

**A GRAVITY ANALYSIS OF BILATERAL TRADE AMONG ECOWAS
MEMBER COUNTRIES**

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DEDICATION

I dedicate this thesis to my sweet mum, Mrs. Shukurah Wahab.

ABSTRACT

The Economic Community of West African States (ECOWAS) is one of the most prominent RTAs in Sub-Saharan Africa (SSA). The main objective of ECOWAS is to boost the economic development of member countries, reduce/eliminate trade barriers, and enhance the free movement of capital and labor among ECOWAS member countries. The ECOWAS is deemed to have important regional economic impacts on member countries, and there are important prospects to increase the effectiveness of this agreement in the future. Thus, it is important to empirically examine the magnitude of bilateral trade flows among ECOWAS member countries and to determine to what extent these trade preferences have enhanced trade flows among ECOWAS member countries. The main objective of this thesis is to examine the impact of ECOWAS on bilateral trade flows among member countries using a dataset covering bilateral trade observations among the 15 ECOWAS countries, and between ECOWAS member countries and other (non-ECOWAS) trading partners from 2000 to 2018. The empirical analysis is extended to examine the magnitude of trade flows among members of the West African Economic and Monetary Union (WAEMU), and among members of the West African Monetary Zone (WAMZ). The empirical analysis uses the conventional log-linear form of the gravity equation, and it also estimates the multiplicative form of the gravity equation using the PPML. The results show positive and statistically significant coefficients on the ECOWAS binary variable, implying higher magnitudes of trade flows among ECOWAS member countries. They also show a higher magnitude of trade among WAEMU countries relative to trade among other ECOWAS members, implying that WAEMU countries have benefitted from increases in economic cooperation and coordination and the introduction of the common currency, the CFA Franc, in increasing trade among each other. They also show lower magnitudes of trade among WAMZ countries relative to trade among other ECOWAS member countries, suggesting that there is a wide margin to increase trade among WAMZ countries by increasing economic cooperation and coordination, and by introducing the common currency (ECO). Finally, regional trade flows among ECOWAS member countries could increase further by eliminating/reducing remaining trade barriers, improving infrastructure and institutions, boosting political stability, and increasing economic and political cooperation and coordination among ECOWAS member countries.

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List of Abbreviations

AEC – African Economic Community
AFCFTA – African Continental Free Trade Area Agreement
AFDB – African Development Bank
AFTA – ASEAN Free Trade Area
ARII – African Regional Integration Index
AU – African Union
BIMSTEC – Bangladesh India Myanmar Sri Lanka Thailand Economic Cooperation
CACM – Central American Common Market
CEMAC – The Economic and Monetary Community of Central Africa
CEPII – Centre d’Études Prospectives et d’Informations Internationales
CET – Common External Tariff
COMESA – Common Market for Eastern and Southern Africa
CIP – Cross - border Initiate Programme
CPI – Consumer Price Index
EAC – East African Community
EBA – Everything But Arms
EBID – ECOWAS Bank of Investment and Development
ECCAS – Economic Community of Central African States
ECO – ECOWAS Common Currency
ECOWAS – Economic Community of West African State.
ECREEE – ECOWAS Centre for renewable Energy and Energy Efficiency
EEU – Eurasian Economic Union
EGDC – ECOWAS Gender Development Centre
EPA – Economic Partnership Agreement
ERERA – Electricity Regulatory Authority
ETLS – Ecowas Trade Liberalization Scheme
EU – European Union
EU-ACP-PTA – European Union-African Caribbean-Pacific Preferential Trade Agreement
EYSDC – ECOWAS Youth and Sports Development Centre
GATT – General Agreement on Tariffs and Trade
GCC – Gulf Cooperation Council
GDP – Gross Domestic Product
GSP – Generalised System of Preference
GIABA – Inter-government Action Group against Money Laundering and Terrorism financing in West Africa
IGAD – Intergovernmental Authority on Development
IMF – International Monetary Fund
LCD – Least Developed Countries
MARIUN – Mano River Union

MERSCOSUR – The Southern Common Market
NTBs – Non-tariff Trade Barriers
PPML – Pseudo – Poisson Maximum Likelihood
PTA – Preferential Trade agreement
RTAs – Regional Trade Agreements
RECs – Regional Economic Communities
SADC – Southern African Development Community
SAPs – Structural Adjustment Programmes
SAPTA – South Asian Preferential Trade Arrangement
SSA – Sub-Saharan Africa
TLS – Trade Liberalisation Scheme
WAEC – West African Economic Community
WAEMU – West African Economic and Monetary Union
WAHO – West African Health Organization
WAMA – West African Monetary Institute
WAMI – West African Monetary Institutes
WAMZ – West African Monetary Zone
WAPP – West African Power Pool
WTO – World Trade Organisation (WTO)

CHAPTER ONE: INTRODUCTION

1.1. Background

Relative to the more prosperous regions of the world, Africa has a smaller economy accounting for about 2.9 percent of the world production and trade respectively (Takele, 2019). Also on the continent, there is significant inequality in economic development among countries with poverty still widespread (Takele, 2019). Based on this shared dilemma, African countries have increasingly chosen to trade among themselves. Renninger (1982) argues that economic cooperation is perhaps more relevant to Africa than to any of the developing regions of the world because of the continent's fragmentation and poverty. Many African leaders' expectations of economic growth and development through regional economic integration made them eager to establish integration schemes and, currently, there are several regional schemes in existence in Africa.

To further this, members of the African Union (AU) in 2018 signed a Regional Trade Agreement (RTA) and the African Continental Free Trade Area Agreement (AfCFTA). The AfCFTA commits African states to gradually liberalize service trade, scrap tariffs on 90 percent of goods, and remove other non-tariff barriers (Cofelice, 2018). This agreement, in full operation, would cover all 55 African countries, which boast a combined Gross Domestic Product (GDP) of about US\$3.4 trillion, consumer and business of more than US\$ 4 trillion, and a population of over 1.2 billion people (World Bank, 2020). The AfCFTA officially became operational on 1st January 2020. Principal among the objectives of the agreement is the promotion of rapid economic growth and development within the African continent through intra-Africa trade boosting.

As more African countries became independent, the number of regional integration economic communities increased significantly over time. By the end of 2019, the continent had

over fifteen regional integration arrangements with only eight recognized by the AU (Odijie,2019). West Africa alone has several regional bodies but the two regional bodies that can be identified as explicitly concerned with the promotion of intra-regional trade flows is the Mano River Union (MARIUN) which was established in 1973 and reactivated on the 20th of May 2004 after a summit attended by the President of Guinea, Sierra Leone, Liberia with Cote d'Ivoire agreeing to join the union on the 15th of May 2008 and the Economic Community of West African States (ECOWAS).

External and internal motivation has been the major factor in the evolution and development of regional bodies in developing countries, especially bodies devoted to regional integration (Ogunkola,1998). Many African countries found the need to be associated with one another both politically and economically after independence with the belief that for their economies to develop, certain obstacles had to be removed. Regional bodies were created to take advantage of economies of scale in production and consumption which are the benefits of effective and efficient regional integrations. These economies believed that coming together under a regional body would be an effective means of gaining economic independence. However, economies of scale, deficiency in infrastructure, lack of technical know-how, corruption, and poor resource endowment, among others, have been adduced as economic arguments for the formation of regional bodies. Regional integration is believed to eliminate these difficulties, which are the woe of poor and isolated economies, and pave way for sustainable growth.

Although the view among those who study African regional economic integration schemes is that these schemes have not succeeded in increasing trade flows in their respective regions. This study seeks to investigate empirically if the formation of ECOWAS increases trade flows among member countries. Quantitatively evaluating the effect of a change in the trade policy (for example RTA) on bilateral trade flows of the affected countries has traditionally been done in one of two

ways: *ex-ante* or *ex-post* studies. Researchers have mostly utilized computable general equilibrium models of trade in conducting *ex-ante* studies. Even though these techniques have significant upsides and downsides, they are still the standard tools for evaluating the *ex-ante* effects of trade policy change on bilateral trade flows. For *ex-post* studies, researchers utilized the “gravity equation” for decades. The gravity equation is generally theoretically interpreted as a formal general equilibrium model in reduced form. Studies employing the gravity equation model typically use cross-sectional data for either a single or multiple years, with the estimated average treatment effect of belonging to an RTA captured by the coefficient of a dummy variable representing the presence or absence of an RTA membership among country pairs.

In Africa, several studies utilizing the gravity model have found positive and statistically significant effects of RTAs on trade flows (see, for instance, Carrere, 2004; Afesorgbor et al., 2011; Turkson, 2012; Buigut, 2016). These results suggest that African countries belonging to RTAs benefit more from trade with member countries compared to non-members, therefore, highlighting the relevance of RTAs to increasing international trade. There have been several advances in the specification of the gravity model and the estimation methodology. Given that ECOWAS is one of the main RTAs in Africa, a comprehensive empirical analysis of its effects on bilateral trade flows between member countries is warranted. Accordingly, a critical question yet to be answered is simply this: What is the effect of ECOWAS as a form of the regional trade agreement on the bilateral trade flows of member countries? This is the central objective of the study.

1.2. Regional Integration in Africa

Africa has a ‘spaghetti bowl’ of trade agreements, and although it makes up a modest percentage of the region’s overall economy, intra- and interregional trade is intermittent and insignificant. Due mostly to their aim to boost trade and draw foreign direct investment, several African nations are participants in more than two RTAs. African producers are given duty-free access to developed and emerging markets in the hopes that trade will promote regional economic progress. Although occasionally the motivation is more political than economic, regional integration is also getting greater attention in the area. Less than 2% of global exports are from Africa, which means that trade with the rest of the world is severely marginalized.

A few European Union (EU) countries, the United States (US), and more recently the developing economies of China and India are the primary markets for African exports. The exports of African nations are still limited to a few agricultural goods including coffee, chocolate, cotton, hide and skin products, and horticulture commodities. Some nations export as much as 50% of their overall exports in the form of agricultural goods. Raw goods like metal, oil, and minerals predominate for exports that are not related to agriculture. At the same time, while having the resources to meet her import demands, Africa nevertheless imports more than 90% of the consumed items. Only 10 to 12 percent of African trade, on average, is conducted between African countries.

African policymakers and experts have increasingly prioritized the potential contribution of trade to Africa’s growth and development since trade is seen to have been a major factor in the continent’s recent economic boom. Studies demonstrate that outward-oriented trade policies promote quicker economic growth. Such regulations stimulate competition, foster experiential learning, provide trade prospects, and effectively distribute resources. Thus, having access to trade

blocs may assist nations to overcome the challenges provided by small domestic markets and aid them in achieving higher economies of scale, which enables them to engage in international trade. The level of integration among African regional trade blocs is, however, equally uneven, and frequently just extremely superficial. While some trade blocs are stumbling to strengthen their trade agreements, others have already formed Free Trade Areas (FTAs) and Custom Unions (CUs).

However, as shown in table 1, only a small number of the members of various trade blocs have ratified trade agreements. It is also important to note that trade inside Africa is restricted by several issues, including a dearth of complementary goods, high external trade barriers, low levels of competition, institutional bottlenecks, governments' reluctance to cede control over their macroeconomic policies, infrastructure deficiency, and political instability. Many African nations are also prevented from embracing trade as a growth weapon by politicians' unawareness of how trade affects growth and their incapacity to negotiate development-friendly bilateral and multilateral trade agreements.

Table 1.1: Depth of integration of various Regional Economic Communities (RECs) in Africa

<i>Economic integration</i>	<i>Free trade</i>	<i>Custom union</i>	<i>Comment</i>
AEC	In operation	Proposed	
CENSAD	Stalled	Stalled	
COMESA	Progressing	Proposed	About six member countries not yet participating
EAC	Fully in force	Fully in force	

ECCAS	Proposed	Proposed	Both FTA and CU are fully in force for CEMAC members.
ECOWAS	Proposed	Proposed	Both FTA and CU are fully in force for WAEMU members.
SADC	Progressing	Proposed	Both FTA and CU are fully in force for SACU member countries that are not yet participating.

Notes: AEC African Economic Community, CENSAD Community of Sahel-Saharan States, COMESA Common Market for Eastern and Southern Africa, EAC East African Community, ECCAS Economic Community of Central African States, ECOWAS Economic Community of West African States, SADC South African Development Community.

The 2019 African Regional Integration Index (ARII) measures the progress made by nations that are part of the eight regional economic communities recognized by the African Union in terms of regional integration. It compares each country to other countries in its regional economic community and to the countries of Africa as a whole. These factors, including trade integration, productive integration, macroeconomic integration, infrastructure integration, and free movement of people, are taken into consideration by the index. The index demonstrates that trade and macroeconomic integration on the continent are progressing at a reasonable rate, but infrastructure connection, productive capacity, and cross-border human movement need to be improved.

African trade has always been skewed toward the more developed North, with little intra-regional trade taking place. One of the primary justifications for the AfCFTA plan is provided by this circumstance. Like other nations in Africa, trade between West African member states has not been particularly strong over time. According to the 2019 edition of the ARII, the average

intraregional trade across the continent's nations was 0.3832 (Figure 1.1). Different Regional Economic Communities (RECs) in Africa have varying levels of intra-regional trade, with the Common Market for Eastern and Southern Africa (COMESA) having the greatest level (0.445) and the Southern African Development Community (SADC) having the lowest (0.340). Despite being higher than the average for Africa, the ECOWAS intra-regional trade index (0.438) is still rather low. ARII evaluates the extent to which a country trades with others in the region, using four indicators namely, share of intra-regional export over GDP, share of intra-regional import over GDP, share of intra-regional trade and average intra-regional import tariffs. The more outward intra-regional trade stretches, the more integrated the regional body is in terms of trade. Scores are calculated on a scale of 0 (not at all integrated) to 1(entirely integrated).

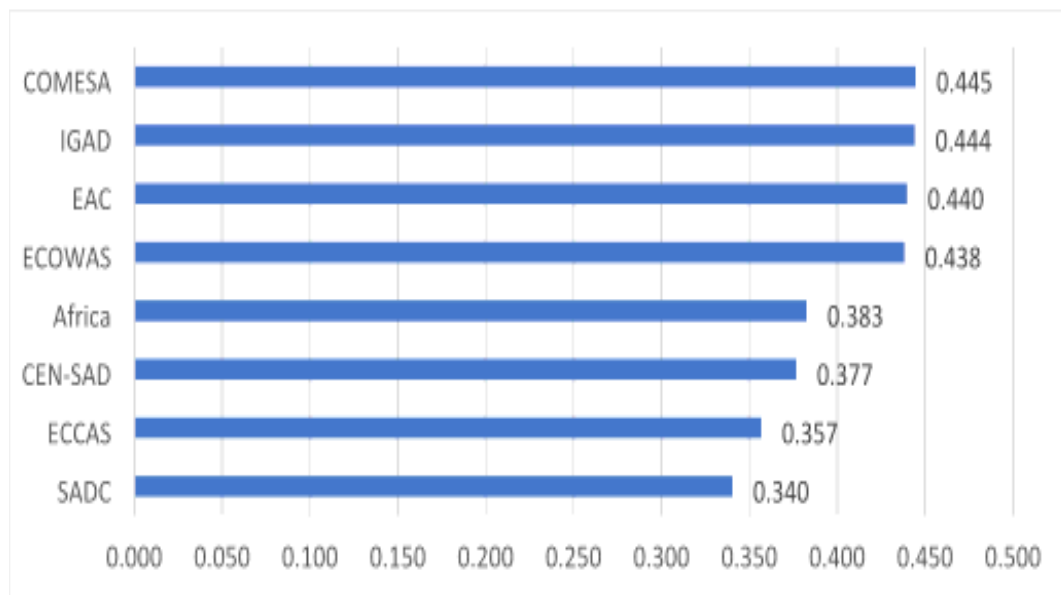


Figure 1.1: Intra-regional trade in Africa,2019

Source: AU-AfDB-ECA, African Regional Integration Index 2019

1.3. Overview of ECOWAS

The Economic Community of West African States (ECOWAS) was established on the 28th of May 1975 through the treaty of Lagos. The preamble of the ECOWAS treaty defines its primary objectives as the ‘... *accelerated and sustained economic development of (the member) states and the creation of a homogenous society, leading to the unity of the countries of West Africa, by the elimination of all types of obstacles to the free movement of goods, capital, and persons.*’ Before its creation, the collective territory known as West Africa was made up of an aggregation of states that had emerged from different colonial experiences and administrations which largely defined the boundaries of the 16 states that aboded in the area. However, Mauritania withdrew from the ECOWAS in 2000, bringing the total down to fifteen members. This 15-member regional group has a mandate of promoting economic integration in all fields of activity of the constituting countries. As shown in Figure 1.2, ECOWAS membership includes Benin, Burkina Faso, Cabo Verde, Cote d’Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Members of the community make use of English, French, and Portuguese as their official languages but there are well over thousands of existing local languages including cross-border native languages such as Yoruba, Ewe, Hausa, Mandingo, etc. which constitute over 300 million people in a vast land of about 5.1 million square kilometers. This region’s cultural, linguistic, and ecological diversity presents both opportunities and challenges for the integration process.



Figure 1.2: ECOWAS Countries
Source: EUROSTATS

In this regard, the first effort at integration dates to 1945 with the creation of the CFA Franc which brought francophone countries of the region together into a single currency union. Then in 1964, Liberian President William Tubman proposed an economic union for West Africa leading to an agreement that was signed in 1965 by Ghana, Liberia, Guinea, Cote d'Ivoire, and Sierra Leone. However, it was not until 1972 that the proposal for a union of West African States emerged. That year, the then Nigerian head of state Yakubu Gowon and Gnassingbe Eyadema of Togo toured the region in support of the integration idea. And thanks to the drafts that emanated from their efforts, it formed the basis for the emergence of the treaty of Lagos in 1975 which led to ECOWAS. The primary purpose of ECOWAS is to promote economic trade, national cooperation, and monetary union, for growth and development throughout West Africa, but emerging political events led to its revision and expansion of scope and powers in 1993. This revised treaty intended to accelerate the integration of economic policy and improve political

cooperation was signed on July 24, 1993. It set out goals of a common economic market, a single currency, the creation of a West African parliament, economic and social councils, and a court of Justice. The court primarily interprets and mediates disputes over ECOWAS policies and relations, but it also has the power to investigate alleged human rights abuses in member countries.

ECOWAS's formation involved the incorporation of the West African Economic Community (WAEC), a free trade area formed in 1973. The CEO contained the francophone countries of the region, namely Benin, Burkina Faso, Cote d'Ivoire, Mali, Mauritania, Niger, and Senegal, with Togo as an observer. WAEC members sought to develop the organization into a customs union within 12 years of its establishment and later establish a complete common market. As a means of achieving the goal, the members called for the progressive liberalization of trade by reducing tariffs on imports of goods manufactured within the community. The principal instrument employed was a 'regional cooperation tax (TCR)' applied on a product-by-product basis following government approval of manufacturers qualifying for preferential treatment. After the formation of WAEC, trade increased rapidly with a seven-fold increase in TCR product flows between 1976 and 1982, by which time intra-community trade was more than 10% of all exports of all the countries (Bach, 1997). The World Bank (1989) stated that within Africa, "of all trade integration schemes, the WAEC has had the greatest success". That success, however, did not last for long. The WAEC was dissolved in 1994 and effectively replaced by the West African Monetary and Economic Union (WAMEU).

In 2000, WAMEU also became a customs union, which was eventually extended to cover all of ECOWAS. Unfortunately, the actual implementation of both internal liberalization and the common external tariff has been exceedingly slow, and many member nations still do not completely uphold their duties. The integration of Nigeria, which retains a very sophisticated tariff

system with high tariff peaks and outright import prohibitions on several items is an example of a challenge faced by the Union.

After signing the ECOWAS treaty, the first four years were mostly used to address institutional matters. The ECOWAS Trade Liberalization Scheme (ETLS), which is ECOWAS's comprehensive trade liberalization program, was supposed to start in 1979, but it was only launched in 1990 (ECOWAS Vanguard 2013). It is the main framework for trade and market integration in ECOWAS, as it addresses protocols for the free movement of goods, persons, and transportation. In the beginning, it included agricultural, artisanal handicrafts, and unprocessed products, with a phasing on industrial products.

The ETLS was the initial step aimed at the free circulation of goods to create a region where all tariff and non-tariff barriers on member countries are removed and a common external tariff (CET) on non-member countries is created. Apart from free trade, the rationale for the ETLS is the development of entrepreneurial skills, increased economic growth and competitiveness of the domestic market at a global level, and an improvement in welfare.

The vision of ECOWAS is the creation of a borderless region where the population has access to its abundant resources, and it can exploit the same through the creation of opportunities in a sustainable environment. Considered one of the pillars of the African Economic Community, ECOWAS was set up to foster the ideal of collective self-sufficiency for its members. Expectations of economic integration have always been high, and a lot has been accomplished by the regional group since the endorsement of the treaty which gave it legal backing. Going by the current performances, the regional body has exceeded the expectations of its founding fathers. Integrated economic activities as envisaged in the area revolve around, but are not limited to industry,

transport, telecommunications, energy, agriculture, natural resource, commerce, monetary and financial issues, and social as well as cultural matters.

Nevertheless, this free movement of people and goods within ECOWAS remained elusive. A revised ECOWAS treaty was signed on 24 July 1993 to expand the political authority of its members and to allow for the formation of new bodies, such as a regional parliament (Van Nieuwkerk, 2001). Between 1993 and 2012, about eight more agreements were signed with various other economic groups and countries (Global Edge, 2018). Article 3 of the Revised Treaty of ECOWAS stipulates the removal of trade barriers and harmonization of trade policies for the establishment of a free trade area, a customs union, a common market, and eventually a monetary and economic union in West Africa (UNECA, 2018).

In 2010, the Economic Community of West African States (ECOWAS) established its “West African Common Industrial Policy.” With a vision to “maintain a solid industrial structure, which is globally competitive, environmentally friendly, and capable of significantly improving the living standards of the people by 2030”, one of its main goals is to increase the share of intra-regional trade from its current level of around 12 percent of total trade to 40 percent in 2030. (ECOWAS, 2010). It continues a worldwide trend toward regionalization of trade integration and is the most recent phase in a long line of ambitious initiatives for regional integration in West Africa.

The ECOWAS trade liberalization program was developed in 1979 to encourage intraregional trade and create a common market in the subregion (adopted in 1990 and amended in 2003). The scheme’s goals are as follows:

- Elimination of customs duties and taxes having equivalent effects on products from member states.

- Elimination of non-tariff restrictions on trade between member states.
- Establishing a community-wide common external tariff (CET) on goods imported from other nations.
- Organization of trade fairs etc.

The average degree of ECOWAS intra-regional trade integration protected the various levels of trade integration among the regional member states. Scores are calculated based on a scale of 0 (no trade integration) to 1 (entirely integrated). As shown in Figure 1.3, the level of aggregate trade integration varies and is unevenly distributed across West African nations, with Côte d'Ivoire having the highest level (0.772), Togo coming in second with 0.58, Liberia having the lowest level (0.198), and four other nations (Cape Verde, Guinea, Guinea-Bissau, and Sierra Leone) performing below the sub-regional average (0.438). The intra-regional imports for the sub-region (0.353) were higher than the intra-regional exports (0.295), according to a detailed examination of the major components of the trade integration.

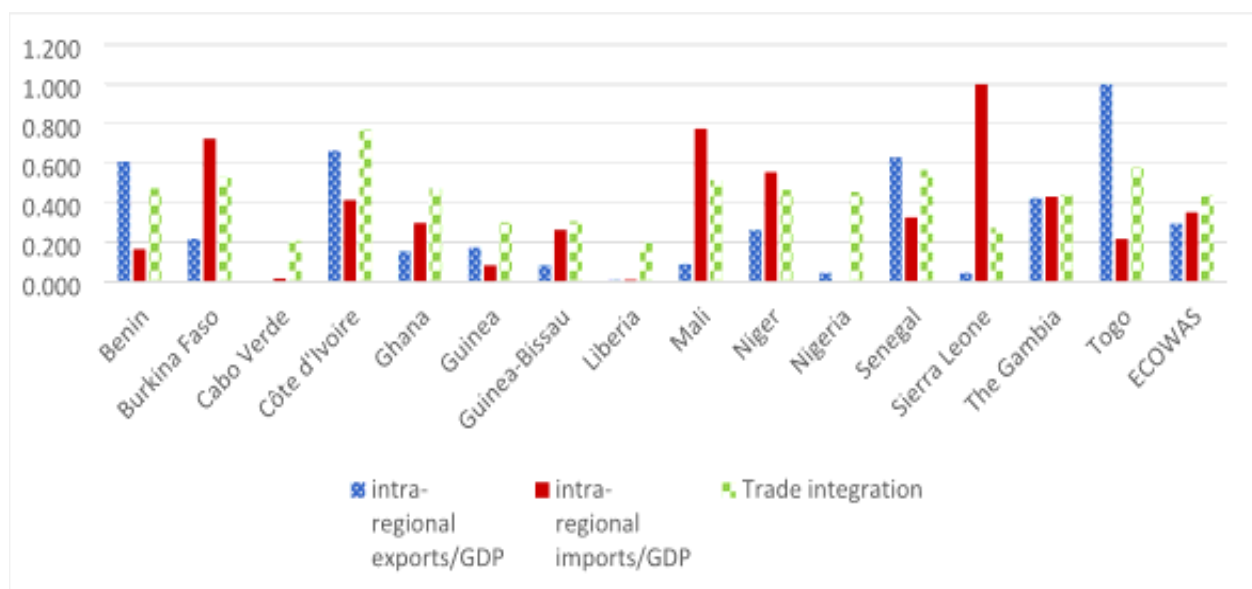


Figure 1.3: Intra-African Regional Trade in ECOWAS

Source: *AU-AfDB-ECA*, African Regional Integration Index 2019

ECOWAS has a long history of commercial integration, although intra-regional commerce in products and services between nations has remained at a modest level. Although intra-regional imports averaged 15.9% during the same time, the region's export share of total exports to the rest of the globe increased significantly from 18.0% in 2010 to 21.7% in 2019 (see Figure 1.4). The existence of several non-tariff trade barriers (NTBs), such as non-tariff trade measures, infrastructural deficits (gaps), and other trade-related transaction costs (inefficient regional transportation networks and customs procedures, slow financial transaction clearance, among others), may be causing the widespread phenomenon of low intra-regional trade among ECOWAS countries and between them and other countries in Sub-Saharan Africa (SSA). Additionally, most exports are made to developed and industrialized regions of the world. Also, production in the area was reliant on imported intermediate inputs from nations in Europe, North America, and Asia. A country's share of intra-regional trade is the value of both intra-regional export and import expressed as a percentage of the country's GDP.

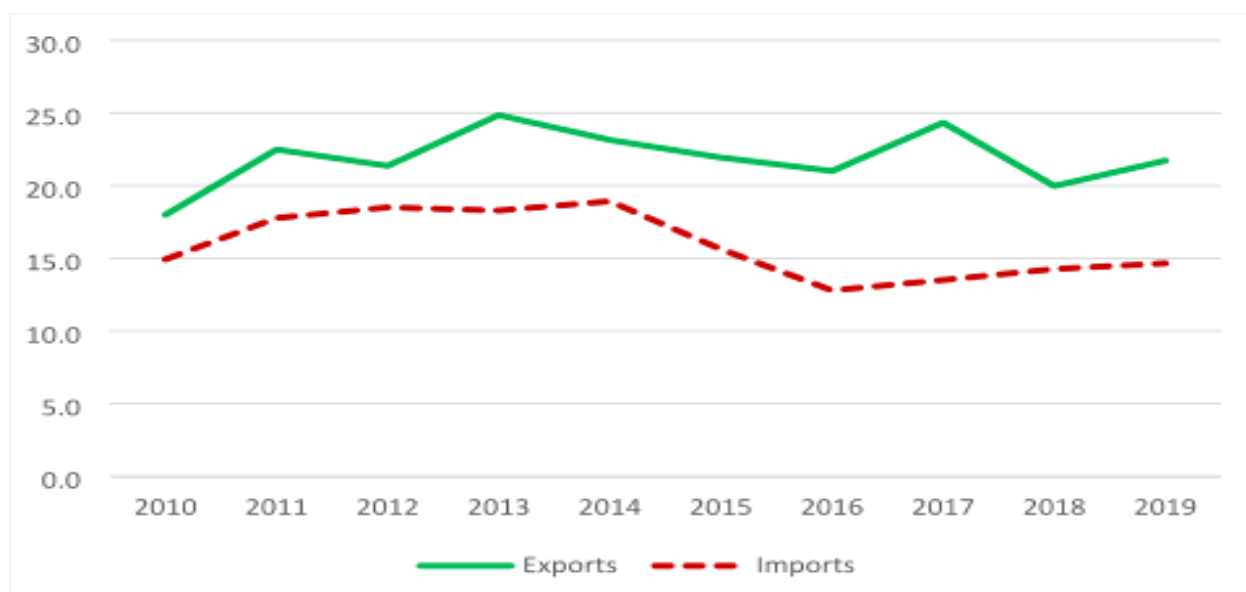


Figure 1.4: Intra-regional trade among ECOWAS countries.
Source: Computed from IMF Direction of Trade Statistics

1.4. The Structure of ECOWAS

The structure of ECOWAS has changed several times over the years. As of June 2019, ECOWAS has seven active institutions: the Authority of Heads of States and Government, the ECOWAS Commission, the community Parliament, the community court of justice, the ECOWAS Bank of Investment and Development (EBID) also known as the Fund, the West African Health Organization (WAHO), and the Inter-Governmental Action Group against Money Laundering and Terrorism Financing in West Africa (GIABA). The treaties also provide for an advisory Economic and Social Council, but ECOWAS does not list this as part of its current structure.

ECOWAS comprises three arms of governance namely, The Executive, Legislature, and Judiciary. The Chairman of the Authority of the head of state and Government is at the helm of the organization structure. The Chairman is currently the head of state and Government appointed by the other Heads of state and Government to oversee the affairs for one year. The minister in charge of ECOWAS affairs in the country of the Chairman of the Authority automatically becomes

the Chairman of the Council of Ministers; similarly, that country presides over all other ECOWAS statutory meetings for a year. The Chairman is assisted by a Vice President and 13 Commissioners, and his position is non-renewable after 4 years. The legislative arm of the Community is the community Parliament headed by the speaker of the Parliament. The administrative functions of the parliament are directed by the Secretary General of the Parliament. They are all seconded by the Supreme courts of their respective member states to fill the country's positions. The court ensures the interpretation and application of Community laws, protocols, and conventions. The administrative functions of the courts are handled by the court Registrar who is assisted by other professionals.

This regional body consists of two zones. It is the WAEMU (West African Economic and Monetary Union) zone which has eight countries consisting of Benin, Burkina Faso, Cote D'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. WAEMU members share a common currency called "CFA Franc" since its establishment in 1962. The non-WAEMU zone which counts seven countries of ECOWAS consists of Cabo Verde, The Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone, but non-WAEMU countries have their national currency. Also, ECOWAS countries conduct separate monetary policies and adopt different exchange rate regimes. As reported by the International Monetary Fund (IMF)'s Exchange Rate Regime (2016), the WAEMU adopts a fixed exchange rate regime while countries in the non-WAEMU zone present fixed, flexible, and indefinite exchange rate regimes.

In addition to the seven institutions of ECOWAS, specialized agencies include the West African Monetary Agency (WAMA), the Regional Electricity Regulatory Authority (ERERA), ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), The West African Power Pool (WAPP), ECOWAS Brown Card, ECOWAS Gender Development Centre (EGDC),

ECOWAS Youth and Sports Development Centre (EYSDC), West African Monetary Institute (WAMI), and ECOWAS infrastructure Projects.

1.5. Imports and Exports of ECOWAS Countries

Trade within ECOWAS is still unfolding; there was a time were this community depended on outmoded trade links to sustain business exchanges in the area. But today, trade is being awakened with a developmental dimension. Since the formation of ECOWAS, trade policies have been designed to increase intra-regional commerce, increase trade volumes, and generally stimulate the economic activities within the region in such a way as to positively impact the economic well-being of the citizens of ECOWAS. The trade policy of ECOWAS is also meant to encourage the smooth integration of the region into the world economy taking into consideration the political choices and development priorities of states in the desire to create sustainable development and reduction of poverty.

In 2015, the average value of trade within the ECOWAS area was US\$208.1 billion. The most active trading nations were Nigeria, Ghana, and Cote d'Ivoire which together account for around 93.8 percent of ECOWAS trade (76 percent, 9.2 percent, and 8.6 percent, respectively). The estimated trade surplus within the same period for the area was approximately US\$47.3 billion, which includes Nigeria's surplus of US\$58.4 billion and Cote d'Ivoire's surplus of US\$3.4 billion, while all the other member countries had a deficit in trade balance.

Table 1.2: Imports and Exports of ECOWAS Countries

Weight (%)	Countries	Exported products	Imported products
75.2	Nigeria	Crude oil (77%) Petroleum gas (15%)	Refined oil (15%)
7.5	Ghana	Gold (41%) Cocoa (19%) Crude Oil (16%)	Refined Oil (7%)
5	Cote d'Ivoire	Cocoa (29%)	Crude oil (14%)
2.7	Senegal	Gold (10%)	Refined oil (11%)
2	Mali	Gold (59%) Cotton (20%)	Refined oil (11%)
1.6	Burkina Faso	Gold (73%) Cotton (13%)	Refined oil (19%)
1.3	Benin	Cotton (26%) Coconut and cashew nuts (21%)	Rice (10%)
1.3	Guinea	Gold (38%) Aluminum (30%)	Refined oil (10%)
1.1	Niger	Chemicals and radioactive (47%) Refined oil (12%)	Airplanes, helicopters, and/ or spacecraft (14%)
0.6	Togo	Refined oil (17%)	Refined oil (49%)

		Calcium phosphates (10%)	
0.6	Sierra Leone	Diamonds (22%) Iron-ore (24%) Titanium ore (18%)	Refined oil (9%)
0.5	Liberia	Ships and boats (45%) Iron-ore (24%) Rubber (12%)	Ships and boats (69%)
0.2	Cabo Verde	Pisces (49%) Refined oil (13%)	Refined oil (11%)
0.2	The Gambia	Wood (43%) Coconut and cashew nuts (34%)	Soft goods (15%)
0.2	Guinea-Bissau	Coconut and cashew nuts (84%)	Refined oil (14%)

From Table 1.2, products account for at least 10% of total exports and imports except in Ghana and Sierra Leone where the first imported product is below the threshold. Weight is equal to US\$ current GDP of each country/USD current GDP of ECOWAS) (Observatory of Economic Complexity (OEC) 2015). It can be observed that Nigeria has a much larger economy than other members of the ECOWAS. It represents 75% of the GDP of the region (World Bank, 2015). The Nigerian economy, unlike most ECOWAS member countries, is highly dependent on crude oil exports. As a result, when the prices of oil are high, Nigeria may experience strong expansion,

while its oil-importing neighbors may suffer from weak growth. Also, the specialization of the member countries to the export of raw materials promotes a situation of structural vulnerability linked to the significant volatility of the terms of trade (Benassy-Quere and Coupet, 2005).

Also, Table 1.2 shows that the ECOWAS countries' foreign trade is oriented toward raw materials. Its dependence on raw materials, whose prices are very unstable, usually promotes a situation of structural vulnerability linked to the significant volatility of the terms of trade. Among the export products of the region, gold and cotton are the most common and most other products are specific to one or two countries. The main imported product of ECOWAS countries is refined oil and most other imported products are also specific to one or two countries. According to Benassy-Quere and Coupet (2005), two countries with a similar dependence on the primary sector may have a different vulnerability to specific sectoral shocks depending on their dependence on a single product. An example of a similar dependence is the case of Nigeria, whose fall in the price of oil at the end of 2014 has been the most affected in Africa. But Cote D'Ivoire was able to take advantage of the fall in the price of oil, recording the best real GDP growth rate in West Africa in 2015 according to the United Nations (UN) (2017) report.

The direction of trade within ECOWAS seems to follow established patterns. Landlocked countries such as Mali, Niger, and Burkina Faso conduct a large portion of their trade with other ECOWAS countries as observed by Obadan (1984). It follows a north-south pattern, part of which is usually a transit trade through coastal countries. They export livestock, hides, and skins to the coastal countries and import food crops such as yams and vegetables in addition to petroleum and petroleum products. Most of the trade within ECOWAS has not significantly moved beyond colonial language blocs and their associated barriers which existed before the formation of the union. However, there is an obvious concentration of inter-language-zone trade. This relation is

strong among the former French colonies; transaction costs are lowered not only by common language but also by the CFA Franc which is a common currency system and greater than in the case of the separated former British colonies.

Apart from primary products, trade within ECOWAS is generally competitive and not complementary among its members, and this condition goes along with the supply constraints reflected in the low levels of production in the primary as well as the secondary sector. The manufacturing sector is still underdeveloped in the region, so member countries still rely on conventional sources, mainly Asia and Europe for those products. For agriculture, problems such as pests and the land tenure system, prevent large-scale cultivation.

1.6. ECOWAS Open Trade Policies

ECOWAS' open trade policies can be highlighted through various elements. These elements include Structural Adjustment Programmes (SAPs), Trade Liberalisation Scheme (TLS), Common External Tariff (CET), Economic Partnership Agreement (EPA) between the European Union (EU) and West African countries, African Continental Free Trade Area (AfCFTA) and World Trade Organisation (WTO) agreement. African nations (particularly those in the ECOWAS area) resorted to greater outward-looking trade policies after the 1960s and 1970s import-substitution industrialization development plan failed. Therefore, to attain high growth rates as indicated in the SAPs, governments should do away with import controls, including the rationing of foreign exchange that results from a short-term balance of payments deficits as well as long-term protection measures (tariff barriers, and non-tariff barriers). The establishment of the WTO in 1995 has expedited and continued this trade liberalization. Additional integration measures were pursued in a variety of sectors in addition to trade policy. The cross-border Initiative Programme

(CIP), for instance, was established in 2004 to assist initiatives in sectors including security and conflict prevention, health and education, agriculture, trade, and transportation. Additionally, citizens of nine member nations can travel to any country in the area without a visa by using the ECOWAS passport.

Table 1.3 shows the evolution of trade in the percentage of GDP, governance, and income per capita (constant 2010 US\$) in the ECOWAS region from 1980 to 2019. There are fluctuations in the evolution of the series of these variables from one period to another (simple 5-year averages). However, Table 1.3 reveals these variables continue to increase from 1980 to 2019. This can be explained by the efforts of the ECOWAS countries to liberalize their economies as described above. While, the value of the governance from the World Bank is negative over the period considered, they indicate a rise in the quality of governance. This considers voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Each indicator is ranged from -2.5 to 2.5 with a higher value indicating better governance. This can be explained by the reforms undertaken since the 1980s by countries, as recommended by some international institutions such as the World Bank.

Table 1.3: Trade, governance, and GDP per capita trends from 1980 to 2019

Periods	[1980- 1984]	[1985- 1989]	[1990- 1994]	[1995- 1999]	[2000- 2004]	[2005- 2009]	[2010- 2015]	2[016- 2019]
Trade (% of GDP)	60.41	57.45	54.11	56.49	63.72	71.93	71.14	70.89
Governance (from - 2.5 to +2.5)	NA	NA	NA	-0.62	-0.60	-0.61	-0.59	-0.56

GDP per capita (constant 2010 US)	830.52	777.88	768.39	818.79	876.10	979.96	1096.45	1171.71
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Note: NA means Not Available

Concentrating on regional trade integration, the ECOWAS trade policy is based on the implementation of the TLS established in 1979. The overall goal of the trade policy program is to harmonize the trade policies of the member countries, create a common market that will allow the region to benefit from economies of scale, spur economic growth, and make it easier for the region to integrate into the global economy (ECOWAS, 2015). According to Article 54 of the Revised Treaty of ECOWAS, each country has a maximum of four years from the start of the TLS (except in exceptional cases) to gradually loosen and eliminate all restrictions or prohibitions of a quota, quantitative and assimilated that apply to the importation into this country of goods from other member countries and does not impose further restrictions or prohibitions: it is the establishment of a free trade area. But since the TLS took so long to be implemented, the WAEMU, which had been in operation since 1 July 1996, was superseded on 1 January 2004 by the ECOWAS free trade area. The ECOWAS member nations also committed to establishing a customs union within ten years of the TLS's launch and an economic and monetary union within five years.

The ECOWAS nations have been negotiating an Economic Partnership Agreement (EPA) with the EU since the Cotonou agreement was signed in 2000. The signing of the EPA with the EU and the approval of the AfCFTA are additional goals of the ECOWAS trade negotiation. A crucial step in integrating West African countries into the AfCFTA is the ECOWAS CET's coming into existence on January 1, 2015. Regarding the agreement's development provisions and the number of resources for financial support, the 2006 official evaluation of the negotiating process revealed a lack of progress and ongoing dispute. The European Commission adopted a two-stage

strategy in response to the delays and challenges in the negotiation process, requesting that non-LDCs (LDCs denote Least Developed Countries) sign “interim EPAs” that are only applicable to trade in goods to maintain their privileged market access to the EU (LDCs already have duty-free market access thanks to the “Everything But Arms” (EBA) initiative).

Among the four non-LDC members, Ghana and Cote d'Ivoire signed an interim EPA, but Nigeria reverted to a less favorable Generalized System of Preferences access to the EU market (GSP). This makes Nigeria presently the only West African country that has not signed the EU-West Africa EPA. This happened for several reasons such as dependence on the exports of oil, the equilibrium of the trade balance, the fear of loss of income, and the zeal to protect its embryonic local industry. After leaving the LDC category in 2008, Cape Verde was granted an extension of the EBA to the end of 2011. Currently, it has been permitted to access the EU market under GSP+, a special market access status given by the EU to developing nations who agree to abide by international standards for human and labor rights, environmental protection, and good governance.

Figure 1.5 shows how the member nations of ECOWAS are a diverse set of nations. By far, Nigeria is the largest member in terms of both population and economic influence. The region's per capita GDP (PPP) ranges from US\$ 396 (Liberia) to US\$ 3,650. (Cape Verde). All the ECOWAS's members are categorized as LDCs, except Cape Verde, Nigeria, Ghana, and Cote d'Ivoire. Regarding the economic structure, only a small number of member nations have developed sizeable manufacturing industries, while most of the rest rely primarily on agriculture, services, and, in certain circumstances, the extraction of oil and minerals. All other members have access to the sea, except Mali, Niger, and Burkina Faso, although some of them do not have well-developed port facilities. Cape Verde is an island and has a small economy.

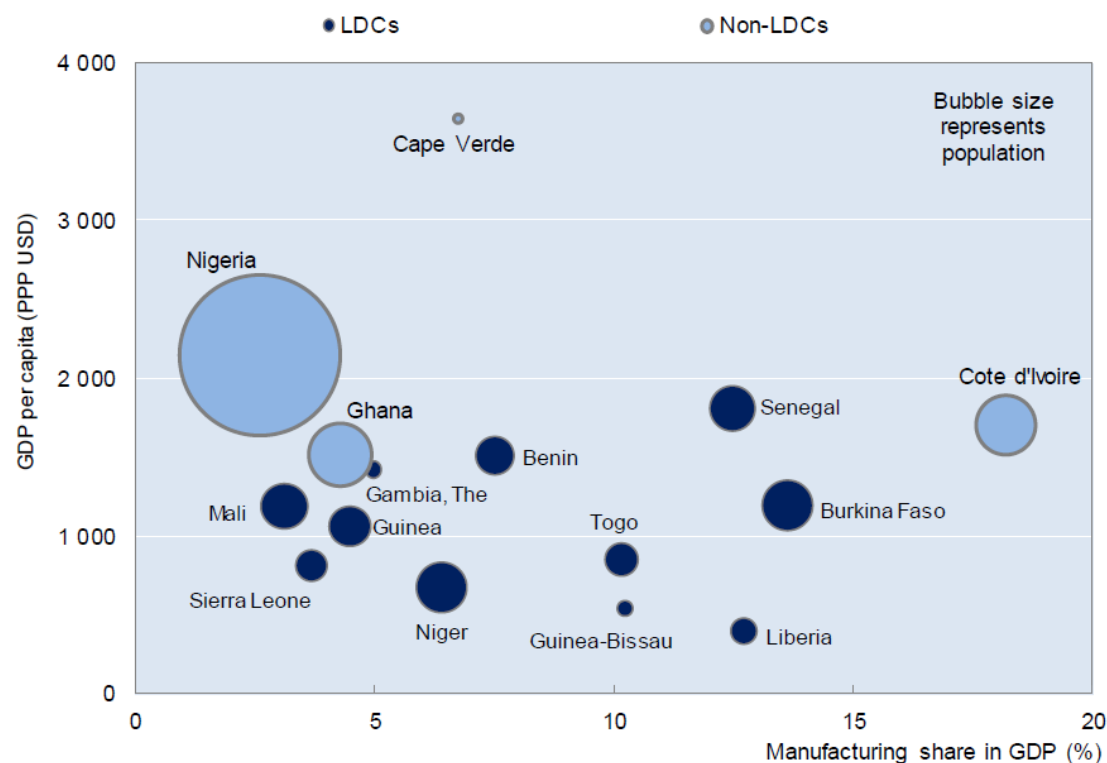


Figure 1.5. Size and economic structure of ECOWAS members
Source: All the data from World Bank, World Bank Indications.

According to critics such as Gonzalez (2007) and (d'Achon and Gerard, 2010), the EPA process might hinder regional integration by making the negotiations more complex and imposing deadlines and procedures that are inappropriate for the regions' unique circumstances. It might be argued that establishing reciprocal free trade with the European Union before the regional market has had time to consolidate increases the risk of "diverting" trade to EU markets (d'Achon and Gerard, 2010). Therefore, ECOWAS countries have declared that they view regional integration advancement as a requirement for the adoption of an EPA with the EU (ECOWAS, 2005).

1.7. Limitations of ECOWAS

In terms of constraints, several factors limit the effectiveness of regional economic integration in countries such as those in West Africa. The major limitations include inadequate infrastructure, lack of capital goods industries, inconvertibility of currencies, nationalism, conflicts on the distribution of benefits, lack of policy-implementing machinery, and lack of grassroots involvement. Infrastructural development is still in the progress in West Africa. Transportation and communication are still major setbacks in trade. Also, important industries that produce capital goods are very few in the region, so the region still imports from industrial countries. Another issue is the inconvertibility of the West African currencies with others. Even though the common currency was one of the major goals of ECOWAS, it has still not achieved it. All WAEMU countries in the region share a common currency but non-WAEM countries have different currencies, and this imposes a constraint on the efficiency of trade between the member countries.

On the political level, nationalism motivates African leaders to initiate national policies that may conflict with the goals of ECOWAS and the long-run goals of their respective countries. Government effectiveness shows the quality of the formulation of policies and how credible the government is concerning the commitment to such policies. But policy inconsistencies are likely to cause negative effects on both private and public participation in trade. Dissatisfaction among member countries over the distribution of benefits of regional integration is also a barrier to cooperation. This situation can delay the implementation of policies agreed upon by treaties.

The unexpressed objective to conquer the colonial legacies ties into the suggestion that has long been made that regional integration of SSA countries forms a means by which many countries in the region can overcome the limitation to their economic growth that appears to be the result of small size and small endowments of human and physical capital (Foroutan and Pritchett, 1993;

Mbaku, 1995). Regional integration efforts such as ECOWAS, therefore, should provide the foundation for escaping the colonial trade pattern dominated by primary exports to the industrial countries through the development of large intra-regional markets for locally manufactured products. The colonial legacy caused a divergent interest between anglophone and francophone members in implementing the provisions of its treaty.

The relative factor costs within the group of countries in the region are identical, to a large extent, since the entire region is characterized by an abundance of labor and a shortage of capital. Therefore, the benefits from increased trade based on the differences in comparative factor costs appear to be ambiguous in ECOWAS. Problems of competition within the customs union are very common in developing countries. Different specialization within ECOWAS is less likely, so members fear that intra-union competition because of lowered trade barriers will only serve to weaken their domestic economies. Changes in sectoral specialization are improbable, as individual ECOWAS nations appear to have minimal potential for establishing manufacturing export capacity. Generally, ECOWAS economies appear to have little prospects for considerable trade expansion due to comparative advantage or distinctive market features.

Aside from the obvious structural issues with trade inside ECOWAS, the organization appears to be confronted with additional obstacles to trade. Since the end of the colonial era, political concerns, both internal and international, have hampered efforts at regional integration in SSA. The disparity in size among ECOWAS members, with Nigeria being the largest, a limited number of intermediate-sized nations like Cote d'Ivoire, Ghana, and Senegal, and the rest countries being small, raises concerns about the incidence of regional integration costs and benefits. Nigeria has a much larger economy than any other member, it represents almost 75% of the GDP of the region (World Bank, 2015). Furthermore, transaction costs within ECOWAS are high. Although

the French franc zone has a shared currency, that area and ECOWAS are not coincident. Large-scale shipping across nations is unlikely in some situations due to a lack of infrastructure linking certain countries. While all customs unions have comparable issues, they appear to be more acute in ECOWAS, where they simply serve to exacerbate the more basic economic concerns of boosting trade through regional integration.

Low per capita incomes and small populations in most African nations lead to constrained marketplaces. 12 SSA states in 2008 had populations under 2 million, and 19 of them had a gross GDP of less than \$5 billion, with six of them having a GDP of under \$1 billion. In addition to being small and underdeveloped, 15 of the SSA countries also have landlocked economies, which is a significant contributor to the high trade transaction costs and generally high cost of doing business in Africa.

Many more restrictions exist in addition to border barriers, raising the transaction costs of trade. Geographical factors are crucial. One of the nine trans-African roads that the African Development Bank has suggested to encourage land transportation in Africa is the Lagos–Dakar Corridor, commonly known as the Trans Coastal West African highway. The Highway’s primary significance lies in the fact that it offers the most direct and occasionally the only road link between the capitals of the nations along its route. Additionally, it offers the beginning places for the highways that connect the ports with the hinterland’s landlocked nations. There are 4,010 km of roadway in total, 3,260 of which are paved in various places. The length of the Lagos–Dakar corridor is seen in Figure 6.

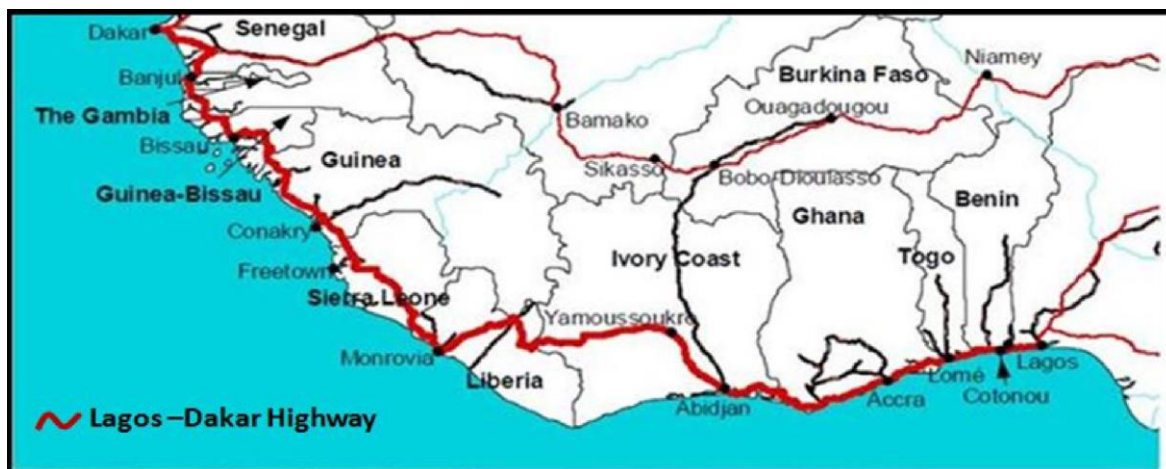


Figure 1.6. Lagos-Dakar Highway

Source: AfDB

Low per-capita densities of the road and rail infrastructure, which was built during colonial periods to convey agricultural products to ports. The result is inadequately established cross-country linkages (McCord et al., 2005). According to others, “the reality on the ground is that transportation costs in Africa remain among the highest in the world.” For instance, the cost of shipping a car from Japan to Abidjan is \$1,500 (insurance included); the cost of transporting an identical vehicle from Addis Ababa to Abidjan is \$5,000. Many of the continent’s rail, aviation, and road networks are still disconnected (Economic Commission for Africa 2004). The high cost of air travel is also a result of cost inefficiency and a lack of competition in the industry due to regulatory rules. Overall, the high cost and unreliability of transportation services lead to a high-cost business environment where enterprises are required to maintain greater quantities of inventory, making it impossible to implement just-in-time production management systems that would otherwise save money.

Business news and information needed for well-informed decision-making is another significant constraint due to the lack of knowledge and resources needed to establish and run

sophisticated modern communication systems and the small business communities' disapproval of economically viable business publications. Fixed-line telephone services have notoriously expensive call rates, particularly for international calls, and are both limited and unreliable. Fixed-line phone service supply is still solely controlled by state monopolies in most African economies. Contracts depend on accurate, quick, and inexpensive access to trustworthy market information, including information on the creditworthiness of potential customers. They also require information on competitive rates. Information is crucial for facilitating effective market outcomes, and a lack of information that is easily accessible and affordable can reduce market effectiveness due to high or undetected trade transaction costs.

1.8. Trade Creation and Trade Diversion

RTAs such as ECOWAS might indeed positively influence trade between member countries under the agreements, but their effects on trade with non-member countries are not obvious. Trade creation and trade diversion are terms that were first coined by Viner (1950) to explain the differing effects of trading arrangements on the volume of trade. The consumption effect was later included by Meade (1955) and Lipsey (1957). Trade creation occurs when a member state of a regional integration starts importing from the other members a product that was previously produced locally by higher-cost producers. It represents a movement in the direction of free trade, which is associated with an increase in the welfare of the member countries of regional integration. While trade diversion occurs when a member state of a regional integration switches her importing activities from lower-cost non-member states to higher-cost member states. It represents a movement away from free trade, which is associated with a decrease in welfare. The net effect of regional integration on trade based on welfare depends on the relative size of these

two effects. A regional integration that causes more trade creation than trade diversion would increase the welfare of member countries while one that causes more trade diversion than trade creation would lead to a decrease in the welfare of member countries. Thus, whether a regional integration scheme produces a net welfare benefit to participating countries is an empirical issue. For instance, in Figure 7, two countries A and B form a bilateral free trade agreement (FTA) and country C is not part of the FTA. However, country C is a more efficient producer of a tradeable good, say oil, compared to country B. If country A was importing oil from country C before the formation of the FTA, but it switched to country B after the FTA due to a reduction in tariffs on oil from country B, then a trade diversion effect occurs. Therefore, if the effect of trade diversion outweighs trade creation, the welfare effect of FTA could be reduced for member countries.

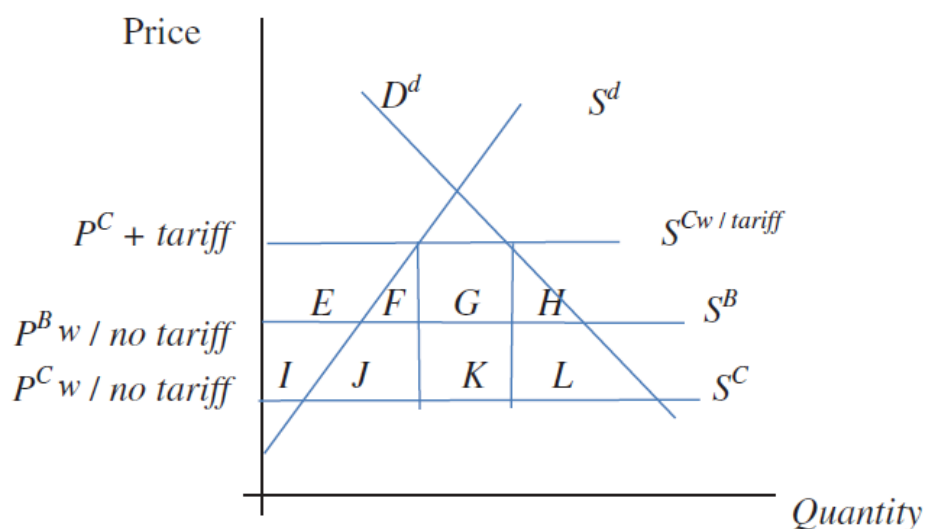


Figure 1.7. Trade creation, trade diversion, and welfare.

In Figure 7, D^d and S^d represent domestic demand and supply in country A, respectively; S^C with tariff and S^C without tariff represents supply by non-member country C, respectively; S^B

represents supply by member country B, respectively; and PC and PB represent prices of the products from country C and B, respectively. When country A imposes tariffs on both B and C, country B's tariff-inclusive price exceeds the tariff-inclusive price of C, causing country A to import goods from C. In contrast, customers in A import from B under a free-trade agreement between A and B since B's price is less expensive than the tariff-inclusive price of C. This trade diversion from C to B also results in the substitution of domestic production for imports from B. For country A, areas E, F, G, and H represent a gain in consumer surplus, area E represents a loss in producer surplus, and areas G and K, denote a decrease in tariff revenue; the net welfare change is therefore equal to $(E + F + G + H) - (E + G + K)$ which is $F + H - K$. Area $F + H$ represents a welfare gain to consumers due to trade creation, and area K is a loss in tariff revenue resulting from the trade diversion.

Many researchers have since tried to test empirically the net effect of trade creation and trade diversion of various trade agreements. While the study of the effect of trading agreements on the welfare of trading partners would be a more useful approach in analyzing public policy, welfare is more difficult to measure than trade volumes. Welfare gains are generally expected from trade liberalization, but if that is the case, the question arises why the progress with integration is often so slow. Nshimbi (2005) concludes that short-term domestic considerations often make member states neglect long-term goals for regional integration. As stated by Forson (2013), the lack of progress with economic integration amongst the ECOWAS countries can be attributed to the lack of political commitment among some of these West African states. Therefore, researchers have analyzed the best alternative for the effect of the trade agreement on the volume of trade rather than on the welfare of countries.

Without any doubt, the most adopted model in the empirical work on trade is the gravity model. The model postulates that bilateral trade flows are positively related to the size of the trading countries, but negatively related to the distance between the two countries. Therefore, large economies will trade more with each other than with a smaller economy, but countries generally trade less with countries that are geographically far from them. Bilateral trade flows in the gravity theory represent either export, imports, or total trade between countries. This thesis adopts the gravity model in analyzing if ECOWAS increased trade among its members. Nevertheless, there are drawbacks to applying the gravity model in this study, there is no agreement in the literature on which variables to add to or to exclude from the basic gravity model. Hence, authors tend to specify their models differently at their ease depending on their variable of interest. To reduce the effect of this problem, variables chosen in this study were those commonly used in prior studies and diagnostic tests were conducted to confirm an improvement in the model specification when adding them. Also, the gravity model in this thesis accounts for the recent advances in the specification of the gravity model and the econometric methodology.

1.9. Objectives of the Study

Countries' propensity to trade with one another is expected to rise when trade obstacles are lowered. This is the fundamental goal for many trade blocs. The primary objective of the ECOWAS is to increase regional trade and support economic growth that is sustainable for the region. The assumption is that, by creating ECOWAS, regional economic integration will be able to expedite trade and capital flows, lower business and transaction costs, boost investment, and ultimately improve the overall economic activities and standards of living of its members. Numerous studies have examined the relationship between trade liberalization and economic

growth (e.g., Robinson and Thierfelder, 2002), and it has been suggested that rapid economic growth cannot be sustained in the absence of trade liberalization. Lower trade barriers result in more economic openness in trade, which lowers costs and increases efficiency when countries identify the areas in which they have a local or global competitive edge.

This thesis evaluates how ECOWAS affects the trade of member countries, and it derives corresponding inferences about welfare and productive activities in the region. Therefore, this thesis study focuses on the implicit welfare implications of the formation of ECOWAS and the extent to which trade between its members has increased because of trade liberalization. Hence, the objective of the empirical analysis in this thesis is basically to examine the magnitude of trade flows among ECOWAS member countries. It will be further extended to examine the magnitude of trade among members of the West African Economic and Monetary Union (WAEMU), which membership includes eight, mainly francophone, states within ECOWAS. The WAEMU member countries are Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The empirical analysis will also estimate the magnitude of trade flows among members of the West African Monetary Zone (WAMZ), which includes six, mainly anglophone, countries within ECOWAS (Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone) that plan to introduce a common currency called the ECO. The empirical analysis uses the gravity model to implement the empirical analysis. The empirical analysis uses the conventional log-linear form of the gravity equation, and it also estimates the multiplicative form of the gravity equation using the Poisson pseudo-maximum likelihood (PPML) estimator to tackle empirical issues associated with zero bilateral trade flow observation and heteroskedasticity (Santos-Silva and Tenreyro, 2006, 2011). This thesis will then use the empirical results to assess regional trade potentials among ECOWAS member nations, determine the factors that can promote or hinder bilateral trade flows among

ECOWAS countries, and provide suggestions to guide analysts and policymakers to develop strategies to increase regional trade in the ECOWAS bloc.

1.10 Significance of the study

This study is significant for various reasons. Most importantly, this study will provide empirical evidence about the performance of ECOWAS in terms of trade flows. It will give insights into how the factors promoting trade perform and into how the factors hindering trade in ECOWAS can be tackled. It also extends the literature on the trade effects in the ECOWAS region. A future researcher exploring the topical issue of ECOWAS will find this study as a source of literature. In addition, this study has economic implications as it can be used by policymakers to develop strategies to reinforce the integration process. Although the gravity model has been successful in describing trade flows across trading blocs in Europe, Asia, South, and North America, and Sub-Saharan Africa overall, not much has been done to explain the more recent trade patterns seen in the ECOWAS regional bloc. As a result, by utilizing the gravity framework to estimate the effects of the ECOWAS on regional trade flows, this study will contribute to the body of knowledge on applied international trade.

1.11 Thesis Organization

The remaining of this thesis is organized as follows. Chapter two provides a review of the literature on international trade and the theories of trade agreements. Chapter three presents the empirical gravity model that will be used in this thesis, and it provides a detailed discussion of the variables in the model and the data. The empirical challenges associated with estimating the model will be discussed and the advances in the empirical specification and econometric methodology

will be reviewed. Descriptive statistics will be also included in this chapter. Chapter four will present and discuss the empirical results. Lastly, chapter five will include the study's summary, conclusion, and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1. Theories of International Trade

International trade theory has progressed tremendously since Adam Smith's era. More so since the formation of the General Agreement on Tariffs and Trade (GATT) in 1948. Before Adam Smith, in the 17th and 18th centuries, the most dominant explanation for the conduct of international trade was based on the theory of mercantilism. Mercantilists primarily encouraged exports and discouraged imports, if necessary to create an export surplus. For mercantilists, since all nations could not operate on export surpluses, successful and powerful nations gained, while nations less powerful and successful lost from trade. Ideally, for a nation to maximize employment, it exports finished goods and imports raw materials.

However, Smith (2010) in his book "The Wealth of Nations" presented a different view of international trade. He contended that in a two-nation framework where one nation is more efficient in the production of a commodity with the other nation being more efficient in producing a different commodity, both nations could benefit if they decide to trade. Trading allows each nation to specialize in the production of commodities for which it has an "absolute advantage" and, therefore, increases the production of both commodities. Against mercantilism, this implied the implementation of very different policies such as less government involvement and the reduction of trade barriers. In the book "On the Principles of Political Economy and Taxation," Ricardo (2015) proposed a very significant refinement of the original theory by Adam Smith. For Ricardo, trade is still beneficial even if one country possessed an absolute advantage in the production of both commodities. He argued that rather than "absolute advantage" what should be considered is the "comparative advantage" of countries in the production of commodities.

According to Ricardo's theory of comparative advantage, both countries can benefit from trade even though one country is more efficient in manufacturing both commodities. Under this theory, what matters is relative efficiency. The law of comparative advantage, for most economists, is fundamental to the theory of international trade. As Salvatore (2019) states, it remains “one of the most important and still unchallenged laws of economics’ ...it is the cornerstone of the pure theory of international trade”.

Labour was used as the sole factor of production in the theories of absolute advantage and comparative advantage. In the early 20th century, Bertil Heckscher and Eli Ohlin modified these theories by considering the additional factor of production (Davis, 1995). The resulting theory, the so-called Heckscher- Ohlin (H-O) theory, asserts that a country exports goods whose factors of production are in relative abundance in the country and imports goods whose factors of production are relatively scarce. These theories proposed by Smith, Ricardo, and H-O are premised on some key assumptions. Some of these include a perfectly competitive market with no barriers imposed by governments and production under constant or diminishing returns to scale. Another key assumption of traditional economic theory is that basic factors of production, such as land, labor, and capital, are not traded across borders, although Ohlin argues that relative returns to factors of production between countries would tend to be equalized as goods are traded between them (Davis, 1995). Subsequently, Samuelson (1948) contended, in the factor price equalization theorem, that factor prices would be equalized under free trade conditions. One major weakness of the theories discussed is the concept of the two nations and the two factors. Vanek (1968) considers the N-factors case and concludes, among others, that “a country better endowed in the *jth* factor relative concerning the rest of the world (i.e., another country in a two-country model) could never be a net exporter of productive services of the *ith* factor embodied in international barter exchange.”

The literature demonstrates that several researchers have studied various ways that trade may have an impact on a nation's economy. First, Sala-i-Martin and Barro (1997) and Grossman and Helpman (1991) both claim that trade is a means of knowledge and technology dissemination between trading partners. Second, according to Vickers and Yarrow (1991) and Wacziarg (2001), enhanced trade openness boosts competitiveness in the local market, which in turn stimulates economic growth and production efficiency. Conversely, Alcalá and Ciccone (2003) claimed that trade was more important for growth in countries with smaller domestic markets, implying that these nations often gain more from trade openness. According to Ades and Glaeser (1999), increased market size brought about by trade openness enables economies to better reap the potential advantages of rising returns to scale.

2.2. Theories of Regional Trade Agreements

Viner (1950) proposed the earliest theory on regional integration in his influential work “The customs union issue.” Before this, the prevailing idea was that the presence of any form or kind of preferential trade leads to specialization in the production of the commodity for which the country incurred the least cost and, therefore, improving international trade. For Viner, preferential trade is not always welfare-improving and can sometimes reduce by diverting trade from a low-cost country to a high-cost country. The concepts of ‘trade creation’ and ‘trade diversion’ were used by Viner in explaining the economic consequence of regional integration. Trade creation means that regional integration replaces high-cost domestic users with a low-cost partner firm, making prices cheaper for consumers. In the concept of trade diversion, the rest of the world is viewed as low-cost and is replaced by a high-cost partner country. This leads to a welfare loss to the home country (see Chapter 1 for the corresponding welfare analysis). In Viner’s view, trade

agreements that are trade-creating are useful for countries involved while trade-diverting ones are harmful to member countries as well as the entire world. Nonetheless, an individual member country can gain large benefits from a primarily trade-diverting union by shifting the intra-union terms of trade in its favor. Despite its obvious advantages, the model has two major weaknesses. First, it is a partial equilibrium model and, therefore, it is not able to accommodate the neoclassical trade theory based on general equilibrium. Second, it is not able to explain the existence of large bloc countries of regionalism.

The next significant contribution to the theoretical literature was made by Meade (1995). Meade presented the modern static theory of regional integration in a book titled “The theory of Customs Union”. In several meaningful ways, this was an upgrade to the model proposed by Viner. For instance, the model admitted multiple countries trading in multiple commodities. Viner assumed constant costs of production in the trading countries, this assumption no longer holds for Meade (1995). Finally, the model ensured equilibrium in international payment balances. With these refinements, the model admitted multiple countries, this assumption no longer holds for Meade. Finally, the model ensured equilibrium in international payment balances. With these refinements, the model can admit the possibility of spillover effects from RTAs on non-members. There are also feedback effects of international adjustments to the formation of regional integration arrangements on member countries. Meade focused his analysis on the economic welfare of the world economy, not simply on the countries forming a regional integration arrangement. In an RTA where trade barriers and external tariffs are very high, the members trade exclusively with one another, and the union is wholly trade-diverting. The equilibrium emerging from this situation determines the domestic and intra-block terms of trade for members of the RTA. From the perspective of the partner country, the equilibrium is superior under either protection or free trade.

However, from the perspective of the home country, the equilibrium is inferior to the equilibrium under protection or free trade. Thus, in a small union, the allocation of trade gains among member countries is vital for the stability of the agreement.

The previous theories relied heavily on the concepts of trade creation and trade diversion. Lipsey (1960) bucks this trend and focuses primarily on the welfare effects of these unions. The welfare effects of RTAs are determined by the mixture of their impact on the location and cost of world production and the location and utility of world consumption. Lipsey (1960) defined the consumption and production effects of the customs unions and posited that when consumption effects are considered, concluding that trade diversion is bad while trade creations are good no longer holds. This is highlighted in the model by the fact that diverting trade from lower-cost producers to higher-cost producers in a customs union could result in welfare gains. The model further proves that this gain in welfare may be enjoyed by a country whose import trade is diverted.

International prices of commodities traded by members of RTAs are affected when there are significant changes to intra-regional trade and extra-regional trade. This affects the economic welfare of both members as well as non-members. Based on this, Vanek (1965), Ohyama (1972) and Kemp and Wan (1976) provide a theoretical viewpoint. The theory assumes that holding the net trade vector of countries in a union constant concerning the rest of the world ensures that the rest of the world can be made neither better off nor worse off by the union. By considering the external trade vector as a constraint, the joint welfare of pairs of countries in the union can be maximized by equating the marginal rate of substitution to the marginal rate of transformation for each pair of commodities across all agents in the union. This can be achieved through the elimination of intra-union trade barriers and setting the common external tariff vector at a level just right to hold the extra-union trade vector at the pre-union level.

The Domino theory of regionalism was developed by Baldwin (1993). It was developed to provide an understanding of why most countries prefer regional integration to multilateral liberalization. For Baldwin, idiosyncratic shocks such as deeper integration of an existing regional bloc can trigger membership requests from countries that were previously happy to be non-members. In this situation, the government's stance on whether to join a union resulted from a political equilibrium that is a balanced pro and anti-membership forces. Some of the pro-integration sentiments are expressed by firms exporting to the regional bloc. Given that integration reduces profits for firms in non-member countries, exporters in the non-member country would express greater pro-regional sentiments. This alone could be enough to tilt the balance of the political equilibrium to favor joining the union. As union becomes larger, there is an increased cost for non-member firms. This generates more pro-regional sentiments in non-member states, resulting in a further expansion of the union. This explains why regionalism is preferred more than multilateral liberalization. In the juggernaut theory by Baldwin and Robert-Nicoud (2007), these authors highlight the fact that liberalization leads to liberalization, and once the process of liberalization starts, it becomes very difficult, impossible in some cases, to stop it. Baldwin explains that when there is an agreement for multilateral tariffs to be cut based on the principle of reciprocity, exporters would agitate for domestic tariffs to be reduced to enable them to have access to overseas markets. Therefore, the reduction in tariffs, both at home and abroad, changes the economic landscape. This eventually leads to a political economy momentum and the liberalization of the sector involved in the multilateral tariff cutting. The intersection between these two theories of Baldwin (1993) and Baldwin and Robert-Nicoud (2007) gives the conclusion that regional trade blocs are the building blocks for free trade. Baldwin presents some limiting cases for RTAs involving South-South countries in that they are not able to generate the domino and juggernaut

effects. Baldwin (2011) critically evaluated theoretical literature to identify the insights that are useful for thinking about regionalism's systemic impact in the new century. He concluded regionalism is here to stay and there is a need for deep multilateral integration.

2.3. Trade Liberalization

The classical and modern trade theories can be used to trace the theoretical literature on the connection between trade liberalization and intra-regional trade. The classical thinkers had proposed that trade served as a stimulus for the growth of domestic markets and output while also encouraging specialization. Contrarily, the neoclassical school of thought holds that advantages from trade result from nations engaging in trade based on disparities in factor endowments. The Stolper-Samuelson theory is another extension, and it states that, under certain circumstances, a rise in a good's relative price will result in an increase in the return to the factor used most intensively in the production of that good and, in the reverse case, a decline in the return to the other factor. The factor price equalization and special factor models are supplementary expansions of the neoclassical models.

These models do, however, imply that trade liberalization improves well-being, although the advantages are rather modest when compared to the experience of nations that switched to open development methods (Robinson and Thierfelder, 2002). Neoclassical market structures are considered by the new trade theory, along with increasing returns, imperfect competition, technology transfers, trade externalities, and dynamic effects. This covers the relationships between trade liberalization, rising total factor productivity, and building capital stock. Despite claiming to explain the growing trend in trade in intermediates, the new trade theory presupposes that all businesses are symmetrical (i.e., similarity of production coefficients).

According to Xiong (2012), the gravity framework may also consider additional variables that impact trade costs, such as import taxes, non-tariff controls, contiguity conditions, past colonial relationships, and religious similarities. Given that import taxes greatly increase trade costs, this shows that the inclusion of import tariffs in an enhanced gravity model is feasible (Fukao et al., 2003; Lee and Park, 2007). This line of thinking was supported by Amin et al. (2009), who stated that the supply and demand circumstances of the exporting and importing economies or restraint forces linked to the specific flows between the two nations affect the amount of trade flows between countries.

2.4. The Gravity Model

Tinbergen (1962) and Poyhonen (1963) proposed a gravity model to examine trade flows in the context of international trade. It has been rationalized from several theoretical viewpoints such as the Heckscher-Ohlin relative factor abundance theory (Deardorff, 1998). The gravity model initially lacked a theoretical foundation until the 1970s. This prompted several advancements and debates on the theory behind the gravity equation. The new economic geography and trade theories, among other gravity models, were founded on a microeconomics theory. Almost all these theories provided a thorough justification for the existence of diverse trades and points of view that led to the creation of similar gravity models. Similarly, Anderson (1979), Evenett and Keller (1998), Bergstrand (1989, 1990), Anderson and Van Wincoop (2003), and Hanson and Xiang (2002) all made significant contributions to the development of a theoretically grounded approach for gravity models to investigate trade flow at the international level. According to Deardorff (1998), under this framework, Heckscher-Ohlin trade was hindered with or without friction, and the gravity model is well-matched with a variety of business models.

The gravity model has evolved from the mortification of poverty to a theoretically supported method that has also given way to the mortification of prosperity, according to Cheng and Wall's (1999) theoretical contributions research.

The gravity model, which incorporates certain components of volume and distance, is used in social science to describe economic activities like trade and immigration that reflect the characteristics of Newton's law of gravity. The most fundamental version of the model assumes that the amount of trade between two nations is inversely proportional to their distance from one another and directly related to their relative sizes. Empirical studies using the model frequently increase the number of variables to account for linguistic differences, political and economic ties between trading partners, border and exchange rate regimes between trading partners, political tensions, trade association membership, road quality, etc. (Frankel, 1997; Carrillo-Tudela and Li, 2004; Longo and Sekkat, 2004; Coulibaly and Fontagne, 2005; Behar and Manners, 2010; Buys et al., 2010).

Using a gravity model, Longo and Sekkat (2004) investigated the effects of infrastructural accessibility, economic policies, and internal political conflicts. Geda and Kebret (2007) evaluated the challenges and opportunities of regional economic integration in Africa. They then used the common market for Eastern and Southern Africa (COMESA) as a case study to empirically identify the most significant element driving intra-regional trade. To calculate the intensity of trade formation and trade diversion in the three regional economic communities of COMESA, the Economic Community of Central African States (ECCAS), and ECOWAS in Africa, Musila (2005) employed the gravity model. The study's findings showed that the rate of trade formation differs by area, with ECOWAS having the greatest rate.

The effect of geographic barriers on intra- and extra-regional trade of nations participating in the West African Economic and Monetary Union was studied by Coulibaly and Fontagne (2005). Buys et al. (2010) quantified the effects of improving road networks linking significant African urban centers using spatial network approaches and gravity model predictions. According to the simulations of the study, the initial costs of improving the road networks will be around \$20 billion, and they will need \$1 billion in annual maintenance. The impact of this will be an increase in overland trade in sub-Saharan Africa, which could grow to \$250 billion within 15 years. Using the gravity model, Shepherd and Wilson (2007) also looked at how improved roads affected the growth of commerce in Eastern Europe and Central Asia.

Additionally, Laser and Schrader (2002) demonstrated that there are two ways to estimate distances: virtual and actual geographical distances. The importance of distance in the context of international economic relations must be recognized in empirical investigations. The rapid decline in the cost of information and communication has not led to the elimination of distance (Ghemawat 2001). The impact of a variety of political factors, such as regional trade, monetary unions, historical links, and political blocs, has been thoroughly estimated using a variety of gravity models (Soloaga and Winters 2001; Freund 1998; Djankov and Freund 2002). Based on their comparative advantages, preferences, technological advancements, infrastructure, customs, and historical similarities, natural trading partners might arise.

The benefits of regional trade practices have been found by several researchers. Viners (1950) made a ground-breaking discovery on the two diametrically opposed effects of each country's RTA membership. Generally, if import duties are lowered or eliminated, a country will profit more by trading with another member at a lower cost. By optimizing resource allocation inside the zone, trade creation speeds up the development of free trade zones. Diversion of trade

amounted to stepping up a defense against resources outside the region. The long-term outcome will depend on which trade diversion or trade creation is more significant; a trade creation effect will result in welfare enhancement while a trade diversion effect may result in welfare loss.

Due to its ability to describe some genuine phenomena that the standard factor endowment cannot, the gravity model continues to be the most popular estimating approach in this field (Deardorff, 1998). The model was expanded by Linnemann (1966), Aitken (1973), and Leamer (1974). Although the field's theoretical underpinnings were not as strong in the beginning, since the end of the 1970s, things have changed. The sample of selected countries for the analysis affects the estimation findings of the gravity model used to calculate the RTA impacts. Haveman and Hummels (1998) show that altering the country sample leads to a different trade forecast in the absence of the RTA, which alters the estimation impact of the RTA. The gravity model, according to Pomfret (1997), is ineffective for analyzing trade impacts in an RTA. According to Ghosh and Yamarik (2004), the gravity model results are extremely sensitive to the variables used in the regressions and the researchers' preconceived notions. When they include the researcher's prior assumptions in the calculation, they discover a striking decline in the number of regional agreements that are trade-creating. Additionally, Clausing (2001) discovered that the gravity model is unable to distinguish between surplus trade occurring before and after the Canada–US free trade agreement.

Nevertheless, the gravity model is still a widely used strategy in international trade since it can assess international trade flows between nations, despite the limitations described above. Yang and Martinez-Zarzoso (2014), Salisu and Ademuyiwa (2012), Musila (2005), and more recently Deme and Ndrianasy (2017) use the gravity model to show the effects of trade creation and trade diversion in the ACFTA (ASEAN4-China Free Trade Area), WAMZ (West African Monetary

Zone), ECCAS, COMESA, and ECOWAS zones, respectively. Yang and Martinez-Zarzoso (2014) showed that the ACFTA results in large and substantial trade creation using both aggregated and disaggregated export data. In a similar vein, Romadona and Pujiati (2018) assert that two out of every five Indonesian commodity imports considered for their analysis experience trade creation because of the ACFTA.

Salisu and Ademuyiwa (2012) discovered that the region has been diverting trade utilizing a gravity equation on a 2005–2010 period in WAMZ. However, Musila (2005) demonstrates that the trade diversion impact remains small in the ECCAS region when the notion of trade creation is not considered. The author reaffirms the notion that barrier factors (distance and language) and size factors (level of GNP and population) are important in determining international trade flows. On the other hand, Musila (2005) discovered evidence of trade creation for the ECOWAS. Similar findings are made more than ten years later by Deme and Ndrianasy (2017). In essence, the authors contend that the origin of trade creation is an RTA developed among small, relatively low-income nations with a limited proportion of total bilateral trade, such as the one established in the ECOWAS area.

Sattayanuwat and Tangvitoontham (2018), Urata and Okabe (2014), Muhammad and Yucer (2009), and Pfaermayr (2018) assess the impact of various RTAs and PTAs on the creation and diversion of trade using the gravity model as well. Sattayanuwat and Tangvitoontham (2018) more correctly dissected the impact of ASEAN preferential trade accords. They discovered that, generally, trade preferences promote trade formation among ASEAN states using a pooled regression method. However, there is also proof of trade diversion. This latter is most likely connected to preferential trade agreements with high external tariffs. Urata and Okabe (2014) discovered somewhat comparable results (2014). In fact, the authors examined the effects of RTAs

on 67 developing and developed nations between 1980 and 2006. The findings of gravity estimations reveal that, in contrast to RTAs between wealthy nations, trade between underdeveloped countries tends to be diverted. They contend that the persisting high level of tariffs on imports from non-members is likely to be the source of the observed trade diversion among developing nations, whereas the development of trade would be facilitated by several variables in addition to the drop-in tariff rates. In a previous study, Urata, and Okabe (2010) showed that the EU is characterized by trade creation in agricultural commodities while the AFTA (ASEAN Free Trade Area) and the NAFTA (North American Free Trade Agreement) led to trade creation in all types of machinery trade. This study used the same sample of countries, the same methodology, and the same period (1980-2006).

Muhammad and Yucer (2009) estimated a gravity model specification taken from Santos Silva and Tenreyro's (2006) work using a Poisson pseudo-maximum likelihood (PPML) approach to reduce the bias inherent to the OLS estimators (2006). The study, which concentrated on six RTAs in the Western Hemisphere, found that four of them resulted in the formation of new trade, although the initial RTAs' trade diversion differed considerably. In a similar sense, Pfaermayr (2018) evaluated the trade creation and trade diversion effects of RTAs covering 65 nations from 1994 to 2002 using a restricted panel PPML estimator. The findings demonstrate both large trade creation and trade diversion.

2.5. Review of the Empirical Literature

Numerous studies have been conducted to examine the impact of RTAs on the bilateral trade of member countries. The empirical evidence on this question can be broadly divided into two categories: ex-ante and ex-post. Given that RTAs under investigation were formed decades

ago, I proceed to conduct an ex-post analysis of their impacts and, as such, the review of the literature would focus on ex-post empirical studies.

Several Studies on the impacts of RTAs on trade flows in Africa have utilized the gravity equation. These estimates have yielded conflicting and underwhelming results. While most find RTAs to create more trade, there is a significant minority that has found RTAs to either have a negative impact on trade or no impact. In the case of studies analyzing multiple RTAs, it is commonplace to find conflicting results for different RTAs. For instance, Longo and Sekkat (2004) investigated the challenges of increased intra-African trade. The results from this study showed that, for the full sample, WAEC, UDEAS, and ECOWAS have led to increases in trade flows while COMESA, CEPGL, and SADC have led to decreased trade between members. After splitting the sample, the authors reported that SADC and COMESA still have a negative effect on trade. A later study by Geda and Kebret (2008), which uses the gravity equation with the Tobit formula and annual data from 1980 to 1997, found that SADC and COMESA do not have a positive impact on trade flows between members, confirming the results from the previous study. In a recent study, Afolabi et al. (2017) utilized panel data of bilateral export flows for ECOWAS members from 1983 to 2013 and found a negative and statistically significant relationship between RTAs and trade flows when utilizing dynamic OLS and fully modified OLS, but no effect when utilizing pooled OLS. Similarly, Kagochi and Durmaz (2018) use the gravity equation to empirically investigate the effects of RTAs on intra-regional trade for 46 African countries between 1995 to 2011. They found, among others, a non-positive impact of ECCAS on trade flows. This is confirmed by Musila (2005), who used data from 1991 to 1998.

Contrary to these, several studies have established the presence of a positive and statistically significant impact of RTAs on trade flows. This implies that RTAs have been

principally trade-creating. For example, Buiguit (2016), utilizing a sample of 49 country pairs for the period 2000 to 2003, examined the impact of East Africa Community (EAC) using a gravity equation. He found EAC to have a positive effect on intra-EAC trade of about 22.1 percent. Similarly, a study by Carrere (2004) utilized panel data for the period 1962 to 1996 for a sample of 150 countries and found ECOWAS, SADC, and COMESA to be trade-creating. These results are confirmed by Cernat (2001), who used pooled data for 1994, 1996, and 1998 and found trading among SADC countries to be nine times more than trading between SADC countries and other countries. After controlling for the possible endogeneity, Carrere (2004) found intra-Ecowas trade to be an average of 22 percent higher. In a similar study, Afesorgbor et al. (2011) utilized data from 35 African countries from the period 1995 to 2006 to examine the impact of ECOWAS and SADC on trade flows. The study compared these to the EU-ACP trade agreement. The results show that ECOWAS and SADC have improved bilateral trade among members more than the EU. The SADC, however, has a bigger impact 6.2 to 10.4 times more compared to non-members while ECOWAS has 4.9 to 6.5 times more. To further buttress this finding, Turkson (2012) utilized data from 48 countries in SSA as well as 25 EU countries for the period 1960 to 2006. After controlling for the endogeneity of the trade agreement dummy, accounting for multilateral price resistance and zero-valued trade flows, the findings indicate that the EU-ACP trade agreement and RTAs within ECOWAS and SADC have positive and significant impacts on bilateral trade involving SSA countries. In some cases, the relative impact of the sub-regional RTAs was found to be stronger than EU-ACP non-reciprocal preferential trade agreement. By employing a gravity equation and conducting a meta-analysis, Afesorgbor (2017) examined the impact of regional integration. In conducting the meta-analysis, data from previous studies were collected. The study also employed

bilateral data exports from 1980 to 2006. After correcting for bias, the results showed that RTAs increase bilateral trade among members by 27 to 32 percent.

Outside Africa, Coulibaly (2004) used data from 1970 to 2000 for several RTAs across the developing world. The study utilized instrumental variable methods to estimate the gravity equation and examine the effects of RTAs. Specifically, SADC, CAN, ATA, and MERSCOSUR were found to be trade diverting, while ECOWAS and SAPTA were found to be trade-creating. In a related study, Coulibaly (2007) used unbalanced panel data from 1960 to 1999 to examine the impact of RTAs. Here, he estimated the gravity equation and used it to conduct a kernel estimation. The results indicate that, except for SAPTA, all these RTAs have had a positive impact on their members' intra-trade over the estimation period. In a follow-up study, Coulibaly (2009) considered 22 RTAs involving mostly developing countries and covering all the continents. The study used an unbalanced panel containing 176 exporters and 180 importers over the period 1962-2006. To estimate the impact of these RTAs, the author first estimated a gravity equation excluding the RTA variables, and then use the estimated trade residuals to run a kernel regression for each of the RTAs. The results show that, except for BIMSTEC, CACM, CEMAC, EEU, and GCC, all remaining RTAs appear to have had a positive impact on their members' intra-regional exports.

Within the African continent, Assarsson (2006) investigated the effects of the EU-South Africa free trade agreement to investigate whether South Africa benefited from it. According to the findings of the study, South Africa benefited from the EU-SA free trade agreement by increasing trade value at the expense of other South African economies that were negatively affected by the FTA. According to some researchers such as Harvey (2000) and Lewis et al. (1999), macroeconomic policies have consequences for trade integration in the Southern African area. Mold and Mukwaya (2017) used a sample of 26 nations to investigate the consequences of the

tripartite FTA for the Southern, Eastern, and Northern African regions in a more comprehensive study. According to the general equilibrium conclusion, unrestricted trade across the regions increased intra-regional exports by 29%. The manufacturing and agriculture (food processing) sectors profited the most from free trade.

Even though matching has predominantly been used in labor economics in the evaluation of either job training or benefits programs in large cross-sections of individuals (Baier and Bergstrand, 2009), a few studies (Persson, 2001; McKinnon, 2002) have used this approach in international trade. While Persson (2001) utilized the logit equation and covariates in the gravity equation to estimate the probability that a country-pair belongs to a currency union, McKinnon (2002) alternatively employed the probit equation. Persson (2001) found that countries within currency union trade between 13 to 65 percent more, however, this was not statistically significant. McKinnon (2002), using an asymmetrical method, replicated the results of Persson (2001) although these were with anomalies. In a similar study, Chintrakarn (2008) utilized panel data from 22 developed economies for the period 1994 to 2002 and found no evidence of trade diversion because of the introduction of the Euro. In the trade agreement literature, Baier and Bergstrand (2009) are the first to adopt matching techniques to evaluate the effect of trade agreements on trade flows, and they find free trade agreements to have a long-run impact of 100 percent on trade flows of member countries.

Olofin et al. (2013) investigated the determinants of a successful RTA in West Africa between 1995 and 2010. They used the least Square Dummy Variable (LSDV) technique to estimate a modified gravity model which includes the gravity variables of income and distance together with socioeconomic variables such as common language, political stability, and infrastructure. They found that economic size, distance, landmass, landlocked or not, and common

border of countries influence intraregional exports in ECOWAS significantly. In addition, they found that the West African Economic and Monetary Union (WAEMU) is trade-creating while the West African Monetary Zone (WAMZ) is trade-diverting. This study deals with the roles of WAEMU and WAMZ in intra-regional trade among other objectives of the study. The role of the intermediate tariff was however not considered in their study.

Afolabi et al. (2015) investigated bilateral trade flows and the level of openness in ECOWAS from 1981 to 2013 using the gravity model. They employed fully modified ordinary least Squares (FMOLS) and canonical cointegrating regression. Adding trade and financial openness variables to the gravity equation, they found that financial openness negatively impacts intra-regional trade flows. The effect of trade openness varied in economic and statistical significance through different techniques. Estrella (2012) used 80 percent of the dataset on world trade to compare the alternative method to estimate gravity models of bilateral trade based on bilateral exports of 80 countries. The dataset spanned from 1980 to 2008. The compared techniques were Tobit, Heckman, Panel fixed, Truncated OLS, and Panel random models. Based on Anderson and van Wincoop's (2003) gravity equation, Estrella (2012) found that the Heckman sample selection model yielded better results, in general, compared to other techniques.

In the late 1990s, much of the empirical works in the international trade literature attempted to analyze why trade agreements may or do not increase trade flows. Indeed, the positive effect of RTAs on the overall international trade among member countries could be offset by factors such as decreases in trade with non-member countries. But even testing the direct relationship between RTAs and bilateral, not overall, the trade volume of trading countries is challenging for several reasons (Baier and Bergstrand, 2007). Firstly, the empirical model might not have accounted for other important factors of trade volume, thus incorrectly estimating the effect of RTAs. If the

estimate is biased upward, then the positive relationship between RTAs and trade volume could be weaker, and vice versa if it is biased downward. Secondly, the causality between RTAs and trade volume could be running both ways. If the higher trade volume increases the probability of forming RTAs, then reverse causality would lead to an incorrect estimate of their relationship. Third, there could be measurement errors in variables used in the empirical test.

If the formation of RTAs is significantly related to political factors or economic policies of member countries, which are also related to trade volume, then these factors must be accommodated to correctly understand the relationship between RTAs and trade volume. For instance, empirical work has shown that most of the increases in trade among European Community (EC) countries in the 1960s and 1970s could be explained by EC members' size, level of development, proximity, common borders, and common languages (Frankel, 1997). Similarly, the rapid growth of East Asian economies was also found to be sufficient to explain the increase in their trade shares from 1965 to 1990 (Frankel et al., 1995). By contrast, Baier and Bergstrand (2007) argued that even after accounting for most of the important influences on trade flows, RTAs were still found to increase member countries' trade by about 86 percent on average after 15 years since the implementation of the RTAs.

Furthermore, a big challenge in resolving the debate on the impact of RTAs on trade flows has been the lack of consensus on how to specify the gravity model. Most international trade economists adopt the gravity model in analyzing the determinants of bilateral trade flows. In its simplest form, the gravity equation indicates a positive relationship between bilateral trade volume and the economic sizes of trading countries relative to the world economy assuming no transaction costs (Feenstra, 2003). Another core explanatory variable is the distance between trading countries, sometimes referred to as the iceberg cost, assuming that it is negatively related to trade volume

between trading countries. However, there is a lack of consensus in the literature on which other variables should be included in the extended gravity model equation. This lack of an exact specification may lead to selective reporting of results driven by the prior beliefs of researchers (Ghosh and Yamarik, 2004). After eliminating these prior beliefs, Gosh and Yamarik (2004) found that no regional trade agreements in their study have a trade-creating effect.

Additionally, researchers have also argued on the appropriate methodology to analyze the relationship between RTAs and trade volume. While the cross-section estimation of gravity models using data from one period has been the norm in the literature, panel data on trade (which are data observed across time for several countries) have also recently been used to analyze the effect of RTA on trade flows. The effect seems to be greater and more significant when using panel data compared to cross-section data, and researchers have argued that panel estimates reveal a more plausible and consistent pattern than cross-section estimates (Baier and Bergstrand, 2007; Carrere, 2002).

The 2010 World Economic Forum reported that corruption, weak and onerous tax regulations, lack of infrastructure, and restrictions on access to capital are some of the obstacles to conducting business in West Africa. Ogunkola (1998) demonstrated that ECOWAS trade liberalization had little impact on intra-regional trade flows, which may be partially attributed to inadequate institutions and ineffective governance. Also, Meyer et al. (2010) claimed that technical trade barriers are not significantly impacted regional trade agreements in SSA. Keane et al. (2010) stated that non-tariff barriers are obstacles to intra-SADC trade. According to Zannou (2010), factors affecting Intra-ECOWAS trade include openness and exchange rate depreciation. According to Olayiwola et al. (2011), trade facilitation in the ECOWAS is below the global average. According to the report, trade costs rise because of increased bureaucracy.

Adam (2012) concluded that if regional integration efforts are intensified and trade costs are reduced, there is great potential for commerce among West African nations. Also, according to Ackah et al. (2013), high trade costs have an impact on Intra-ECOWAS trade, regarding intra-regional trade, several additional studies have considered such related costs (see Banik and Yoonus, 2012; Chete and Adewuyi, 2012; and Serlenga and Shin, 2013). Shepherd (2010) demonstrates how lower transport and tariff costs boost exports. Anecdotal data reveals that corruption and lengthy, ineffective border processes may prevent intra-regional commerce (Hatzenberg, 2011).

CHAPTER THREE: EMPIRICAL MODEL, DATA, AND VARIABLES

3.1. The Gravity Model

The gravity model is seen to be an important empirical tool in the study and analysis of trade barriers, especially in a bilateral trade framework. The pioneer of the gravity model, Tinbergen (1962), applied Newton's law gravity of to bilateral trade flows, theorizing that trade flows between two countries are proportional to the size of their income and inversely proportional to the distance between them. After that, Linnemann (1966) applied the gravity model extensively to study bilateral trade flows. Various studies, including Feenstra et al. (2001), confirm that a wider range of trade theories than previously recognized are consistent with a gravity model.

The gravity model specifies that trade flows between two countries are a function of the economic mass of both countries and the distance between them. It implies that trade flows between two countries are positively related to their economic mass or size which is commonly measured by GDP and inversely related to the geographic distance between them. The basic gravity model is presented as:

$$Trade_{ij} = G Y_i Y_j / Dist_{ij} \quad (3.1)$$

In multiplicative form Equation (3.1) could be rewritten as follows:

$$Trade_{ij} = G Y_i^\beta Y_j^\gamma Dist_{ij}^{-\delta} \quad (3.2)$$

where $Trade_{ij}$ represents trade flows from country i to country j , G is the gravitational constant, Y_i and Y_j are country i 's and country j 's GDP, and $Dist_{ij}$ is the distance between the countries.

Taking the logarithm of both sides, the gravity model can be empirically presented as:

$$\ln Trade_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j - \delta \ln Dist_{ij} + \mu_{ij} \quad (3.3)$$

where μ_{ij} is the error term. This basic equation is used to derive a developed gravity equation that includes other conventional factors that determine bilateral trade flows such as linguistic ties, colonial ties, and contiguity. Also, the gravity equation contains the variable of interest, $ECOWAS_{ijt}$, which is a dummy variable that equals one if both countries are members of ECOWAS and that equals zero otherwise. Then, the empirical gravity equation can be specified as:

$$\ln Trade_{ijt} = \theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt} + \epsilon_{ijt} \quad (3.4)$$

where $Trade_{ijt}$ represents the constant US\$ value of bilateral trade flows from country i to country j at time t , GDP_{it} and GDP_{jt} are the real GDP values of country i (the exporter) and country j (the importer) at time t . The coefficients on those variables, θ_1 and θ_2 , are expected to be positive as the economic sizes of the trading partners are expected to be positively related to trade flows], $Dist_{ij}$ is a measure of the great-circle distance between the capital cities of countries i and j . As the geographical distance is used to proxy for transportation and communication costs (Head and Mayer, 2014; Ghazalian, 2015), as well as the required delivery time, the expected sign on its coefficient, θ_3 , is negative. Also, $Lang_{ij}$ is the language variable and it takes a value of 1 if countries i and j share a common language and 0 otherwise, Col_{ij} is the common colonial variable and it takes a value of 1 if trading partners have had a colonial relationship post-1945 and 0 otherwise, $Cont_{ij}$ denotes contiguity, a binary variable that takes the value of 1 if countries i and j share a common border and 0 otherwise. Countries with linguistic and colonial ties, and with common borders are expected to trade more with each other, hence, the coefficients on these variables (θ_4 , θ_5 , and θ_6) are expected to be positive. The variable of interest, $ECOWAS_{ijt}$, is the regional trade agreement (ECOWAS) dummy variable. As noted earlier, it takes the value of 1 if

countries i and j are both members of ECOWAS in periods t and 0 otherwise. Finally, ϵ_{ijt} is the error term.

The gravity equation has been commonly employed to investigate the determinants of bilateral trade and to estimate the extent of trade barriers (e.g., Baier & Bergstrand, 2001; Egger, 2002; Brun et al., 2005; Ghazalian & Furtan, 2007; Olper & Raimondi, 2008; Ghazalian et al., 2012; Novy, 2013; Baniya et al., 2018; Agnosteva et al., 2019; Ghazalian, 2015, 2019; Heid et al., 2021). The empirical analysis in this thesis follows the large literature that estimated the effects of RTAs on international trade using the gravity equation (e.g., Carrere, 2006; Philippidis & Sanjuán, 2007; Jayasinghe & Sarker, 2008; Ghazalian et al., 2011; Ghazalian, 2013, 2017; Afesorgbor, 2017). The gravity model will be estimated with different empirical specifications, including specifications with fixed effects and remoteness variables to control for the multilateral resistance terms of the exporting countries and importing countries (Anderson and van Wincoop, 2003; Head and Mayer, 2014; Feenstra, 2016; Yotov *et al.*, 2016;). Also, this thesis applies the Poisson pseudo-maximum likelihood to estimate the multiplicative form of the gravity model which will deal with issues concerning zero trade values in the dependent variable and heteroskedastic residuals (Santos-Silva and Tenreyro, 2006, 2011). Also, the Poisson Pseudo Maximum likelihood approach is recommended due to its consistency, robustness, and capacity to catch zero trades (Santos Silva & Tenreyro, 2011). Following Santos-Silva and Tenreyro (2006, 2011), the multiplicative form of the gravity equation can be empirically represented as:

$$Trade_{ijt} = \exp(\theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt}) + u_{ijt} \quad (3.5)$$

The empirical analysis is extended to examine the magnitude of trade flows within ECOWAS, among members of the West African Economic and Monetary Union (WAEMU),

which membership includes eight, mainly French-speaking, states within ECOWAS. The WAEMU member countries are Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The empirical analysis estimates the following log-linear gravity equation:

$$\ln Trade_{ijt} = \theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt} + \theta_8 WAEMU_{ijt} + \epsilon_{ijt} \quad (3.6)$$

Also, the empirical analysis estimates the multiplicative form of the gravity equation:

$$Trade_{ijt} = \exp(\theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt} + \theta_8 WAEMU_{ijt}) + u_{ijt} \quad (3.7)$$

The coefficient on the WAEMU variable presents the difference relative to the reference effect of ECOWAS on trade flows for trade among WAEMU member countries.

The empirical analysis also estimates the magnitude of trade flows within ECOWAS, among members of the West African Monetary Zone (WAMZ), which includes six countries within ECOWAS that plan to introduce a common currency called the ECO. The members of WAMZ are Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone. Then, the empirical analysis estimates the following log-linear gravity equation:

$$\ln Trade_{ijt} = \theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt} + \theta_8 WAMZ_{ijt} + \epsilon_{ijt} \quad (3.8)$$

Also, the empirical analysis estimates the multiplicate form of the gravity equation:

$$Trade_{ijt} = \exp(\theta_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln GDP_{jt} + \theta_3 \ln Dist_{ij} + \theta_4 Lang_{ij} + \theta_5 Col_{ij} + \theta_6 Cont_{ij} + \theta_7 ECOWAS_{ijt} + \theta_8 WAMZ_{ijt}) + u_{ijt} \quad (3.9)$$

The coefficient on the WAMZ variable presents the difference relative to the reference effect of ECOWAS on trade flows for trade among WAMZ member countries. It is important to

note that the combined membership of WAEMU and WAMZ is not exhaustive of ECOWAS in the sense that it does not cover Cape Verde which is a member of ECOWAS.

3.2. Data and Variables

The data used for the empirical analysis is gathered from different sources. It covers 172 countries over a period of 2000 to 2018 to capture the most recent developments regarding trade flows among ECOWAS member countries, and trade flows between member countries and non-member countries. In other words, the dataset covers observations of bilateral trade of ECOWAS countries with 172 (ECOWAS and non-ECOWAS) countries. The ECOWAS variable is constructed based on the membership in ECOWAS. Data on distance, common language, contiguity, and colonial link are sourced from the *Centre d'Études Prospectives et d'Informations Internationales* (CEPII) database (Head and Mayer, 2014). The GDP datasets are obtained from the World Bank's World Development Indicators (2020) database. Finally, the data on bilateral trade flows are also obtained from the CEPII database (Head and Mayer, 2014). This database is derived from data directly reported by each country to the United Nations Statistical Division (COMTRADE). All values are converted into constant 2015 US\$ throughout the empirical analysis. Table 3.1 displays the main variables used in the empirical analysis, as well as the source and definition of the variables.

Table 3.1: Variables, sources, and definition

Variable	Source	Definition
$Trade_{ijt}$	CEPII, Comtrade database	bilateral trade flows (constant US\$)
GDP_{it}	The World Bank, WDI	GDP of the origin country (constant US\$)

GDP_{jt}	The World Bank, WDI	GDP of the destination country (constant US\$)
$Dist_{ij}$	CEPII, GeoDist database	Bilateral geographic distance between capital cities of the trading partners
$Cont_{ij}$	CEPII, GeoDist database	Dummy variable that takes the value of 1 if both countries share a common border, and 0 otherwise.
$Lang_{ij}$	CEPII, GeoDist database	Dummy variable that takes the value of 1 if both countries speak a common official language, and 0 otherwise.
Col_{ij}	CEPII, GeoDist database	Dummy variable that takes the value of 1 if the two countries share a colonial relationship after 1945, and 0 otherwise.
$ECOWAS_{ijt}$	ECOWAS membership	The dummy variable takes a value of 1 if the two countries are members of ECOWAS, and 0 otherwise.
$WAEMU_{ijt}$	WAEMU membership	The dummy variable takes a value of 1 if the two countries are members of WAEMU, and 0 otherwise.
$WAMZ_{ijt}$	WAMZ membership	The dummy variable takes a value of 1 if the two countries are members of WAMZ, and 0 otherwise.

An approximate measure of a country's economic size is its GDP. Therefore, it illustrates the size of a country's supply and demand for commodities and other factors. It is anticipated that countries with relatively large economies will require more imports than those with smaller economies. Additionally, this suggests that larger countries should export more commodities than their smaller counterparts. The GDP of the exporter proxies for supply capacity, and the GDP of the importer proxies for market size. Theoretically and experimentally, bilateral trade flows between two

countries have been shown to be associated with the GDP of the exporter and the GDP of the importer. Thus, the estimated coefficient on the GDP variables is expected to be positive. Bilateral distance is employed as a proxy for transportation and communication costs. Larger distances drive up the cost of trade (Markusen and Maskus, 2002; Egger 2004; Carrere and Guillaumont, 2005). Then, the estimated coefficient on the bilateral distance variable is expected to be negative.

When two nations share a border, they are said to be contiguous. Sharing borders could proxy for bilateral social and business networks between contiguous countries and bilateral infrastructure (e.g., highways). Then, as indicated in other studies (e.g., Endoh, 1999; Carrère, 2004; Coulibaly, 2009; and Turkson, 2012), the estimated coefficient on the contiguity variable is expected to be positive. Due to their institutional similarities and their shared cultural heritage and palates, countries with colonial connections are often expected to trade more frequently. As a result, the estimated coefficient on colonial ties is expected to be positive. Also, the use of different official languages by trading partners is one of the main obstacles to international trade as it increases communication and information costs, and it drives up transaction costs. Therefore, language is expected to have a considerable influence on bilateral trade flows, and the estimated coefficient on the common language dummy variable is expected to be positive.

The dataset covers 172 countries spanning the period of 2000 to 2018. Table 3.2 reviews the means, standard deviations, minimum values, and maximum values of the variables used in the empirical analysis.

Table 3.2: Descriptive statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
$\ln Trade_{ijt}$	13.2898	5.1556	0	24.5959
$ECOWAS_{ijt}$	0.0819	0.2742	0	1

$Cont_{ij}$	0.0226	0.1487	0	1
Col_{ij}	0.0051	0.0710	0	1
$Lang_{ij}$	0.1930	0.3946	0	1
$\ln Dist_{ij}$	8.5817	0.6849	5.0989	9.8812
$\ln GDP_{it}$	22.6580	1.5158	20.0246	27.0372
$\ln GDP_{jt}$	24.3268	2.1729	18.4166	30.5987

Source: Authors', using STATA software

Also, Table 3.3 presents the corresponding descriptive statistics (means, standard deviations, minimum values, and maximum values) covering bilateral ECOWAS observations spanning from 2000 to 2018.

Table 3.3: Descriptive statistics – bilateral ECOWAS observations (2000–2018)

Variables	Mean	Standard Deviation	Minimum	Maximum
$\ln Trade_{ijt}$	14.9342	4.3040	0	22.3420
$Lang_{ij}$	0.3714	0.4833	0	1
Col_{ij}	0	0	0	0
$Cont_{ij}$	0.2381	0.4260	0	1
$\ln Dist_{ij}$	7.0298	0.6403	5.0989	8.7103
$\ln GDP_{it}$	22.6580	1.5160	20.0246	27.0372
$\ln GDP_{jt}$	22.6580	1.5160	20.0246	27.0372

Source: Authors', using STATA software

Tables 3.4, 3.5, and 3.6 present summary statistics (means, standard deviations, minimum values, and maximum values) for individual ECOWAS countries, covering bilateral trade flows, bilateral distance, and GDP variables that are used in the empirical analysis, respectively.

Table 3.4: Descriptive statistics by ECOWAS country - $\ln Trade_{ijt}$ (2000–2018)

Country	Mean	Standard Deviation	Minimum	Maximum
Benin	16.3294	3.8872	0	20.5653
Burkina Faso	14.7209	5.6510	0	20.2086
Cote d'Ivoire	17.7465	2.8852	0	21.5095
Cabo Verde	10.3424	5.0139	0	17.3765
Ghana	16.9544	2.5225	0	21.8619
Nigeria	16.8685	2.8982	0	22.0843
Niger	14.0543	4.7300	0	18.9252
Senegal	17.1807	1.6545	0	20..9396
Sierra Leone	13.1910	4.0887	0	18.1486
Togo	15.8561	3.9782	0	22.3420
Guinea	15.0250	2.6386	0	18.7510
The Gambia	12.6985	4.3180	0	18.4423
Guinea Bissau	12.8117	4.3665	0	18.2409
Liberia	13.2995	3.6254	0	19.9655
Mali	13.7383	4.4442	0	18.9888

Table 3.5: Descriptive statistics by ECOWAS country - $\ln Dist_{ij}$ (2000–2018)

Country	Mean	Standard Deviation	Minimum	Maximum
Benin	7.0218	0.8006	5.0989	8.0132
Burkina Faso	6.9802	0.4522	6.0618	7.7747
Cote d'Ivoire	6.9256	0.3826	6.3548	7.6893
Cabo Verde	7.4538	0.5346	6.4813	8.0132
Ghana	6.9549	0.7161	5.2522	7.9191
Nigeria	7.3487	0.5680	6.3443	8.1305
Niger	7.1509	0.5124	6.0618	7.9244
Senegal	7.1462	0.5882	5.9011	7.9189
Sierra Leone	6.8651	0.6159	5.6748	7.7193
Togo	6.9383	0.8441	5.0989	7.9676
Guinea	6.8955	0.7194	5.5708	7.8297
The Gambia	7.0440	0.6969	5.3451	8.7103
Guinea Bissau	6.8452	0.7939	5.3451	7.8301
Liberia	6.9468	0.4510	5.9103	7.6029
Mali	6.9294	0.2917	6.5343	7.4391

Table 3.6: Descriptive statistics by ECOWAS country - $\ln GDP_{it}$ (2000–2018)

Country	Mean	Standard Deviation	Minimum	Maximum
Benin	22.9490	0.3312	22.2744	23.3307
Burkina Faso	22.9370	0.4219	22.1040	23.4368
Cote d'Ivoire	24.2871	0.2782	23.8162	24.7309
Cabo Verde	21.0843	0.3395	20.3983	21.4134
Ghana	23.9774	0.7863	22.6220	24.8910
Nigeria	26.3630	0.5658	25.2565	27.0372
Niger	22.6632	0.4436	21.8232	23.2199
Senegal	23.4456	0.3066	22.8099	23.8103
Sierra Leone	21.6901	0.4573	20.5632	22.3462
Togo	21.9863	0.3566	21.3876	22.6320
Guinea	22.5819	0.3661	21.9813	23.1470
The Gambia	20.9634	0.2689	20.2407	21.2720
Guinea Bissau	20.5697	0.3159	20.0246	21.0759
Liberia	21.3873	0.4573	20.6698	21.9366
Mali	22.9841	0.4299	22.1016	23.5096

CHAPTER FOUR: EMPIRICAL RESULTS

4.1. Benchmark Empirical Results

We first estimate the baseline log-linear form of the empirical gravity model of bilateral trade, as represented by Equation (3.4). The baseline results are shown in Table 4.1 (estimated coefficients with robust standard errors). The signs of variables are consistent with the *a priori* expectations, and the estimated coefficients are statistically significant across the different specifications. The basic gravity model implies that bilateral trade flows between trading partners are (1) proportional to the economic size of the exporting country, proxying the supply capacity of the exporting country; (2) proportional to the economic size of the importing country, proxying the market size of the importing country; and inversely proportional to the bilateral geographic distance between trading partners, proxying transportation, communication, and information costs.

Column (1) of Table 4.1 presents the results (estimated coefficients with robust standard errors) from the log-linear empirical gravity equation that exclusively includes the GDP of the exporter ($\ln GDP_{it}$), GDP of the importer ($\ln GDP_{jt}$), and bilateral distance ($\ln Dist_{ij}$) [i.e., Model (1)]. The estimated coefficients are all statistically significant at the 1% level. They indicate that a 1% increase in the exporter's GDP raises bilateral trade flows by 0.85% and that a 1% increase in the importer's GDP raises bilateral trade flows by 1.39%, *ceteris paribus*. Also, a 1% increase in the bilateral geographic distance leads to reductions in the bilateral trade flows by 2.32%, *ceteris paribus*. Column (2) shows the results from Model (2) when adding the ECOWAS binary variable ($ECOWAS_{ijt}$) to the log-linear empirical gravity equation. The estimated coefficients on the GDP variables are generally comparable (a 1% increase in the exporter's GDP and importer's GDP increases bilateral trade flows by 0.87% and 1.42%, respectively), but the estimated coefficient on

the distance variable decreases, in absolute terms, where a 1% increase in the bilateral geographic distance leads to reductions in bilateral trade flows by 1.68%, *ceteris paribus*. The estimated coefficient on the ECOWAS binary variable is positive and statistically significant at the 1% level. It indicates that $\Delta \ln Trade = 2.256$, *ceteris paribus*, implying that trade flows among ECOWAS member countries are $\exp(2.256) = 9.5$ times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*. This coefficient highlights the favorable effects of trade preferences and the significance of this regional economic integration.

Column (3) of Table 4.1 presents the results from Model (3) when extending the log-linear empirical gravity equation by including the common language binary variable ($Lang_{ij}$), contiguity binary variable ($Cont_{ij}$), and colonial ties binary variable (Col_{ij}). The estimated coefficients on the GDP variables ($\ln GDP_{it}$ and $\ln GDP_{jt}$) remain comparable, and the estimated coefficient on the bilateral geographic distance variable ($\ln Dist_{ij}$) slightly decreases (in absolute terms). Also, the estimated coefficient on the variable of interest, $ECOWAS_{ijt}$, slightly decreases, and it indicates that trade flows among ECOWAS member countries are $\exp(2.177) = 8.82$ times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*.

Also, in column (3), the estimated coefficients on the common language binary variable ($Lang_{ij}$), contiguity binary variable ($Cont_{ij}$), and colonial ties binary variable (Col_{ij}) are all positive and statistically significant at the 1% level. The positive sign of the estimated coefficient on $Lang_{ij}$ indicates that countries that share a common official language tend to trade more with each other than otherwise. This result is consistent with the *a priori* expectations that sharing a common language promotes communication and reduces transaction costs in international trade. There are increases in bilateral trade flows by $\exp(1.214) = 4.37$ times when trading partners share a common official language. The positive and statistically significant coefficient on $Cont_{ij}$

indicates that countries that share a common border are likely to trade more with each other than otherwise: there are increases in bilateral trade flows by $\exp(0.759) = 2.14$ times when trading partners are adjacent to each other. The positive and statistically significant coefficient on Col_{ij} indicates that trading partners that have had colonial ties (post-1945) have higher trade flows by $\exp(0.712) = 2.03$ times than otherwise. ECOWAS member countries have had colonial ties in the past with France, the United Kingdom, or Portugal and these results are consistent with the *a priori* expectations that colonial ties favor trade due to similarity in institutions and to business and social networks between those countries.

Table 4.1 also shows the results from Model (4) which includes exporter-country fixed effects and time-fixed effects, and from Model (5) which includes time-varying exporter fixed effects. The results, which are respectively presented in columns (4) and column (5), are generally comparable to those obtained from Model (3). Finally, column (6) of Table 4.1 extends Model (5) by including the remoteness variable of the importing country ($\ln REM_{jt}$), where $REM_{jt} = [\sum_s (w_{st}/Dist_{sj})]^{-1}$, where w_{st} is the relative economic weight (relative GDP size) of country “s”. It is worth noting that the remoteness variable of the exporting country is already controlled by the time-varying exporter fixed effects. The results from this model remain similar to those presented in column (5).

Table 4.2 presents the results (estimated coefficients with robust standard errors) when estimating the multiplicative form of the gravity model using the PPML estimator. Santos Silva and Tenreyro (2006, 2011) showed that this empirical approach is robust, and it tackles some prominent issues concerning zero trade flows in the dependent variable and heteroskedasticity. The results are generally qualitatively comparable to those presented in Table 4.1, but with some important quantitative variations. As in the previous specification, the estimated coefficients on

the exporter GDP, importer GDP, and distance are elasticities. The results in column (1) [from Model (1)] show that a 1% increase in the exporter's GDP raises bilateral trade flows by 0.52% and that a 1% increase in the importer's GDP raises bilateral trade flows by 0.67%, *ceteris paribus*. Also, a 1% increase in the bilateral geographic distance leads to reductions in bilateral trade flows by 0.89%, *ceteris paribus*. The PPML distance estimate is considerably smaller (in absolute terms) than the distance estimate that is obtained from estimating the log-linear form of the gravity equation. The results in column (2) [from Model (2)] show that the estimated coefficient on bilateral distance is smaller (in absolute terms), indicating that a 1% increase in the bilateral geographic distance leads to reductions in bilateral trade flows by 0.43%, *ceteris paribus*. The estimated coefficient on $ECOWAS_{ijt}$ is positive and statistically significant at the 1% level, but it is smaller than the one obtained when estimating the log-linear gravity equation. The PPML estimate on the ECOWAS binary variable indicates that trade flows among ECOWAS countries are $\exp(1.573) = 4.92$ times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*.

Column (3) of Table 4.2 shows the PPML results from Model (3) when adding the common language binary variable ($Lang_{ij}$), contiguity binary variable ($Cont_{ij}$), and colonial ties binary variable (Col_{ij}) to the empirical equation. The estimated coefficient on bilateral distance further decreases (in absolute terms), indicating that a 1% increase in the bilateral geographic distance leads to reductions in bilateral trade flows by 0.24%, *ceteris paribus*. The estimated coefficient on the variable of interest, $ECOWAS_{ijt}$, remain comparable to those obtained from the previous models in Table 4.2. The estimated coefficient on $Lang_{ij}$ is positive and statistically significant at the 1% level, indicating that countries that share a common official language tend to trade more with each other by $\exp(0.352) = 1.42$ times than otherwise. The estimated coefficient on $Cont_{ij}$ is

positive and statistically significant at the 1% level, indicating that countries that share common borders trade more with each other by $\exp(0.728) = 2.07$ times than otherwise. Also, the estimated coefficient on Col_{ij} is positive and statistically significant at the 1% level, indicating that countries that share colonial ties trade more with each other by $\exp(0.906) = 2.47$ times than otherwise. The results from Model (4) (when including exporter country fixed effects and time-fixed effects) and from Model (5) (when including time-varying exporter fixed effects) are presented in columns (4) and (5), respectively. They are comparable to the previous results in column (3). Also, the results from Model (6) in column (6), which extends Model (5) by adding the importer country's remoteness variable are comparable to the previous results. The estimate on $ECOWAS_{ijt}$ indicates that trade flows among ECOWAS countries are $\exp(1.508) = 4.52$ times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*.

The results highlight the significance of the ECOWAS trade liberalization program and trade openness policies that encourage intraregional trade and the creation of a common market. The results show that the elimination of customs duties and non-tariff restrictions on trade between member states, and the promotion of economic cooperation and coordination among ECOWAS member countries have had important effects on intraregional trade flows.

Table 4.1: Empirical Results – Bilateral Trade Between ECOWAS CountriesDependent Variable: Log of Bilateral Trade Flows ($\ln Trade_{ijt}$)

	(1)	(2)	(3)	(4)	(5)	(6)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.854*** (0.014)	0.870*** (0.014)	0.858*** (0.013)			
$\ln GDP_{jt}$	1.397*** (0.012)	1.422*** (0.012)	1.440*** (0.012)	1.482*** (0.012)	1.482*** (0.012)	1.465*** (0.012)
$\ln Dist_{ij}$	-2.306*** (0.033)	-1.677*** (0.044)	-1.475*** (0.047)	-1.549*** (0.046)	-1.549*** (0.046)	-1.531*** (0.047)
$ECOWAS_{ijt}$		2.256*** (0.101)	2.177*** (0.103)	2.137*** (0.099)	2.138*** (0.099)	2.125*** (0.099)
$Lang_{ij}$			1.214*** (0.052)	1.111*** (0.051)	1.111*** (0.051)	1.106*** (0.051)
$Cont_{ij}$			0.759*** (0.125)	0.807*** (0.119)	0.808*** (0.120)	0.794*** (0.123)
Col_{ij}			0.712*** (0.114)	0.785*** (0.138)	0.787*** (0.140)	0.773*** (0.141)
$\ln REM_{jt}$						0.297*** (0.095)
Observations	34,325	34,325	34,325	34,325	34,325	34,325
R-squared	0.366	0.374	0.385	0.414	0.417	0.418

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4.2: Empirical Results – Bilateral Trade Between ECOWAS Countries (PPML Estimations)

Dependent Variable: Bilateral Trade Flows ($Trade_{ijt}$)						
	(1)	(2)	(3)	(4)	(5)	(6)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.521*** (0.008)	0.541*** (0.008)	0.549*** (0.008)			
$\ln GDP_{jt}$	0.665*** (0.008)	0.685*** (0.008)	0.667*** (0.009)	0.678*** (0.008)	0.676*** (0.008)	0.661*** (0.008)
$\ln Dist_{ij}$	-0.895*** (0.026)	-0.430*** (0.035)	-0.243*** (0.036)	-0.263*** (0.036)	-0.266*** (0.035)	-0.275*** (0.036)
$ECOWAS_{ijt}$		1.573*** (0.072)	1.531*** (0.076)	1.529*** (0.076)	1.526*** (0.074)	1.508*** (0.075)
$Lang_{ij}$			0.352*** (0.034)	0.328*** (0.033)	0.334*** (0.033)	0.340*** (0.033)
$Cont_{ij}$			0.728*** (0.079)	0.789*** (0.077)	0.774*** (0.077)	0.763*** (0.079)
Col_{ij}			0.906*** (0.060)	0.879*** (0.060)	0.866*** (0.062)	0.872*** (0.062)
$\ln REM_{jt}$						0.248*** (0.080)
Observations	33,857	33,857	33,857	33,857	33,857	33,857

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.2. Empirical Results – Effects of WAEMU

We examine next the magnitude of bilateral trade flows among the West African Economic and Monetary Union (WAEMU) member countries, by estimating Equations (3.6) and (3.7). The WAEMU includes a subset of eight ECOWAS countries (Benin, Burkina Faso, Cote D'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo) that share a common currency, the CFA Franc (since its establishment in 1962). Thus, the empirical equations are extended by including the binary variable, $WAEMU_{ijt}$, which equals one for bilateral trade between WAEMU member countries and zero otherwise. The estimated coefficient on WAEMU captures the magnitude of bilateral trade flows among WAEMU member countries relative to the reference magnitude of bilateral trade among ECOWAS countries. The results from estimating the log-linear empirical model are presented in Table 4.3 (estimated coefficients with robust standard errors), and the results from estimating the multiplicative form of the gravity equation through PPML are presented in Table 4.4 (estimated coefficients with robust standard errors). The models in these tables match the corresponding models in the previous tables. The estimated coefficients on the basic gravity variables ($\ln GDP_{it}$, $\ln GDP_{jt}$, and $\ln Dist_{ij}$) are robust across models, and they are comparable to the estimates in Table 4.1 and Table 4.2. Also, the estimated coefficients on $Lang_{ij}$, $Cont_{ij}$, and Col_{ij} are fairly equivalent across models, and they are comparable to the estimates in Table 4.1 and Table 4.2.

The results from the most developed empirical log-linear gravity model - from Model 6 (in column 5) in Table 4.3 - show that the estimated coefficient on the ECOWAS binary variable, $ECOWAS_{ijt}$, is positive and statistically significant at the 1% level. It indicates that non-WAEMU ECOWAS countries trade more with each other than they trade with non-ECOWAS countries by $\exp(1.837) = 6.28$ times, *ceteris paribus*. Also, the estimated coefficient on the WAEMU binary

variable, $WAEMU_{ijt}$, is positive and statistically significant at the 1% level, implying that WAEMU countries trade more with each other compared to trade among other ECOWAS countries. Specifically, the results indicate that WAEMU member countries considerably trade more with each other by $\exp(1.837+1.112) = 19.09$ times compared to trade with other countries, *ceteris paribus*.

The results in Table 4.4 show that the estimates from the PPML estimation of the multiplicative form of the gravity model are qualitatively similar to those in Table 4.3, but there are some important quantitative variations. The results from Model 6 (in column 5) in Table 4.4 show that the estimated coefficient on the ECOWAS binary variable, $ECOWAS_{ijt}$, is positive and statistically significant at the 1% level. It indicates that non-WAEMU ECOWAS countries trade more with each other than they trade with non-ECOWAS countries by $\exp(1.349) = 3.85$ times, *ceteris paribus*. Also, the estimated coefficient on the WAEMU binary variable, $WAEMU_{ijt}$, is positive and statistically significant at the 1% level, implying that WAEMU countries trade more with each other compared to trade among other ECOWAS countries. Specifically, the results indicate that WAEMU member countries considerably trade more with each other by $\exp(1.349+0.758) = 8.22$ times compared to trade with other countries, *ceteris paribus*. These results highlight that WAEMU countries have benefitted from increases in economic cooperation and coordination from the introduction of the common currency, the CFA Franc, in increasing trade among each other.

Table 4.3: Empirical Results – Bilateral Trade Between WEAMU CountriesDependent Variable: Log of Bilateral Trade Flows ($\ln Trade_{ijt}$)

	(1)	(2)	(3)	(4)	(5)
	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.870*** (0.016)	0.859*** (0.013)			
$\ln GDP_{jt}$	1.421*** (0.012)	1.439*** (0.012)	1.481*** (0.012)	1.481*** (0.012)	1.460*** (0.012)
$\ln Dist_{ij}$	-1.660*** (0.044)	-1.484*** (0.047)	-1.565*** (0.046)	-1.565*** (0.046)	-1.539*** (0.047)
$ECOWAS_{ijt}$	1.838*** (0.108)	1.980*** (0.109)	1.856*** (0.105)	1.857*** (0.105)	1.837*** (0.107)
$WAEMU_{ijt}$	1.538*** (0.125)	0.791*** (0.133)	1.109*** (0.131)	1.105*** (0.131)	1.112** (0.131)
$Lang_{ij}$		1.163*** (0.054)	1.036*** (0.053)	1.036*** (0.053)	1.012*** (0.053)
$Cont_{ij}$		0.617*** (0.128)	0.616*** (0.121)	0.617*** (0.122)	0.598*** (0.126)
Col_{ij}		0.753*** (0.115)	0.847*** (0.139)	0.849*** (0.141)	0.820*** (0.143)
$\ln REM_{jt}$					0.304*** (0.097)
Observations	34,325	34,325	34,325	34,325	34,325
R-squared	0.376	0.385	0.415	0.418	0.420

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4.4: Empirical Results – Bilateral Trade Between WEAMU Countries (PPML Estimations)Dependent Variable: Bilateral Trade Flows ($Trade_{ijt}$)

	(1)	(2)	(3)	(4)	(5)
	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.552*** (0.008)	0.556*** (0.008)			
$\ln GDP_{jt}$	0.697*** (0.009)	0.674*** (0.009)	0.687*** (0.008)	0.684*** (0.008)	0.680*** (0.008)
$\ln Dist_{ij}$	-0.424*** (0.035)	-0.252*** (0.036)	-0.273*** (0.036)	-0.275*** (0.035)	-0.286*** (0.036)
$ECOWAS_{ijt}$	1.354*** (0.079)	1.405*** (0.083)	1.371*** (0.084)	1.368*** (0.083)	1.349*** (0.084)
$WAEMU_{ijt}$	0.943*** (0.071)	0.625*** (0.072)	0.771*** (0.073)	0.755*** (0.073)	0.758*** (0.074)
$Lang_{ij}$		0.274*** (0.036)	0.221*** (0.037)	0.228*** (0.037)	0.245*** (0.037)
$Cont_{ij}$		0.631*** (0.075)	0.723*** (0.073)	0.712*** (0.073)	0.697*** (0.074)
Col_{ij}		0.962*** (0.061)	0.957*** (0.063)	0.942*** (0.065)	0.944*** (0.065)
$\ln REM_{jt}$					0.251*** (0.082)
Observations	33,857	33,857	33,857	33,857	33,857

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.3. Empirical Results – Effects of WAMZ

The magnitude of bilateral trade flows among the West African Monetary Zone (WAMZ), which includes six ECOWAS countries (Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone) that plan to introduce a common currency, the ECO, is examined next by estimating equations (3.8) and (3.9). The empirical equations are extended by including the binary variable, $WAMZ_{ijt}$, which equals one for bilateral trade between WAMZ member countries and zero otherwise. The estimated coefficient on WAMZ captures the magnitude of bilateral trade among WAMZ member countries relative to the reference magnitude of bilateral trade among ECOWAS countries. The results from estimating the log-linear empirical model are presented in Table 4.5 (estimated coefficients with robust standard errors), and the results from estimating the multiplicative form of the gravity equation through PPML are presented in Table 4.6 (estimated coefficients with robust standard errors). The models in these tables match the corresponding models in the previous tables. The estimated coefficients on the basic gravity variables ($\ln GDP_{it}$, $\ln GDP_{jt}$, and $\ln Dist_{ij}$) are robust across models, and they are comparable to the estimates in Table 4.1 and Table 4.2. Also, the estimated coefficients on $Lang_{ij}$, $Cont_{ij}$, and Col_{ij} are basically similar across models, and they are comparable to the estimates in Table 4.1 and Table 4.2.

The results from the most developed empirical log-linear gravity model - from Model 6 (in column 5) in Table 4.5 - show that the estimated coefficient on the ECOWAS binary variable, $ECOWAS_{ijt}$, is positive and statistically significant at the 1% level. It indicates that non-WAMZ ECOWAS countries trade more with each other than they trade with non-ECOWAS countries by $\exp(2.310) = 10.74$ times, *ceteris paribus*. Also, the estimated coefficient on the WAMZ binary variable, $WAMZ_{ijt}$, is negative and statistically significant at the 1% level, implying that WAMZ countries trade less with each other compared to trade among other ECOWAS countries.

Specifically, the results indicate that WAMZ member countries trade more with each other by exp $(2.310-1.170) = 3.13$ times compared to trade with other countries, *ceteris paribus*.

The results in Table 4.6 show that the estimates from the PPML estimation of the multiplicative form of the gravity model are qualitatively like those in Table 4.5, but there are some important quantitative variations. The results from Model 6 (in column 5) in Table 4.6 show that the estimated coefficient on the ECOWAS binary variable, $ECOWAS_{ijt}$, is positive and statistically significant at the 1% level. It indicates that non-WAMZ ECOWAS countries trade more with each other than they trade with non-ECOWAS countries by exp $(1.667) = 5.30$ times, *ceteris paribus*. Also, the estimated coefficient on the WAMZ binary variable, $WAMZ_{ijt}$, is negative and statistically significant at the 1% level, implying that WAMZ member countries trade more with each other by exp $(1.667-0.695) = 2.64$ times compared to trade with other countries, *ceteris paribus*. The magnitudes of bilateral trade among WAMZ countries are significantly lower than the magnitudes of bilateral trade among WAEMU countries, implying that there is a wide margin to increase trade among WAMZ countries by increasing economic cooperation and coordination, and by introducing the common currency (ECO).

Table 4.5: Empirical Results – Bilateral Trade Between WAMZ CountriesDependent Variable: Log of Bilateral Trade Flows ($\ln Trade_{ijt}$)

	(1)	(2)	(3)	(4)	(5)
	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.871*** (0.014)	0.859*** (0.013)			
$\ln GDP_{jt}$	1.422*** (0.012)	1.441*** (0.012)	1.484*** (0.012)	1.484*** (0.012)	1.467*** (0.012)
$\ln Dist_{ij}$	-1.677*** (0.044)	-1.476*** (0.047)	-1.553*** (0.046)	-1.553*** (0.046)	-1.543*** (0.047)
$ECOWAS_{ijt}$	2.324*** (0.105)	2.296*** (0.106)	2.324*** (0.102)	2.325*** (0.102)	2.310*** (0.103)
$WAMZ_{ijt}$	-0.438*** (0.148)	-0.731*** (0.151)	-1.161*** (0.152)	-1.164*** (0.153)	-1.170*** (0.155)
$Lang_{ij}$		1.232*** (0.052)	1.137*** (0.051)	1.136*** (0.051)	1.130*** (0.051)
$Cont_{ij}$		0.713*** (0.125)	0.738*** (0.119)	0.738*** (0.120)	0.718*** (0.124)
Col_{ij}		0.694*** (0.114)	0.760*** (0.139)	0.762*** (0.140)	0.749*** (0.143)
$\ln REM_{jt}$					0.299*** (0.098)
Observations	34,325	34,325	34,325	34,325	34,325
R-squared	0.374	0.385	0.415	0.418	0.420

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4.6: Empirical Results – Bilateral Trade Between WAMZ Countries (PPML Estimations)

Dependent Variable: Bilateral Trade Flows ($Trade_{ijt}$)					
	(1)	(2)	(3)	(4)	(5)
	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_{it}$	0.544*** (0.008)	0.552*** (0.008)			
$\ln GDP_{jt}$	0.686*** (0.009)	0.670*** (0.009)	0.681*** (0.008)	0.678*** (0.008)	0.674*** (0.008)
$\ln Dist_{ij}$	-0.410*** (0.035)	-0.247*** (0.036)	-0.269*** (0.036)	-0.269*** (0.035)	-0.275*** (0.036)
$ECOWAS_{ijt}$	1.716*** (0.076)	1.694*** (0.079)	1.713*** (0.078)	1.693*** (0.077)	1.667*** (0.078)
$WAMZ_{ijt}$	-0.724*** (0.128)	-0.702*** (0.129)	-0.761*** (0.126)	-0.706*** (0.125)	-0.695*** (0.127)
$Lang_{ij}$		0.384*** (0.033)	0.357*** (0.033)	0.359*** (0.033)	0.350*** (0.033)
$Cont_{ij}$		0.576*** (0.080)	0.624*** (0.078)	0.626*** (0.078)	0.607*** (0.080)
Col_{ij}		0.877*** (0.059)	0.855*** (0.060)	0.845*** (0.062)	0.828*** (0.062)
$\ln REM_{jt}$					0.254*** (0.082)
Observations	33,857	33,857	33,857	33,857	33,857

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

CHAPTER FIVE: CONCLUSION

The Economic Community of West African States (ECOWAS) is one of the most prominent Regional Trade Agreements (RTAs) in Sub-Saharan Africa (SSA). The ECOWAS was established on the 28th of May 1975 through the Treaty of Lagos with the initial aim of promoting regional economic integration. The current ECOWAS membership includes 15 (mostly anglophone and francophone) countries: Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The main objective of ECOWAS is to boost the economic development of member countries, reduce/eliminate trade barriers, and enhance the free movement of capital and labor among ECOWAS member countries. Specifically, in terms of bilateral trade flows among member countries, ECOWAS covered the elimination of customs duties and taxes, the elimination/reduction of non-tariff restrictions on trade between member states, and the establishment of common external tariff schemes on goods imported from other nations. The ECOWAS is deemed to have important regional economic impacts for member countries, and there are important prospects to increase the effectiveness of this agreement in the future. Thus, it is important to examine the magnitude of bilateral trade flows among ECOWAS member countries and to determine to what extent these trade preferences have enhanced trade flows among ECOWAS member countries.

The rising number of RTAs over the years, most notably over the 1990s, has drawn lots of attention in the empirical literature. The latter responded by empirically examining the impacts of RTAs on trade flows. This empirical literature regularly implemented the empirical analysis using the gravity model, where RTAs are often depicted by dummy/binary variables that equal one for

trade observations between member countries, and that equal zero otherwise. RTAs are often considered an important channel to increase regional economic integration by increasing intraregional trade flows and capital flows, lowering business/transaction costs, boosting investment, and ultimately improving the overall economic activities of its member countries.

The main objective of this study is to examine the impact of ECOWAS on bilateral trade flows among member countries using a dataset covering bilateral trade observations among the 15 ECOWAS countries and between ECOWAS countries and other (non-ECOWAS) trading partners from 2000 to 2018. This thesis follows a broad empirical literature that estimated the effects of RTAs on international trade using the gravity equation (e.g., Carrere, 2006; Philippidis & Sanjuán, 2007; Jayasinghe & Sarker, 2008; Ghazalian et al., 2011; Ghazalian, 2013, 2017; Afesorgbor, 2017). The empirical analysis in this thesis basically examines the magnitude of trade flows among ECOWAS member countries. It is further extended to examine the magnitude of trade among members of the West African Economic and Monetary Union (WAEMU), which membership includes eight, mainly francophone, states within ECOWAS. The WAEMU member countries are Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The empirical analysis also estimates the magnitude of trade flows among members of the West African Monetary Zone (WAMZ), which includes six, mainly anglophone, countries within ECOWAS (Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone) that plan to introduce a common currency called the ECO. The empirical analysis uses the gravity model to implement the empirical analysis. The empirical analysis uses the conventional log-linear form of the gravity equation, and it also estimates the multiplicative form of the gravity equation using the Poisson pseudo-maximum likelihood (PPML) estimator to tackle empirical issues associated with zero bilateral trade flow observation and heteroskedasticity (Santos-Silva and Tenreyro, 2006, 2011).

The main results from estimating the log-linear gravity model show that trade flows among ECOWAS member countries are around nine times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*. The results from estimating the multiplicative form of the gravity equation with the PPML estimator show positive and statistically significant coefficient on the ECOWAS variable, but the magnitude of this effect is lower compared to the estimate obtained from estimating the log-linear gravity model - trade flows among ECOWAS member countries are around five times higher than trade flows between ECOWAS countries and other (non-ECOWAS) countries, *ceteris paribus*.

The empirical analysis examined next the magnitude of bilateral trade flows among the WAEMU member countries. The results show that WAEMU countries have benefitted from increases in economic cooperation and coordination, and the introduction of the common currency, the CFA Franc, in increasing trade flows among each other. Also, the empirical analysis investigated the magnitude of bilateral trade flows among WAMZ, which includes six ECOWAS countries that plan to introduce a common currency, the ECO. The estimates show that the magnitude of bilateral trade among WAMZ countries is significantly lower than the magnitude of bilateral trade among WAEMU countries (and the magnitude of trade among other ECOWAS member countries). These results indicate that there is a wide margin to increase trade among WAMZ countries by increasing economic cooperation and coordination, and by introducing the common currency (ECO).

The empirical findings also highlight the negative effect of bilateral geographic distance, which proxy form transportation, information, and communication costs, on bilateral trade flows of ECOWAS countries. Also, we find that sharing a common language, sharing a common border, and sharing colonial ties have positive effects on the bilateral trade flows of ECOWAS countries.

These factors naturally reduce transaction costs and facilitate trade flows through similarity in institutions and social and business networks between trading partners.

The findings of this thesis highlight the positive impacts of trade preferences, economic cooperation and coordination, and enhanced movement of factors of production among ECOWAS member countries on intra-regional trade flows, and on the extent of regional economic integration. Accordingly, the ECOWAS, as an organization, must maintain and must further enhance free-trade and trade-facilitation policies to further increase trade flows, and eventually attain higher levels of economic growth, regional integration, and living standards. The ECOWAS must urge member countries to eliminate the remaining restrictive trade barriers, improve infrastructure, boost the performance of institutions, and increase cooperation and coordination. Also, the creation of a strong industrial production policy would strengthen the competitiveness of ECOWAS member countries.

Also, it is critical for ECOWAS member countries to attain political stability. For example, many ECOWAS countries such as Niger, Guinea Bissau, Mali, Guinea, and Burkina Faso, have gone through coup d'état within the last two decades. Also, militant activities occur in many regions. For example, Boko Haram's activities in North-Western Nigeria, Niger, and the Cameroon borders constitute a threat to regional security. Conflicts between robbers and Fulani herdsmen-farmers in Nigeria's North-Western, North-Eastern, and Middle Belt regions have become out of control for internal security. To address instability across the continent, ECOWAS member nations must adopt a comprehensive and coherent strategy to fulfill their obligations under the treaties and protocols. The ECOWAS organization should benefit from organizational restructuring. It should create stronger institutions and initiatives, and it should boost political cooperation to attain higher levels of security and political stability.

This thesis empirically examined the effects of ECOWAS on bilateral trade among member countries. Future studies could cover the analysis of other economic aspects, by examining the effects of ECOWAS on economic growth, capital formation, and foreign direct investment. Also, future research could investigate the evolving trade patterns in the ECOWAS region as countries start to revive their economies following the COVID-19 pandemic which caused significant and long-lasting implications on the global economy.

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APPENDIX

Table A1: List of ECOWAS countries

Benin	The Gambia	Liberia	Senegal
Burkina Faso	Ghana	Mali	Sierra Leone
Cabo Verde	Guinea	Niger	Togo
Cote d'Ivoire	Guinea Bissau	Nigeria	

Table A2: List of WAEMU countries

Benin	Mali
Burkina Faso	Niger
Cote d'Ivoire	Senegal
Guinea-Bissau	Togo

Table A3: List of WAMZ countries

The Gambia	Liberia
Ghana	Nigeria
Guinea	Sierra Leone

Table A4: List of other (non-ECOWAS) countries

Afghanistan	Gabon	North Macedonia
Albania	Georgia	Norway
Algeria	Germany	Oman
Angola	Greece	Pakistan
Argentina	Guatemala	Panama
Armenia	Guyana	Papua New Guinea
Australia	Haiti	Paraguay
Austria	Honduras	Peru
Azerbaijan	Hong Kong	Philippines
Bahamas	Hungary	Poland
Bahrain	Iceland	Portugal
Bangladesh	India	Qatar
Belarus	Indonesia	Romania
Belgium	Iran	Russia
Belize	Iraq	Rwanda
Bhutan	Ireland	Sao Tome And Principe
Bolivia	Israel	Saudi Arabia
Bosnia And Herzegovina	Italy	Serbia
Botswana	Jamaica	Seychelles
Brazil	Japan	Singapore
Brunei Darussalam	Jordan	Slovak Republic
Bulgaria	Kazakhstan	Slovenia
Burundi	Kenya	Solomon Islands
Cabo Verde	Korea, Rep.	Somalia
Cambodia	Kuwait	South Africa
Cameroon	Kyrgyz, Rep	South Sudan
Canada	Laos	Spain
Central African Rep.	Latvia	Sri Lanka
Chad	Lebanon	Sudan
Chile	Lesotho	Suriname
China	Liberia	Sweden
Columbia	Libya	Switzerland
Comoros	Lithuania	Syria
Congo Dem	Luxembourg	Tajikistan
Congo, Rep.	Macao SAR, China	Tanzania
Costa Rica	Madagascar	Thailand
Croatia	Malawi	Timor-Leste

Cuba	Malaysia	Trinidad And Tobago
Cyprus	Maldives	Tunisia
Czech Republic	Malta	Turkey
Denmark	Mauritania	Uganda
Djibouti	Mauritius	Ukraine
Dominican Republic	Mexico	United Arab Emirate
Ecuador	Moldova	United Kingdom
Egypt	Mongolia	United States
El Salvador	Montenegro	Uruguay
Equatorial Guinea	Morocco	Uzbekistan
Eritrea	Mozambique	Venezuela
Estonia	Myanmar	Yemen
Eswatini	Namibia	Zambia
Ethiopia	Nepal	Zimbabwe
Fiji	Netherlands	
Finland	New Zealand	
France	Nicaragua	