables, cast iron, hedge shears and pruning. Others are treading and tapping tool etc. The Plastics and Plastics Articles is another industry in which Ghana has substantial IIT with the EU. Although, the IIT in the Plastics and Plastics Articles industry is calculated to be 0.0031 in 2001, which second to the lowest in Ghana, it has since increased to 0.4958 in 2011. The products in this sector include: lavatory seats, lavatory cover, tableware, and kitchen ware etc.

Ghana also has IIT in raw hides and skins, leather with the EU. The value of Ghana's IIT with EU in raw hides and skins, leather was 0.0562 in 2001; this has increased to 0.4134 in 2011. The products that have IIT in raw hides and skins are handbags and belts. Although Ghana is known to be agriculturally endowed economy, its IIT with EU in animals; animal products and vegetable products are low. The IIT in Animals and Animal Products between Ghana and EU was 0.0667 in 2001 and was increased to 0.1422 in 2004. Although, there was a decline in animals and animal products intra-industry between Ghana and EU to 0.0003 in 2005, IIT in the sector became 0.2827 in 2011. Despite the fact that the magnitude of IIT in animals and animal products is low, the products in which IIT occurred in the sector include: smoked fish, cuttle fish, frozen crabs, natural honey, tunas and other.

Similarly, Ghana and EU IIT in Vegetable Products was 0.0880 in 2001. It increased gradually to 0.2210 in 2011. The following products in the Vegetable Products sector have IIT: guavas, mangoes, mangosteens, aubergines (egg-plants), and pepper. Others are beans, spinach, cashew nuts, onions, mushrooms truffles, lemons, ginger, shallots and other. For IIT in prepared foodstuffs and beverages sector between Ghana and EU, it increased from 0.0027 in 2001 to 0.2846 in 2011. And the products in this sector include sparkling wine, mineral water, aerated water, doughs, homogenised composite food, pasta, nuts, ground-nuts, infant food, crispbread, soups and broths, cocoa powder, juice, beer made from malt, fermented beverage, pineapples, and vinegars etc.

Table 5.4 Ghana's Intra Industry Trade in Final Products

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.0667	0.0726	0.1921	0.1422	0.0003	0.1412	0.1982	0.2146	0.2426	0.2239	0.2827
Vegetable Products	0.0880	0.1032	0.1312	0.1503	0.2924	0.2616	0.2506	0.2134	0.1838	0.2635	0.2210
Animal or Vegetable Fats	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	Non
Prepared Foodstuffs; Beverages	0.0027	0.0032	0.0171	0.3013	0.1977	0.2349	0.1907	0.2281	0.1710	0.2022	0.2846
Mineral Products	non	non	Non	non	non	non	non	Non	non	non	non
Products of the Chemicals	0.0267	0.0707	0.0881	0.1018	0.4259	0.2891	0.1215	0.3207	0.1657	0.1293	0.2503
Plastics and Articles thereof	0.0031	0.0121	0.0154	0.0185	0.0234	0.0240	0.1592	0.1774	0.2188	0.2279	0.4958
Raw Hides and Skins, Leather	0.0562	0.0661	0.1099	0.1141	0.1519	0.1807	0.2192	0.2439	0.3854	0.4051	0.4134
Wood and Articles of Wood	0.1079	0.1209	0.1232	0.1238	0.1371	0.1873	0.2131	0.2174	0.2209	0.2688	0.3462
Pulp of wood and Fibrous	0.0453	0.0520	0.0534	0.1019	0.1073	0.1211	0.1389	0.1994	0.3102	0.3278	0.3320
Textile and Textile Articles	0.1279	0.1552	0.1620	0.1684	0.1906	0.1906	0.2283	0.2285	0.2390	0.2496	0.2516
Footwear, Headgear, Umbrellas	0.1093	0.1102	0.1145	0.1152	0.1442	0.1601	0.2556	0.2700	0.3012	0.3254	0.3556
Articles of Stone, Plaster, Cement	0.0991	0.1088	0.1189	0.1509	0.1761	0.1776	0.1779	0.1852	0.1935	0.2557	0.2758
Natural Precious Stones	0.0011	0.0044	0.0185	0.0361	0.0936	0.1723	0.2169	0.1552	0.1102	0.1088	0.1412
Base Metals and Articles	0.2846	0.3166	0.3310	0.3577	0.3687	0.3787	0.3809	0.3882	0.4232	0.4293	0.4321
FINAL PRODUCTS	**0.0679**	**0.0797**	**0.0983**	**0.1388**	**0.1539**	**0.1679**	**0.1834**	**0.2028**	**0.2110**	**0.2278**	**0.2722**

(ii) Cote d'Ivoire's IIT in Final Products

The level of IIT in final products between Cote d'Ivoire and EU is quite appreciable considering the fact that it is vertical trade that exists between the two countries. IIT in final products between Cote d'Ivoire and EU rose from 0.2465 in 2001 to 0.3712 in 2011. Nilsson (1999) earlier reported 0.57 IIT between the EU and Developing countries. Variations occurred in IIT between Cote d'Ivoire and EU in the various sectors considered.

Although it is only one product that Cote d'Ivoire has IIT with EU in the Mineral products sector, the sector recorded the highest magnitude of IIT between 2001 and 2011. The only product in which the sector recorded intra-industry is petroleum oils. Moreover, the sector in which Cote d'Ivoire has the second highest IIT in final product with EU is vegetable products. IIT in the sector rose from 0.2191 in 2001 to 0.6363 in 2011. This sector has the highest number of products that recorded IIT in Cote d'Ivoire trade with EU. Some of the products in this sector that recorded IIT are onions, shallots, garlic, cauliflowers, headed broccoli, brussels sprouts, lettuce, fruits of the genus capsicum, spinach, leguminous vegetable, mushrooms, truffles, chickpea, cashew, almond, hazelnuts.

Another sector in which Cote d'Ivoire has IIT in final products is Wood and Articles of Wood. The sector has intra-industry of 0.4079 in 2001 but it declined to 0.2904 in 2011. Some of the products in the sector are tableware and kitchenware, of wood, and statuettes and other ornaments. Prepared foodstuffs; beverages is another sector that Cote d'Ivore has IIT with EU. The sector has IIT that ranged between 0.3491and 0.4639, in the period 2001 and 2011. Some of the food in the sector includes Fish, whole or in pieces, but not minced-tunas, skipjack and bonito, nuts, ground-nuts and other seeds, pineapples etc.

Table 5.5. Cote d'Ivoire's Intra Industry Trade in Final Products

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	Non	Non	Non	Non	Non	Non	Non	non	Non	non	non
Vegetable Products	0.2191	0.0309	0.4317	0.6035	0.5459	0.6195	0.5790	0.4849	0.5084	0.5206	0.6363
Animal or Vegetable Fats	0.0896	0.1536	0.2162	0.1877	0.2153	0.2676	0.2007	0.2811	0.3254	0.4944	0.4187
Prepared Foodstuffs; Beverages	0.3491	0.3610	0.2248	0.3394	0.3187	0.3030	0.4434	0.4733	0.3510	0.4639	0.4153
Mineral Products	0.8886	0.5900	0.9505	0.4590	0.5144	0.7197	0.4384	0.8987	0.9209	0.5333	0.6545
Products of the Chemicals	0.2343	0.2743	0.3195	0.2689	0.3205	0.4681	0.4534	0.3186	0.5583	0.3040	0.1575
Plastics and Articles thereof	Non	Non	Non	Non	Non	Non	Non	non	Non	non	non
Raw Hides and Skins, Leather	0.1843	0.5584	0.1348	0.1255	0.1393	0.1356	0.1894	0.0279	0.3217	0.1341	0.3422
Wood and Articles of Wood	0.4079	0.3728	0.2118	0.3943	0.1956	0.2056	0.1806	0.2555	0.6322	0.3076	0.2914
Pulp of wood and Fibrous	0.1047	0.1362	0.1469	0.1729	0.1878	0.2025	0.3589	0.1557	0.2628	0.2728	0.2904
Textile and Textile Articles	0.2567	0.3137	0.2654	0.3674	0.4132	0.3646	0.2032	0.2781	0.3864	0.2696	0.3515
Footwear, Headgear, Umbrellas	0.1159	0.0827	0.2914	0.1362	0.1619	0.1022	0.2761	0.2162	0.2115	0.3324	0.2299
Articles of Stone, Plaster, Cement	0.0825	0.1751	0.2665	0.1954	0.0720	0.1070	0.3797	0.0129	0.2244	0.4915	0.5212
Natural or Cultured Pearls, Precious Stones	0.1382	0.2987	0.4362	0.2189	0.2138	0.2174	0.0417	0.0878	0.0458	0.5188	0.5144
Base Metals and Articles of Base Metal	0.1265	0.3179	0.2197	0.3710	0.3300	0.1663	0.2128	0.2087	0.4941	0.3742	0.4442
FINAL PRODUCTS	**0.2465**	**0.2444**	**0.2744**	**0.2560**	**0.2419**	**0.2586**	**0.2638**	**0.2466**	**0.3495**	**0.3345**	**0.3712**

Source: Author's computation: underlying annual data from World Integrated Trade Indicators (WITS)

(iii) Nigeria's IIT in Final Products

Out of the 15 industries considered, Nigeria did not record IIT with the EU in four sectors. These sectors are Animal or Vegetable Fats, Raw Hides and Skins, Leather and Natural Precious Stones, Natural Precious Stones. The IIT in final products between Nigeria and EU is shows in Table 5.6. Variations occurred in IIT between Nigeria and EU in the various sectors considered. Although it was small, IIT between Nigeria and EU occurred in animals; animal products and it ranged between 0.0079 and 0.0628 between 2001 and 2011. The specific products in animal and animal products that have IIT include: granules, added sugar, powder sugar, natural honey, pacific salmon, fat content and frozen fillets. Similarly, Nigeria IIT with EU in vegetable products was very small in 2001 but rose to 0.3851 in 2011. And the vegetable products that recorded IIT are dates, fresh vegetables, mixtures of vegetables and other vegetables.

The magnitude of Nigeria's IIT with EU, in products of the chemicals was also small in the early 2000s. It however increased from 0.1538 in 2004 to 0.7835 in 2011. Some of the products in the products of the chemicals sector in which Nigeria has IIT are chlorine, sulphuric, potassium, ammonium chloride etc. Nigeria IIT with EU in base metals and articles of base metal is equally substantial between 2000 and 2011. It ranges between 0.2078 and 0.7339. Some of the product includes ceramics, slivers and diamonds etc. IIT between Nigeria and EU in textile and textile articles was low between 2000 and 2011. It ranges between 0.0756 and 0.2964 between 2000 and 2011.

Table 5.6. Nigeria's Intra Industry Trade in Final Products

Harmonized System Code List	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.0999	0.1151	0.1238	0.1412	0.2727	0.1374	0.2898	0.1175	0.2462	0.2987	0.2634	0.1749
Vegetable Products	0.0244	0.0969	0.2674	0.1372	0.1957	0.1331	0.1574	0.2089	0.2983	0.2745	0.3120	0.7455
Animal or Vegetable Fats	Non	Non	Non	Non	Non	Non	non	Non	Non	Non	non	non
Prepared Foodstuffs; Beverages	0.0244	0.1282	0.0455	0.0245	0.0679	0.0766	0.1467	0.2871	0.1596	0.1975	0.1548	0.1768
Mineral Products	0.0256	0.1651	0.0257	0.0406	0.1327	0.1072	0.1394	0.1556	0.1055	0.2351	0.2187	0.7835
Products of the Chemicals	0.0026	0.0089	0.1698	0.1617	0.1538	0.6777	0.9607	0.3885	0.5781	0.2685	0.1804	0.7606
Plastics and Articles thereof	0.0192	0.0435	0.0284	0.1228	0.2420	0.2532	0.3866	0.4917	0.1081	0.5096	0.2420	0.2532
Raw Hides and Skins, Leather	Non	Non	Non	Non	Non	Non	non	Non	Non	Non	non	non
Wood and Articles of Wood	0.1895	0.0711	0.1665	0.1653	0.1465	0.1456	0.2708	0.3913	0.4937	0.8653	0.9256	0.9812
Pulp of wood and Fibrous	0.0007	0.0011	0.3893	0.4163	0.8059	0.4609	0.7202	0.5819	0.6087	0.7732	0.8893	0.9727
Textile and Textile Articles	0.1287	0.2906	0.2391	0.2993	0.2671	0.2797	0.2539	0.0756	0.1108	0.2423	0.1493	0.2964
Footwear, Headgear, Umbrellas	0.1203	0.4989	0.4657	0.7423	0.5333	0.7290	0.0353	0.2372	0.5538	0.7706	0.8855	0.1680
Articles of Stone, Plaster, Cement	Non	Non	Non	Non	Non	Non	non	non	Non	Non	non	non
Natural Precious Stones	Non	Non	Non	Non	Non	Non	non	non	Non	Non	non	non
Base Metals and Articles of Base Metal	0.5877	0.3768	0.7963	0.3296	0.7339	0.3595	0.4140	0.2078	0.6443	0.6551	0.5559	0.4650
FINAL PRODUCTS	**0.0471**	**0.1455**	**0.1212**	**0.1234**	**0.1654**	**0.1573**	**0.1369**	**0.1759**	**0.2458**	**0.2281**	**0.2733**	**0.3851**

Source: Author's computation: underlying annual data from World Integrated Trade Indicators (WITS)

5.2.1.2 Intermediate Products

IIT in intermediate product for Cote d 'Ivories, Ghana and Nigeria with EU are presented in Tables 5.7, 5.8 and 5.9 respectively. The IIT in intermediate products are reported for 15 industries based on the HS chapters.

(i) Cote d'Ivoire's IIT in Intermediate Products

Out of the 15 chapters considered, only Cote d'Ivoire has IIT with EU in intermediate products of 11 industries. Pure inter –industry trade was reported in animals and animal products, raw hides and skins leather, footwear headgear and umbrellas and natural or cultured pearls precious stone industries in Cote d'Ivoire trade with EU. The average Cote d Ivories IIT with EU in intermediate products increased from 0.1418 in 2001 to 0.2237 in 2011. The sector in which Cote d'Ivoire has the highest IIT with EU in intermediate products is vegetable products. The sector recorded 0.2424 IIT with EU in intermediate products in 2001. This however, increased to 0.5265 in 2011. Some of the intermediate products in the vegetable products sector are coffee, not roasted, rice in the husk, maize flower, maize starch, vegetable seeds etc.

The animal or vegetable fats product is another sector in which Cote d'Ivoire also has intra-industry with the EU, although, there are only two products in the sector in which IIT occurred. IIT in the sector increased from 0.1475 in 2001 to the highest 0.4817 in 2005, although it however declined to 0.1709 in 2011. The products in animal or vegetable fats categories are fish liver oil as well as fish and their fractions. IIT in intermediate products of food stuff and beverages sector between Cote d'Ivoire and EU occurred in four products. The products are invert sugar, cocoa beans broken, cocoa powder and tapioca. Intermediate IIT in this industry fluctuated between 0.1330 and 0.2668 between 2001 and 2011.

Cote d'Ivoire's intermediate IIT with EU in the products of chemical occurred in seven products. they includes sodium hydroxide (caustic soda), disodium carbonate, potassium carbonate based polyesters and others. The industry IIT ranged between 0.1788 and 0.2915. There are over 17 intermediate products in which Cote d'Ivoire has IIT with the

EU in the plastic and articles industry. The intermediate IIT in the industry increased from 0.2464 in 2001 to 0.4767 in 2011. Wood and article of wood is another sector in which Cote d'Ivoire record IIT in intermediate products with the EU. Nine intermediate products in this sector have IIT; they are non-coniferous, plywood consisting solely of sheets, casks, barrels, vats, tubs, and tableware and kitchenware. The intermediate IIT between Cote d'Ivoire and EU in this industry increased from 0.1822 in 2001 to 0.3515 in 2011.

IIT exists between Cote d'Ivoire and EU in intermediate Textile and Textile articles products. The value of was 0.3348 in 2001 and has declined to 0.2019 in 2011. Some of the product in which Cote d'Ivoire has IIT with EU in this sector are cotton not carded, bleached, dyed, article of yarn, textile wicks and other textile materials. In article of stone, plaster and cement sector, intra-industry exist in intermediate products between Cote d'Ivoire and EU in two products which are roses, grafted and articles containing magnesite. The IIT in this sector ranged between 0.1366 and 0.4757 between 2001 and 2011. Lastly, IIT also occurred between Cote d'Ivoire and EU in based metals and article of based metal sector. The major product in this sector is scrap of alloyed steel. IIT in this sector increased from 0.1934 and 0.3050.

Table 5.7 Cote d'Ivoire's Intra Industry Trade in Intermediate Products

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	Non	Non	Non	Non	non	Non	Non	Non	Non	non	non
Vegetable Products	0.2424	0.2414	0.3464	0.4605	0.5463	0.5528	0.6045	0.4932	0.5182	0.6057	0.5265
Animal or Vegetable Fats	0.1475	0.1245	0.3976	0.4128	0.4486	0.4817	0.4493	0.2372	0.2714	0.1678	0.1709
Prepared Foodstuffs; Beverages	0.1330	0.1236	0.1224	0.2266	0.2668	0.1643	0.1736	0.1362	0.2926	0.2106	0.1770
Mineral Products	0.1621	0.2362	0.1501	0.2623	0.4847	0.3162	0.2319	0.4749	0.2029	0.1500	0.1364
Products of the Chemicals	0.1788	0.1668	0.3582	0.2181	0.1974	0.1363	0.1734	0.2715	0.1020	0.1610	0.2915
Plastics and Articles thereof	0.2464	0.3899	0.2325	0.2532	0.3352	0.2327	0.4357	0.3179	0.2424	0.3414	0.4767
Raw Hides and Skins, Leather	Non	Non	Non	Non	non	Non	Non	Non	Non	non	non
Wood and Articles of Wood	0.1725	0.1802	0.1706	0.3277	0.2149	0.1418	0.1609	0.3495	0.4916	0.4114	0.3134
Pulp of wood and Fibrous	0.1822	0.3345	0.3074	0.3540	0.3186	0.5039	0.4474	0.4998	0.6434	0.4851	0.3515
Textile and Textile Articles	0.3348	0.2383	0.2612	0.3123	0.2275	0.1392	0.3512	0.4719	0.2889	0.3541	0.2196
Footwear, Headgear, Umbrellas	Non	Non	Non	Non	non	Non	Non	Non	Non	non	non
Articles of Stone, Plaster, Cement	0.1366	0.1475	0.1405	0.2318	0.0733	0.1785	0.4757	0.1315	0.4887	0.2969	0.2019
Natural or Cultured Pearls, Precious Stones	Non	Non	Non	Non	non	Non	Non	Non	Non	non	non
Base Metals and Articles of Base Metal	0.1910	0.2201	0.2208	0.2901	0.4285	0.3383	0.2797	0.3376	0.3819	0.2616	0.4900
INTERNEDIATE PRODUCTS	**0.1418**	**0.1602**	**0.1805**	**0.2233**	**0.2361**	**0.2124**	**0.2522**	**0.2481**	**0.2616**	**0.2297**	**0.2237**

Source: Author's computation: underlying annual data from World Integrated Trade Indicators (WITS)

(ii) Ghana's IIT in Intermediate Products

Based on the calculated unadjusted Grubel Lloyd, intermediate IIT between Ghana and EU was very low between 2001 and 2011. Although intermediate IIT between Ghana and EU increased from 0.0638 in 2001 to 0.2553 in 2004, it however declined to 0.2251 in 2011. Out of the 15 sectors considered, trade between Ghana and EU were purely inter-industry in raw hides and skins leather, footwear headgear as well as umbrellas, and natural precious stones. The sector that has the highest IIT in Ghana's trade with EU in intermediate product is mineral products. The IIT in the sector increased from 0.0948 in 2001 to 0.4949 in 2011. Five different products have IIT in the sector, they includes petroleum oils, granules, chippings and powder, clays, Sandstone and Granules, chippings and powder.

Although IIT between Ghana and EU in intermediate products of animals and animals products was low in 2001 and 2002, it however increased from 0.0001 in 2002 to 0.6375 in 2011. Five intermediate products in the sector are in IIT. These products are Natural sponges of animal origin, Flours, meals and pellets of fish, parts of horses, fresh or chilled carcasses and other live animals. Ghana IIT with EU in intermediate product of vegetable products sector occurred in about eighteen products. IIT in this sector ranged between 0.1398 and 0.2785 between of 2001 and 2011. Some of the intermediate products in which Ghana has IIT with EU are coconuts, coffee not roasted, cherries, wheat or meslin flour, maize flour groats and meal of cereals and others.

IIT in animals and vegetable facts sector between Ghana and EU increased from 0.1371 in 2001 to 0.5159 in 2011 by however declined to 0.3104 in 2011. Five intermediate products of this sector are involved in IIT. They includes: palm kernel, babassu oil, coconut (copra) oil, and coconut fraction. There are twelve intermediate products of foodstuffs and beverages sector in which Ghana IIT with EU. They includes shrimps and prawns, cocoa beans, whole or broken, cocoa butter, fat and oil, ethyl alcohol and other spirits, tapioca and substitutes, cocoa powder, raw sugar, fish, whole or in pieces, and undenatured ethyl alcohol. Products chemicals or allied is another sector in which Ghana has IIT with EU in intermediate products. There are about 13 products in this

sector that have IIT. Some of the products in these sectors are vaccines for human medicine, gold compounds, nitrogen, antisera and other blood fractions, ammonium nitrate, saturated chlorinated derivatives blood-grouping reagents and others. IIT index in this sector increased from 0.0887 in 2001 to 0.3486 in 2011. Ghana's IIT with EU in the intermediate products of plastics and rubber sector are in about thirteen products. And the index of IIT in the sector ranges between 0.0881 and 0.2110 in between 2001 and 2011. Some of the products in this sector include carboys, bottles, flasks, natural rubber latex, natural rubber, compounded with carbon black, sacks and bags, of polymers of ethylene, as well as tubes, pipes and hoses.

There are about 13 intermediate products in which Ghana has IIT with EU in wood and wood products sector. The products include coniferous, plywood consisting solely of sheets, wood charcoal, of tropical wood specified in subhe, plywood consisting solely of sheets, plywood consisting solely of sheets and non-coniferous. The value of IIT index in this sector increased from 0.0887 in 2001 to 0.2110 in 2011. The value of IIT index in pulp of wood or fibriods sector remained low through the period of 2001 and 2011. It remained less than 0.1000 in the period. Four products are involved in IIT in this sector. They includes paper and paperboard, printed paper, binders (other than book covers), as well as cartons, boxes and cases.

The IIT in intermediate products between Ghana and EU in textile and textile articles remained low between 2001 and 2011. Although it increased from 0.0950 in 2001 to 0.4674 in 2009 it however declined to 0.2405 in 2011. There are about eight intermediate products in the sector that have IIT. The products are of man-made textile materials, cotton, not carded or combed, of jute or of other textile, Fabrics of noil silk and bleached. In the articles of Stone plaster and cement sector, Ghana has IIT with EU in about ten intermediate products. They include brake linings and pads, glass cubes and other glass, glass beads, imitation pearls and porcelain. The index of IIT in this sector ranged between 0.0645 and 0.3979 between 2001 and 2011.

Lastly, in the sector base metals and articles, Ghana has IIT in about 20 intermediate products. The products include casing, tubing and drill pipe, interchangeable tools, Tools for drilling, iron or steel, steel core, Lead waste and scrap. others are tools for pressing, stamping, casing of a kind used in drilling, aluminium

Trade 5.8. Ghana's Intra Industry Trade in Intermediate Products

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2010	2011
Animals; Animal Products	0.0012	0.0001	0.0858	0.0874	0.1754	0.2402	0.2482	0.2529	0.3385	0.3423	0.6375	0.3423	0.6375
Vegetable Products	0.2561	0.3248	0.2561	0.2092	0.2785	0.1225	0.1807	0.1779	0.2181	0.1398	0.2433	0.1398	0.2433
Animal or Vegetable Fats	0.1371	0.1316	0.2898	0.3760	0.3290	0.5095	0.4713	0.5900	0.4805	0.5159	0.3104	0.5159	0.3104
Prepared Foodstuffs; Beverages	0.0065	0.2268	0.4871	0.3226	0.2289	0.3770	0.3790	0.2243	0.2812	0.2482	0.2450	0.2482	0.2450
Mineral Products	0.0948	0.2444	0.0316	0.1105	0.1603	0.1354	0.1783	0.1330	0.2438	0.2957	0.4949	0.2957	0.4949
Products of the Chemicals	0.0887	0.1184	0.1305	0.5990	0.1880	0.3323	0.2384	0.2841	0.3933	0.3414	0.3486	0.3414	0.3486
Plastics and Articles thereof	0.0881	0.2126	0.2709	0.1286	0.3834	0.4519	0.1872	0.2222	0.2368	0.2513	0.2110	0.2513	0.2110
Raw Hides and Skins, Leather	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	non	non
Wood and Articles of Wood	0.0439	0.1006	0.2919	0.6056	0.3848	0.3783	0.3910	0.4226	0.0881	0.1164	0.2110	0.1164	0.2110
Pulp of wood and Fibrous	0.0036	0.0015	0.0017	0.0255	0.0907	0.0012	0.0465	0.0109	0.0676	0.0134	0.0707	0.0134	0.0707
Textile and Textile Articles	0.0950	0.1100	0.1188	0.3725	0.1203	0.1873	0.3053	0.2490	0.4747	0.1683	0.2405	0.1683	0.2405
Footwear, Headgear, Umbrellas	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	non	non
Articles of Stone, Plaster, Cement	0.0645	0.3876	0.6134	0.8170	0.3979	0.3236	0.1580	0.2156	0.2044	0.1422	0.1995	0.1422	0.1995
Natural Precious Stones	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	non	non
Base Metals and Articles of Base Metal	0.0769	0.1495	0.4439	0.1760	0.2086	0.3427	0.1809	0.4464	0.2961	0.1387	0.1635	0.1387	0.1635
INTERNEDIATE PRODUCTS	**0.0638**	**0.1339**	**0.2014**	**0.2553**	**0.1964**	**0.2268**	**0.2177**	**0.2219**	**0.2482**	**0.1943**	**0.2251**	**0.0638**	**0.1339**

Source: Author's computation: underlying annual data from World Integrated Trade Indicators (WITS)

(iii) Nigeria's IIT in Intermediate Products

Similar to what was obtainable in final IIT, Nigeria IIT with EU in intermediate products occurred in 12 sectors out of the 15 sectors considered. This implies that nigeria's trade with EU in raw hides and skins, leather, footwear, headgear, umbrellas and natural precious stones are purely inter-industry. Generally however, Nigeria IIT in intermediate products with the EU was very low between the period 2001 and 2011. It gradually increased from 0.0882 in 2001 to 0.3370 in 2011.

Nigeria's foodstuffs and beverages sector recorded the highest IIT with EU out of the 15 sectors considered. Although there are only five intermediate products that recorded IIT in the sector, the computed index of intra-industry in the sector increased from 0.0173 in 2001 to 0.4446 in 2011. And the products in which IIT occurred in the sector are cocoa beans, whole or broken, cocoa powder, other preparations in blocks, slabs, and cucumbers and gherkins. The presences of several multinationals that operate in this sector in Nigeria justify the kind of trade. Substantial IIT was equally recorded in the animal and animal products sector in Nigeria trade with the EU. Although, Nigeria and EU exchange only four intermediate products in this sector, IIT index in the sector has been increasing since it first occurred in 2001. It rose from 0.0064 in 2001 to 0.5227 in 2011. The products that have IIT in this sector include powder, granules or other solid, Flours, meals and pellets of fish, carcasses and half-carcasses.

There are five intermediate products in which Nigeria has IIT with the EU in the animals and vegetable products sector. The products are glycerol, crude; glycerol waters lard stearin, lard oil, oleostearin, vegetable waxes and palm kernel or babassu oil. The computed index of IIT in this sector was 0.0613 in 2001 to 0.2137 in 2011. There has been consistent decline in the IIT in the intermediate product of mineral product sector in Nigeria trade with EU. It declined from 0.3031 in 2001 to 0.0605 in 2011 despite the fact that about seven products in this sector are IIT. This intermediate products are Salt (including table salt and dena), cement clinkers, liquefied, butanes, zinc ores and concentrates, liquefied, propane and other.

Although the IIT between Nigeria and EU in products of the chemicals or allied was low in 2001, it has increased from 0.0175 in 2001 to 0.3853 in 2011. About 15 intermediate products recorded IIT in the sector. Some of which include hydraulic brake fluids, hydrogen chloride (hydrochloric), radioactive elements and isotopes, pickling preparations for metal, prepared binders for foundry, sulphuric acid; oleum, containing penicillin or derivative, amino-acids and their esters, insecticides, phosphoric acid, and containing other antibiotics.

Plastic and articles of plastic sector recorded very low IIT in Nigeria's trade with the EU. The computed IIT index for the sector's intermediate products ranges between 0.0912 in 2001 and 0.1566 in 2011. Wood and wood products sector recorded higher IIT in Nigeria trade with EU in intermediate products between 2009 and 2011 as the index increased from 0.4110 to 0.7767. The intermediate products in this sector that have IIT are Treated with paint, stains, wood charcoal (including shell), non-coniferous, densified wood, in blocks, plates, doors and their frames, cases, boxes, crates, drums and densified wood, in blocks, plates.

Textile and Textile articles sector equally recorded IIT in Nigeria's trade with the EU in six intermediate products. Textured yarn, cotton, not carded or combed. unbleached, other fabrics, fabrics not put up for retail sales, textured yarn, polyesters. The index of IIT in intermediate products of this sector increased from 0.0985 in 2001 to 0.2722 in 2011. Article stone and glass sector also recorded progressive IIT in Nigeria's trade with EU in intermediate products. IIT occurred in 5 of the intermediate products of the article stone and glass sector. These products are glass cubes and other glass, glass for electric lighting, of fused quartz or other fused, and other.

Finally, Nigeria IIT with the EU in the intermediate products of base metals and articles occurred in over 15 products. Some of them are Line pipe of a kind used for oil, aluminium, not alloyed, sheet piling, doors, windows and their frames, threaded elbows, bends, aluminium alloys, butt welding fittings, anchors, grapnels and parts,

Trade 5.9. Nigeria's Intra Industry Trade in Intermediate Products

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.0064	0.0327	0.0529	0.1022	0.2236	0.2553	0.2695	0.2991	0.3048	0.3871	0.5227
Vegetable Products	0.0036	0.0050	0.0098	0.0175	0.0271	0.0290	0.0339	0.0428	0.0492	0.0502	0.0518
Animal or Vegetable Fats	0.0613	0.1203	0.0248	0.1778	0.1728	0.0243	0.0676	0.1316	0.1793	0.2678	0.2137
Prepared Foodstuffs; Beverages	0.0173	0.0281	0.0374	0.0920	0.1257	0.1299	0.2333	0.2783	0.4718	0.4976	0.4446
Mineral Products	0.3031	0.2817	0.2754	0.2699	0.2437	0.1437	0.1007	0.0970	0.0707	0.0639	0.0605
Products of the Chemicals	0.0175	0.0179	0.0182	0.0184	0.0242	0.0274	0.0276	0.0305	0.0338	0.0361	0.3853
Plastics and Articles thereof	0.0912	0.1048	0.1209	0.1215	0.1275	0.1406	0.1413	0.1419	0.1543	0.1563	0.1566
Raw Hides and Skins, Leather	Non	Non	Non	non	Non	Non	Non	Non	Non	non	Non
Wood and Articles of Wood	0.0827	0.0944	0.1049	0.1383	0.1596	0.1718	0.2416	0.2729	0.4110	0.4803	0.7767
Pulp of wood and Fibrous	0.0084	0.0088	0.0287	0.0505	0.0614	0.0822	0.1104	0.1145	0.1815	0.3866	0.7104
Textile and Textile Articles	0.0985	0.1062	0.1404	0.1675	0.1684	0.1685	0.1795	0.2078	0.2293	0.2343	0.2722
Footwear, Headgear, Umbrellas	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	Non
Articles of Stone, Plaster, Cement	0.1794	0.2994	0.3292	0.3768	0.4310	0.4812	0.5829	0.6619	0.7895	0.7919	0.4803
Natural Precious Stones	Non	Non	Non	Non	Non	Non	Non	Non	Non	non	Non
Base Metals and Articles of Base Metal	0.3709	0.3712	0.3734	0.3846	0.4026	0.4429	0.4547	0.4641	0.4693	0.5199	0.5356
INTERNEDIATE PRODUCTS	0.0882	0.1048	0.1093	0.1397	0.1579	0.1532	0.1773	0.1973	0.2378	0.2792	0.3370

Source: Author's computation: underlying annual data from World Integrated Trade Indicators (WITS)

rock drilling or earth boring tools, aluminium, not alloyed and others. The index of IIT increased from 0.3709 in 2001 to 0.5356 in 2011.

5.2.1.3 Comparing IIT across Selected ECOWAS Countries.

The descriptive summary of the computed IIT in final products for the three selected ECOWAS countries between the period of 2001 and 2011 is presented in Table 5.10. This is in a view of compare the extent of IIT among them. The mean value of Cote d'Ivoire IIT in final product between the period 2001 and 2011 is 0.3238 and it was the highest among the three selected countries. The mean value of IIT in final products between 2001 and 2011 for Ghana and Nigeria were 0.1640 and 0.1549 respectively. Similarly, the maximum IIT Cote d'Ivoire has between the period 2001 and 2011 was 0.4283, it is about double of the maximum IIT Ghana and Nigeria have between 2001 and 2011.

In the animals; animal products, while Cote d'Ivoire recorded pure ITER between 2001 and 2011, Ghana has higher mean value of IIT than Nigeria. In the vegetable products industry, Cote d'Ivoire also has the highest mean and maximum IIT with EU in the period 2001 and 2011. While the mean value of IIT for final products in the vegetable products industry in Nigeria is higher than that Ghana, the maximum value for Ghana is higher than that of Nigeria. Only Cote d'Ivoire has IIT in animal or vegetable fats industry, for Ghana and Nigeria Animal or vegetable fats industry were purely ITER between 2001 and 2011. While Nigeria performed least in terms of IIT with the EU in prepared foodstuffs; beverages industry, the performance of Ghana is not as much as that of Cote d'Ivoire. Ghana's trade with the EU in mineral products was purely ITER between 2001 and 2011. Cote d'Ivoire IIT with the EU in mineral products was more than that of Nigeria in the same period. While Ghana has the least IIT among the three countries in products of the chemicals that of Nigeria is equally lower than what Cote d'Ivoire have. Cote d'Ivoire didn't have IIT in plastics and articles thereof, while Nigeria's IIT in with EU in plastics and articles thereof was higher than that of Ghana. As regards raw hides and skins, leather, Nigeria's trade.

Table 5.10. Descriptive Comparison of IIT in Final Products among the Selected ECOWAS Countries

	Cote d'Ivoire			Ghana			Nigeria		
Harmonized System Code List	**Minimum**	**Maximum**	**Mean**	**Minimum**	**Maximum**	**Mean**	**Minimum**	**Maximum**	**Mean**
Animals; Animal Products	Non	non	non	0.0003	0.3422	0.1797	0.0079	0.2987	0.0260
Vegetable Products	0.0309	0.6363	0.4709	0.0880	0.2924	0.1963	0.0062	0.5681	0.1393
Animal or Vegetable Fats	0.0896	0.4944	0.2591	Non	Non	non	Non	non	Non
Prepared Foodstuffs; Beverages	0.2248	0.4733	0.3675	0.0027	0.3013	0.1667	0.0043	0.0635	0.0259
Mineral Products	0.4384	0.9505	0.6880	Non	Non	non	0.0037	0.4201	0.0896
Products of the Chemicals	0.1575	0.5583	0.3343	0.0267	0.4259	0.1809	0.0026	0.6959	0.1991
Plastics and Articles thereof	Non	non	non	0.0031	0.4958	0.1251	0.0009	0.5096	0.2027
Raw Hides and Skins, Leather	0.0279	0.5584	0.2085	0.0562	0.4134	0.2133	Non	non	Non
Wood and Articles of Wood	0.1806	0.6322	0.3141	0.1079	0.3462	0.1879	0.0358	0.6410	0.2488
Pulp of wood and Fibrous	0.1362	0.6047	0.2538	0.0453	0.3320	0.1627	0.0007	0.9193	0.4635
Textile and Textile Articles	0.2032	0.4132	0.3154	0.1279	0.2516	0.1993	0.0229	0.6934	0.2251
Footwear, Headgear, Umbrellas	0.0827	0.3324	0.1960	0.1093	0.3556	0.2056	0.0047	0.8604	0.3121
Articles of Stone, Plaster, Cement	0.0129	0.5212	0.2298	0.0991	0.2758	0.1745	0.0063	0.2549	0.0842
Natural Precious Stones	0.0417	0.8144	0.2756	0.0011	0.2169	0.0962	Non	non	Non
Base Metals and Articles of Base Metal	0.1265	0.4941	0.2969	0.2846	0.4321	0.3719	0.1129	0.6761	0.3499
FINAL PRODUCTS	**0.2791**	**0.4283**	**0.3238**	**0.0679**	**0.2722**	**0.1640**	**0.0391**	**0.2733**	**0.1549**

with EU was purely IIT, while both Ghana and Cote d'Ivoire has low IIT. For the trade in wood and articles of wood sector and textile and textile articles sector and articles of stone, plaster, cement sector, Cote d'Ivoire has highest IIT with EU, similarly Nigeria IIT with EU in the two products were higher than that of Ghana. Nigeria has highest IIT with EU in pulp of wood and fibrous sector and base metals and articles of base metal sector,

IIT in intermediate products between the selected ECOWAS countries was earlier presented. A descriptive summary is shown in Table 5.11 in a bid to make comparison among the countries. General remarks about IIT in intermediate products between the selected countries and EU are that Cote d'Ivoire has highest magnitude of IIT than Nigeria and Ghana in five sectors. The sectors include vegetable products, mineral products, plastics and articles thereof, pulp of wood and fibrous and textile and textile articles. Also, Ghana has the highest IIT in intermediate products with EU in five of the industries and they include animals; animal products, animal or vegetable fats, prepared, foodstuffs; beverages, products of the chemical and wood and articles of wood. In the case of Nigeria, she only led the other countries in three sectors. They are raw hides and skins, leather, base metals and articles of base metal and articles of stone, plaster, cement. None of the three countries has IIT in Natural precious stones and footwear, headgear, umbrellas

Table 5.11. Descriptive Comparison of IIT in Intermediate Products among the Selected ECOWAS Countries

	Cote d'Ivoire			Ghana			Nigeria		
Harmonized System Code List	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Animals; Animal Products	Non	Non	Non	0.0001	0.6375	0.2191	0.0036	0.5227	0.2050
Vegetable Products	0.2414	0.6057	0.4671	0.1225	0.3248	0.2188	0.0036	0.1259	0.0371
Animal or Vegetable Fats	0.1244	0.4816	0.3008	0.1316	0.5900	0.3765	0.0243	0.2678	0.1321
Prepared Foodstuffs; Beverages	0.1224	0.2925	0.1842	0.0065	0.4871	0.2751	0.0173	0.4976	0.2022
Mineral Products	0.1364	0.4847	0.2553	0.0316	0.4949	0.1930	0.0605	0.3930	0.1919
Products of the Chemicals	0.1020	0.3582	0.2050	0.0887	0.5990	0.2784	0.0110	0.3853	0.0540
Plastics and Articles thereof	0.2325	0.4767	0.3185	0.0881	0.4519	0.2404	0.0824	0.1566	0.1283
Raw Hides and Skins, Leather	Non	Non	Non	Non	Non	Non	0.0603	0.4445	0.1971
Wood and Articles of Wood	0.1418	0.4916	0.2668	0.0439	0.6056	0.2758	0.0704	0.7767	0.2504
Pulp of wood and Fibrous	0.1822	0.6434	0.4025	0.0012	0.4676	0.1212	0.0041	0.7104	0.1456
Textile and Textile Articles	0.1392	0.4719	0.2908	0.0950	0.4747	0.2220	0.0890	0.2722	0.1718
Footwear, Headgear, Umbrellas	Non	Non	Non	Non	Non	Non	Non	non	Non
Articles of Stone, Plaster, Cement	0.0733	0.4887	0.2275	0.0645	0.8170	0.3203	0.0179	0.7919	0.4518
Natural Precious Stones	Non	Non	Non	Non	Non	Non	Non	non	Non
Base Metals and Articles of Base Metal	0.1910	0.4900	0.3127	0.0769	0.4464	0.2385	0.3644	0.5356	0.4295
INTERNEDIATE PRODUCTS	**0.1418**	**0.2616**	**0.2154**	**0.0638**	**0.2553**	**0.1986**	**0.0882**	**0.3370**	**0.1731**

5.2.2 Presentation of Empirical Results

5.2.2.1 Determinants of IIT in Final Products between ECOWAS and EU

This sub-section presents the result of the determinants of IIT in final products. The gravity model for the determinants of final IIT was estimated for four different data sets. The first is the panel of three ECOWAS countries selected for this study, that is, Nigeria, Ghana and Cote d'Ivoire. The other three estimations are sectoral panels for each of the three selected ECOWAS countries. Two methods of analysis were used: panel data analysis and fractional logit model of estimation for purpose of comparisons.

Comparing the two methods of analysis, shows that the fractional logit model of analysis, specially designed for models whose dependent variables are bounded by zero and one, has more of its independent variable significant than the panel data analysis. This attests to the superiority of the fractional logit model of analysis over panel data analysis. Therefore, the result of the estimated fractional logit model is interpreted. Two panel fractional logit models were estimated. The first is the pool fractional logit model and other is the fixed effect fractional logit model. Moreover, the significant L-M values 23.3 showed that the fixed effect fractional logit model is preferred and thus interpreted. With regards to the fixed effect model for ECOWAS, the independent variables explain over 58.5 per cent of the movement of the dependent variable as indicated by the coefficient of determination. Similarly, the F-statistics attest to the joint significance of the model.

The empirical results of the determinants of IIT estimated with a panel gravity model. The result of the model reveals that all the explanatory variables except relative market size had their hypothesised signs. Moreover, the factor endowment and relative market size of ECOWAS and EU have insignificant effect on final intra-industry in ECOWAS. However, product differentiation, income distribution, weighted distance between ECOWAS and EU, FDI, Real effective exchange rate and average tariff

Table 5.12: Regression Results of the Determinants of IIT in Final Products in ECOWAS

	PANEL DATA ANALYSIS			PANEL FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Pool Panel**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	7.0083*** (0.54)	0.4824 (0.11)	3.8698*** (9.43)	0.3060* (2.19)	-16.368 (-0.06)
PRODDIFF	-0.0144 (-1.14)	-0.0163* (-2.00)	0.0030 (0.18)	-0.0014* (-2.76)	0.3540*** (6.32)
DIFFPC	-13.6796*** (3.47)	4.1699 (0.15)	1.7678*** (20.23)	0.1306 (0.51)	0.0994*** (7.91)
AVEP	4.2361** (-2.79)	3.6000 (1.09)	0.7045*** (8.37)	0.2828** (2.87)	12.8248 (0.06)
EXCH	0.0065 (3.76)	0.3735 (0.97)	-0.8056 (-6.82)	0.0503* (2.21)	-0.0392*** (-5.27)
DISTANCE	0.1188 (1.25)	1.2110 (1.09)	-0.6727 (-4.01)	0.0260 (1.57)	-0.0289* (-2.29)
TARIFF	-0.0429 (0.70)	-0.1765* (-1.86)	-0.0149 (-0.99)	0.0134** (2.99)	-0.0068* (-1.74)
FDI	0.0031 (1.25)	0.0934 (1.05)	0.0128** (2.05)	0.0298*** (3.15)	0.1112*** (2.51)
CONSTANT	-76.1167** (-1.83)	-27.7893 (-0.59)	-42.6192*** (-10.77)	-364.4207 (-0.29)	12.0822 (0.00)
R-SQUARED	0.9077	0.8625	0.8296	0.6992	0.5853
F-TEST	29.5	17.25		12.2	14.1
LAG. MULTIPLIER	21.1			23.3	
HAUSMAN-TEST		2.65		-	

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**
Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

between ECOWAS and EU all have positive significant impact on IIT in final products in ECOWAS. Product differentiation exerts positive and significant effect on IIT between ECOWAS and the EU. It shows that a 1 per cent increase in products differentiation is capable of increasing IIT between ECOWAS and EU by 35 per cent. As regards the income distribution between ECOWAS and EU, measured by the differences in per capita between the two regions, it exerts positive significant impact on IIT between the two regions. Moreover, the result further shows that 1 per cent increase in income distribution increases IIT between ECOWAS and EU. The impact of real effective exchange rate, on ECOWAS IIT with EU is negative but significant. A 1 per cent increase in exchange rate reduces IIT by 3.9 per cent. Negative significant effect is equally exerted by weighted distance between ECOWAS and EU on IIT between the two regions. Also, trade tariff also exerts negative but significant impact on IIT between ECOWAS and EU. A 10 per cent change in tariff will causes a 6 per cent change in IIT between ECOWAS and EU. Also, a unit change in FDI will increase IIT by 11.1%.

5.2.2.2 Determinants of IIT in Final Products between Nigeria and EU

Concerning the individual selected ECOWAS countries, the empirical results of the determinants of IIT between Nigeria and the EU is shown in Table 5.13. The Table shows the results of the panel data analysis and the panel fractional logit model. The application of the fractional logit model to the panel data shows better results than the panel data analysis. With the 18.7 value of Lagrange Multiplier test, the fixed effect fractional logit panel result is better than the pool FLRM. The independent variables included in the model are able to explain the variation in final IIT in Nigeria by 71 per cent. Information on the Table shows that only the real effective exchange rate does not have the expected sign.

Positive significant impact is exerted by relative market size, FDI, product differentiation, real effective exchange rate, and the weighted distance on IIT in final products. Meanwhile, the impact of income distribution, factor endowment and tariff on IIT between Ghana and EU were insignificant.

Table 5.13. Regression Results of the Determinants of IIT in Final Products in Nigeria

	PANEL DATA ANALYSIS			PANEL FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	-1.1723 (-0.90)	-0.8410 (-0.76)	-0.9163 (-0.82)	1.3698*** (19.14)	0.7459*** (14.41)
PRODDIFF	0.0328* (2.53)	0.0204* (1.79)	0.0233* (2.06)	-0.0023 (-1.61)	0.0028** (3.26)
DIFFPC	2.1551* (1.77)	1.7949 (1.74)	1.8814 (1.81)	-0.6618*** (-5.50)	11.0420 (0.70)
AVEP	-0.6778 (-1.34)	-0.6678 (-1.55)	-0.6694 (-1.54)	-30.7797*** (-3.93)	-3.9820 (-0.62)
EXCH	1.1405* (1.99)	1.0363 (2.13)	1.0587* (2.15)	-9.9900* (-2.61)	0.2382*** (7.02)
DISTANCE	0.5600 (0.68)	0.4599 (0.66)	0 .4811 (0.68)	27.6059** (3.26)	-0.5454*** (-19.14)
TARIFF	-0.1692 (-1.79)*	-0.1632 (-0.54)	-0.1845 (-1.23)	-0.0047 (-0.45)	-0.2887 (-0.06)
FDI	0.0012 (0.25)	0.3421 (0.51)	0.1210** (1.97)	0.1210** (4.15)	0.1219*** (2.45)
CONSTANT	7.7874 (0.77)	6.1257 (0.71)	6.5043 (0.75)	-9.6412 (-13.90)	19.3130 (0.15)
R-SQUARED	0.6599	0.8064	0.7059	0.8272	0.7104
F-TEST	4.56	4.20		7.34	6.75
LANG. MULTIPLIER	18.9			18.7	
HAUSMAN-TEST		5.42		-	

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

In consistence with a priori expectation, factor endowment has positive significant impact on IIT between Nigeria and EU. A 1 per cent increase in factor endowment exerts 74 per cent increase in IIT between Nigeria and EU. In addition, IIT will increase by 12.1% if there is a unit increase in FDI. Positive significant effect was also exerted by product differentiation on Nigeria IIT with EU, such that a 10 per cent increase in product differentiation produces a 2 per cent increase in Nigeria IIT with EU. Although real effective exchange rate has an unexpected sign, its impact on Nigeria IIT is significant. 1 per cent increase in real effective exchange rate causes IIT between Nigeria and EU to increase by 23 per cent. Consistent with the hypothesised sign, negative significant impact is exerted by weighted distance on IIT between Nigeria and EU.

5.2.2.3 Determinants of IIT in Final Products between Ghana and EU

The gravity estimation results for Ghana examining the determinants of IIT between Ghana and EU is shows in Table 5.14. The Table expresses the results of the panel data analysis and the application of fractional logit model on panel data.

Most of the variables in the estimated result using the panel data analysis are not significant compared to the panel fractional logit regression. This implies that the panel FLRM is a better estimator of the intra-industry model. Choosing between the pool FLRM and the fixed effect fractional logit model the Lagrange Multiplier test comes handy. The 19.2 LM – test shows that the fixed effect FRLM is better and thus interpreted. Only weighted distance and real effective exchange rate do not follow the hypothesised sign. Moreover, relative market size, income distribution, factor endowment, products differentiation and weighted distance all have significant impact on Ghana's IIT in final products.

The positive significant effect of factor endowment implies that 1 per cent increase in it will lead to 270 per cent increase in IIT between Ghana and EU. Also, a 1 per cent increase in product differentiation is capable of asserting 13 per cent increase in IIT between Ghana and EU. Income distribution has a very strong impact on IIT between

Table 5.14: Regression Results of the Determinants of IIT in Final Products in Ghana

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	0.4198* (1.31)	0.5214 (2.11)	0.4949 (2.03)	3.4860 (0.81)	2.7005*** (2.40)
PRODDIFF	0.0150* (2.40)	0 .0013 (0.22)	0.0033 (0.56)	0.0013 (0.81)	0.1307** (2.20)
DIFFPC	0.4107 (1.63)	0 .2177 (1.08)	0.2568 (1.30)	0.1899** (2.88)	12.3146*** (3.79)
AVEP	0.0400 (0.18)	-0.1065 (-0.62)	-0.0896* (-0.52)	6.3171* (1.78)	11.3435*** (4.10)
EXCH	0.0197 (0.72)	0.0035 (1.78)	1.0448*** (20.83)	2.7007** (2.40)	0.1899 (2.88)
DISTANCE	0 .1936 (0.72)	0 .2820 (1.38)	0.2721 (1.34)	6.3171 (1.78)	0.7286*** (20.83)
TARIFF	-0.0064 (-0.07)	-0.1264 (-0.62)	-0.0699 (-0.46)	0.0233 (0.99)	-0.0431 (-0.04)
FDI	0.2110 (1.25)	0.4121 (1.35)	0.1021** (2.10)	0.1039** (1.92)	0.2918*** (2.33)
CONSTANT	-6.6914* (-1.94)	-5.2264 (-1.96)	-5.3741 (-2.03)	7.0204*** (9.84)	-50.8501 (-0.49)
R-SQUARED	0.6193	0.5755	0.5748	0.5677	0.6774
F-TEST	16.73	28.01		21.1	23.7
LANG. MULTIPLIER	23.1			19.2	
HAUSMAN-TEST		9.74			

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

Ghana and EU, specifically; a 1 per cent change in the income distribution is capable of producing 1231 per cent change in IIT between Ghana and EU.

The relative market size is another major factor that has serious impact on IIT between Ghana and EU, such that a 1 per cent increase in relative market size between Ghana and EU produces 1134 per cent in Ghana-EU IIT. The weighted distance between Ghana and EU has unexpected positive significant effect on IIT between them.

5.2.2.4 Determinants of IIT in Final Products between Cote d'Ivoire and EU

As regards Cote d'Ivoire, the gravity results of the determinants of IIT between Cote d'Ivoire and EU in final products is presented in Table 5.15. Contained in the table are the estimated panel data analysis and the panel fractional logit regression model. The fact that majority of the variables are not significant in the panel data analysis informed the choice of the panel fractional logit regression model. Moreover, the fixed effect FLRM is preferred over the pool FLRM based on the high LM test of 17.9. Although, only income distribution, real effective exchange rate and weighted distance do not have the expected hypothesised sign, majority of the explanatory variables have statistically insignificant impact on Cote d'Ivoire IIT with EU in final products. Specifically, the impact of relative market size FDI and product differentiation on Cote d'Ivoire IITs with EU on the final products is positively significant.

Despite the fact that only, three variables have significant impact on IIT between Cote d'Ivoire and EU, the impact of factor endowment is very substantial, a 1 per cent increase in factor endowment will cause 201 per cent increase in IIT between Cote d'Ivoire and EU. FDI turned out to be an important determinant of IIT as 191% increase will occur in IIT if it increases by 1%. Product differentiation equally promotes IIT between Cote d'Ivoire and EU, 10 per cent increase in product differentiation is capable of increasing IIT between Cote d'Ivoire and EU.

Table 5.15: Regression Results of the Determinants of IIT in Final Products in Cote d'Ivoire

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	-2.3737 (-1.54)	-1.3411 (-1.02)	-1.6736 (-1.27)	-0.0087 (-1.54)	2.0109*** (15.82)
PRODDIFF	0.0444 (2.97)	-0.0067 (-0.37)	0.0097 (0.58)	0 .0022* (2.46)	0.0061** (1.17)
DIFFPC	0.8604 (2.61)	0.7115 (2.56)	0.7595** (2.71)	0.1037 (5.73)	-0.1309 (-2.71)
AVEP	0.2712 (0.85)	0.2583 (0.97)	0.2624 (0.98)	-0.0409* (-2.16)	0.1004 (2.19)
EXCH	0.3027 (0.68)	0.5020 (1.28)	0.4669 (1.23)	-0.0679* (-2.59)	0.1334 (2.08)
DISTANCE	0.7466 (1.17)	-.3161 (-0.23)	0.3605 (0.55)	0.3425*** (15.82)	0.0160 (2.77)
TARIFF	-0.0132 (-0.26)	-0.1803 (-0.58)	-0.0465 (-0.47)	0.0011 (0.37)	-0.0297 -4.20
FDI	0.1231 (0.01)	0.2145 (0.85)	0.2189 (0.19)	0.0123** (3.92)	1.9101*** (4.03)
CONSTANT	14.6526 (0.99)	7.8097 (0.60)	8.9734 (0.71)	9.2861 (43.64)	40.4522 (0.14)
R-SQUARED	0.8916	0.6964	0.7891	0.7240	0.5027
F-TEST	3.83	3.60		18.9	21.2
LANG. MULTIPLIER	21.5			17.9	
HAUSMAN-TEST		5.95		-	

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

5.2.2.5 Determinants of IIT in Intermediate Products between ECOWAS and EU

An addition of inward FDI and capital – labour ratio are added to the gravity model estimated for the determinants of IIT in final products to reflect the peculiarity of IIT in intermediate products. The result of the determinants of IIT in intermediate products is shown in this sub-section. Just as in the case of IIT in final products, the gravity model was used to examine the determinants of IIT in intermediate product for four different data sets using the panel data analysis and the application of fractional logit model to

panel data. The panel data sets include include ECOWAS, and each of the ECOWAS countries selected for this study, that is, Nigeria, Ghana, and Cote d'Ivoire.

The estimated gravity result for the determinants of IIT between ECOWAS and EU in intermediate products is shown in Table 5.16. The panel FLRM is preferred to the classical panel data analysis, this is because the panel FLRM produces better results. Reporting the panel fractional logit model, the researcher chose the fixed effect model of the FLRM, based on the 23.2 Lagrange Multiplier test, all the independent variables follow the hypothesised signs with the exception of foreign direct investment and trade tariff. The explanatory variables are able explain the variation in the intermediate IIT by 71.8 per cent. Market size differences, product differentiation, and exchange rate have positive significant impact of IIT in intermediate product between ECOWAS and EU. However, though weighted distance and foreign direct investment have significant effect on IIT in intermediate product. On the other hand, relative income distribution, factor endowment, capital-labour ratio, and tariff have insignificant impact on IIT in intermediate product.

Factor endowment is one of the major factors that drive IIT between ECOWAS and EU. A 1 per cent increase in factor endowment is capable of increasing the IIT between by 259 per cent. Product differentiation is another factor that has positive impact on IIT between ECOWAS and EU. The result shows that 22 per cent increase in IIT in intermediate products between ECOWAS and EU improved product differentiation by a 1 per cent.

Table 5.16: Regression Results of the Determinants of IIT in Intermediate Products in ECOWAS

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	0.1166 (0.54)	0.1797 (1.09)	0.1166 (0.54)	4.4627* (2.81)	2.5920** (2.50)
PRODDIFF	-0.0079 (-1.14)	0.0031 (0.49)	-0.0079 (-1.14)	0.0479 (0.79)	0.2266** (2.61)
DIFFPC	0.6139** (3.47)	0.6206*** (4.47)	1.0443** (3.47)	-0.8891 (-0.47)	1.9199 (1.47)
AVEP	-0.4094* (-2.79)	-0.0379 (-0.26)	-0.4094** (-2.79)	-0.7853 (-0.54)	0.9754 (0.97)
EXCH	0.6902** (3.76)	0.4995* (3.39)	0.6902*** (3.76)	1.0542 (0.53)	0.0920** (2.50)
DISTANCE	-0.1724 (-1.25)	-0.3309* (-2.69)	-0.1724 (-1.25)	-2.5673** (-2.35)	-3.0869*** (-4.22)
CLR	0.0333* (2.21)	0.0353** (2.07)	0.0333 (2.21)	-0.2428* (-1.83)	0.1190 (0.92)
FDI	0.0237 (0.97)	-0.0650** (-2.29)	0.0237 (0.97)	1.7418 (0.97)	-3.1956* (-2.29)
TARIFF	0.0485 (0.70)	-0.0485 (-0.78)	0.0485 (0.70)	1.4408** (2.81)	0.0242 (0.06)
CONSTANT	-5.2746 (-1.83)	-8.9300** (-3.77)	-5.2746* (-1.83)	-50.4780 (-0.23)	-66.7874 (-0.29)
ADJ. R-SQUARED	0.7802	0.8992	0.8170	0.8026	0.7187
F-TEST	12.36	17.84		18.9	19.2
LANG. MULTIPLIER	22.3			23.2	
HAUSMAN		8.99		-	

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS

Although, the impact of real effective exchange rate on IIT between ECOWAS and EU does not follow the hypothesised sign, the impact is however significant. The result shows that 1 per cent depreciation in real effective exchange rate could cause 9 per cent increase in IIT between ECOWAS and EU.

As expected, the negative impact of weighted distance on IIT between ECOWAS and EU implies that a 1 per cent increase in weighted distance causes IIT between the two regions to decline by 308 per cent. It unexpected that inflow of IIT could cause IIT to decline, however, a 1 per cent increase in inflow of FDI to ECOWAS causes IIT to decline between the two regions.

5.2.2.6 Determinants of IIT in Intermediate Products between Nigeria and EU

The estimated gravity result of the determinants of IIT in intermediate products between Nigeria and EU is shown in Table 5.17. The Table contains the classical panel data analysis and the application of fractional logit regression model. None of the independent variables in the classical panel data was significant; this informed the choice of the panel FLRM, which has better results. The fixed effect fractional logit regression model is interpreted as is preferred to the pool FLRM based on the Lagrange Multiplier test result. About 65.2 per cent change in the IIT in intermediate products was explained by the explanatory variables. All the independent variables followed the a prior expectation exert factor endowment and trade tariff. Only relative market size and tariff have insignificant impact on IIT in intermediate products.

Specifically, product differentiation, relative income distribution, capital-labour ratio, and foreign direct investment have positive significant impact on IIT in intermediate products between Nigeria and EU. Conversely, factor endowment, weighted distance and real effective exchange rate exert negative significant impact on IIT in intermediate products between Nigeria and EU.

Table 5.17: Regression Results of the Determinants of IIT in Intermediate Products in Nigeria

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	0.2920 (0.15)	0.5658 (0.45)	0.4279 (0.34)	0 .0471 (0.32)	0.0006 (0.15)
PRODDIFF	0.0076 (0.78)	0.0087 (1.22)	0.0085 (1.20)	0 .0017** (3.38)	0.0014** (3.29)
DIFFPC	0.3280 (0.25)	0 .3574 (0.41)	0.3531 (0.41)	0.4669*** (9.76)	0.4788*** 10.40
AVEP	-0.6494 (-0.85)	-0.5257 (-1.05)	-0.5846 (-1.18)	-0.3112*** (-13.15)	-0.3125*** (-13.72)
EXCH	-0.2975 (-0.59)	0 .3000 (0.92)	-0.3009 (-0.93)	0 .0673** (2.85)	-0.0680*** (-2.95)
DISTANCE	-0.2509 (-0.26)	-0.0870 (-0.14)	-0.1662 (-0.27)	-0.4194*** (-16.02)	-0.4172*** (-16.37)
CLR	-0.0030 (-0.01)	0 .0313 (0.11)	0.0158 (0.05)	0 .0480* (2.21)	0.0540* (2.56)
FDI	0.0633 (0.21)	0. 0111 (0.06)	0.0362 (0.19)	0.1270*** (15.18)	0.1262*** (15.49)
TARIFF	0 .1598 (2.17)	-0.1017 (-0.55)	0.0169 (0.12)	0 .0284* (2.08)	0.0038 (1.08)
CONSTANT	1.0560 (0.05)	-2.3245 (-0.18)	-0.6815 (-0.05)	9.7754 (33.07)	9.7647 (34.06)
R-SQUARED	0.7381	0.6268	0.6247	0.7142	0.6526
F-TEST	4.24	9.18		17.1	21.1
LANG. MULTIPLIER	19.8			18.8	
HAUSMAN		7.34		-	

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

The product differentiation's impact on Nigeria's IIT with the EU indicated that 10 per cent increase in it produces 14 per cent increase in IIT in intermediate products between Nigeria and EU. In the case of relative income classes, its impact on Nigeria's IIT with EU shows that 1 per cent increase in income distribution cause 47 per cent increase in IIT between Nigeria and EU. Though positive impact is expected to be exerted by relative market size on IIT, negative impact was reported, the result show that 1 per cent increase in relative market size will lead to a decrease of 31 per cent in IIT between Nigeria and EU. As expected, weighted distance reduces IIT between Nigeria and EU. Specifically, a unit increase in the weighted distance causes a decrease of 41 per cent in IIT between Nigeria and EU. Capital – labour ratio promotes IIT between Nigeria and EU. A 1 per cent increase in capital – labour ratio will increase IIT by 5 per cent. Also, as expected the impact of inflow of FDI promotes IIT between Nigeria and EU. A 1 per cent increase in the inflow of FDI increases IIT by 12 per cent.

5.2.2.7 Determinants of IIT in Intermediate Products between Ghana and EU

As regards the gravity model for the determinants of IIT between Ghana and EU, the estimated result is shown in Table 5.18. The panel FLRM produced preferred results compared to the classical panel data analysis. Also, the panel fixed effect fractional logit regression model is interpreted as suggested by the Lagrange Multiplier test result of 17.5. Tariff is the only explanatory variable that does not follow the hypothesised signs. Positive significant impact is exerted by relative market size and income distribution. However, the impact of weighted distance and capital-labour ratio on IIT in intermediate product is significant but negative. The implication of the result is that a 1 per cent increase in factor endowment increases IIT between Ghana and EU in intermediate products. The impact of income distribution is not really much on IIT between Ghana and EU in intermediate products. Precisely, a 1 per cent increase in the income distribution promotes IIT by 25 per cent. In a similar vein, a 1 per cent increase in relative market size causes IIT between Ghana and EU to increase by 28 per cent. Distance reduces IIT. 1 per cent increase in weighted distance reduces IIT by 41 per cent.

Table 5.18: Regression Results of the Determinants of IIT in Intermediate Products in Ghana

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	0.2647 (0.26)	0.2150 (0.23)	0.2536 (0.27)	1.7620 (0.10)	0.9119*** (5.27)
PRODDIFF	0.0065 (0.58)	0.0041 (0.32)	0.0037 (0.31)	0.03478 (0.19)	0.0014 (3.29)
DIFFPC	1.1094 (1.27)	1.0638 (1.31)	1.0734 (1.32)	-0.0257** (-2.96)	0.2596* (1.61)
AVEP	0.2414 (0.44)	0.1980 (0.38)	0.2041 (0.39)	0.5927*** (10.82)	0.2830** (2.89)
EXCH	-2.8094 (-3.13)	0.8160*** (10.82)	-0.0982 (-12.79)	-0.0762 (-9.45)	-0.0006 (-0.15)
DISTANCE	0.2153 (0.45)	-0.2599 (-0.58)	0.2451 (0.54)	-0.1310 (-0.08)	-0.4172*** (-16.37)
CLR	0.0264 (0.26)	0.0255 (0.27)	0.0255 (0.27)	0.1993*** (5.27)	-0.0439** (-2.33)
FDI	0.2153 (0.45)	-0.0773 (-0.74)	-0.0762 (-0.72)	-0.4356 (-0.23)	0.0191 (0.90)
TARIFF	-0.0348 (-0.30)	-0.4279** (-2.19)	-0.1748 (-1.20)	5.7270*** (9.00)	0.004 (0.19)
CONSTANT	-9.8368 (-1.05)	-8.2810 (-0.95)	-9.0437 (-1.03)	-65.0758 (-0.42)	-15.2482 (-0.05)
R-SQUARED	0.6030	0.7179	0.6065	0.7999	0.6526
F-TEST		3.90		19.2	22.7
LANG. MULTIPLIER	18.7			17.5	
HAUSMAN		2.89			

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

Lastly, as against theoretical expectation, capital-labour ratio reduces IIT, such that a 1 per cent increase in capital-labour ratio reduces IIT between Ghana and EU in intermediate products.

5.2.2.8 Determinants of IIT in Intermediate Products between Cote d'Ivoire and EU

The result of the gravity model estimated for the determinants of IIT between Cote d'Ivoire and EU is shown in Table 5.19. Both classical panel data and panel application of FLRM are experimented. The researcher chose the estimation of panel FLRM over the classical panel data analysis since the estimated result is better. Moreover, the fixed effect panel FLRM is interpreted based to the Lagrange Multiplier test. The result shows that all the explanatory variables follow the hypothesised signs. Further, the result indicates that relative market size, product differentiation, and income distribution have positive significant effect on IIT in intermediate products. Although the real effective exchange rate has significant effect on IIT in intermediate products between Cote d'Ivoire and EU, the impact is however insignificant.

It must be noted that few determinants of IIT between Cote d'Ivoire and EU were significant, as compared with the cases of Nigeria and Ghana. Factor endowment is the major factor that promotes IIT in intermediate products between Cote d'Ivoire and EU. The result shows that a 1 per cent increase in factor endowment promotes IIT between Cote d'Ivoire and EU in intermediate products by 549 per cent. As regards products differentiation, 8 per cent increase in IIT in intermediate products is caused by a 10 per cent increase in products differentiation. The dividing income class is another major determinant of IIT between Cote d'Ivoire and EU in intermediate products. The impact of the factor is such that, a 1 per cent increase in it causes IIT between Cote d'Ivoire and EU in intermediate products to increase by 155 per cent.

As expected, the real effective exchange rate reduces IIT in intermediate products between Cote d'Ivoire and EU. A unit change in real effective exchange rate causes IIT between Cote d'Ivoire and EU to decline by 59 per cent.

Table 5.19. Regression Results of the Determinants of IIT in Intermediate Products in Cote d'Ivoire

	PANEL DATA ANALYSIS			FRACTIONAL LOGIT MODEL	
	Pool Panel	**Fixed Effect**	**Random Effect**	**Pool Fractional Logit Model**	**Fixed Effect FLRM**
DIFFGDP	-2.1441 (-0.56)	-2.5194 (-0.87)	-2.4253 (-0.84)	-0.0011 (-0.56)	5.4997*** (12.20)
PRODDIFF	-0.0517 (-2.14)**	0.0082 (0.31)	-0.0028 (-0.11)	0.0004 (0.76)	0.0088* (2.12)
DIFFPC	-0.5035 (-0.54)	0.1588 (0.22)	0.0374 (0.05)	-0.0986*** (-5.10)	1.5588*** (18.43)
AVEP	-0.1588 (-0.30)	-0.0530 (-0.13)	-0.0750 (-0.18)	-0.0395** (-3.36)	0.4951 (6.04)
EXCH	0.4588 (0.65)	-0.0506 (-0.09)	0.0215 (0.04)	0.0117 (0.73)	-0.5917*** (-5.37)
DISTANCE	1.7715* (1.72)	2.1503 (1.17)	1.7654 (1.74)	0.2284 (17.40)	-0.9974 (-6.33)
CLR	-0.0510 (-0.89)	-0.0598 (-1.37)	-0.0580 (-1.34)	-0.0105*** (-11.25)	0.0536 (6.12)
FDI	0.2892 (0.57)	0.0507 (0.13)	0.0935 (0.24)	0.0963 (12.20)	0.0102** (3.76)
TARIFF	0.0574 (0.74)	0.0988 (0.24)	0.0175 (0.11)	-0.0003 (-0.21)	-0.0102 (-0.76)
CONSTANT	18.0793 (0.49)	19.6829 (0.70)	20.1385 (0.73)	9.4975 (74.44)	-55.4122 (-13.58)
R-SQUARED	0.5086	0.6550	0.6534	0.8521	0.8443
F-TEST		2.45		21.2	19.2
LANG. MULTIPLIER	22.3			19.9	
HAUSMAN		9.20			

*****, **, and * denote the significance at the 1%, 5%, and 10%, respectively.**

Source: Author's computation: underlying annual data from World Development Indicators (WDI) and World Trade Indicators (WITS)

5.3 Discussion of the Results

This sub-section embarks on more intuitive discussion of findings from the results presented in the previous sub-section; this is with view to discuss the results in relation to theoretical expectation. Efforts will also be made to compare the findings in this study to empirical results obtained by previous studies. This discussion will be made in line with the objectives set for this study. This study set out to achieve three objectives: to examine the extent of IIT between ECOWAS and EU in final and intermediate products. The second is to analyse the determinants of IIT between ECOWAS and EU in final products. Finally, the determinants of IIT between ECOWAS and EU in intermediate products were equally examined. It will be recalled that three ECOWAS countries: Cote d'Ivoire, Ghana and Nigeria were selected for this study.

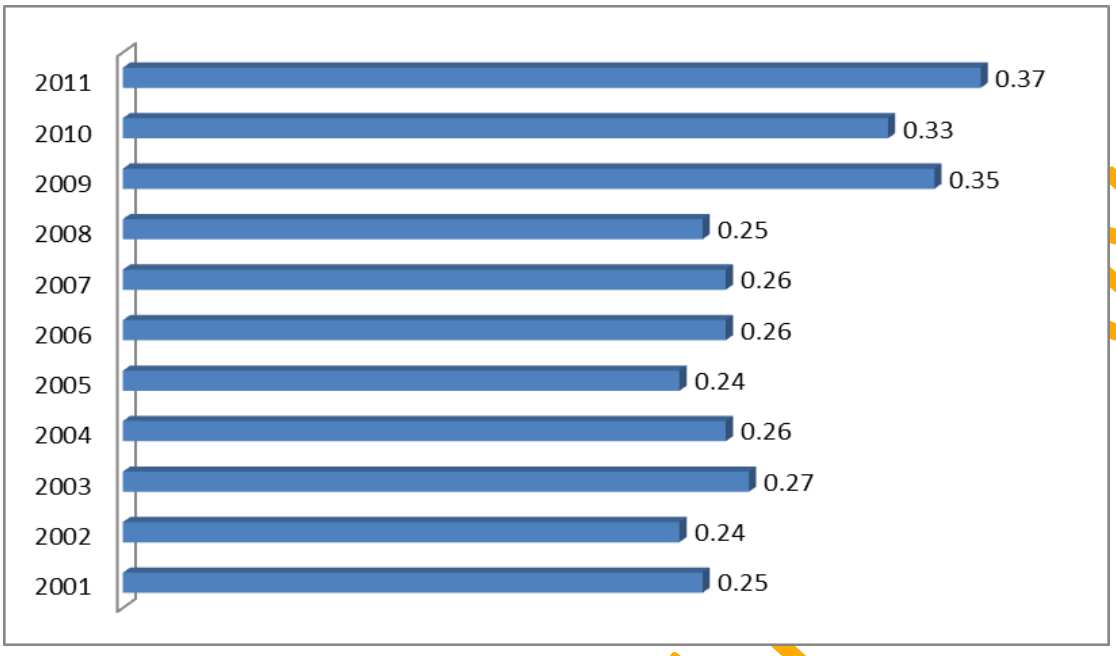
5.3.1 Extent of IIT in Final Products between Selected ECOWAS Countries and EU (First Objective)

In order to achieve objective 1 of this study, the extent of IIT in final goods between the selected ECOWAS countries and EU as a group is analysed in this section. The calculated unadjusted IIT in final products between ECOWAS and EU is presented in Tables 5.5 to 5.8 and discussed thus.

(i) Analysis of IIT in Final Products between Cote d'Ivoire and EU

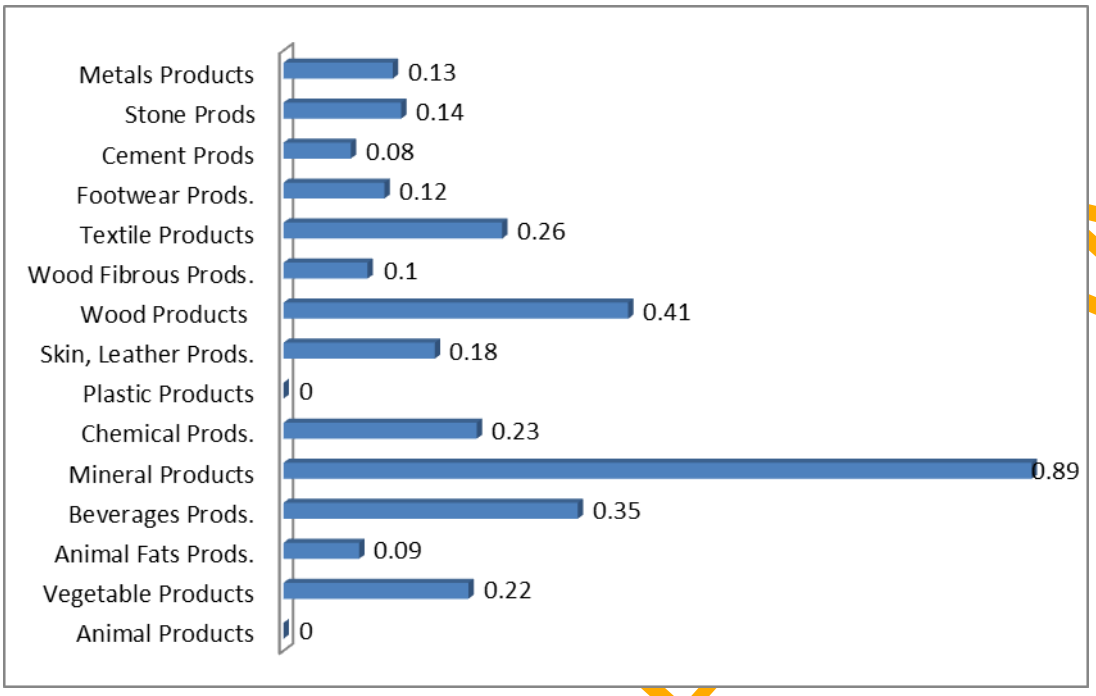
Starting with Cote d'Ivoire, the number of products in which the country has IIT in final products with EU stood at 117 in 2011 as shown in Table 5.5. Moreover, Cote d'Ivoire IIT in final product with EU ranged from 0.2465 in 2001 to 0.3712 in 2011. The implication of this is that in 2001, 24.6 per cent of the final products Cote d'Ivoire's had IIT with EU were in favour of Cote d'Ivoire, while the rest 75.4 per cent was in favour of the EU. There was consistent increase in IIT between Cote d'Ivoire and EU between 2001 and 2011. This further implies that in 2011, the IIT between Cote d'Ivoire and EU was 37.1 per cent in favour of Cote d'Ivoire. This trend is consistent with earlier studies such as Liao (2006) recorded increasing IIT between North and South for average of all products.

Figure 5.1: Trends of Cote d'Ivoire IIT with EU in Final Products (2001 to 2011)



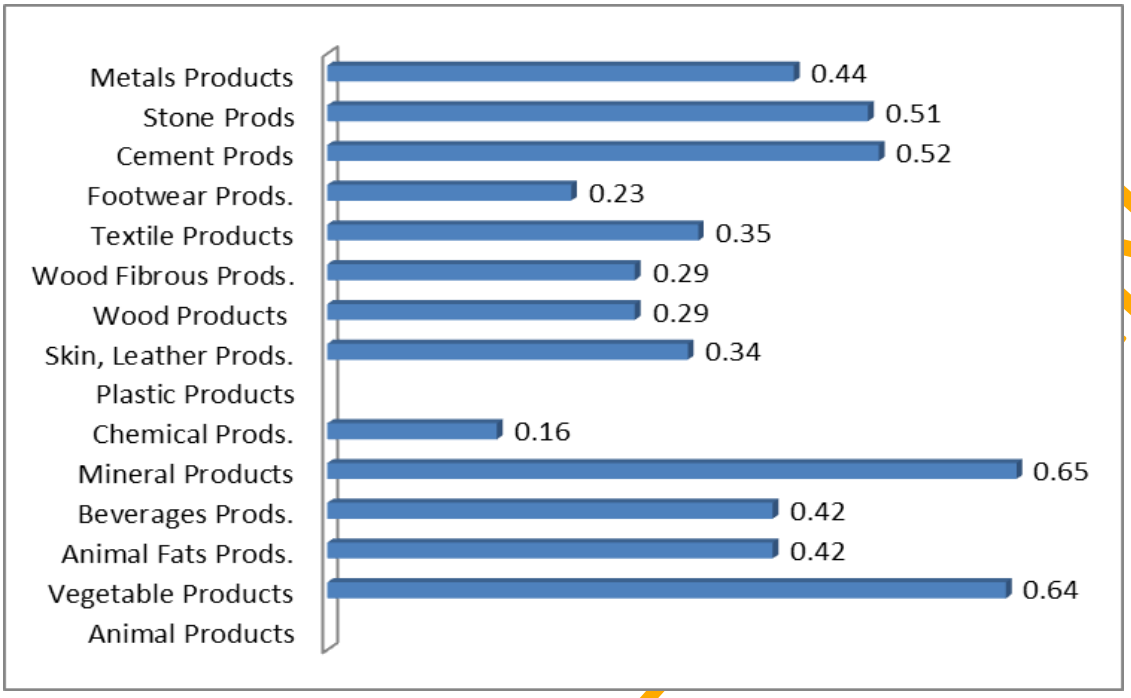
Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.2 Industrial Composition of Cote d'Ivoire IIT with EU in Final Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.3 Industrial Composition of Cote d'Ivoire IIT with EU in Final Products 2011



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

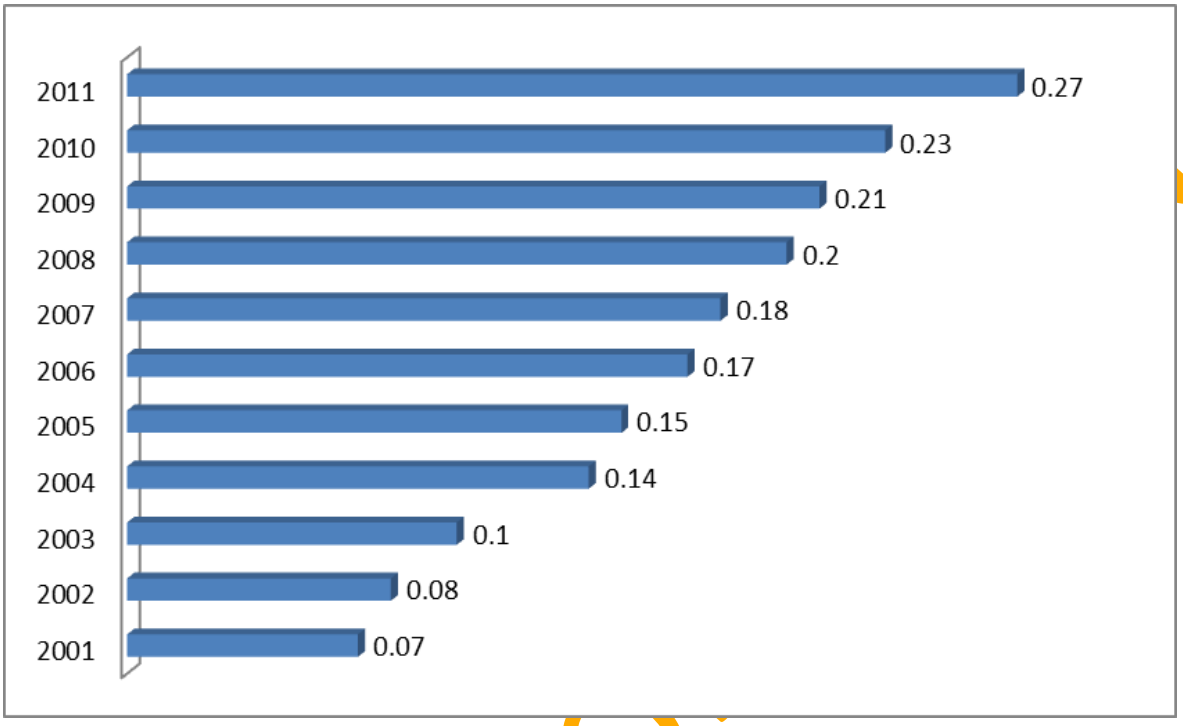
At industrial levels, IIT in vegetable products was about the highest between 2001 and 2011. In 2011, the intensity of IIT in final vegetable products between Cote d'Ivoire and EU was 63 per cent, meaning that it was in favour of Cote d'Ivoire. Although it was low in 2001, IIT in final products of Natural or cultured pearls and precious stone have consistent increase up till 2011. IIT in the sector is equally show that they are in favour of Cote d'Ivore. The IIT in final mineral products between Cote d'Ivoire and EU is also high. This implies that the benefit of IIT between Cote d'Ivoire and EU in final mineral products was majorly in favour of Cote d'Ivoire. It was 0.8886 in 2001 but declined to 0.6545 in 2011.

The major product in the mineral products sector is petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70%. Prepared food stuffs and beverages is another product group that is growing IIT final products. In 2011 IIT in the final products between Cote d'Ivoire and EU with respect to other industries such as of animal or vegetable fats, chemicals, raw hides and skins leather, wood and fibrous, textile, footwear and headgear and base metals increased substantially during 2001 to 2011. However, IIT in these industries are mainly in favour of the EU rather than Cote d'Ivoire.

(ii) Analysis of IIT in Final Products between Ghana and EU

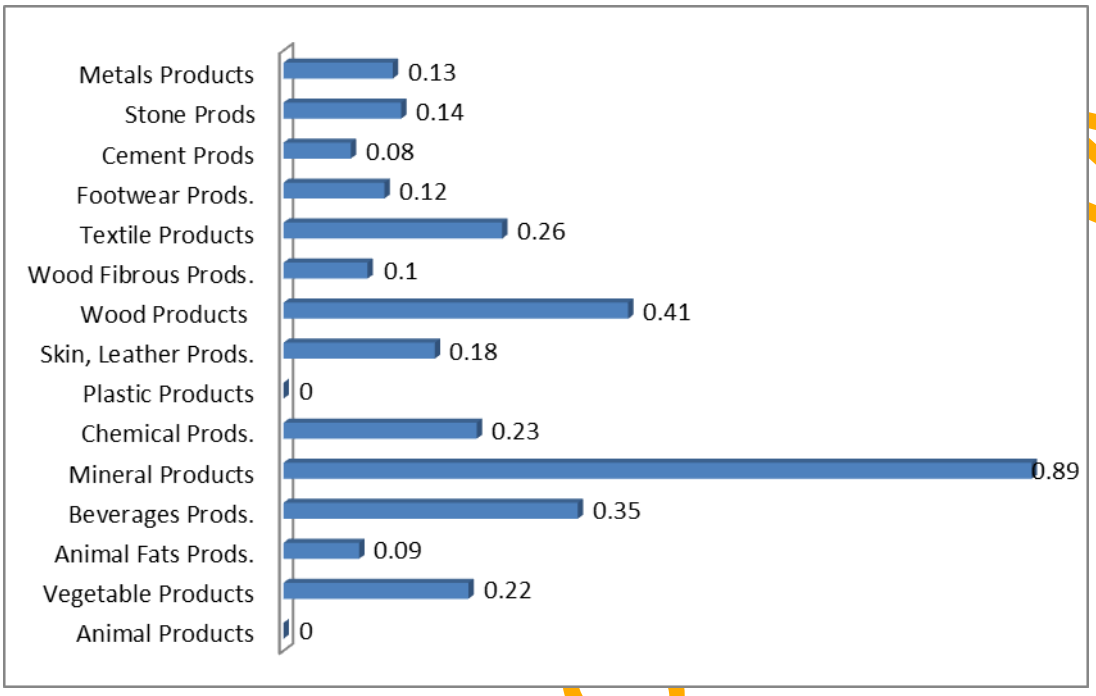
Ghana has IIT with EU in only 71 final products spread across industries and the index that reflects the extent of IIT is shown in Table 5.10. Ghana's IIT with EU in final products increased from 0.0679 to 0.2722 between the period of 2001 and 2011. Although this is quite appreciable, it is however low compared with 0.57 reported for trade between the EU and developing countries by Nilsson (1999). The computed index of IIT in final product between Ghana and EU implies that it was only 27.2 per cent in favour of Ghana in 2011. This further indicated that the IIT between them generally favours the EU.

Figure 5.4: Trends of Ghana's IIT with EU in Final Products (2001 to 2011)



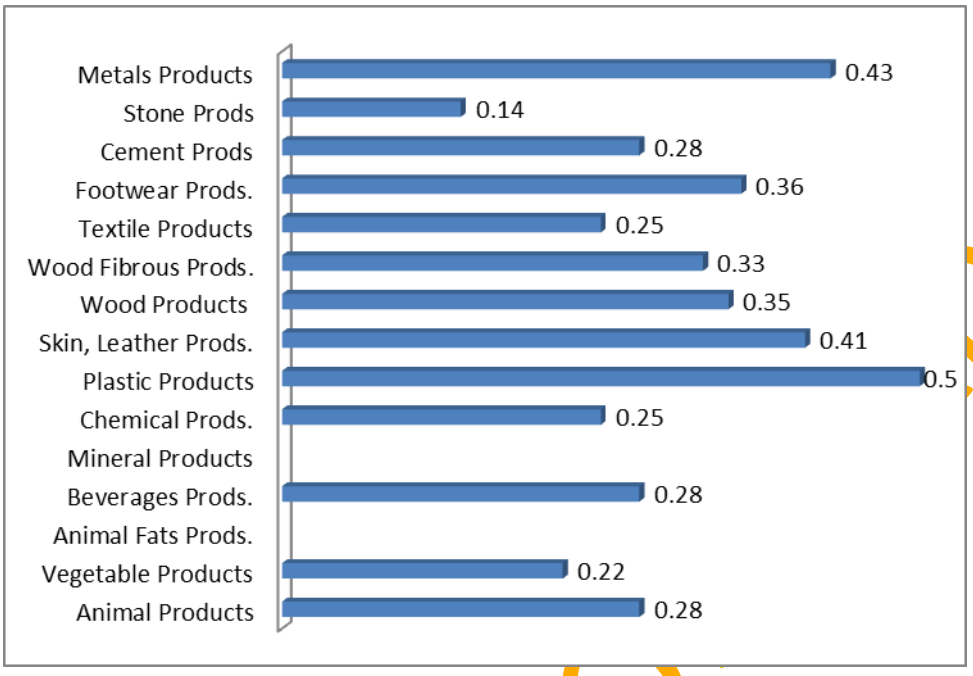
Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.5 Industrial Composition of Ghana's IIT with EU in Final Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.6 Industrial Composition of Ghana IIT with EU in Final Products 2011



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

It should be noted however, that variations occurred in IIT between Ghana and EU in the various industries considered. The performance of Ghana's Base Metals and Articles industries in IIT with EU is expected with the presence of a number of Metals firms in Ghana both local and multinationals.

Some of these firms are: Rayray Frontline Ltd, Mazze Group of Companies, Nanametal & Co, Richstone & Rivers Miner Ltd., Bonte Gold Mines Gh Ltd etc. Although, Ghana's IIT with EU is highest in the base metal and articles sector, it is however very low compare to the value of 0.630, Clark and Stanley (1999) got for metals IIT between developing countries and the United States. Appreciable increase was recorded in Ghana's IIT with EU in final products between 2001 and 2011. The firms that produce plastic in Ghana are numerous, that might have accounted for the high IIT in the industry. Some of them include: Mazze Group Of Companies, Dwinat Company Limited, Vernurs Ventures Ltd., Crystal Oasis Ltd and Al Rayyan Global and several others.

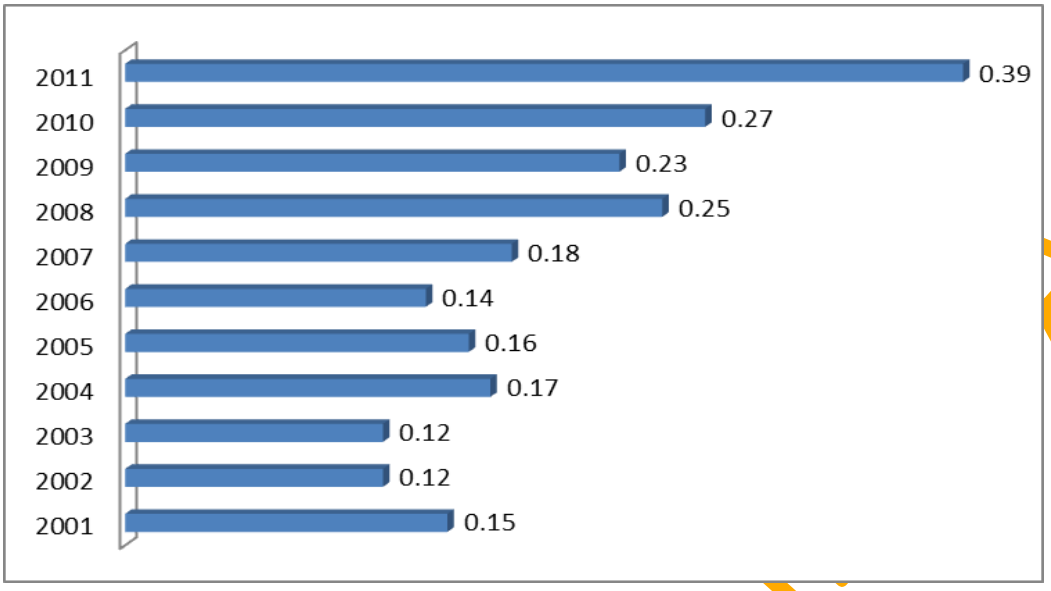
The value of Ghana's IIT with EU in raw hides and skins and leather is higher than the 0.2070 that Clark and Stanley (1999) got for trade between developing countries and the United States. Similarly, Hu and Ma (1999) report 0.8120 for IIT between China and the developed countries trade partners.

(iii) Analysis of IIT in Final Products between Nigeria and EU

IIT existed between Nigeria and EU in about 105 final products. IIT between Nigeria and EU[32] was 0.0471 in 2001. However, Nigeria's IIT in total final product increased from 0.1369 in 2006 to 0.3851 in 2011 Table 5.6. This result indicates that the extent of IIT in final products between Nigeria and EU is 38.5 per cent in favour of Nigeria, and 61.5 per cent in favour of the EU. Nilsson (1999) reported 0.4700 IIT between the EU and the developing countries. Industrial products such as base metals and articles of base metal recorded the highest IIT in final products between ECOWAS and EU.

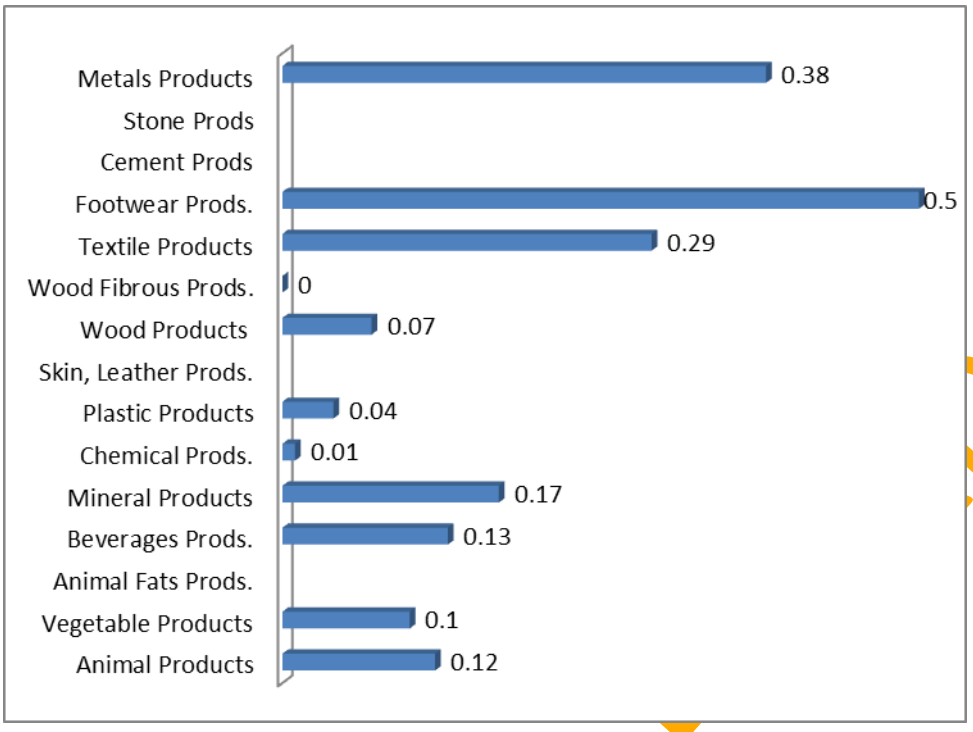
[32] Nigeria started recording intra-industry trade in both final and intermediate products much earlier than Ghana and Cote d'Ivoire

Figure 5.7: Trends of Nigeria's IIT with EU in Final Products (2001 to 2011)



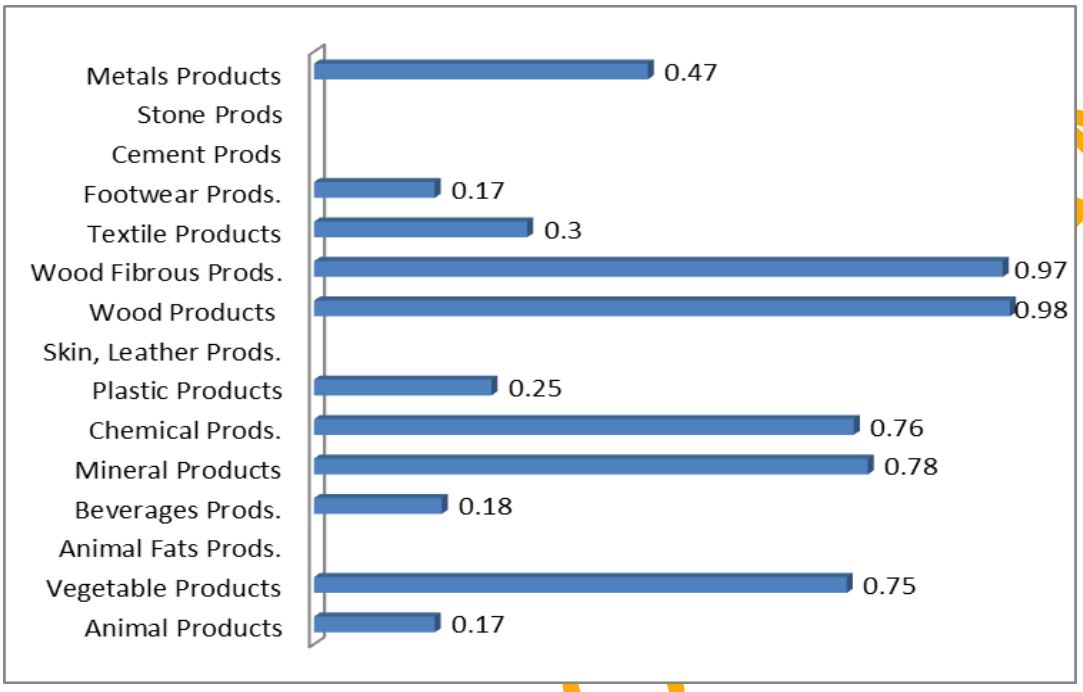
Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.8: Industrial Composition of Nigeria's IIT with EU in Final Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.9: Industrial Composition of Nigeria's IIT with EU in Final Products 2011



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

As against the other industrial product where IIT was low in the early 2000, IIT in base metals and articles of base metal has been very high since 2000. The IIT in this sub-sector was more than 50 per cent in most of the years between 2000 and 2011. This implies that Nigeria's exports to EU in the products where IIT occurred were about the same as her imports in the sub-sector. Similar result of 0.630 was obtained by Clark and Stanley (1999) for IIT in metals between developing countries and the United States 1992 data. The fact that Nigeria recorded IIT in base metals and articles of base metal with her highest trade partner is not unexpected since there are a number of the affiliates of the EU multinational corporations that produces metal in Nigeria, some of them include: Astrazeneca PLC, Sulzer AG, Crittall Holdings LTD, Wishart Investments INC.

Much fluctuation was recorded in IIT involving Chemicals products during the period 2000 - 2011. In 2011, Nigeria's IIT in final products of Chemical industry with EU was 0.7606, this implies Nigeria exports to EU in the final products of Chemical outweigh her imports from the union. This index is higher than what Clark and Stanley (1999) had reported (0.3760) as the IIT in chemicals between developing countries and the United States. Similarly, the IIT in final chemical products reported by McMahon (2003) for EU and South Korea was however higher. The IIT in final chemical products between Nigeria and EU might have been occasioned by the presence of several affiliates of the EU multinationals such as PZ Cussons PLC, Astrazeneca PLC, Linde AG, Stichting Administratiekantoor, Unilever N.V., Sulzer AG, Novartis AG, Wishart Investments Inc., Reckitt Benckiser PLC.

The final products of Wood and Articles of Wood industry recoded high IIT between Nigeria and EU in the latter parts of 2000s. That is, Nigeria exchanged higher exports than imports with the EU. The major product in this Wood and Articles of Wood industry is paper and Clark and Stanley (1999) had reported appreciable IIT between Developing countries and United States.

5.3.2 Extent of IIT (IIT) between ECOWAS and EU Intermediate Products (First Objective)

Contained in Tables 5.9 to Tables 5.11 are the computed IIT intermediate products and they have earlier been presented in previous sections.

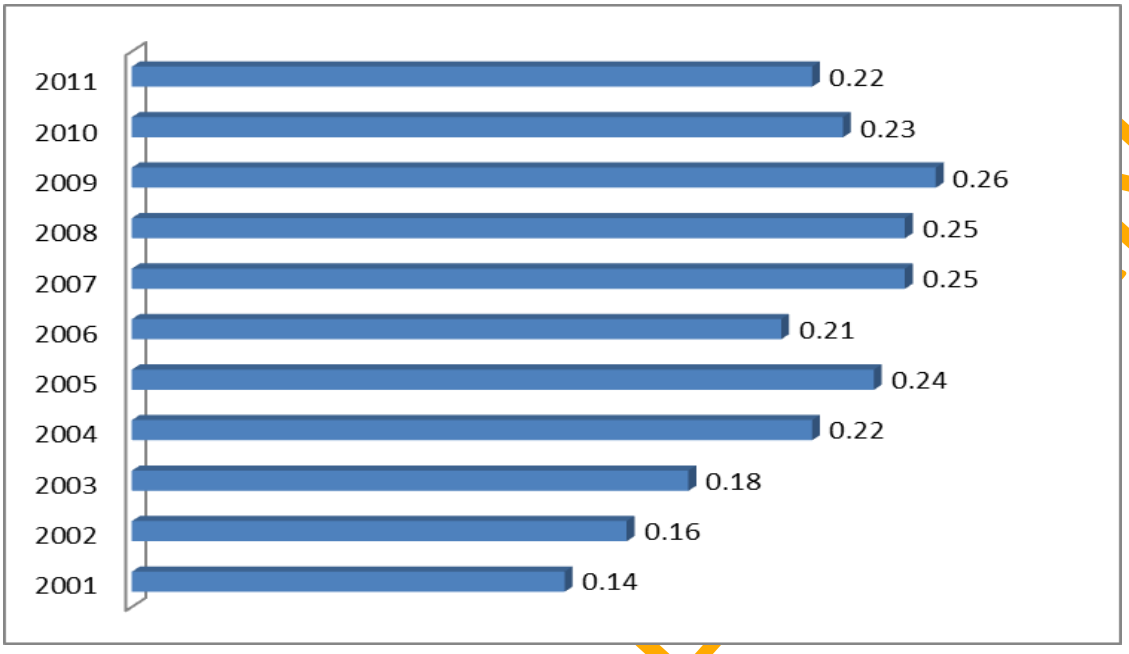
(i) Analysis of IIT in Intermediate Products between Cote d'Ivoire and EU

Cote d'Ivorie's IIT in intermediate products with EU increased from 0.1418 in 2001 to 0.2237 in 2011, this is lower than their IIT in final products. This indicates that Cote d'Ivoire exchanged more of final products with EU than intermediate products. This is not in terms of the number of products, but in terms of magnitude of goods exchanged. Thus, due to the fact that Cote d'Ivoire recorded IIT in 117 final products, and 156 intermediate products, it implied that she has higher IIT in final products than in intermediate products. Intermediate products of vegetables recorded the highest magnitude of IIT between Cote d'Ivoire and EU. The result shows that all the 11 industries where IIT in intermediate products occurred grew between 2001 and 2011. However, IIT in these products between Cote d'Ivoire and EU was largely in favour of EU, this is because the intensity of IIT in various products was less than 45 per cent in the study period. In 2011, the industries in which IIT in intermediate seemed to be in favour of Cote d'Ivoire are vegetable products, plastic products, metals and base metals products. The occurrence of IIT in products of these industries is not surprising because of the presence of the affiliates of the EU multinationals in these sectors. For instance, Crown Holding, CE Carnaud Metalbox are some of the affiliates of EU multinationals producing metals and base metals in Cote d'Ivoire.

(ii) Analysis of IIT in Intermediate Products between Ghana and EU

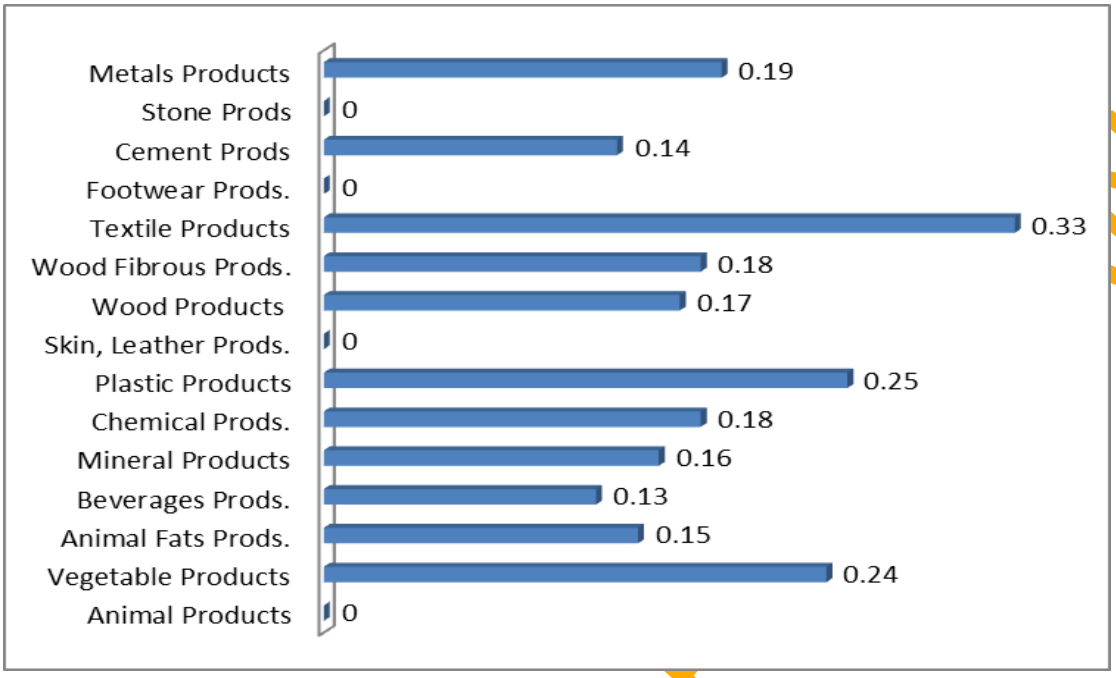
Although IIT in intermediate products between Ghana and EU increased from 0.0638 in 2001 to 0.2251 in 2011, it was still lower than IIT in final products between Ghana and EU. The result further shows that Ghana's export of intermediate products to the EU was quite low compared to their imports of the products from EU. It will be

Figure 5.10: Trends of Cote d'Ivoire's IIT with EU in Intermediate Products (2001 to 2011)



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.11: Industrial Composition of Cote d'Ivoire's IIT with EU in Intermediate Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

5.12: Industrial Composition of Cote d'Ivoire's IIT with EU in Intermediate Products 2011

Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

recalled again that Ghana has IIT with EU in only 71 final products in 2011, while her IIT in intermediate products occurred in 182 products.

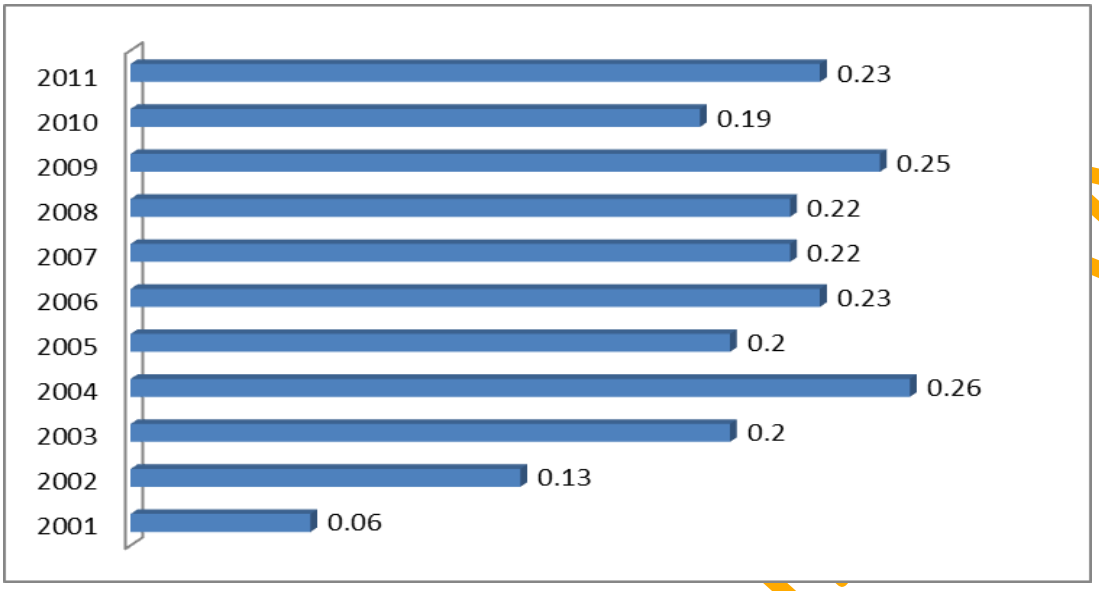
Despite the differences in the number of products in which the two forms of IIT have occurred, the intensity of IIT was very close.

Aside the fact that the average IIT in intermediate products between Ghana and EU was lower than 50 per cent between 2001 and 2011, none of the 15 industries considered in this study has IIT of 50 per cent, except animal and animal products. The implication of this result is that the import of the products in which Ghana has IIT with EU outweighs the exports. Mineral and chemical products are the other industries Ghana has appreciable and growing IIT with the EU. The two industries have 49 per cent and 34 per cent IIT intensity during the period. This implies that the quantity of Ghana's exports in the intermediate products in which she has IIT with EU have been increasing in the period. The presence of several affiliates of EU multinationals in Ghana producing chemical products attest to the possibility of IIT between Ghana and EU. Some of such affiliates of EU multinationals in Ghana include PZ Cussons PLC, Air Liquide SA Etu Exploit Procedes GC, L'oreal, Basf SE, and Astrazeneca PLC.

(iii) Analysis of IIT in Intermediate Products between Nigeria and EU

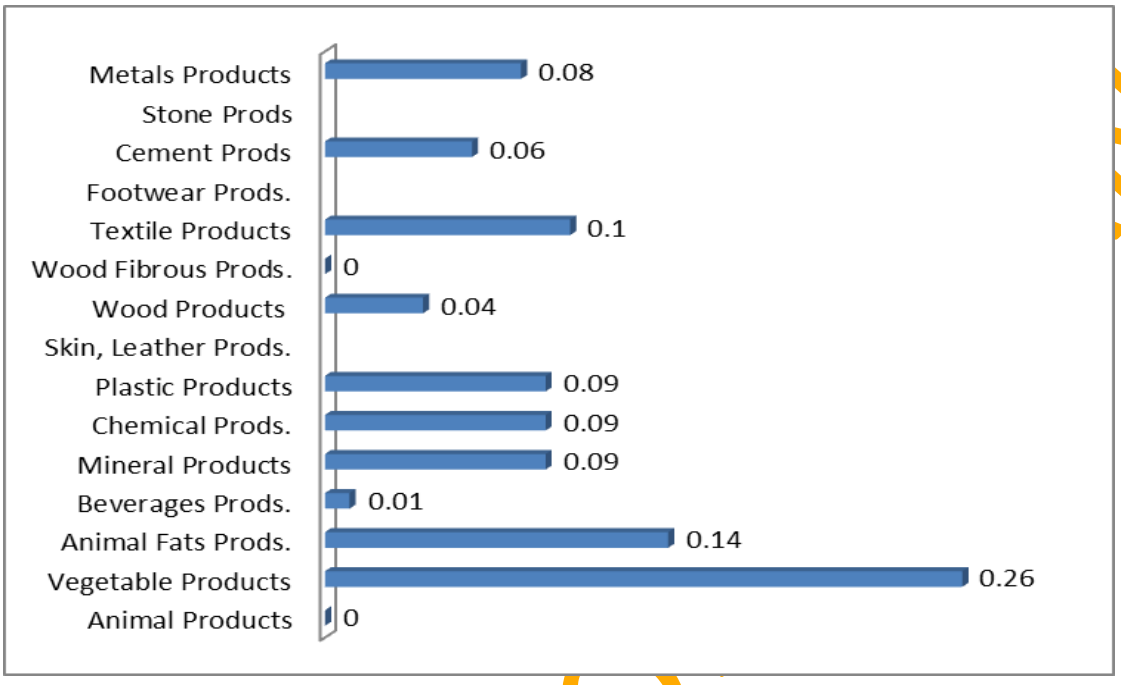
Similar to Ghana and Cote d'Ivoire, Nigeria's IIT in intermediate products is higher in number than the final products. That notwithstanding, the intensity of Nigeria's IIT in final products outweigh that of intermediate products. The IIT in intermediate products between Nigeria and EU increased from 0.0882 in 2000 to 0.3370 in 2011. This implies that the intensity of imports in the 142 intermediate products that Nigeria has IIT with EU were more than the exports. Precisely in 2011, the IIT favoured EU (66.0%) at the expense of Nigeria (34.0 %).

Figure 5.13: Trends of Ghana's IIT with EU in Intermediate Products (2001 to 2011)



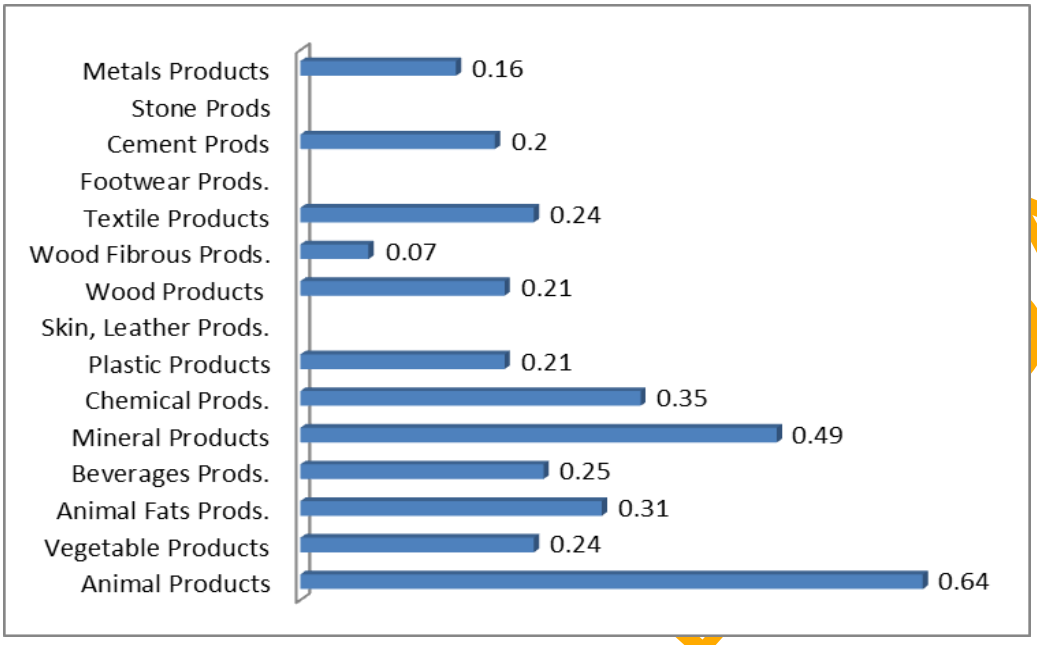
Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.14: Industrial Composition of Ghana's IIT with EU in Intermediate Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.15: Industrial Composition of Ghana's IIT with EU in Intermediate Products 2011

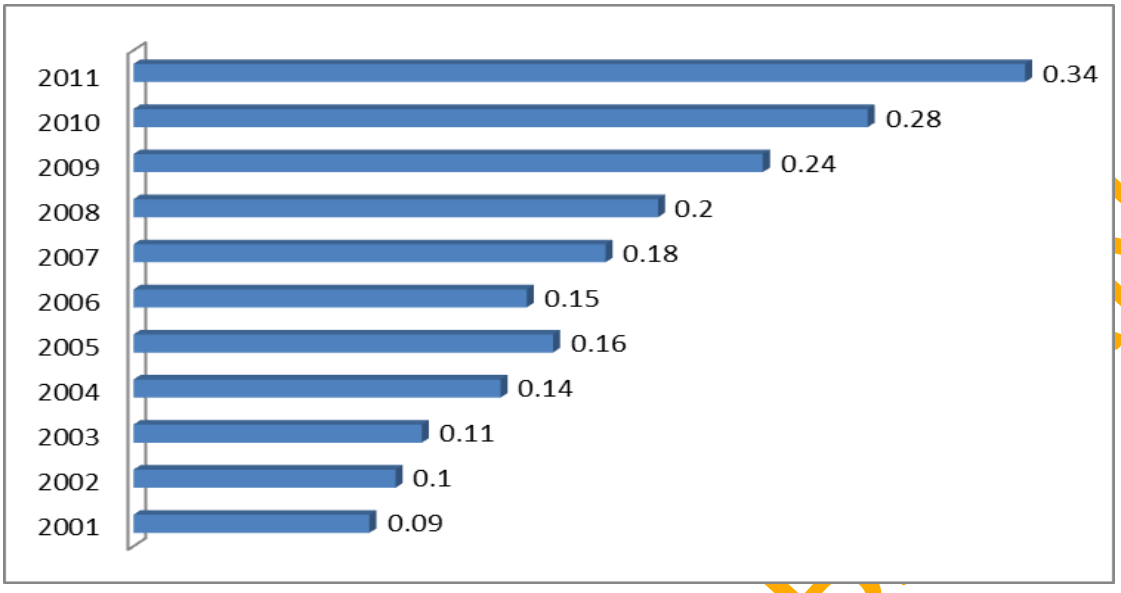


Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

At industrial level, intensities of IIT in wood and wood articles and Pulp of wood of wood and fibrous are very encouraging till 2011. Other three industries Nigeria recorded quite encouraging IIT with EU are animals and animal products, prepared foodstuffs and beverages. In 2011, the three industries had 53 per cent, 52 per cent and 44 per cent of intensity respectively. The result suggests that Nigeria's exports of IIT in intermediate products to EU in the first two industries outweigh the imports from EU. There are several national and multinational industries in Nigeria that exports these products to countries of the world. Some of them include Bayrem Group Internationals, Bellet Construction PLC, Bissy Kind INT LTD, Cosource Venture, Delta Forestry, Eddy Bros Nig LTD, EG Woods LTD, Hephzibah Resc and Inv LTD etc.

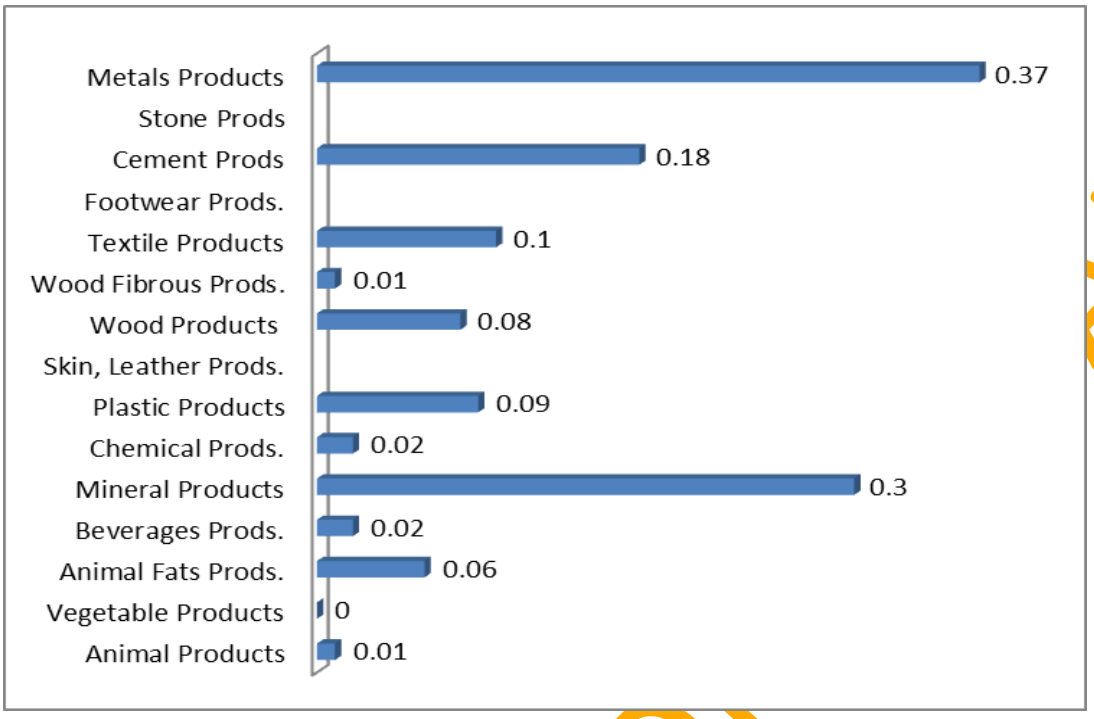
The other three sub-sectors in which Nigeria recorded quite encouraging IIT in intermediate products with EU are base metals, animals and animal products and prepared foodstuffs and beverages. As at 2011, the two sub-sectors had 53 per cent, 52 per cent and 44 per cent respectively. This implies that quite substantial part of these intermediate products exchanged between Nigeria and EU in these sub-sectors recorded high exports. This result may be expected because most of the EU based multinationals that have affiliates in Nigeria producing foodstuffs and beverages, these affiliates will definitely have to exchange intermediate products with the mother companies or other affiliates in EU. Some of the numerous affiliates of EU multinationals that produce foodstuffs and beverages are Nestlé S.A., L'Arche Holding SA, Zuivelcoöperatie Friesland Foods U.A, Wishart Investments Inc, British American Tobacco (Investments) Ltd , Lac B.V, Cadbury Schweppes P L C. The 53 per cent IIT in intermediate products Nigeria has with EU in metal and metal products is equally substantiated with the several metal industries that exports to EU markets. Although IIT in intermediate products between Nigeria and EU in other sub-sectors are quite low, most of them show potentials.

Figure 5.16: Trends of Nigeria's IIT with EU in Intermediate Products (2001 to 2011)



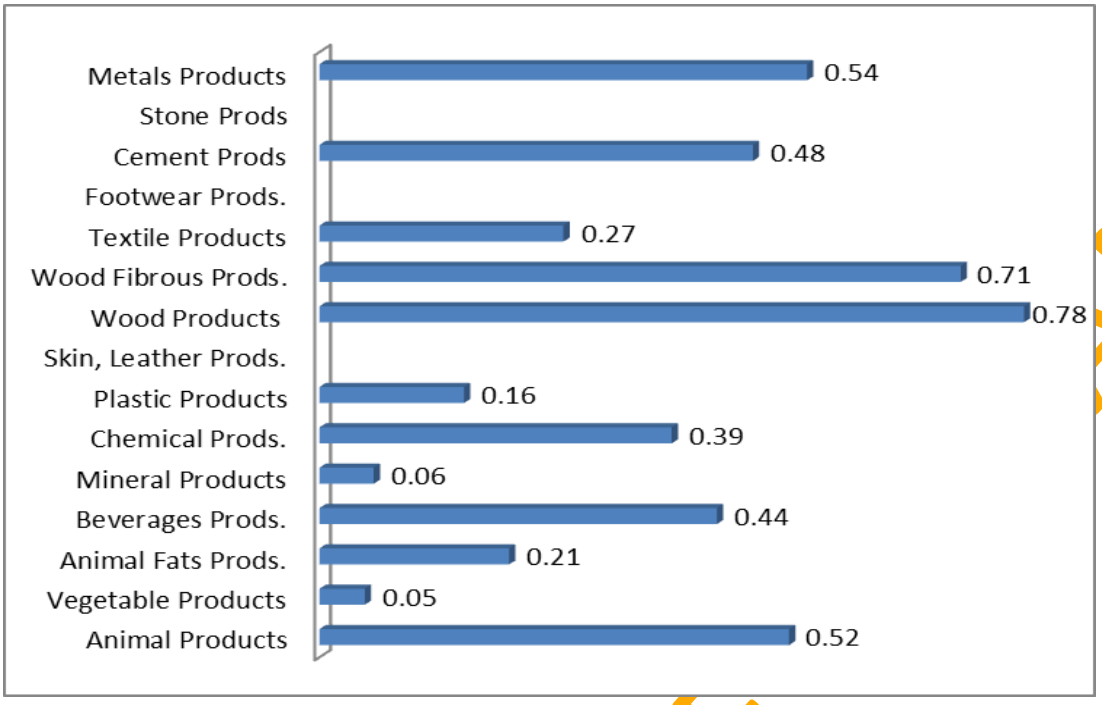
Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.17: Industrial Composition of Nigeria's IIT with EU in Intermediate Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

Figure 5.18: Industrial Composition of Ghana's IIT with EU in Intermediate Products 2001



Source: Computed, underlying data from World Integrated Trade Solution (WITS) database

5.4 Determinants of IIT in final products between selected ECOWAS countries and EU (Objective Two).

This section discussed the determinants of IIT in final products. The modified gravity model was estimated for selected countries individually and as a group (ECOWAS). Two methods of analysis were experimented: the panel data analysis (OLS Panel, Fixed Effect and Random Effect) and the fractional logit regression model (Pure FLRM and the Fixed Effect FLRM). Comparison of panel data analysis and the fractional logit regression model methods of analysis shows that the latter produced better results. The better results of fractional logit regression model attests to its superiority over the panel data analysis in estimating the determinants of IIT. Moreover, based on the L.M test, which is decisive that there are individual effects, we would conclude that the fixed effects model is better choice.

(i) Relative Market Size and IIT in Final Products

Positive relationship is expected between the variable and IIT. That is, the larger/smaller the average (level of population) country size, the higher/lower the IIT. Larger markets have the potential for great differentiation in products that is conducive to both models. Large markets also have great potential for the exploitation of economies of scale. As with economic development, there are a variety of measures used for this determinant. The large market available in ECOWAS, especially Nigeria, has continued to be an attraction to the EU countries. However, the relative market size has insignificant impact on IIT between ECOWAS and EU. This result may not really be unexpected in vertical IIT between developing countries and developed countries.

This is because the population of the relatively poor citizens of the EU countries that will demand for low quality products from ECOWAS may be very low. Similar result was earlier obtained by Nilsson (1999) for 12 EU countries and 108 less Developed countries[33]. Nilsson (1999) reports that relative market size do not drive the VIIT between EU and Developing countries, as reported in this study. In the case of Nigeria and Cote d'Ivoire, the impact of relative market size was not also significant. Similar to

[33] None of the 15 ECOWAS counties was included in the Developing counties studied by Nilsson (1999).

what was obtainable in ECOWAS, the reason attributable to this result is that the poor quality of products produced by these countries may only be needed by a negligible part of the EU population. However, relative market size has positive significant impact on IIT in final product between Ghana and EU. While it does not mean that Ghana is more populous than Nigeria and Cote d'Ivoire, the result simply suggests that the products Ghana is exchanging with EU seems to be preferred and hence witness more patronage from EU compared to those of Nigeria and Cote d'Ivoire. The result of the impact of relative market size on Ghana's IIT with EU obtained in this study is similar to that of Balassa and Bauwens (1987) and Stone and Lee (1995). The two studies examined the impact of relative market size on IIT between developed and developing counties.

(ii) Factor Endowment and IIT in Final Products

The theory states that the greater the relative difference in factor endowment between trading nations, the larger will be the share of vertical IIT. This implies that countries that differ in relative factor endowments will have larger share of vertical IIT as the potential gains from trade in quality products are greater. On the other hand, the potential gains from trading variety products are reduced when relative factor endowment is large. Just as the significant impact was reported for the effect of factor endowment on IIT in final products between ECOWAS and EU, similarly it also was found to be major driver of IIT in the individual selected ECOWAS countries. The empirical results in these three counties and ECOWAS as a group are in line with theoretical models for explaining VIIT. The intuitive reason why differences in factor endowment drive vertical IIT is clear from the theory of North-South trade with product differentiation. The low quality of products that the ECOWAS countries have capacity to produce are equally needed by the poor population of EU[34] countries.

[34] The rate of poverty is around 23 per cent in the countries of European Union. The rate poverty tends to be higher in the Mediterranean and the Baltic states. Altogether around 75 million people in the EU are poor. Countries with the highest poor population include France, Germany, Italy, Poland, Spain and the UK. Incidentally, these countries are the highest ECOWAS trading partners in EU. In fact they account for over 75 per cent of trade flows between the two regions.

Most of the studies on vertical IIT between Developed and developing countries found similar results. Such studies include Balassa and Bauwens (1987), Nilsson (1999), Clark and Stanley (1999) and Damoense (2007). Factor endowment was found to drive vertical IIT in final products in Cote d'Ivoire and Ghana than in Nigeria.

(iii) Income Distribution and IIT in Final Products

Income distribution (similarity or dissimilarity) is one of the most important factors in model of North-South trade with product differentiation. Differences in per capita income of the trading partners were used as proxy to income distribution in this study. The more dissimilar the per capita income between trading partners in VIIT, the higher the type of trade. Conversely, the higher the dissimilarity in per capita income of trade partners in HIIT the lower the IIT.

The result of ECOWAS at aggregate level shows that differences in income distribution cause vertical IIT between ECOWAS and EU to grow. Very wide difference exists in the capita income of ECOWAS and EU, therefore the result is not be unexpected. Mixed results have been obtained in previous studies. Specifically, the result obtained in this study is in consonance with that of Balassa and Bauwens (1987) and Clark and Stanley (1999). In a similar vein, income distribution enhances vertical IIT between Ghana and EU. However, though income distribution has positive significant impact on vertical IIT in final products in Nigeria and Cote d'Ivoire, the impact is insignificant. The result suggests that there are other socio-economic factors that drive the demand pattern of the people in the two countries are other than income.

(iv) Real Effective Exchange Rate and IIT in Final Products

Real exchange rate between trade partners has the capacity to decrease VIIT between trade partners. For vertical IIT in final products between ECOWAS and EU, the impact of real effective exchange rate is found to be negative. When exchange rate depreciation takes place, products become relatively cheaper and vice versa. The implication of the negative effect of real effective exchange rate on IIT between ECOWAS and EU is that, it is either EU countries find ECOWAS products relatively costlier or ECOWAS

countries find EU products relatively costlier. Damoense Jordaan (2007) and Oguro, Fukao, and Khatri (2008) found similar results in their respective studies.

In the case of Nigeria, the impact of real effective exchange rate on vertical IIT in final products is positive and significant. This implies that real effective exchange rate promotes IIT between Nigeria and EU. Stone and Lee (1995) equally got positive relationship between real effective exchange rate and IIT. The impact of real effective exchange rate on Ghana and Cote d'Ivoire's vertical IIT with the EU is not significant.

(v) Weighted Distance and IIT in Final Products

The trade theory posits that the greater the geographical distance between trading partners, the lower the shares of all IIT. Geographic distance is typically used as a proxy for transport costs, insurance costs, delivery times and market access barriers. Many studies use kilometres or miles to measure geographic distance between the capital cities of trading partners. The empirical results for aggregate ECOWAS indicated that weighted distance between ECOWAS and EU has negative significant impact on VIIT in final products between the two regions. This implies that the distance between the two regions discourages IIT between them. Similarly in Nigeria, the weighted distance is a disincentive to VIIT in final products between Nigeria and EU. All the previous studies that used distance as a determinant of IIT obtained negative relationship. Such studies include Balassa and Bauwens (1987), Nilsson (1999) and Damoense (1987). For Ghana, although the impact of weighted distance on VIIT between Ghana and EU is significant, it is however positive. The impact of weighted distance on VIIT between Cote d'Ivoire is positive but not significant.

(vi) Product Differentiation and IIT in Final Products

The North-South trade model with products differentiation states that the greater the degree of product differentiation, the larger the share of VIIT. According to theoretical and empirical studies of IIT, product differentiation is an important determinant of IIT (Byun and Lee, 2005; Faustino and Leitão, 2007; Chang, 2009). The index provides an average unit value dispersion of export unit values for a given product k aggregated over

the sum of all products within a given industry and is a measure of vertical differentiation of a product. Product differentiation is one of the major factors that drive VIIT in final products between ECOWAS and EU. Positive significant effect of product differentiation on IIT was obtained for ECOWAS. This implies that availability of varieties of goods to costumers is a factor that fosters vertical IIT. And more varieties of products are made available, the greater the cases of VIIT between ECOWAS and EU. The earlier empirical results of the impact of products differentiation on VIIT are mixed. However, the positive impact of product differentiation on vertical differentiation obtained in this study is in consonance with Clark and Stanley (1999). For the three selected ECOWAS countries, product differentiation was also found to drive VIIT in final products.

(vii) Trade Tariff and IIT in Final Products

Trade theory has predicted that the lower the level of tariffs between trade partners, the greater the shares of trade between them. Typically, a negative relationship between trade barriers and IIT is predicted by Sharma, (2004) that a reduction in trade barriers (tariffs) increased IIT. Thus, trade agreements serve to reduce trade barriers thereby resulting in trade-creating effects between trading countries and are likely to result in rising IIT levels. In this study, the tariff variable used is calculated as the bilateral average level applied MFN tariff rates for HS 6 digit level (WTO, 2011). The result shows that tariff has negative but insignificant effect on IIT final products between ECOWAS and EU. This implies that trade tariff discourages VIIT in intermediate products. The results obtained by Manrique (1987) and Sharma, (2004) are corroborated by this study. Although, two studies reveal a positive relationship between trade barriers and IIT (Kind & Hathcote, 2004; Al- Mawali, 2005).

Table 5.21: Selected Econometric Study of Determinants of IIT in Final Products between Developed and Developing Countries

Study	Balassa and Bauwens (1987)	Stone and Lee (1995)	Nilsson (1999)	Clark and Stanley (1999)	Damoense Jordaan (2007)	Manrique (1987)	Present Study	Present Study	Present Study	Present Study
Scope	Developed Countries and Less Developed Countries	68 Developed Countries and Less Developed Countries	12 European Union and 108 Less Developed Countries	Developing Countries and the United States	South Africa and Developed Countries	8 Developed and Developing Countries	ECOWAS and EU	NIGERIA and EU	GHANA and EU	COTE DI'VOIRE and EU
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
DIFFGDP	0.698*	0.08*	2.18*	0.075*	3.1996*		-16.368 (-0.06)	0.7459*** (14.41)	2.7005*** (2.40)	2.0109*** (15.82)
PRODDIFF				0.0910*	-0.4162	-1.4591	0.3540*** (6.32)	0.0028** (3.26)	0.1307** (2.20)	0.0061** (1.17)
DIFFPC	0.761*		-0.46*	0.774*	-0.0703*	+0.1230	0.0994*** (7.91)	11.0420 (0.70)	12.3146*** (3.79)	-0.1309 (-2.71)
AVEP	0.286*	0.259*	3.25	0.475*		-0.8810*	12.8248 (0.06)	-3.9820 (-0.62)	11.3435*** (4.10)	0.1004 (2.19)
EXCH		0.432*			-0.1782*		-0.0392*** (-5.27)	0.2382*** (7.02)	0.1899 (2.88)	0.1334 (2.08)
DISTANCE	- 0.265		-5.53*		-0.7047*		-0.0289* (-2.29)	-0.5454*** (-19.14)	0.7286*** (20.83)	0.0160 (2.77)
FDI					-0.2898***		0.1112*** (2.51)	0.1219*** (2.45)	0.2918*** (2.33)	1.9101*** (4.03)
TARIFF					-0.2005	-0.1390*	-0.0068* (-1.74)	-0.2887 (-0.06)	-0.0431 (-0.04)	-0.0297 -4.20
CONSTANT							12.0822 (0.00)	19.3130 (0.15)	-50.8501 (-0.49)	40.4522 (0.14)

Source: Author compilation from the survey of literature and empirical analysis

(viii) FDI and IIT in Final Products

Greater levels of efficiency-seeking FDI, the larger the shares of VIIT. Alternately, greater levels of market-seeking FDI, the smaller the shares of VIIT. Empirical result of this study showed that the impact of FDI on ECOWAS' VIIT in final products with EU is positive and significant. This implies that the investment of the multinationals in ECOWAS complements the result. Damoense Jordaan (2007) had earlier obtained a negative impact of FDI on IIT. FDI on VIIT between Ghana and EU shows that multinationals' presence in Ghana has been trade-FDI complementing. The result for Nigeria and Cote d'Ivoire were not different as FDI promotes IIT.

5.5 Determinants of IIT in intermediate products between selected ECOWAS countries and EU, (Third Objective)

(i) Relative Market Size and IIT in Intermediate Products

Positive relationship is also expected between relative market size and VIIT in intermediate products. Similar to IIT in final products, the relative market size has positive but insignificant impact on VIIT in intermediate products between ECOWAS and EU. The intra-industry in intermediate products has a lot to do with the firms, especially the multinationals and not necessarily because of the relative market sizes. Nigeria has VIIT in intermediate products with the EU, relative market size does not promote VIIT in intermediate products. This will be so if majority of intermediate products produced in Nigeria are consumed locally. In other words fewer commodities are available for exchange with her trading partners.

VIIT in intermediate product between Ghana and EU is promoted by relative market size. The implication of this result is that less of intermediate products produced are consumed locally, which means more of such products are exchanged with the EU. Also, the multinationals locate their affiliates in countries where there is large market and this indirectly promotes intra-firms and IIT. This type of result was earlier obtained by Türkcan (2005). However, the impact of relative market size on IIT in intermediate products between Cote d'Ivoire and EU is not significant.

(ii) Factor Endowment and IIT in Intermediate Products

Factor endowment is more important to IIT in intermediate products than in final products. This is because multinationals locate their affiliates in countries where they can take advantages of natural resources, and as such, exchange of similar products between these multinationals and their various affiliates promotes IIT in intermediate products. The higher the differences in factor endowment of trade partners, the larger the share of VIIT in intermediate products. The result of this study revealed that the difference in natural endowment promotes IIT in intermediate products between EU and ECOWAS. It further indicates that IIT in intermediate products between EU and Ghana, and between EU and Cote d'Ivoire are enhanced by differences in natural endowment. Türkcan (2005) and Türkcan and Ateş (2008) earlier reported positive significant impact of differences in natural endowment on IIT in intermediate products. In the case of IIT between Nigeria and EU in intermediate products, this study found that difference in natural endowment does not promote it. This result is not unexpected as very vast natural resources in Nigeria are yet unexploited.

(iii) Income Distribution and IIT in Intermediate Products

The more dissimilar the per capita income between trading partners in VIIT in intermediate products, the higher the type of trade. The result shows that income distribution does not significant affect VIIT in intermediate products between ECOWAS and EU. However, for the individual ECOWAS countries, the impacts of income distribution on their IIT in intermediate products with EU are significant. While, the significant impact is negative for Nigeria, the effects are positive for Ghana and Cote d'Ivoire.

(iv) Real Effective Exchange Rate and IIT in Intermediate Products

Negative impact is expected by IIT on real exchange rate. This implies that appreciation of real exchange rate will cause IIT between trade partners to decrease. The empirical result shows that the impact of real effective exchange rate on VIIT in final products between ECOWAS and EU was found to be positive. The implication of this result is that exchange rate appreciation promotes IIT in intermediate products between

ECOWAS and EU. This could be so particularly for intermediate products that have little or no substitutes and are needed by multinationals for productions; higher import cost may not reduce such trade.

As expected, the impact of real effective exchange rate on Nigeria and Cote d'Ivoire IIT in intermediate products with the EU was negative. This implies that exchange rate appreciation declines IIT in intermediate products in Nigeria and Cote d'Ivoire. In the case of Ghana, real effective exchange rate has negative and insignificant impact of IIT between Ghana and EU.

(v) Weighted Distance and IIT in Intermediate Products

The result indicates that the weighted distance has negative significant impact on the VIIT in intermediate products between ECOWAS and EU. This implies that distance trade reduces IIT in intermediate products between the two regions. In a similar vein, the weighted distance also exerts negative impact on IIT in intermediate products between Nigeria and EU; and Ghana and EU. Since distance is typically used as a proxy for transport costs, insurance costs, delivery times and market access barriers, it then implies that increase in transport, and other related costs incurred in moving goods from one country to another reduces the extent of IIT in intermediate products between the them. The negative impact of distance on IIT in intermediate products obtained in this study is in line with Turkan (2005) and Turkan (2009).

(vi) Product Differentiation and IIT in Intermediate Products

Theoretical and empirical studies of IIT identified product differentiation as an important determinant of IIT (Turkan, 2005; Faustino and Leitão, 2007; and Chang, 2009). Product differentiation is a process of distinguishing a product to make it more attractive to a particular target market. It involves differentiating it from competitors' products as well as a firm's product offerings. The results of the impact of product differentiation on EU's VIIT in intermediate products with ECOWAS, show positive impact. Similar result was also obtained for products differentiation impact on EU IIT in intermediate products with Nigeria and Cote d'Ivoire. Positive significant effect of product differentiation reported for ECOWAS, Nigeria and Cote d'Ivoire implies that the availability of varieties of

goods to customers is a factor that promotes VIIT in intermediate products between the trade partners. Which means that the more varieties of products are made available, the greater the cases of VIIT between the trade partners. However, earlier studies such as Turkan (2009) reported positive but insignificant effect of product differentiation on vertical IIT.

(vii) Trade Tariff and IIT in Intermediate Products

Every trade barrier including, tariff between trade partners usually has negative impact on IIT. In this study, the tariff variable used is calculated as the bilateral average level applied MFN tariff rates for HS 6 digit level (WTO, 2011). The result of the impact of trade tariff on VIIT in intermediate products between ECOWAS and EU is positive but not significant. However, trade tariff impact on Nigeria – EU IIT in intermediate products is positive and significant. This implies that increases in tariff does not reduce the products exchanged between Nigeria and EU, but rather increases them. This result could be so if the products have little or no substitution. In the case of Ghana's IIT with EU, trade tariff impact is negative. This implies that increases in tariff imposed on intermediate products exchanged between Ghana and EU harms trade flows between them. Only the negative impact of tariff obtained on Nigeria IIT in intermediate products supports earlier result obtained by Türkcan and Ateş (2008).

(viii) Capital-Labour Ratio and IIT in Intermediate Products

Absolute difference in physical capital endowment per worker at industry level between the ECOWAS and EU is particularly very important in explaining the VIIT between them. High capital-labour ratio drives IIT particularly in intermediate products. High absolute difference of physical capital endowment between the EU and ECOWAS suggests that EU has more technological capacity. This could make the EU outsource the labour intensive part of their production to ECOWAS while the intermediate product is returned to EU for further processing. The empirical result of the study shows that the capital-labour ratio decreases IIT in intermediate products between ECOWAS and EU. The reason for the negative effect of capital-labour ratio on IIT in intermediate products between ECOWAS and EU could be associated with the socio-political factors that do

not encourage FDI inflow, and recent trend in ECOWAS FDI show massive divestment. Turkan (2005) earlier obtained similar result.

As regards the individual selected ECOWAS countries, only Nigeria obtained positive impact of capital-labour ratio on IIT in intermediate products between her and EU. The positive impact of capital-labour ratio on IIT in intermediate products implies that greater technological differences between the trade partners promote IIT between them.

(ix) Inward FDI and IIT in Intermediate Products

The FDI can have either positive or negative impact on IIT between partners. This depends on whether such inward FDI complements or substitute exports. If the purpose of inward FDI complements exports, then the shares of VIIT in intermediate products will increase. However, if Inward FDI substitutes exports, it will cause VIIT to decline. Empirical result of this study showed that the impact of FDI on ECOWAS' VIIT in intermediate products with EU is positive and significant. This implies that the investment of the multinationals in ECOWAS complements exports hence, promotes IIT in intermediate products. Similar result was recorded by Turkan (2005). As regards Nigeria VIIT with the EU, the impact of FDI is significant and positive. The positive sign of the FDI coefficient suggests that high inward FDI complements trade. This implies that some of the products of the multinationals were been exported. Similarly, the result obtained for the impact of FDI on VIIT between Ghana and EU shows that multinationals' presence in Ghana has been trade complementing. The result obtained for Nigeria and Cote d'Ivoire corroborates earlier result by Türkcan (2005). FDI does not produce significant effect on VIIT in intermediate products between Ghana and EU.

Table 5.22: Stylized Summary: Selected Econometric Study of Determinants of IIT in Intermediate Products.

Study	Türkcan (2005)	Leitão, Faustino and Yoshida (2009)	Türkcan and Ateş (2008)	Türkcan (2009)	Present Study	Present Study	Present Study	Present Study
Scope	Turkey and OECD Countries	Portugal and Trading Partners	USA and Trading Partners	Austria and Trade Partners	ECOWAS and EU	NIGERIA and EU	GHANA and EU	COTE DI'VOIRE and EU
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
DIFFGDP	0.111*** (9.80)	5.60* (2.26)	3.191 (4.00) ***	-0.928 (-1.39)	2.5920** (2.50)	0.0006 (0.15)	0.9119*** (5.27)	5.4997*** (12.20)
PRODDIFF				0.722 (0.18)	0.2266** (2.61)	0.0014** (3.29)	0.0014 (3.29)	0.0088* (2.12)
DIFFPC	-0.023 (-1.48)	0.21** (0.10)	-0.051 (-1.26)	1.301 (4.17)***	1.9199 (1.47)	0.4788*** 10.40	0.2596* (1.61)	1.5588*** (18.43)
AVEP	0.209*** (14.57)		6.751*** (5.32)	0.465** (2.14)	0.9754 (0.97)	-0.3125*** (-13.72)	0.2830** (2.89)	0.4951 (6.04)
EXCH		-0.01 (0.04)	0.036*** (2.71)	-0.027 (0.75)	0.0920** (2.50)	-0.0680*** (-2.95)	-0.0006 (-0.15)	-0.5917*** (-5.37)
DISTANCE	-0.133*** (-14.27)	0.29 (0.21)	-0.242*** (-4.43)	-0.410 (-4.42)***	-3.0869*** (-4.22)	-0.4172*** (-16.37)	-0.4172*** (-16.37)	-0.9974 (-6.33)
TARIFF			-0.567 (-4.80)***		0.1190 (0.92)	0.0540* (2.56)	-0.0439** (-2.33)	0.0536 (6.12)
CLR	-0.006** (-2.20)				-3.1956* (-2.29)	0.1262*** (15.49)	0.0191 (0.90)	0.0086 (0.57)
FDI	0.009*** (4.62)		(-7.57) *** (-0.242)	0.130 (3.95)***	0.0242** (3.06)	0.0038*** (4.08)	0.004 (0.19)	0.0102** (3.76)
CONSTANT	-4.712*** (-14.93)		-290.784*** (-4.86)		-66.7874 (-0.29)	-34.36 (-0.55)	-15.2482 (-0.05)	-55.4122 (-13.58)

Source: Author compilation from the survey of literature

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary, conclusion and recommendations of the study. Specifically, it summarises the extent and determinants of IIT between the selected ECOWAS countries and the EU. Based on the results obtained, appropriate recommendations were given with a view to promoting IIT between ECOWAS countries and their highest trade partners.

6.1 Summary

The focus of this study was to examine the extent of IIT between ECOWAS and EU in final and intermediate products. The factors that that determine IIT in final and intermediate products between ECOWAS and EU were also investigated. The development of IIT literature has evolved in three main areas in the last four decades, these areas include: determining the existence of and measuring the magnitude of the phenomenon, developing theoretical explanations for its existence and, finally, evaluating the determinant factors arising from the theory. The theoretical literature on IIT theory is very extensive. For instance, it is possible to distinguish two kinds of IIT, horizontal and vertical IIT. HIIT arises when there is a two-way trade in products of similar quality with different attributes (horizontally differentiated products), while VIIT is this refers to the simultaneous exports and imports of products of different qualities but same attribute classified in the same sector. The two sets of models are different in their predictions. Whereas HIIT is more likely to take place between countries with high and similar per-capita incomes (North-North IIT), VIIT is more likely to take place between countries at different levels of per capita incomes (North-South IIT) (Hellvin, 1996).

There are three major theories in vertical IIT. They include Neo-H-O model, Natural Oligopoly and Vertical Differentiation as well as model of North- South and Vertical Product Differentiation. The models of horizontal IIT can be categorised as 'neo-Chamberlinian[6]' 'neo-Hotelling' and **'**Reciprocal Dumping Model'. All these models exist

under conditions of 'monopolistic competition'. The model of North-South trade based on vertical product differentiation is adopted as theoretical framework for this study. Flam and Helpman (1987) developed a model of North-South trade based on vertical product differentiation (that is, differentiation according to quality). They assumed that two commodities exist: homogeneous product and a vertically differentiated product. The North produces and exports high quality, high cost varieties, while the South exports low quality, low cost varieties. Given an overlap in income distribution, there exists IIT. They predicted further that the share of IIT depends on relative country size, income distribution in both trading countries, and the dividing income classes.

In order to achieve the stated objectives, the researcher considered the highest ECOWAS trading partner-EU. Three ECOWAS countries that account for the over 75 per cent of total trade of the region were selected: Nigeria, Ghana and Cote d'Ivoire. To examine the extent of IIT between ECOWAS and EU, the researcher used unadjusted and adjusted Grubel-Lloyd (G-L) index on the 6-digit Harmonized Tariff Schedule with 5209 commodity classifications. The Greenaway, Hine, and Milner, (1998) method was used to disentangle the products into vertical and horizontal trade flows. Since the researcher is interested in final and intermediate products separately, the intermediate goods were separated from final goods. The researcher concord from the BEC codes to the HS rev.1 codes using a correspondence table published by the United Nations. BEC in terms of the Harmonised System, Revision 1, maps the goods according to the end-use classes. When this was done to the selected countries' trade flows with the EU, the researcher was able to separate the trade flows into intermediate and final products.

The modified gravity model based on the inclusion of variables predicted by the North-South trade model with product differentiation by Flam and Helpman (1987) and other variables capable of determining bilateral trade flows was estimated. Two methods of analysis were used: the usual panel data analysis and panel data of the fractional logit model of estimation for purpose of comparison. The estimations were done for a panel of the three selected ECOWAS countries, and products panel of each of the selected countries.

As regards the objectives of the study, **the first objective** examined the extent of IIT between ECOWAS and EU in final and intermediate products. This study shows that IIT in both final and intermediate products do not only exist between the selected countries in ECOWAS and the EU, but has also been increasing overtime. Specifically, for Cote d'Ivoire and EU, IIT in final products ranged between 0.2465 in 2001 and 0.3712 in 2011. Ghana's IIT with EU in final products increased from 0.0679 to 0.2722 between 2001 and 2011. Nigeria's IIT with EU started in 2000 earlier than Ghana and Cote d'Ivoire and it rose from 0.0471 in 2001 to 0.3851 in 2011.

In the case of the intermediate products, Cote d I'vorie's IIT in intermediate products with EU increased from 0.1418 in 2001 to 0.2237 in 2011. IIT in intermediate products between Ghana and EU increased from 0.0638 in 2001 to 0.2251 in 2011. The IIT between Nigeria and EU in intermediate products increased from 0.0882 in 2000 to 0.3370 in 2011. Despite the fact that the selected ECOWAS countries recorded higher numbers of products that have IIT with EU in intermediate products, than final products, the intensity of IIT in final products outweighs the intermediate products.

The **second objective** sought to examine the determinants of IIT between ECOWAS and EU. The analysis was done based on aggregate ECOWAS, Cote d'Ivoire, Ghana and Nigeria. The findings revealed that the factors that drive final IIT between ECOWAS and EU are product differentiation and income distribution. Conversely, weighted geographic distance, real effective exchange rate, and trade tariff are found to reduce the intensity of IIT between ECOWAS and EU. No evidence was found for factor endowment, average market size as theory of North-South model with product differentiation predicted. In the case of Nigeria, product differentiation and factor endowment are the major factors that drive IIT between Nigeria and EU, while exchange rate and weighted distance reduces it. Ghana IIT is found to be promoted by factor endowment, product differentiation, income distribution and average market size. Distance was not found to discourage IIT between Ghana and EU. Cote d'Ivoire's IIT with the EU was only found to be promoted by factor endowment and product differentiation.

Lastly, the **third objective** of the study equally examined the factors that determine IIT. The study showed that ECOWAS IIT in intermediate products is promoted by factor endowment products differentiation and inward foreign direct investment. Also, evidence was found that weighted geographic distance and capital –labour ratio reduces IIT in intermediate products between ECOWAS and EU. The result also shows that IIT between Nigeria and EU is enhanced by products differentiation, income distribution, and capital –labour ratio. Inward foreign direct investment, weighted geographic distance and real effective exchange rate are factors that reduce IIT in intermediate products between Nigeria and EU. In the case of Ghana, her IIT in intermediate products with the EU is intensified by factor endowment, income distribution, and average market size, while trade tariff and weighted geographic distance reduces it. Lastly, IIT between Cote d'Ivoire and EU in IIT is enhanced by factor endowment, income distribution and product differentiation, while real effective exchange rate and inward foreign direct investment increases it.

6.2 Conclusion

This study contributes to the literature theoretically empirically, and methodologically. Starting with the theoretical contribution of this study, it was the first to apply the theory of North-South model with Products Differentiation to examine the determinants of VIIT between ECOWAS and EU. All previous studies that examined the determinants of IIT between developing and developed countries did not distinguish between vertical and horizontal types, inappropriate and conflicting theories. The major methodological contribution of this study is that it used the Fractional Logit Model to examine the determinants of vertical IIT. Empirically, to the best of the researcher's knowledge, while there has been no study that examined IIT of ECOWAS collectively, no study equally exist for the individual ECOWAS countries. Very few studies have examined IIT between developing countries and developed countries. Incidentally, none of the ECOWAS countries were included in the developing countries used in the studies.

This study was able to achieve the three objectives that were set out in the study. The first objective, which was to examine the extent of IIT in final and intermediate products between selected ECOWAS countries and EU. The study found that IIT that emerged in early 2000 between ECOWAS and EU was very low final and intermediate products. Moreover, IIT between ECOWAS and EU have been increasing since its emergence. Also, while the final products that have IIT were fewer compared to intermediate products that have IIT, the intensity of IIT was higher in final products in the three selected ECOWAS countries. The factors predicted by the North-South model with product differentiation were found to promote IIT in final and intermediate products between selected ECOWAS countries and EU

6.3 Recommendations

This study has confirmed the existence of IIT between the three selected ECOWAS countries and the EU. The magnitude of the type of trade has also been calculated. Similarly, the factors that can either promote or hinder IIT have been identified. Arising from the findings of this study it is expedient to give some recommendations to ECOWAS as a regional body and each of the ECOWAS countries selected for this study on how to increase IIT with their highest trade partners and other trade partners by extension. Consequently, the following suggestions are made:

- The three ECOWAS countries selected for this study account for about 80 per cent of the region's exports. Large proportion of exports of these countries has been going to the developed world. As a way of solving the problem of low intra-regional trade in West Africa, the three ECOWAS countries that have shown potentials in certain products to the extent of engaging in two way trade with the EU should be encouraged to trade among each other.
- This is arising from the fact that all the products in which the selected ECOWAS countries exchanged with the EU are those differentiated by quality (vertical IIT) rather than varieties (horizontal IIT). Efforts should be made by the ECOWAS countries to enhance better quality of their products this will further promote IIT between them and other developed economies especially the EU.
- As regards the inconclusive Economic Partnership Agreement between

ECOWAS and EU, the magnitude of IIT between the two regions does not suggest that ECOWAS should accept the agreement as it were. However, for the sake of long term trade relations that have existed between the two regions, Nigeria in particular could identify the products in which she has IIT and use that as bases for negotiation, since Ghana and Cote d'Ivoire are already on interim adoption of EPA.

- The selected ECOWAS countries, especially Nigeria should intensify efforts in diversifying their economies from crude products to industrial ones.
- This study showed that the inward foreign direct investment has positive significant impact on IIT in intermediate products, this suggests that the inward foreign direct investment into the ECOWAS countries is efficiency seeking. Hence, more efficiency seeking inward foreign direct investment should be encouraged by the ECOWAS countries. This will not only promote IIT but also enhance knowledge transfer, which will ultimately encourage production of industrial products in the ECOWAS countries.

6.4 Agenda for future research

IIT is very wide in scope; hence a single study may not be able to cover all the aspects of IIT. Similarly, the scope of this study was limited to three selected countries in ECOWAS against the EU. Future study can redefine this scope to have more insight and information needed for policy making between the two regions.

- Although the three ECOWAS countries considered in this study account for about 80 per cent of the region's export, more ECOWAS countries could be considered in future studies
- The EU countries were considered as a region in this study, future research could consider the individual EU countries that are major ECOWAS trade partners.
- Only product of goods were analysed in this study, future research could be done on IIT in services between the trade partners.

REFERENCES

Abd-el-Rahman, K. 1991. Firms' competitive and national comparative advantages as joint determinants of trade composition. *Weltwirtschaftliches Achive*[35], 127:83-97.

Adenikinju, F.A and Alaba O.B. 2004. EU-ECOWAS EPAs: Implication for non-agricultural market access for ECOWAS countries, *Paper Prepared for ILEAP, Canada and TPRTP, Ibadan.*

Alaba, O.B. 2005, Negotiations on non-agricultural market access: West Africa's positions in WTO, EPA and AGOA, A draft report submitted to ILEAP, Canada

Al-Mawali, N. (2005), Country-specific Determinants of vertical and horizontal intra-industry trade of South Africa: an empirical investigation, *South African Journal of Economics*, 73(3): 406-25.

Amiti, M., and Venables, A. J. 2002. The geography of intra-industry trade. in p. j. Lloyd and H. Lee (Eds.), frontiers of research in Intra-Industry Trade. Basingstoke: *Palgrave MacMillan.*

Aquino, A. 1978. Intra-industry trade and inter-industry specialisation as concurrent sources of international trade in manufactures. *Weltwirtschaftliches Archive*, vol. 114, pp.275-296.

Balassa B. 1966 Tariff reductions and trade in manufactures among industrial countries, *American Economic Review* 56. 466-73

Balassa, B. and Bauwens, L. 1988. Inter-industry and intra-industry specialisation in manufactured goods. *Weltwirtschaftliches Archive*, Bd. 124, H. 1, pp. 1-13

Balassa, B. 1986a. Intra-industry trade among exporters of manufactured goods. In G. Greenaway and p. K. M. Tharakan (eds.), Imperfect competition and international trade. atlantic highlands, N.J.: *Humanities Press; Brighton, Sussex: Harvester Press.*

Balassa, B. 1986b. Intra-industry specialisation: a cross-country analysis. *European Economic Review 30 (1): 27-42.*

[35] Weltwirtschaftliches Achive is the French name of Review of World Economics. Founded in 1913 under the name of Weltwirtschaftliches Archiv, it is the world's first journal focusing on international economics.

Balassa, B., and Bauwens, L. 1987. Intra-industry specialisation in a multi-country and multi-industry framework. *Economic Journal* 97 (December): 923-939.

Balassa, B., and Bauwens, L. 1988a. Inter-industry and intra-industry specialisation in manufactured goods. *Review of World Economics/Weltwirtschaftliches Archiv 124 (1): 1-13.*

Balassa, B., and Bauwens L. 1988b. The determinants of intra-European trade in manufactured goods. *European Economic Review* 32 (7): 1421-1437

Bano, S., 2009. Women in parliament in Pakistan: problems and potential solutions. Women Stud. J. ,23(1): 19-35.

Beaulieu, E, Benarroch, M. and Gaisford, J. 2004 Intra-industry trade liberalization, wage inequality and trade policy preferences. Department of Economics, *University of Calgary, 2500 University Drive N.W., Calgary*

Becuwe, S. and Mathieu, C. 1992 The determinants of intra-industry trade: the case of the automobile industry. *Weltwirtschaftliches Archiv*, Bd. 128, H. 1, pp. 34-51

Bergstrand, J. H. and Egger, P. 2006 Trade costs and intra-industry trade. *Weltwirtschaftliches Archiv, Vol. 142, No. 3, pp. 433-458.*

Bergstrand, J. H. 1990. The heckscher-ohlin-samuelson model, the linder hypothesis and the determinants of bilateral Intra-industry Trade *The Economic Journal*, 100, Dec., 1216-1229.

Blanes, J., and Martin, C. 2000. The nature and causes of Intra-Industry trade: back to the comparative advantage explanation? the case of Spain. *Review of World Economics/Weltwirtschaftliches Archiv 136 (3): 423-441.*

Bano, S. 2009. Closer economic relation (CER), Intra-industry trade and inter-industry trade intensities: evidence for New Zealand. *University of Waikato Working Paper*.

Bouwmeester, M. C. and Oosterhaven, J. 2008. International fragmentation, specialisation and comparative advantage: an asian-pacific input-output approach, *International Input Output Meeting on Managing the Environment.*

Brander, J. and Krugman, P. 1983. A Reciprocal Dumping Model of International Trade, *Journal of International Economics*, 15 (3-4), 313-321.

Brülhart, M. 1994. Marginal Intra-industry trade: measurement and relevance for the pattern of industrial adjustment. *Review of World Economics/Weltwirtschaftliches Archiv 130 (3): 600-613.*

Busse, M., Borrmann, A. and Grossmann, H. 2004. The impact of ACP/EU economic partnership agreements on ECOWAS countries: an empirical analysis of the trade and budget effects. *Hamburg Institute of International Economics Department World Economy. Prepared for the Friedrich-Ebert-Stiftung*

Burange L. G. and Chaddha S. J. 2008. Growth in India's intra-industry trade. *Department of economics, university of mumbai, Working Papers. UDE24/2/2008*

Byun, J. and Lee, S. (2005), Horizontal and vertical intra-industry trade: new evidence from Korea, 19991-1999, *Global Economy Journal*, 5(1): 1-29.

Cabral, M., Falvey, R. and Milner C. 2007. Vertical intra-industry trade and differences in endowments: revisiting the empirical evidence. *Working Papers*. 02/12/2007

Caetano, J. and Galego, A. 2007. In search for the determinants of intra-industry trade within an enlarged Europe. *South-Eastern Europe Journal of Economics 2 163-183. University of Évora*

Caves, R. E 1981. Intra-industry trade and market structure in the industrial countries. *Oxford Economic Papers, New Series, Vol. 33, No. 2, pp. 203-223*

Chang, K., 2009. Intra-industry trade between Japan and east asian countries in the agri-food sector: patterns and determinants. *Department of Applied Economics , National Chung Hsing University,Taiwan*.

Chiba, T. 1994. product quality, factor endowment and international trade: an empirical test of the neo-heckscher-ohlin theory for Japan. *Econ. of Hokkaido Univ.,Vol. 23 (1994), pp.139~150.*

Clark, D. P. and Stanley, D. L. 1999. Determinants of intra-industry trade between developing countries and the United States. *Journal of Economic Development Volume 24, Number 2*

Clark, D. P, Fullerton, T. M, and Burdorf, D. 2001. Intra-industry trade between the United States and México. *Estudios Económicos, Vol*. 16, No. 2 (32), pp. 167-183

Clark, D. P. 1993. Recent evidence on determinants of intra-industry trade. *Weltwirtschaftliches Archiv, Bd.* 129, H. 2 (1993), pp. 332-344

Crespo, N, and Fontoura, M. P. 2001. Determinants of the pattern of horizontal and vertical Intra-industry trade: what can we learn from Portuguese data? *Global Business & Economics Review-Anthology* 2001.

Crespo, N. and Fontoura, M. P. 2004. Intra-industry trade by types: what can we learn from portuguese data? *Review of World Economics*/Weltwirtschaftliches Archiv, Vol. 140, No. 1, pp. 52-79

Culem, C, and Lundberg, L. 1986. The product pattern of intra-industry trade: stability among countries and over time. *Review of World Economics/Weltwirtschaftliches Archiv 122 (1): 113-130.*

De Ghellinck, P, Geroski, P. K, and Jacquemin, A. 1988. Inter-industry variations in the effect of trade on industry performance. *The Journal of Industrial Economics, Vol. 37, No. 1, pp. 1-19*

Dixit, A. K. and Stiglitz, J. 1977. Monopolistic competition and optimum product diversity." *American Economic Review,* 27, *pp: 217-38*

Damoense, M. Y. and Jordaan, A. C. 2007. Intra-industry trade: a methodology to test the automobile industry in south africa. *University of Pretoria, Department of Economics. SAJEMS NS 10 (2007) No 1*

Durkin, J.T., Krygier, M., 2000. Differences in GDP per capita and the share of intra-industry trade: the role of vertically differentiated trade. *Rev. Int. Econ*. 8 (4), 760–774.

Ekanayake, E. M. 2001. Determinants of intra-industry trade: the case of Mexico. *The International Trade Journal, Volume XV, no. 1, Spring 2001*

Ethier, W. J. 1979. International decreasing cost and World trade. *Journal of International Economics, Vol. 9(1), February: 1-24.*

--- 1982. National and international returns to scale in the modern theory of international trade. *The American Economic Review, Vol. 72, June: 389-405.*

--- 2000. Dixit-stiglitz, trade, and growth. *University of Pennsylvania, Department of Economics, Mimeo, November, 2000.*

Evenett, S.J., Keller, W., 2002. On theories explaining the success of the gravity equation. *Journal of Political Economics. 110 (2), 281–316.*

Erlat, G, and Erlat, H 2003. Measuring intra-industry and marginal intra-industry trade: the case for turkey. *Emerging Markets Finance & Trade, Vol. 39, No. 6 (Nov. - Dec., 2003), pp. 5-38*

Falvey, R.E. 1981, Commercial policy and intra-industry trade, *Journal of International Economics*, 11, Nov., 495-511.

Falvey, R. E., and Kierzkowski, H. 1987. Product quality, intra-industry trade, and (im)perfect competition, in Protection and Competition in International Trade: Essays in Honor of Max Corden, (Ed.) H. Kierzkowski, Basil Blackwell.

Faustino, H and Leitão, N. C. 2007. Country-specific determinants of intra-industry trade in Portugal. *School of Economics and Management. Working Papers*.

Feenstra, Robert C. and Hanson, Gordon H. 1997. Foreign direct investment and relative wages: evidence from Mexico's Maquiladoras. *Journal of International Economics. Vol.42:371-393.*

---1996. Globalization, outsourcing, and wage inequality. *American Economic Review.Vol.86 (2): 240-245.*

--- 1997. Productivity measurement and the impact of trade and technology on wages: estimates for the U.S., 1972-1990. *NBER Working Paper no.6052, June*.

---2001. Global production and rising inequality: a survey of trade and wages. *NBER, February.*

Ferto, I., 2005. Vertically Differentiated Trade and Differences in Factor Endowment: The Case of Agri-Food Products between Hungary and the EU. *Journal of Agricultural Economics 56, 117-134.*

Ferto, I. and L. J. Habbard, 2001. intra-industry trade in Agri-Food Products between Hungary and the EU. Department of Agricultural Economics and Food Marketing, University of Newcastle, UK. *Paper prepared for presentation at the annual meeting of the American Agricultural Economics Association. Chicago, August 5-8, 2001*.

Finger, J. M, 1975. Trade overlap and intra-industry trade, *Economic Inquiry 13(4) 581-589.*

Flam, H. 1979. The rybczynski theorem in a model with non-traded goods and indecomposable inter- industry flows. *International Economic Review, Vol. 20, No. 3, pp. 661-670*

Flam, H., and Helpman E. 1987, Vertical product differentiation and north-south trade, *The American Economic Review*, 77, Dec., 810-822.

Fontagné, L. and Freudenberg, M. (1997), Intra-industry trade: Methodological Issues Reconsidered, Centre for CPEII WP 1997-01, Paris.

Fontagné, L, Freudenberg, M & Gaulier, G. 2005. Disentangling horizontal and vertical intra-industry trade. *CEPII, Working Paper No 2005-10*

Fontagné, L, Freudenberg M, and Gaulier G. 2005. A systematic decomposition of world trade into horizontal and vertical intra-industry trade. *CEPII and Université de Paris I*

Fukasaku, K. 1992. Economic rationalization and intra-industry trade: Pacific-Asian perspectives. *OECD Technical Papers 53. Paris*.

Gabrisch, H. (2006), Vertical intra-industry trade between EU and Accession Countries, IHW Discussion Paper, No. 12, July 2006.

Gabszewicz, J., A. Shaked, J. Sutton, and J. Thisse, 1981 International trade in differentiated products, *International Economic Review.* Vol 22, pp 8.

Gebreselasie, T. G. and Jordaan A. C. 2009. Intra-industry trade in the manufacturing sector of South africa *South African Journal of Economics*

Glejser, H., Goossens, K. and Vanden, E. 1979, Inter-industry and intra-industry specialisation do occur in World trade. *Economic Letters*, pp. 261-6

Globerman, S. 1992. North American trade liberalization and intra-industry trade. *Weltwirtschaftliches Archiv*, Bd. 128, H. 3, pp. 487-497

Globerman, S. and. Dean, J. W 1990. Recent trends in intra-industry trade and their implications for future trade liberalization. *Weltwirtschaftliches Archiv, Bd. 126, H. 1, pp. 25-49*

Gorecki, P. K 1975. An inter-industry analysis of diversification in the U.K. manufacturing sector. *The Journal of Industrial Economics, Vol. 24, No. 2 pp. 131-146*

Gray, H. Peter 1973. Two-way international trade in manufactures: a theoretical underpinning. *Weltwirtschaftliches Archiv, Vol. 109, pp. 19-39.*

Gray, H. P. 1988. Intra-industry trade: an "untidy" phenomenon. *Weltwirtschaftliches Archiv,* Bd. 124, H. 2, pp. 211-229

Greenaway, D 1983. Intra-industry and inter-industry trade in Switzerland. *Weltwirtschaftliches Archiv,* Bd. 119, H. 1, pp. 109-121

Greenaway, D, and Milner, C. 1981. Trade imbalance effects in the measurement of intra-industry trade. *Weltwirtschaftliches Archiv*, Bd. 117, H. 4, pp. 756-762.

Greenaway, D., and Milner, C. 1984, "A cross section analysis of Intra-industry trade in the UK.," *European Economic Review*, 25, Aug., 319-344

Greenaway, D., and Milner, C. 1984b, *The Economics of intra-industry trade*, Oxford: Basil Blackwell

Greenaway, D., R. Hine, and Milner, C. 1998, Vertical and horizontal intra-industry trade: a cross industry analysis for the United Kingdom, *The Economic Journal*, 105, Nov., 1505-1518.

Groshen, L. E. 1991 Sources of intra-industry wage dispersion: how much do employers matter? *The Quarterly Journal of Economics*, Vol. 106, No. 3, pp. 869-884

Grubel, H.G., and Lloyd, P.J. 1975, Intra-industry trade: the theory and measurement of international trade in differentiated products, *London, Macmillan.*

Grubel, H. G., 1981, The theory of intra-industry trade. In: R. E. Baldwin and J. D. Richard (Eds.): international trade and finance. Little, Brown and Company, Boston/Toronta

Gujarati, D. N. 2005, *Basic Econometrics*, Tata McGraw-Hill Edition

Hamilton, C. P. Hardin, J. W., and Hilbe J. (2001). Generalized Linear Models and Extensions. College Station, Texas: Stata Press.

Hansson, P.1991. Determinants of intra-industry specialisation in Swedish foreign trade. *The Scandinavian Journal of Economics,* Vol. 93, No. 3, pp. 391-405

Havrylyshyn, O. and Civan, O. 1983. Intra-industry trade among developing countries. *Journal of Development Economics* 18 (1985) 253-271, *North-Holland*.

Havrylyshyn, O. and Kunzel, P, 1997, Intra-industry trade of Arab countries Washington: IMF Working Paper, wp/97/47.

Hellvin, L 1996. Vertical intra-industry trade between china and OECD countries. *OECD Technical Paper 114. Paris.*

Helpman, E. 1981. International trade in the presence of product differentiation, economies of scale and monopolistic competition. *Journal of International Economics*, 11 (3), pp: 305-40

Helpman, E. and Krugman, P. R. 1985. Market structure and foreign trade: increasing returns, imperfect competition and the international economy. *Cambridge, Mass: MIT Press*

Hu, X. and Ma, Y. 1999 International intra-industry trade of China *Weltwirtschaftliches Archiv (Review of World Economics)*, Jan. 1999, Vol.135, No.1, pp.82-101, Kiel Institute for World Economics, Germany.

Hufbauer, G. C. 1970 The impact of national characteristics and technology on the commodity composition of trade in manufactured goods in Vernon (Eds.) (1970)

Hughes, K. S. 1993. Intra-industry trade in the 1980s: a panel study. *Weltwirtschaftliches Archiv*, Bd. 129, H. 3, pp. 561-572

Kandogan, Y. 2003. Intra-industry trade of transition countries: trends and determinants. *Emerging Markets Review* 4 (2003) 273–286

Keller, W. (1999), How trade patterns and technology áows a§ect productivity growth, NBER Working Papers 6990, National Bureau of Economic Research, Inc

Kind, K. and Hathcote, J. (2004). Fabric trade: an Industry in crisis, *Global Economy Journal*, 4(2): 1-20

Kol, J. and Rayment P.1989. Specialisation and intermediate goods in intra-industry trade, in: Intra-industry trade: theory, evidence and extensions, (Eds) by P.K.M. Tharakan and Jacob Kol. New York: St Martin's Press 1989.

Krugman, P.R 1979. Increasing Returns, Monopolistic Competition and International Trade, *Journal of International Economics*, 9, 469-79.

Krugman, P.R. 1980. Scale Economies, Product Differentiation and the Pattern of Trade. *American Economic Review*, 70, pp: 950-59

Krugman, P.R 1981. Intra-industry specialisation and the gains from trade, *Journal of Political Economy*, 89, Oct., 959-973.

Krugman, P.R and Obstfeld, 2003. *International economic theory and policy*. Pearson Education, Fourth Edition

Lawrence, C. and Spiller, P. 1983. Product diversity, economies of scale and international trade, *Quarterly Journal of Economics*. Vol 113, pp 63-83.

Lancaster, K. 1980. Intra-industry trade under perfect monopolistic competition, *Journal of International Economics*, 10, May, 151-175.

Lee, Y. (1989) A Study of The Determinants of intra-industry trade Among the Pacific Basin Countries, *Review of World Economics/Weltwirtschaftliches Archiv*, 125, (2): 346-358.

Lee, H. and Lee Y, 1993. Intra-industry trade in manufactures: the case of Korea. *Weltwirtschaftliches Archiv*, Bd. 129, H. 1, pp. 159-171

Lee, J. and Han, S. 2008. Intra-industry trade and tariff rates of Korea and China. *China Economic Review* 19 (2008) 697–703

Leitao, N. C., Faustino, H. C., and Yoshida, Y. 2010. Fragmentation, vertical intra-industry trade, and automobile components. *Economic Bulletin*, Volume 30, Issue 2.

Li, D, Moshirian F, and Sim, A. 2003. The Determinants of intra-industry trade in insurance services *The Journal of Risk and Insurance, Vol. 70,* No. 2, pp. 269-287

Linder, S. B. 1961. *An essay on trade and transformation, New York, John Wiley*.

Liao, C. H. 2006 Heterogeneity of North-South Sectorial Intra-industry trade: A Demand-Side Approach, mimeo.

Loertscher, R and Wolter, F. 1980. Determinants of Intra-industry trade: among countries and across industries. *Weltwirtschaftliches Archiv*, Bd. 116, H. 2, pp. 280-293

Lipsey, R. E, 1976. Review of Herbert G. Grubel, P.J. Lloyd, Intra-industry trade, *Journal of International Economics* 6, 312-314.

Lovely, M. E. and Nelson D. R. 2002. Intra-industry trade as an indicator of labor market adjustment. *Weltwirtschaftliches Archiv*, Bd. 138, H. 2, pp. 179-206

Lundberg, L. 1982. Intra-industry trade: the case of Sweden. *Weltwirtschaftliches Archiv*, Bd. 118, H. 2, pp. 302-316

Markusen, J.R., 1995. Incorporating the multinational enterprise into the theory of international trade. *Journal of Economic Perspectives* 9, 169–189.

Madela, K. 2010. From the lome convention to the economic partnership agreements: An assessment of trade relations between the ECOWAS and the EU. A thesis submitted in partial fulfilment of the requirement for a master degree in International Relation, University of Witwatersrand, Johannesburg.

Manrique, G.G. 1987. Intra-industry trade between Developed and Developing Countries: the United States and the NICs *The Journal of Developing Areas*, Vol. 21, No. 4 (Jul., 1987), pp. 481-494

Martín-Montaner, J. A. and Orts Ríos, V. 2002. Vertical specialisation and intra-industry trade: the role of factor endowments. *Weltwirtschaftliches Archiv*, Bd. 138, H. 2, pp. 340- 365

Marvel, H. P., and E. J. Ray, 1987. Intra-industry trade: sources and effects on protection, *Journal of Political Economy*, 95, Dec., 1278-1291.

Mc Mahon, O. 2003. Intra-industry trade: the EU and South Korea. *Asia in Extenso, June 2003*

Melitz, J. M. 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*

Musonda, F. M. 1997. Intra-industry trade between members of the PTA/COMESA regional trading arrangement. *African Economic Research Consortium (AERC)*

Nielsen, J. U. and Lüthje, T., 2002. Tests of the empirical classification of horizontal and vertical intra-industry trade. *Weltwirtschaftliches Archiv*, Bd. 138, H. 4, pp. 587-604

Nilsson, L. 1999. The measurement of intra-industry trade between unequal partners. *Weltwirtschaftliches Archiv*, Bd. 133, H. 3, pp. 554-565.

Niroomand, F. 1988. Inter- versus intra-industry trade: a note on U.S. trends, 1963-1980 *Weltwirtschaftliches Archiv*, Bd. 124, H. 2, pp. 337-340

Ofa, S. V., Spence, M., Mevel, S. and Karingi, S. 2012. Export diversification and intra-industry trade in Africa. *Paper Presented at the African Economic Conference 2012, Kigali, Rwanda,* 30 October – 2 November 2012.

Oguro, Y., K. Fukao, and Khatri, Y. (2008) Trade Sensitivity to Exchange Rates in the Context of intra-industry trade, *IMF Working Paper* 08/134.

Oyejide, T.A. 2004. African in the negotiation of economic partnership agreements with the EU. *Paper prepared for the AERC collaborative research project on African imperatives in the new world order – Dissemination Workshop*, 16-17 November, 2004, Dar es Salaam, Tanzania.

Oyejide, T.A. 2005. Negotiations and aid for trade: West African perspectives and priorities, A draft report submitted to ILEAP, Canada.

Oyejide T.A, Bankole A.S., Alaba O. and Adewuyi A. 2005. Strengthening investment instruments for ACP countries: The demand and supply sides of the investment equation within the ECOWAS region in relation to ACP-EU arrangements, *A report submitted to the Commonwealth Secretariat (May).*

Pagoulatos, E., and Sorensen, R. 1975. Two-way international trade: an econometric analysis, *Weltwirtschaftliches Archiv*, 111, 454-465.

Papke, I. E. and Wooldridge, J. M. (1996). Econometric methods for fractional response variables with an application to 401(k) plan participation rates. *Journal of Applied Econometrics*, 11960, 619-632.

Patel, K. 2007. Economic Partnership agreements between the EU and African Countries: potential development implications for Ghana Report. *The Ethical Globalisation Initiative.*

Pomfret, R. 1991. *International trade: an introduction to theory and policy*. Cambridge, M.A.: Blackwell.

Prebisch, R., 1950. The economic development of Latin America and its principal problems. Economic Bulletin for Latin America 7, 1-12.

Rasekhi, S. 2008. The Study of intra-industry trade in agricultural products of Iran. American-*Eurasian J. Agric and Environ. Science, 2 (Supple 1) 12-19, 2008.*

Rayment, P. B. W. 1983. Intra-industry Specialisation and the Foreign Trade of Industrial Countries, in S.F. Frowen (Eds.), *Controlling Industrial Economies, Essays in Honour of C.T. Saunders* (London: Macmillan), pp.1-28.

Ray, E. J. 1991. U.S. Protection and intra-industry trade: The Message to Developing Countries, *Economic Development and Cultural Change*, 40, Oct., 169-187.

Reganati, F. and Pittiglio, R. 2003. Vertical intra-industry trade: patterns and determinants in the Italian case.

Ruffin, R. J 1999. The Nature and significance of intra-industry trade. *Federal Reserve Bank of Dallas.*

Sanyal, K. K. 1983. Vertical specialisation in a ricardian with continuum of stages of production *Economica*, Vol. 50: 71-78.

Sanyal, K. K. and Jones, R. W. 1982. The Theory of Trade in Middle Products. *The American Economic Review*, Vol. 72 (1): 16-31.

Schuler, M. K. 1995. On intra-industry trade in intermediates, *Economia Internazionale*, Vol. 48(1), 67-84.

Shahbaza M, and Leitãob N. C. 2010. Intra-industry trade: The Pakistan experience *International Journal of Applied Economics*, 7(1), March 2010, 18-27

Shaked, A. and Suttan, J. 1982. Relaxing price competition through product differentiation. *The Review of Economic Studies*, 49, pp: 3-13

Shaked, A. and Suttan, J. 1983. Natural oligopolies. *Econometrica*, 51, pp: 1469-83

Shaked, A. and J. Suttan 1984. Natural oligopolies and international trade. In Henryk Kierzkowski (Eds.), *Monopolistic Competition and International Trade*, Oxford, pp: 34-50

Shaked, A. and Sutton J. 1984. Product differentiation and industrial structure, *Journal of International Economics.* Vol 36, pp 13 1-146.

Sharma, K. (2004), Horizontal and vertical intra-industry trade in Australian Manufacturing: Does Trade Liberalisation Have Any Impact? *Applied Economics*, 36: 1723-30.

Sichei M. and Harmse C. 2004. Determinants of South Africa-US intra-industry trade in services: a panel data analysis. *Presented at the African Econometric Society Conference* in Cape Town July, 2004

Siddharthan N. S. and Kumar N 1990. The determinants of inter-industry variations in the proportion of intra-firm trade: the behaviour of US multinationals. *Weltwirtschaftliches Archiv*, Bd. 126, H. 3, pp. 581-591

Siggelkow N, 2003. Why focus? a study of intra-industry focus effects. *The Journal of Industrial Economics*, Vol. 51, No. 2, pp. 121-150

Singer H. W. 1950 The Distribution of Gains between Investing and Borrowing Countries, *American Economic Review*. 40 473-85

Siriwardana A. M. 1990. Intra-industry trade: a note on new evidence from Australia, 1968– 1982 *Weltwirtschaftliches Archiv*, Bd. 126, H. 1, pp. 165-172

Stone, J. A, and Lee, H 1995. Determinants of intra-industry trade: a longitudinal, cross-country analysis. *Weltwirtschaftliches Archiv*, Bd. 131, H. 1, pp. 67-85

Sunde, T., Chidoko C. and Zivanomoyo, J. 2009. Determinants of intra-industry trade between zimbabwe and its trading partners in the Southern African development community region (1990-2006*) Journal of Social Sciences* 5(1): 16-21, 2009

Tharakan, P. K. M and Kerstens, B. 1995. Does North—South horizontal intra-industry trade really exist? an analysis of the toy industry. Weltwirtschaftliches Archiv, Bd. 131, H. 1, pp. 86-105

Tharakan, P. K. M. 1986. The intra-industry trade of Benelux with the Developing World. *Weltwirtschaftliches Archiv*, Bd. 122, H. 1 (1986), pp. 131-149

Thom, R. and McDowell, M. 1999. Measuring marginal intra-industry trade. *Weltwirtschaftliches Archiv*, Bd. 135, H. 1, pp. 48-61

Toh, K. 1982. A cross-section analysis of intra-industry trade in U.S. manufacturing industries, *Weltwirtschaftliches Archiv*, 118, 281-301.

Torstensson, J. 1996. Technical differences and inter-industry trade in the Nordic countries. *The Scandinavian Journal of Economics*, Vol. 98, No. 1, pp. 93-110

Türkcan, K. 2005. Determinants of intra-industry trade in final goods and intermediate goods between turkey and selected OECD countries. *Ekonometrive İstatistik Sayı:1* 2005 15-05.

Türkcan, K. 2007. Outward foreign direct investment and intermediate goods trade: evidence from the USA, *Economie Internationale*, Vol. 112 (4), 51-71.

Türkcan, K. 2009. Vertical intra-industry trade: an empirical examination of the Austria's auto-parts industry. *FIW Working Paper* No 30 May 2009

Turkcan, K. and Ates, A. 2009. Structure and determinants of intra-industry trade in the U.S. Auto-industry, *Journal of International and Global Economic Studies*

Veeramani, C. 2007. Intra-industry trade of India: trends and country-specific factors. *Weltwirtschaftliches Archiv*, Bd. 138, H. 3, pp. 509-533

Verdoorn, P. J. 1960. The Intra-Bloc trade of Benelux, in Robinson (Ed) (1960)

Williamson, J. and Milner C. 1991. *The World Economy: A Textbook in International Economics*. New York, London: Harvester/ WheatSheaf

Yeats, A. 2001. Just how big is global production sharing? In S. Arndt and H. Kierzkowski, Eds. *Fragmentation: New Production Patterns in the World Economy*. New York: Oxford University Press. pp. 108–43

Zeddies, G. 2008. Determinants of international fragmentation of production in the European *Union Halle Institute for Economic Research (IWH*)

Zejan, M.C. 1989. Intra-firm trade and Swedish multinationals. *Weltwirtschaftliches Archiv, Bd. 125, H. 4, pp. 814-833*

Zhang, J, Witteloostuijn J, Zhou C 2005. Chinese bilateral intra-industry trade: a panel data study for 50 countries in the 1992-2001 period. *Review of World Economics / Weltwirtschaftliches Archiv*, Vol. 141, No. 3, pp. 510-540.

Zhigang, Z. 1999. Determinants of China's intra-industry trade in manufactures (1984-1994): a tobit cum fixed effect panel data model application. *Goteborg University Conference Paper*

Appendices

Table A-1: Average Intra-Industry Trade Computed with Adjusted Grubel Lloyds Index for Final Products in Cote d'Ivoire

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	Non	Non	non	Non	non	Non	Non	non	Non	Non	Non
Vegetable Products	0.3915	0.2146	0.5713	0.7129	0.6758	0.7180	0.6296	0.5403	0.6733	0.7053	0.7895
Animal or Vegetable Fats	0.1561	0.1957	0.3624	0.2117	0.3184	0.3778	0.3053	0.3382	0.4964	0.5198	0.5182
Prepared Foodstuffs; Beverages	0.3855	0.4779	0.3142	0.4578	0.4167	0.4576	0.5195	0.5090	0.4045	0.5393	0.5324
Mineral Products	0.8953	0.6349	0.9752	0.5976	0.5944	0.7943	0.4138	0.9009	0.9356	0.6286	0.7018
Products of the Chemicals	0.3798	0.3245	0.4536	0.3885	0.4952	0.5705	0.5044	0.4576	0.6582	0.4024	0.2495
Plastics and Articles thereof	Non	Non	non	Non	non	non	Non	non	Non	Non	Non
Raw Hides and Skins, Leather	0.2351	0.6584	0.2398	0.2782	0.2994	0.2316	0.1985	0.0698	0.4124	0.2274	0.4214
Wood and Articles of Wood	0.5697	0.4327	0.3254	0.4197	0.3267	0.3967	0.2033	0.2885	0.6195	0.4552	0.3901
Pulp of wood and Fibrous	0.7316	0.2321	0.1701	0.2431	0.1912	0.3524	0.4136	0.2115	0.3190	0.2824	0.3607
Textile and Textile Articles	0.3616	0.4292	0.2951	0.4550	0.5699	0.4097	0.3221	0.3140	0.4555	0.3262	0.4221
Footwear, Headgear, Umbrellas	0.2029	0.1744	0.3151	0.2115	0.2386	0.2376	0.3039	0.3446	Non	0.3774	0.3582
Articles of Stone, Plaster, Cement	0.1823	0.2391	0.3388	0.2449	0.1241	0.2996	0.3974	0.1337	0.3693	0.5006	0.6145
Natural or Cultured Pearls, Precious Stones	0.1642	0.3654	0.5502	0.3552	0.3177	0.3773	0.1658	0.1097	0.1785	0.5845	0.8441
Base Metals and Articles of Base Metal	0.1604	0.4590	0.2783	0.4925	0.4236	0.2561	0.2818	0.2728	0.5101	0.4204	0.6195
FINAL PRODUCTS	**0.3705**	**0.3722**	**0.3992**	**0.3899**	**0.3840**	**0.4215**	**0.3584**	**0.3454**	**0.5027**	**0.4592**	**0.5248**

Table A-2: Average IIT Computed with Adjusted Grubel Lloyds Index for Intermediate Products in Cote d'Ivoire

Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	Non	non	Non	Non	Non	non	non	non	Non	Non	Non
Vegetable Products	0.3427	0.3544	0.4083	0.5069	0.5991	0.6254	0.6860	0.5009	0.5883	0.7159	0.6498
Animal or Vegetable Fats	0.1904	0.2630	0.4122	0.484	0.5219	0.5425	0.560	0.3013	0.3165	0.2215	0.2426
Prepared Foodstuffs; Beverages	0.2087	0.2153	0.2100	0.2705	0.3958	0.1971	0.2150	0.1958	0.3291	0.2865	0.1891
Mineral Products	0.2149	0.3607	0.1767	0.3036	0.6186	0.3756	0.2821	0.4989	0.3855	0.2170	0.2330
Products of the Chemicals	0.1867	0.1981	0.4512	0.2841	0.2748	0.2121	0.2165	0.3176	0.1890	0.2069	0.3095
Plastics and Articles thereof	0.3510	0.4607	0.3317	0.3184	0.4161	0.2960	0.5230	0.4118	0.3025	0.3688	0.5694
Raw Hides and Skins, Leather	Non	non	Non	Non	Non	non	non	non	Non	Non	Non
Wood and Articles of Wood	0.2139	0.2396	0.1951	0.4452	0.3415	0.2324	0.2613	0.4984	0.4988	0.5833	0.3431
Pulp of wood and Fibrous	0.2184	0.4522	0.4193	0.4016	0.3896	0.6228	0.5111	0.5984	0.6779	0.5035	0.4779
Textile and Textile Articles	0.4175	0.3383	0.3833	0.4160	0.3082	0.2191	0.4823	0.5650	0.3049	0.4101	0.3194
Footwear, Headgear, Umbrellas	Non	non	Non	Non	Non	non	non	non	Non	Non	Non
Articles of Stone, Plaster, Cement	0.2857	0.1914	0.1940	0.3177	0.1245	0.2119	0.5635	0.2548	0.5051	0.3128	0.3086
Natural or Cultured Pearls, Stones	Non	non	Non	Non	Non	non	non	non	Non	Non	Non
Base Metals and Articles of Base Metal	0.2182	0.2852	0.3737	0.3043	0.5064	0.4591	0.2995	0.4237	0.4211	0.3622	0.5344
INTERNEDIATE PRODUCTS	**0.2589**	**0.3053**	**0.3233**	**0.3684**	**0.4088**	**0.3631**	**0.4182**	**0.4152**	**0.4108**	**0.3808**	**0.3797**

Table A-3: Average IIT Computed with Adjusted Grubel Lloyds Index for Final Products in Ghana											
Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.1685	0.2596	0.2578	0.3885	0.0424	0.2975	0.2046	0.3814	0.3415	0.3683	0.3089
Vegetable Products	0.1303	0.2066	0.1864	0.1952	0.2365	0.3775	0.3410	0.3699	0.2608	0.3751	0.3608
Animal or Vegetable Fats	Non	non	non	Non	Non	Non	non	non	Non	Non	Non
Prepared Foodstuffs; Beverages	0.0142	0.0241	0.1110	0.4510	0.2479	0.3590	0.2118	0.3140	0.2208	0.3876	0.3770
Mineral Products	Non	non	non	Non	Non	Non	non	non	Non	Non	Non
Products of the Chemicals	0.1765	0.1366	0.1934	0.1945	0.5864	0.3667	0.2897	0.4501	0.2092	0.2766	0.3058
Plastics and Articles thereof	0.0145	0.1238	0.1543	0.1930	0.0887	0.1984	0.2362	0.2524	0.3603	0.3594	0.5522
Raw Hides and Skins, Leather	0.1562	0.1237	0.2607	0.1386	0.2113	0.2372	0.3110	0.3525	0.4853	0.5058	0.5629
Wood and Articles of Wood	0.1912	0.2060	0.1711	0.1712	0.2179	0.2811	0.3069	0.3654	0.3500	0.3011	0.4604
Pulp of wood and Fibrous	0.1290	0.1247	0.1227	0.1880	0.2597	0.2065	0.2870	0.2458	0.4511	0.4089	0.4509
Textile and Textile Articles	0.2714	0.1723	0.2360	0.1843	0.1743	0.2441	0.3220	0.3176	0.3189	0.3107	0.3673
Footwear, Headgear, Umbrellas	0.1280	0.2136	0.1630	0.1300	0.2350	0.2433	0.3185	0.3026	0.4819	0.3870	0.3903
Articles of Stone, Plaster, Cement	0.1073	0.2241	0.1913	0.2650	0.2047	0.2315	0.2191	0.2699	0.2387	0.3108	0.3362
Natural Precious Stones	0.0112	0.1528	0.1020	0.1322	0.1594	0.2318	0.3035	0.2372	0.2362	0.2241	0.2975
Base Metals and Articles of Base Metal	0.3282	0.4905	0.4900	0.5755	0.4132	0.4655	0.4227	0.4081	0.5079	0.5181	0.5299
FINAL PRODUCTS	**0.1405**	**0.1891**	**0.2031**	**0.2467**	**0.2367**	**0.2877**	**0.2903**	**0.3282**	**0.3433**	**0.3641**	**0.4077**

Table A-4: Average IIT Computed with Adjusted Grubel Lloyds Index for Intermediate Products in Ghana											
Harmonized System Code List	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.1234	0.0565	0.1749	0.1874	0.1902	0.2756	0.3181	0.3097	0.4398	0.4234	0.7521
Vegetable Products	0.3079	0.4770	0.3086	0.3154	0.3116	0.2478	0.2433	0.2516	0.2707	0.2435	0.3339
Animal or Vegetable Fats	0.2378	0.1789	0.3172	0.4620	0.4105	0.5996	0.5409	0.6092	0.5038	0.5992	0.3983
Prepared Foodstuffs; Beverages	0.1087	0.3677	0.5585	0.4286	0.3427	0.4695	0.4926	0.3121	0.3141	0.3081	0.4221
Mineral Products	0.1415	0.3786	0.1623	0.2497	0.2564	0.3636	0.3346	0.2694	0.3051	0.3417	0.6764
Products of the Chemicals	0.1927	0.2598	0.2136	0.5998	0.1967	0.4272	0.3686	0.3491	0.4068	0.4199	0.4715
Plastics and Articles thereof	0.1146	0.2646	0.3895	0.2478	0.4794	0.5006	0.2104	0.2478	0.3506	0.3408	0.2110
Raw Hides and Skins, Leather	Non	non	non	Non	Non	Non	non	non	Non	Non	Non
Wood and Articles of Wood	0.1423	0.2476	0.3541	0.6973	0.4764	0.4316	0.4366	0.5309	0.1767	0.2645	0.3479
Pulp of wood and Fibrous	0.1511	0.0770	0.0813	0.0768	0.1591	0.0425	0.4706	0.2827	0.5900	0.3418	0.1897
Textile and Textile Articles	0.2600	0.1682	0.2170	0.4886	0.2545	0.2719	0.4373	0.3219	0.5031	0.1683	0.3202
Footwear, Headgear, Umbrellas	Non	non	non	Non	Non	non	non	non	Non	Non	Non
Articles of Stone, Plaster, Cement	0.1941	0.4568	0.7146	0.8854	0.4106	0.4226	0.2158	0.3255	0.3684	0.2448	0.2381
Natural Precious Stones	Non	non	non	Non	Non	non	non	non	Non	Non	Non
Base Metals and Articles of Base Metal	0.0931	0.2092	0.5199	0.2012	0.3861	0.4267	0.2833	0.3658	0.3406	0.2385	0.2634
INTERNEDIATE PRODUCTS	**0.1722**	**0.2618**	**0.3343**	**0.4033**	**0.3228**	**0.3733**	**0.3627**	**0.3480**	**0.3808**	**0.3279**	**0.3854**

Table A-5: Average IIT Computed with Adjusted Grubel Lloyds Index for Final Products in Nigeria												
Harmonized System Code List	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.0999	0.1151	0.1238	0.1412	0.2727	0.1374	0.2898	0.1175	0.2462	0.2987	0.2634	0.1749
Vegetable Products	0.0244	0.0969	0.2674	0.1372	0.1957	0.1331	0.1574	0.2089	0.2983	0.2745	0.3120	0.7455
Animal or Vegetable Fats	Non	non	Non	Non	non	Non	non	Non	Non	non	Non	Non
Prepared Foodstuffs; Beverages	0.0244	0.1282	0.0455	0.0245	0.0679	0.0766	0.1467	0.2871	0.1596	0.1975	0.1548	0.1768
Mineral Products	0.0256	0.1651	0.0257	0.0406	0.1327	0.1072	0.1394	0.1556	0.1055	0.2351	0.2187	0.7835
Products of the Chemicals	0.0026	0.0089	0.1698	0.1617	0.1538	0.6777	0.9607	0.3885	0.5781	0.2685	0.1804	0.7606
Plastics and Articles thereof	0.0192	0.0435	0.0284	0.1228	0.2420	0.2532	0.3866	0.4917	0.1081	0.5096	0.2420	0.2532
Raw Hides and Skins, Leather	Non	non	Non	Non	non	Non	non	Non	Non	non	Non	
Wood and Articles of Wood	0.1895	0.0711	0.1665	0.1653	0.1465	0.1456	0.2708	0.3913	0.4937	0.8653	0.9256	0.9812
Pulp of wood and Fibrous	0.0007	0.0011	0.3893	0.4163	0.8059	0.4609	0.7202	0.5819	0.6087	0.7732	0.8893	0.9727
Textile and Textile Articles	0.1287	0.2906	0.8391	0.7993	0.2671	0.5797	0.2539	0.0756	0.1108	0.5423	0.1493	0.2964
Footwear, Headgear, Umbrellas	0.1203	0.4989	0.4657	0.7423	0.5333	0.7290	0.0353	0.2372	0.5538	0.7706	0.8855	0.1680
Articles of Stone, Plaster, Cement	0.2484	0.1778	0.2045					0.2277			0.1337	0.4610
Natural Precious Stones	Non	non	Non	Non	non	Non	non	Non	Non	non	Non	
Base Metals and Articles of Base Metal	0.5877	0.3768	0.7963	0.3296	0.7339	0.3595	0.4140	0.2078	0.6443	0.6551	0.5559	0.4650
FINAL PRODUCTS	**0.1226**	**0.1645**	**0.2935**	**0.2801**	**0.3229**	**0.3327**	**0.3432**	**0.2809**	**0.3552**	**0.4900**	**0.4092**	**0.5199**

Table A-6: Average IIT Computed with Adjusted Grubel Lloyds Index for Intermediate Products in Nigeria												
Harmonized System Code List	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Animals; Animal Products	0.1314	0.1349	0.2555	0.2233	0.2112	0.3087	0.3712	0.3752	0.4647	0.5132	0.4062	0.7505
Vegetable Products	0.2590	0.1590	0.1254	0.1621	0.1660	0.0768	0.1284	0.1871	0.1727	0.1816	0.1233	0.1202
Animal or Vegetable Fats	0.2499	0.2877	0.2219	0.1256	0.2380	0.2907	0.2690	0.1284	0.2368	0.2980	0.3861	0.3135
Prepared Foodstuffs; Beverages	0.2307	0.1108	0.2670	0.1208	0.2094	0.2547	0.2184	0.3465	0.3386	0.5680	0.5620	0.5497
Mineral Products	0.7891	0.4824	0.3918	0.3583	0.3299	0.3972	0.2877	0.1864	0.1596	0.2445	0.1336	0.1486
Products of the Chemicals	0.1494	0.1739	0.2379	0.1356	0.2066	0.1343	0.1304	0.1168	0.1466	0.1489	0.1249	0.3853
Plastics and Articles thereof	0.2422	0.1388	0.2270	0.2273	0.3763	0.2754	0.2772	0.2749	0.2319	0.2798	0.2756	0.2560
Raw Hides and Skins, Leather	0.1900	0.1668	0.2477	0.2903	0.2935	0.4371	0.3180	0.3982	0.3272	0.3424	0.4238	0.5412
Wood and Articles of Wood	0.2859	0.1839	0.2439	0.2712	0.2658	0.2569	0.2175	0.3234	0.3499	0.5609	0.5643	0.8908
Pulp of wood and Fibrous	0.1995	0.1843	0.1785	0.1261	0.0181	0.1744	0.1441	0.2594	0.3846	0.2476	0.4937	0.7944
Textile and Textile Articles	0.1406	0.1149	0.4812	0.2905	0.2449	0.2143	0.2880	0.2487	0.5587	0.3423	0.3319	0.3088
Footwear, Headgear, Umbrellas	Non	non	Non	Non	non	Non	Non	Non	Non	non	Non	Non
Articles of Stone, Plaster, Cement	0.1587	0.2894	0.4024	0.4443	0.4415	0.5815	0.6656	0.6384	0.7156	0.8421	0.8296	0.5430
Natural Precious Stones	Non	non	Non	Non	non	Non	Non	Non	Non	non	Non	Non
Base Metals and Articles of Base Metal	0.6577	0.4733	0.4897	0.4536	0.4797	0.5937	0.6459	0.7467	0.6093	0.6950	0.6336	0.6270
INTERNEDIATE PRODUCTS	**0.2834**	**0.2231**	**0.2900**	**0.2484**	**0.2678**	**0.3074**	**0.3047**	**0.3254**	**0.3612**	**0.4049**	**0.4068**	**0.4792**

Table A-7**: TRADE PATTERNS: THEORY AND EMPIRICAL PERSPECTIVE.**

Trade Pattern		**Nature of trade**	**Theoretical Foundation**	**Main model of inter and INTRA-INDUSTRY TRADE**		
				Market Structure	**Determinants of trade**	**Main Model**
(One-way trade)		Inter-Industry Trade	Comparative advantage	Perfect Competition	Technological gap and Factor endowments	Ricardian Model Heckscher-Ohlin Model
Intra-industry Trade	VINTRA-INDUSTRY TRADE	Vertically INTRA-INDUSTRY TRADE (Final Product)	Product differentiation based on quality	Perfect Competition	Factor proportion	Falvey (1981) Falvey and Kierzkowski (1987) Flam and Helpman (1987) Durkin and Krygier (2000)
				Imperfect Competition (natural oligopoly)	Fixed costs of R &D	Shaked and Sutton (1984)
		VINTRA-INDUSTRY TRADE(Intermediate Products)	Fragmentation	Perfect Competition	H-O framework with a continuum of intermediate goods, Ricardian model with a continuum of intermediate goods	Sanyal (1983), Hummels et al. (1998), and Deardoff (1998), Feenstra and Hanson (1997) Jones and Kierzkowski (2000)
	HINTRA-INDUSTRY TRADE	Horizontally INTRA-INDUSTRY TRADE (Final Products)	Product differentiation based on attributes	Monopolistic Competition	Demand for brand (Love of variety approach)	Spence (1976) Dixit and Stiglitz (1977) Krugman (1979) Helpman and Krugman (1985)
					Diversity of preferences (ideal variety approach)	Neo-Hotelling model Lancaster (1980) Helpman (1984)
					Reciprocal Dumping Model	Brander and Krugman (1983)
		Horizontally INTRA-INDUSTRY TRADE (Intermediate Products)	Fragmentation	Monopolistic Competition	neo-Chamberlinian models neo-Hotelling models	Ethier (1982) Luthje (2000) Helpman and Krugman (1985)

Source: Authors compilation

Table A-8: SUMMARY OF THE REVIEW OF PREVIOUS EMPIRICAL STUDIES

SN	Author	Scope Data/Sample	Industry/Sector	Underlying Theory	Estimation technique	Measure of INTRA-INDUSTRY TRADE	Type of Trade	Results
1	Clark and Stanley (1999)	Between Developing Countries and the United States 1992 data	Products Sector	Helpman and Krugman (1985)	Limited dependent variable and panel data techniques	Grubel-Lloyd (1975)	Vertical intra-industry	INTRA-INDUSTRY TRADE occurs in non-standard, made-to-order, vertically differentiated, labour intensive products produced by large globally integrated industries. No support is provided for the role of scale economies in determining North-South INTRA-INDUSTRY TRADE.
2	Damoense and Jordaan (2007)	South Africa 2000-2004	Auto mobile Industry	New Trade Theory	Ordinary Least Squares	Grubel-Lloyd index	Vertical intra-industry	The paper proposes a methodology that may be used in future to assess the pattern and determinants of INTRA-INDUSTRY TRADE between South Africa and its main trading partners in the automobile industry.
3	Dias (2000)	South Africa 1988-1993	Manufacturing Sector	Heckscher-Ohlin	Ordinary Least Squares	Grubel-Lloyd index	INTRA-INDUSTRY	Drawing together the regression asserts the proportion that South Africa enjoys a comparative

							TRADE	advantage in the production of capital incentive items which combine the intensive use of natural resources and unskilled labour
4	Ekanayake (2009)	United States and NAFTA	Products	New trade theories	Ordinary Least Squares	Grubel and Lloyd	Horizontal INTRA-INDUSTRY TRADE	This study revealed that the observed increase in INTRA-INDUSTRY TRADE between the United States and NAFTA is almost entirely due to two-way trade in vertical differentiation. Also among the industry-specific variables, product differentiation, vertical product differentiation, and product quality differences are found to have a positive effect on all three types of INTRA-INDUSTRY TRADE shares.
5	Gabrisch (2006)	EU and Accession Countries	Products	New trade theories	OLS and GLS specifications with pooled and panel	Grubel and Lloyd	Vertical INTRA-INDUSTRY TRADE	Results show country-pair fixed effects to be of high relevance for explaining vertical intraindustry trade. In addition, bilateral differences in personal income distribution and their changes are positive related to VINTRA-INDUSTRY TRADEin this special regional integration framework; hence, distributional effects of policies matter. Also, technology differences turn out to be positively correlated with vertical INTRA-INDUSTRY TRADE. However, the cost variable (here: relative GDP

								per capita) shows no clear picture, particularly not in combination with the technology variable.
6	Gebreselasie and Jordan (2009)	South Africa 1994 to 2004	Manufacturing Sector	Helpman theorem	Ordinary Least Squares	Grubel-Llyod	Vertical INTRA-INDUSTRY TRADE	The responsiveness of South Africa's bilateral manufacturing trade to these variables is sound evidence that INTRA-INDUSTRY TRADE constitutes a significant proportion of South Africa's manufacturing trade with the rest of the world
7	Havrylyshyn and Civan (1985)	Among Developing Countries	Products	Chamberlinian Monopolistic competition	Descriptive analysis	Grubel and Lloyd index of INTRA-INDUSTRY TRADE	Horizontal INTRA-INDUSTRY TRADE	The trade of individual NICs with other NICs is well below 10 per cent of their total exports, much lower than among industrial countries. More surprisingly, the level of INTRA-INDUSTRY TRADE is lower among NICs than for NICs with the rest of the world. However, in categories such as capital-intensive products and investment goods, liT is high, although the volume of trade is low.
8	Havrylyshyn and Kunzel (1997)	Arab Countries 1984-1994	Manufacturing	Neo-Heckscher-Ohlin Theory	Logit Regression Analysis	Grubel-Lloyd index		It concludes that whereas increased specialisation has been achieved over the last decade in Arab countries, INTRA-INDUSTRY TRADE remains low, not only in absolute terms, but even in a cross-country comparison.

9	Hu and Ma (1999)	China and Trading Partners	Products	New trade theories	TOBIT regression	Grubel and Lloyd	Vertical and horizontal INTRA-INDUSTRY TRADE	It is revealed that China has possessed the prerequisite of intraindustry trade and that China's INTRA-INDUSTRY TRADE follows the similar patterns of those in developed countries as China is moving towards a market-oriented economy.
10	Kandogan (2003)	Transition Countries1992–1999	Products Sector	Heckscher–Ohlin Trade Theory and Increasing Returns Trade Theory	Panel Data Approach	Kandogan (2003)	Inter-industry and INTRA-INDUSTRY TRADE	Using varieties of gravity models, it is shown that variables from Increasing Returns Trade Theory, such as scale economies, similarity of income levels, and number of varieties produced play important roles in INTRA-INDUSTRY TRADE, especially in horizontal INTRA-INDUSTRY TRADE, whereas factors such as comparative advantage, dissimilarity in income levels, and having more developed trade partners from Heckscher–Ohlin Trade Theory are crucial in determining inter-industry trade and VINTRA-INDUSTRY TRADEto a lesser degree.
11	Lee and Lee (1993)	Korea 1977 – 1986	Manufacturing Products	New trade theories	Logit Regression and nonlinear least squares	Unadjusted G-L Index	INTRA-INDUSTRY TRADE	The result suggests that Korea's trade pattern moved toward that of developed countries during this period. With regard to specific hypotheses, they found that the share of INTRA-INDUSTRY TRADE was negatively correlated with differences in per capita incomes and with

								'economic distances' between Korea and its trading partners, and positively correlated with the trade intensity between Korea and its trading partners and with the existence of a common cultural background
12	Lee and Han (2008)	Korea and China 1999 to 2004	Products	Neo-Heckscher-Ohlin Theory	Factional Logit Model and OLS with logistic transformation	Grubel and Lloyd	INTRA-INDUSTRY TRADE	We also show that the tariff rates of Korea have a negative effect on the share of INTRA-INDUSTRY TRADE between Korea and China. However, the estimation results of FLRM using QMLE do not suggest that the tariff rates of China have a negative effect on the share of INTRA-INDUSTRY TRADE.
13	Liao (2006)	North and South 1988-2003	All Products	DS and Krugman	Ordinary Least Squares	Grubel-Lloyd (1975)	INTRA-INDUSTRY TRADE	Specifically, sectoral INTRA-INDUSTRY TRADE (INTRA-INDUSTRY TRADE) index is jointly determined by similarity of GDP between countries, marginal cost, elasticity of substitution of consumers, and industrial tariffs from both countries. In addition, we include a quality specification in our model and show that North and South can export products with the same or different qualities depending on whether the South finds it profitable or not to be an efficient quality follower of the North. Also, it is shown

								that the INTRA-INDUSTRY TRADE is less intense when consumers consider Northern and Southern products are close substitutes, and vice versa.
14	Lundberg (1988)	Sweden with developing countries	Products Sector	Deardorff (1979)	Ordinary Least Squares	Grubel-Lloyd index	INTRA-INDUSTRY TRADE	This hypothesis is tested on the share of intra-industry trade in Sweden's trade with developing countries for a cross-section of industries, and largely confirmed by the statistical results.
15	Manrique (1987)	Developed and Developing Countries: The United States and the NICs 1967-1982	Manufacturing Sector	……	The Panel Data Model	Grubel-Llyod	INTRA-INDUSTRY TRADE	INTRA-INDUSTRY TRADE was present even before these LDCs were designated as NICs in the late 1970s and that the proportion of total US-NIC trade has become increasingly intra-industry in nature. Determinants of INTRA-INDUSTRY TRADE using a cross section of industries and found similar results for US-UK trade and US-NIC trade.
16	McMahon (2003)	The EU and South Korea 1990-2001	Top 500 imports and exports	New trade theories	Descriptive analysis	Grubel and Lloyd index of INTRA-INDUSTRY TRADE and the Brülharts 'A' index of	Marginal INTRA-INDUSTRY TRADE	The level of MINTRA-INDUSTRY TRADE fell dramatically as a consequence of the 1997 financial crisis, but has increased consistently since. The level of INTRA-INDUSTRY TRADE is higher in the manufacturing sector than in others, and this level is increasing. The level of INTRA-INDUSTRY TRADE as a per centage of

						MINTRA-INDUSTRY TRADE		total trade slowed after the financial crisis, whereas the structure of change in trade flows (MINTRA-INDUSTRY TRADE) fell dramatically.
17	Musonda (1997)	PTA/COMESA Regional Trading Arrangement	Products Sector	Neo-Chamberlain and neo-Heckscher-Ohlin models	logit estimation) and non-linear estimation	Grubel-Lloyd index	INTRA-INDUSTRY TRADE	The results of the study show that indeed this trade does exist and it is determined by the same factors as found in other regions. The distance, which has a negative significant relationship with INTRA-INDUSTRY TRADE.
18	Nilsson (1999)	The EU and the Developing Countries 1980-1992	Products Sector	Helpman and Krugman (1985)	Panel Data Approach	Adjusted Grubel-Lloyd index	INTRA-INDUSTRY TRADE	Results confirm that INTRA-INDUSTRY TRADE increases with greater capital intensity in production and with larger average market size, and decreases with differences in factor endowments and a greater difference in economic size. Transport and transaction costs are also found to negatively affect EU INTRA-INDUSTRY TRADE with the developing countries.
19	Rasekhi (2008)	Iran 1997 – 2003	Agricultural Products	----------	Ordinary Least Squares	Grubel and Lloyd and Fontagne and Freudenberg index of	Vertical INTRA-INDUSTRY TRADE	The foreign trade in agricultural products of Iran is mainly dependent on traditional comparative advantages, rather than new determinants factors such as product differentiation and economic of scale.

						INTRA-INDUSTRY TRADE		
20	Shahbaz and Leitão (2010)	Pakistan 1980-2006	Products	Neo Heckscher-Ohlin model	Unbalance panel	Grubel and Lloyd	INTRA-INDUSTRY TRADE	The results indicate that INTRA-INDUSTRY TRADE is a negative function of the difference in GDP per capita between Pakistan and her trade partners. Statistically strong evidence is also found that this trade is influence by the similar demand. We also introduce an economic dimension; this proxy confirms the positive effects of INTRA-INDUSTRY TRADE. This result reveals the importance of scale economies and the variety of differentiated products. Our results also confirm the hypothesis that trade increases if the transportation costs decrease.
21	Sichei and Harmse (2004)	Between South Africa and US 1994-2002	Services Sector	Helpman and Krugman (1985)	The Panel Data Model	Grubel and Lloyd index of INTRA-INDUSTRY TRADE	INTRA-INDUSTRY TRADE	The dissimilarities in demand structure reduce the possibility of trade in differentiated services between South Africa and the US
22	Sunde, Chidoko and	Zimbabwe and its Trading Partners	Products Sector	Chamberlinian Monopolistic	Ordinary Least Squares	Grubel-Lloyd (1975)	INTRA-INDUSTRY	The study show that per capita income, trade intensity, distance, exchange rate and gross

	Zivanomoyo (2009)	1990-2006)		Competition			TRADE	domestic product explain INTRA-INDUSTRY TRADE (INTRA-INDUSTRY TRADE) between Zimbabwe and its SADC trading partners. The study also established that most countries in SADC trade in more or less the same goods and this can be explained by the type of development that these countries were subjected to during the colonial era which resulted in the establishment of similar economic structures and per capita incomes that were more or less the same.
23	Tharakan and Kerstens (1995)	North—South	Toy Industry	…..……	Logit Regression	Grubel and Lloyd	INTRA-INDUSTRY TRADE	In the present study we have combined case study approach and econometric analysis to investigate bilateral INTRA-INDUSTRY TRADE between high income countries and low income countries in the toy industry. Specifically, we aimed to verify whether such HT in that industry is of a 'vertical' or 'horizontal' nature
24	Zhang, Witteloostuijn and Zhou (2005)	China Study for 50 Countries 1992-2001	Products	New trade theories	Generalised Least Squares	Adjusted Grubel-Lloyd index	INTRA-INDUSTRY TRADE	Chinese bilateral intra- industry trade, particularly VINTRA-INDUSTRY TRADE, increased significantly during this transition period. VINTRA-INDUSTRY TRADE appears to be positively related to differences in consumer patterns. HUT is negatively related to these

								differences. In addition, we find that FDI has played an important role in determining INTRA-INDUSTRY TRADE, especially VINTRA-INDUSTRY TRADE. Other significant INTRA-INDUSTRY TRADE drivers are geographical distance, economic size, trade openness and trade composition
25	Zhigang (1999)	China 1984-1994	Manufacturing Sector	New trade theories	A Tobit cum Fixed Effect Panel Data Model Application	Grubel and Lloyd	INTRA-INDUSTRY TRADE	First, INTRA-INDUSTRY TRADE is becoming important in China's foreign trade, especially for manufactures. Among the determinants of INTRA-INDUSTRY TRADE, the market size and income levels are the most important ones to China, especially for the manufactures. Also, the extent of value-added in production is an important factor for INTRA-INDUSTRY TRADE.
26	Türkcan (2005)	Turkey and Selected OECD Countries 1985-2000	Manufacturing Sector	New trade theories	OLS and Panel Data	Grubel and Lloyd	INTRA-INDUSTRY TRADE in final goods and intermediate products	Finally, the results suggest that country-specific rather than industry-specific variables are the central determinants of INTRA-INDUSTRY TRADE in final and intermediate goods between Turkey and OECD.
27	Leitao,	Portugal and trade	Automobile	New trade theories	OLS and	Grubel and	Fragmentation	The results shows that income differences

	Faustino, and Yoshida (2010)	partners 1995-2005			Logistic Transformation	Lloyd	and vertical INTRA-INDUSTRY TRADE	between trade partner countries are an important driver via the international fragmentation of production of a higher VINTRA-INDUSTRY TRADE.
28	Bouwmeester and Oosterhaven (2008)	East-Asian countries and the United States	Manufacturing Sector	Fragmentation theories	Correlation Analysis	Input-Output Approach	International Fragmentation, Specialisation	These results suggest that international fragmentation follows comparative advantages and takes place when factor cost differentials can be exploited.
29	Türkcan and Ateş (2008)	United States 1989-2006	Auto-industry	Fragmentation theories	Panel Econometrics Techniques	Fontagne and Freudenberg (1997)	INTRA-INDUSTRY TRADE in intermediate goods	The results show that a substantial part of INTRA-INDUSTRY TRADE in U.S. auto-parts industry was VINTRA-INDUSTRY TRADEand econometric results support the hypothesis drawn from the fragmentation literature.
30	Türkcan (2009)	Austria 1996-2006	Auto-industry	Fragmentation theories	Panel Econometrics	Fontagne and Freudenberg (1997)	INTRA-INDUSTRY TRADE (INTRA-INDUSTRY TRADE) in Intermediate goods.	The findings show that the extent of Austria's VINTRA-INDUSTRY TRADEin auto-parts is positively correlated with average market size, differences in per capita GDP, and foreign direct investment while it is negatively correlated with distance.

Source: Authors compilation

Table A-9: Stylized Summary of Empirical Studies on Determinants of INTRA-INDUSTRY TRADE (North South Trade)

Author:	Balassa (1986)	Balassa and Bauwens (1987)	Culem and Lundberg (1986)	Stone and Lee (1995)	Nilsson (1999)	Zhang (1999)
Country/Region	38 DCs and LDC	DCs and LDCs	11 DCs and 7 DCs	68 DCs and LDCs	12 EU and 108 LDCs	China and Trade Partners
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
Difference of per Capita	.	+a	+a	.	+a	.
Average per capita	+a	+a	.	+a	+	.
Difference of GDP	.	+	.	.	+a	.
GDP	+a	+a	.	+a	+a	.
Distance	.	.	+a	+	+	+a
Similarity	.	.	.	.	.	-
FDI	.	.	.	.	.	+a
Size	.	.	.	.	.	+
Exchange Rate	.	.	.	.	.	.
Trade Intensity	.	.	.	.	.	.
Language	.	.	.	.	.	.
Trade balance	.	.	.	.	.	.
Tariff	.	.	.	.	.	.
Economies of Scale	.	.	.	.	.	.
Adj. R^2	0.89	0.24	0.20	0.81	0.36	0.83

Table A-9: Stylized Summary of Empirical Studies on Determinants of INTRA-INDUSTRY TRADE (North South Trade) continues…

Author:	Shahbaz and Leitao (2010)	Havylyshyn and Kunzel (1997)	Lee and Haa (2008)	Zhigang (1999)	Kandogan (2003)	Ekanayake
Country/Region	Pakistan and Partners	among Developing Countries	Korea and China	China and Trade Partners	transition countries	Mexico and Trade Partners
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
Difference of per Capita	.	+a	+a	-	+	+a
Average per capita	.	.	.	+a	+	-a
Difference of GDP	+	+a	+a	-a	.	+a
GDP	+	+	.	.	.	-
Distance	-	.	.	-a	-	-a
Similarity	.	.	.	.	.	.
FDI	-	.	.	+a	-	.
Size	.	.	.	.	.	.
Exchange Rate	.	.	+a	.	.	.
Trade Intensity	.	.	.	.	.	.
Language	.	.	.	.	+	.
Trade balance	.	.	.	.	.	.
Tariff	.	.	-a	.	.	.
Economies of Scale	.	.	.	.	.	.
Adj. R^2	0.89	0.24	0.0032	0.81	0.36	0.837

Table A-9: Stylized Summary of Empirical Studies on Determinants of INTRA-INDUSTRY TRADE (North South Trade) continues…

Author:	Damoense Jordaan (2007)	Manrique (1987)	Clark and Stanley (1999)	Tharakan and Kerstens (1995)	Lee and Lee (2000)	Sunde, Chidoko and Zivanomoyo (2009)
Country/Region	South Africa and Trade Partners	8 Developed and Developing Countries	Developing Countries and the United States	North South	Korea and Trade Partners	7 SADC
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
Difference of per Capita	.	+a	-a	-a	-a	.
Average per capita	.	.	.	.	.	+a
Difference of GDP	+a	.	+a	+	-a	.
GDP	.	-a	.	.	.	+a
Distance	-a	.	-a	.	.	+a
Similarity	.	.	.	.	.	.
FDI	-	.	.	.	.	.
Size	.	.	.	.	.	.
Product Differentiation	-a	-a	.	+	.	+a
Exchange Rate	.	.	.	.	+a	+a
Trade Intensity	+a	.	-a	.	.	.
Language	.	.	.	.	.	.
Trade balance	.	.	-a	.	.	.
Tariff	-a	-a	.	+a	.	.
Economies of Scale	.	.	.	+	0.34	0.76
Adj. R^2	0.67	0.56	0.39	0.45		

Table A-9: Stylized Summary of Empirical Studies on Determinants of INTRA-INDUSTRY TRADE (North South Trade) continues…

Author:	Türkcan (2005)	Leitão, Faustino and Yoshida (2009)	Türkcan and Ateş (2008)	Türkcan (2009)
Country/Region	Turkey and OECD Countries	Portugal and Trading Partners	USA and Trading Partners	Austria and Trade Partners
Dependent Variables	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd	Grubel Lloyd
Difference of per Capita	-a	+a		
Average per capita			+a	
Difference of GDP		+a	+a	-
GDP	+a	+	+a	+a
Infrastructure		a+		
Distance	-a	+		-a
Value added	+			
Similarity				
Capital labour ratio	+			
FDI			+a	+a
Size				
Product Differentiation				
Exchange Rate			+a	+a
Adj. R^2				