

**ECONOMIC INTEGRATION, TRADE FACILITATION AND
AGRICULTURAL EXPORTS PERFORMANCE IN ECOWAS MEMBER
COUNTRIES**

By

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Abstract

This study examined the interaction between economic integration and trade facilitation in ECOWAS and how the regional bloc has performed in promoting agricultural export. The objectives of the study were achieved using descriptive, statistical and econometric analyses of annual data covering the period 1995 –2009. The descriptive analysis helped in assessing the level of economic integration in ECOWAS Members. The statistical and econometric analyses were relied on to examine the effect of economic integration on trade facilitation as well as the role of trade facilitation and economic integration in promoting agricultural exports in ECOWAS. The findings suggest that on the average, the level of trade facilitation in ECOWAS is below world average. It was also found that ECOWAS members with more bureaucratic processes experience greater costs of exporting/importing. Evidence from the study also reveals a sustained growth in agricultural production and a close relationship between agricultural production and agricultural exports in the region. Furthermore, results from econometric analyses indicate that economic integration significantly helps in facilitating trade within the ECOWAS sub-region. On the other hand, economic integration and trade facilitation were also found to be significant in influencing agricultural exports in the ECOWAS sub-region, while agricultural production had direct and significant impact on agricultural exports. Some policy recommendations that would help to facilitate trade as well as improve agricultural exports in ECOWAS sub-region were made in the study.

Introduction

Economic integration (EI), which is an embodiment of custom unions, trade blocs, and free trade area, has the ultimate aim of promoting trade participation of Members and in the long-run enhance economic performance and welfare of their citizenry. EI cannot operate in a vacuum, it requires some sort of components such as transport and communication facilities, critical mass of capital, institutions, and so on to meaningfully realize its objectives (Essien, 2009). It is on this axiom that regional economic communities (RECs) are established across the world, which Economic Community for West African States (ECOWAS) is good example.

A cursory observation at some indicators of EI presented in Table A1 (see the Appendix) indicate that the share of ECOWAS' import ranges from 11.67% to 17.04% between 1999 and 2009; while that of export share was between 8.40% and 14.18% within the same period. This means that ECOWAS sub-region has greater share in world import than export denoting that it is net importer. It has also been noted that the ECOWAS sub-region meets about 80% of the regional population's food need, which implies that the net food import is about 20% (ECOWAS Commission, 2010). This is crucial given understanding that food is fundamental to human existence and agricultural sector is expected to provide food, among other things.

One of the cardinal objectives of RECs is to promote trade within the region (intra-regional trade) as trade barriers are significantly reduced. The values in Figures 1a and 1b show that the level of ECOWAS' total export and import increased markedly between 1999 and 2009. Export increased from USD 20 billion in 1999 to USD 100 billion in 2009 while import increased from USD 18 billion to USD 60 billion. However, as shown in Figure 1b (see the Appendix), intra-regional trade (both import and export) declined within the same period. For instance, intra-regional export fluctuated between 8.4% and 14.2% from 1999 to 2009, while that of import was between 11.5% and 19.9%. Thus, both intra-regional export and import were less than 20%, which implies that more than 80% of trade in ECOWAS sub-region is with other countries in other regions. The export of ECOWAS Members within the region was very low. It was as low as 0.1% in 1999 and 0.4% in 2005 for Cape Verde just like Guinea Bissau that was 0.1% in 2001, 2003 and 2007. For the

import of ECOWAS Members from the region, it was also very low, where it was only 0.5% and 2.3% respectively in 1999 and 2007 in Nigeria (ECOWAS Trade Data, 2010). Others have similar pattern with the exception of few.

Trade facilitation (TF) examines how procedures associated with cross-border trade can be improved through the reduction of transaction costs. TF is believed to enhance competitiveness in world market (ICTSD, 2011). Some other indicators of TF, namely: number of documents required for both import and exports as well as number of days required to process goods for import and export show that it requires about 8 and 9 documents for export and import in ECOWAS sub-region compared to about 7 and 8 of same for the world average (World Bank, 2010). Furthermore, it requires about 30 and 36 days to finish the process of export and import documentation in ECOWAS sub-region unlike 26 to 29 days for the world average (World Bank, 2010). It is equally noted that the average teledensity rate in ECOWAS sub-region in 2007 was 17.98 per 100 inhabitants compared to the averages for SSA and world that were 23.35 and 83.09, respectively (Olayiwola and Osabuohien, 2009).

Agricultural sector in ECOWAS like most African economies occupies prime segment of the society. It is seen as the backbone and mainstay of the economy as it has diverse effects on the society with regard to employment, earnings and food security (ECOWAS Commission, 2010; Efobi and Osabuohien, 2011). Agricultural sector contributes about 35% of the ECOWAS sub-region's gross domestic products (GDP) and it constitutes about 16.3% of total export of goods and services. On the average, over 60% of the active population in the ECOWAS region engaged in agriculture (ECOWAS Commission, 2010). Thus, it is a significant sector that can help poverty alleviation and ensure food security. However, there are some challenges that have bedeviled the performance of the agricultural sector in general and agricultural export in particular in the sub-region. Some of these include: limited local market size, poor and inefficient infrastructure, reliance on rainfall, limited technical know-how, low availability of financial resources, among others. The operations of RECs are believed to provide some of the solutions of the aforementioned challenges by facilitating intra-regional agricultural products flow through: the transportation from surplus to deficit countries in the sub-region; reducing price

fluctuations; supporting regional infrastructure; creating regulatory frameworks; *inter alia*. Thus, RI and TF can help to enhance productivity and competitiveness of agricultural exports by increasing output as well as improving the incomes of farmers. It is on these backdrops that this study seeks to examine how economic integration in ECOWAS has improved trade facilitation on one hand, and how agricultural exports has benefited from EI and TF in the sub-region.

Objectives of Study

The main objective of the study is to analyze the interrelationship among economic integration, trade facilitation and agricultural export performance in ECOWAS. The specific objectives are as follows:

- (a) To investigate the effect of integration on trade facilitation in ECOWAS.
- (b) To assess the relationship between agricultural production and agricultural exports in ECOWAS.
- (c) To determine the role of economic integration and trade facilitation on agricultural export in ECOWAS.

These objectives were achieved using descriptive, statistical and econometric techniques, which informed the directions of policy recommendations made in the study. This is with respect to how trade facilitation process can be improved to enhance economic integration and subsequently promote agricultural export in ECOWAS member countries.

Brief Literature Review

The term Economic integration (EI) has been seen to have several connotations. It usually involves the unification of trade among the Members of a given trade bloc or customs union. It equally includes partial or full removal of tariffs on trade across national boundaries with the purpose of reducing prices and enhancing the welfare of citizens in the Member States (Dalimov, 2009). EI processes can be realised through various stages, namely: Preferential trading area; Free trade area, monetary union; Customs union, Common market; Economic union, Customs and monetary union; Economic and monetary union, Fiscal union; and full/Complete economic integration (Ndulu, Kritzinger-van and

Reinikka, 2005). The stages and duration as well as effectiveness depend on both the nature of regulations and the adherence to laid down rules by the Member States. For instance, UNECA (2010) had noted that regionalism has proliferated in post-independence SSA countries but intra-regional trade in SSA still lower than projected.

The RECs essentially exist to help the region maximize the benefits of engaging in international trade and minimize possible costs that are involved. This is usually pursued through the reduction of trade restrictions and market access. Yang and Gupta (2007) have noted that RTAs in Africa have not been effective in promoting trade due to external trade barriers and low level of resource harmonization among members. Other possible challenges include: small size of markets, poor transport facilities and high trading costs (UNECA, 2010; Osabuohien, 2011). RECs also strive to achieve the existence of mutually benefitting integration, strong political commitment to the integration and strong institutions among members (McCarthy, 2002; Dalimov, 2009).

With respect to trade facilitation (TF), Wilson, Mann and Otsuki (2005) defined it broadly by quantifying the impact of four different measures, namely: port efficiency, customs environment, regulatory environment and e-business usage. However, Engman (2005) used the WTO definition of TF, which involves the simplification and harmonization of international trade procedures. This definition considers mainly what happens around the border. Some other authors such as Martinez-Zarzoso and M´arquez-Ramos (2008) focused on the effects of the measures of TF including: information technology, port efficiency and institutional quality.

In literature, major approaches of estimating the impact of TF have been examined. Some studies such as Martinez-Zarzoso and M´arquez-Ramos (2008); Wilson, Mann and Otsuki (2003, 2005), among others employed the gravity model of trade augmented with some indicators of TF. For instance, Wilson, Mann and Otsuki (2005) estimated gravity model of trade augmented with some indicators of TF for a group of countries in the Asia-Pacific region. Soloaga, Wilson and Mejía (2006) also used augmented gravity model but with focus on Mexico. Djankov, Freund and Pham (2010) also employed the augmented gravity model using the World Bank’s Doing Business Database but with emphasis mainly on the

effects of time delays in the exporting country. Nordas, Pinali and Grosso (2006) had earlier examined how time delays exert probable influence on export. They found that time not only reduces trade volumes, but lengthy procedures for exports and imports reduce the probability that firms will enter the export markets for time sensitive products. This agrees with Persson (2007) who investigated the effect of time delays and transaction costs on trade flows for each of the six groups of African, Caribbean and Pacific (ACP) countries negotiating Economic Partnership Agreements with the European Union (EU).

Martinez-Zarzoso and M´arquez-Ramos (2008) analyzed the effect of TF on sectoral trade flows using data from the World Bank’s Doing Business on the fees associated with completing the procedures for a country’s export/import, on the number of documents needed and on the required time to complete all the administrative procedures to import and export. Their estimation, which was based on augmented gravity model for 13 exporting countries and 167 importing countries, found that trade flows increase by lowering transport costs and the number of days required to trade. Their results support multilateral initiatives that encourage countries to assess their trade facilitation needs and priorities and to improve them. This will benefit both the country that improves trade facilitation and her trading partners.

TF reform has been seen as crucial policy measures for reducing the costs of exporting and importing in developing countries, as the international business community has increasingly expressed its concerns for greater transparency, efficiency, and procedural uniformity of cross-border transportation of goods. Freund and Bolaky (2004) noted that gains from trade can lead to welfare, which will emanate from increasing specialization; however, when the structure of economic activities are not flexible to incorporate nascent changes, the positive impact of trade will be minimal in terms of the allocation of resources across and within industries. It is these rigidities that Economic Integration and TF are meant to address to promote trade flows across regions.

In the African continent, not much has been done in examination of trade facilitation and economic integration. The few studies in this area are briefly reviewed herein. Iwanow and Kirkpatrick (2009) defined TF as reducing the transaction costs associated with the

enforcement, regulation and administration of trade policies. The authors used a panel dataset for 124 developed and developing countries (2003-2004) assessed the impact of TF and other trade-related institutional constraints on manufacturing export performance with particular emphasis on Africa. They estimated a standard gravity model augmented with TF, regulatory quality, and infrastructure indicators and established that TF reforms could contribute to improve export performance in Africa, but other reforms including the quality of the regulatory environment and the quality of the basic transport/communications infrastructures, were noted to be essential. The authors concluded that improvements of *on-the-border* and *behind-the-border* policies will yield a higher return in terms of increasing manufacturing export performance in African countries than in the rest of the world.

Other studies such as Njinkeu, Wilson, and Fosso (2008) and Wilson, Mann and Otsuki (2004) analyzed the impact of reform in four different categories of TF, namely: port efficiency, customs environment, customs regulatory environment, and service infrastructure and established that ports and services infrastructures are the main indicators of TF that affect intra-African trade. Furthermore, Clarke (2005) investigated the factors that affect the export performance of manufacturing enterprises in Sub-Saharan African countries using a cross-country manufacturing survey and noted that manufacturing enterprises are less likely to export in countries with poor customs administrations and restrictive trade and customs regulations. The above is similar to the submission of Eifert, Gelb, Ramachandran (2005) that compared firm-level data on total factor productivity for about 3,000 Sub-Saharan African firms (2000-2004) and found a weak business environment that is reflected in disproportionately high indirect costs which lower the return to labour in production and thereby reducing labour demand and real wages.

On the other hand, Elbadawi, Mengistae and Zeufack (2006) established that after allowing for the effect of geography in terms of physical distance from foreign markets, weak institutions adversely affect the performance of SSA's manufactured exports. In a similar study, Yoshino (2008) observed that *behind-the-border* factors such as electricity and internet services affect how much manufacturing firms can export as well as the geographic orientation of exporters in SSA. Just like Balchin and Edwards (2008) that examined the relationship between business climate, manufacturing productivity, and

export performance in eight African countries, and noted that various aspects of business climate and legal environment were important determinants of probability of exporting.

Njinkeu, Wilson, and Fosso (2007; 2008) have noted that dismal performances of African trade can be attributable to several factors traditionally associated with TF, which include complex customs requirements, lengthy and non-transparent bureaucratic procedures associated with the movement of goods and services across international borders. They also noted that trade impediments could be compounded when countries are parties to several non-functioning regional and bilateral trade agreements, leading to significantly high cost of doing business and competitiveness. Thus, trade facilitation is a comprehensive and integrated approach to reducing the complexity and cost of the trade transactions process, and enhancing the efficiency, transparency and predictability of international trade. The major fallout from the extant studies reviewed, is that the issue of trade facilitation and economic integration has not been related to agricultural export performance with focus on ECOWAS members.

Challenges to Agricultural Products Movement in West Africa

There are a number of challenges to the free movement of agricultural products in West African sub-region. These include the following:

Weak Institutional Framework

Many ECOWAS countries have poor institutional framework to adequately implement various policies that will ease the movement of persons and products within the sub-region. For instance, Brock, Omoluabi and Dusen (2011) have recently noted that in Benin Republic, the major hindrances to enhancing trade liberalization is the lack of enforcement of national and regional laws at the border, which is evident in the non-tariff barriers imposed at the borders, therefore inhibiting the agenda of free trade. Furthermore, traders of variety of goods were exposed to unofficial, unrecorded and arbitrary bans and quotas. Similarly, in Burkina Faso, goods with 30% value added are still being charged tax, despite ECOWAS regulation that such goods should enter duty free within the sub-region. Thus, when the institutional framework to monitor these activities is strong, some of these

challenges will be mitigated (Fosu, 2011). A major way to improve the institutional quality is the political will by the governments of member countries..

Transport Cost

The cost of transporting product in ECOWAS sub-region is high and sometimes involves some bureaucratic delays. This increases the cost of the final product and given the low shelf-life of most agricultural products, it also lead to some of the products reducing their market value owing to the ‘perishability’ of the products. Many ECOWAS countries do not observe the ‘ECOWAS Transit Routier Inter-Etat’ that stipulates free movement of goods within the region, which has adversely affected the cost of transportation. This is even exacerbated by road *harassment*, which is common in most of the member countries especially Benin, Burkina Faso and Nigeria, which accounts for the high cost of transportation through their borders (Brock, Omoluabi and Dusen, 2011).

In many ECOWAS countries, because of the cumbersome payment needed to transport goods across the borders, traders resolve to indulge in informal payments for passage, which has adverse implication on the cost of the goods. For instance, Nigeria questions all Certificates of Origin emanating from Benin and in the process of verifying products before approving their passage, which hikes the cost of transaction both time and resources. In a similar way, in Burkina Faso, limits on truck axle load required by the ETLS (11.5 tonnes per axle) is not adhered, which has resulted into increase in transportation cost, deterioration of roads, increased road accidents and encourage unofficial payment at road block where officials take advantage of the situation.

Poor Communication and Infrastructure Facilities

Poor communication has also posed some challenges to the movement of agricultural product within ECOWAS sub-region. This mainly arises from low awareness with regards to information pertaining to ECOWAS protocols. Some traders do not know where to find relevant information that would facilitate their trading activities coupled with the unavailability of relevant documents needed for transit across borders and the fees required for processing documents. Brock, Omoluabi and Dusen (2011) has observed this as one of

the inhibiting factors to the implementation of the ETLS as there is the existence of low traders' awareness in Benin of the ETLS scheme. Burkina Faso and some other ECOWAS members also faced the same challenge of information asymmetry due to poor communication facility. Thus, efficient communication network is needed reduce information asymmetry between policy makers and the implementers of such policies, which will improve effectiveness and trade performance in the sub-region.

The ECOWAS sub-region also has the issue of weak infrastructural development, which is not improve the demand and growth of their population. Apart from the insensitivity of the infrastructural development, poor renovations and improvement of infrastructure is another inhibiting factor to the development of infrastructure, which poses challenges free trade within the sub-region (Seka, 2009). This has an adverse effect on trade especially because poor infrastructure will aid perishability of goods, increase transportation cost, increase transportation time amongst others. For example, it evidence indicate that poor infrastructure in ports will increase administrative and waiting cost by adding \$20 to the cost of exporting through the sea (Foster, 2008).

The ways and measures to address some of the aforementioned challenges, among others, were what led to the inauguration of the ECWOAS agricultural policy (ECOWAP) and the ECOWAS Trade liberalization Scheme (ETLS). These measures are discussed in the next sub-section

ECOWAS Agricultural Policy and Regional Integration

The importance of the agricultural sector to ECOWAS countries cannot be over-emphasized. The agricultural sector remains a significant contributor to regional GDP, foreign trade, employment, poverty reduction, food security, etc. Despite a very difficult environment for production and hostile trade practices by some developed countries that continue to extend subsidies to their farmers, the resilience of the agricultural sector in ECOWAS countries is never in doubt. The agricultural sector has been highly adaptable and production continues to increase sufficiently to meet the growth in demand. For example, agri-food exports have risen by 95% while imports have only risen by 64% between the period 1988 and 2008 (ECOWAS Commission, 2010). Export crops such as

coffee, cotton, cocoa, and so on have performed relatively impressive and thus recorded huge successes over time. It is believed that the agricultural sector of ECOWAS countries will even perform better under a regional development strategy for the sector.

ECOWAS regional agricultural policy (ECOWAP) was adopted by member heads of state and government for the region on 19th January 2005. ECOWAP is the appropriate reference policy initiative when reviewing regional agricultural policy for the agricultural sector in the region. Under the ECOWAP, the sub-region is believed to be the right arena for a new agricultural development strategy. The major arguments in support of a regional development strategy for the agricultural sector are in the ECOWAP policy document and they include:

- ❖ The strong complementarities between areas of production and consumption and the ecological diversity of the region, which is partly due to a rainfall gradient rising from 300 mm in the north to nearly 4,000 mm per annum in the south.
- ❖ Many natural resources, such as rivers, biodiversity reserves and underground aquifers span several countries, which therefore need to cooperate over their management and develop a shared vision of how they can be exploited and protected.
- ❖ As economies and trade become increasingly globalized, regional integration is seen as a key vector for positioning the region on the world stage.
- ❖ The new international context created by rising prices represents a historic opportunity to re-establish the bases of agricultural development in the region.
- ❖ The regional dimensions of agriculture give it certain comparative advantages at this level.
- ❖ Certain problems can be addressed more effectively at the regional level than by individual governments.
- ❖ Finally, the challenges presented by increasingly globalized trade are more easily met at the regional level, which is both better able to propose clear and ambitious agricultural policies and the only way that African leaders can make their presence felt in international trade negotiations(ECOWAS Commission, 2010).

The general objective of the ECOWAP is “to contribute in a sustainable way to meeting the food needs of the population, to economic and social development, to the reduction of poverty in the Member States, and thus to reduce existing inequalities among territories, zones and nations”. The above general objective was sub-divided into seven specific objectives to make it definite and measurable. The specific objectives of the ECOWAP are as follows:

- ✓ Food security for people in the sub-region
- ✓ Reducing food dependence and achieving food sovereignty
- ✓ Involving producers in markets
- ✓ Creating jobs with guaranteed incomes in order to improve living conditions and services in rural areas
- ✓ Intensifying production systems in a sustainable manner
- ✓ Reducing the vulnerability of the economies in the sub-region by limiting factors of instability and regional insecurity
- ✓ Adopting appropriate funding mechanisms.

The above objectives are consonance with the principle of regional food sovereignty especially as they relate to high regional integration and appropriate levels of border protection, differentiated according to the specific needs of each supply chains in the process.

ECOWAP as a policy thrust sets outlines the principles and the objectives for the agricultural sector including the direction that agricultural development is expected to take. The lines of intervention in the ECOWAS sub-region the policy thrusts are designed to achieve the following targets:

1. Sustainable food security in member countries.
2. Good remuneration for those that are involved in the agricultural sector.
3. To expand trade on a sustainable basis, both within the sub-region and with the rest of the world.

The above policy of thrusts ECOWAP are categorized into three major policy themes to ensure the expectations are delivered. These include:

- i. Increasing the productivity and competitiveness of agriculture in the sub-region
- ii. Implementing a trade regime within the sub-region
- iii. Adapting the trade regime in comparison with countries outside the sub-region.

In view of the foregoing, an integrated approach to agricultural development at the ECOWAS regional level is unarguably the most viable strategy for agricultural development. The regional dimension of agriculture in ECOWAS should significantly boost agricultural production or at least help sustain the momentum of growth already evident in the sector. The ECOWAP initiative necessarily requires a regional free trade area to achieve the broad objectives of accessing an enlarged local market, realizing economies of scale and strengthening bargaining positions in global trade negotiations.

Unarguably, the adoption of a liberal trade policy regime has long been a central objective of ECOWAS. The ECOWAS free trade area or the ECOWAS Trade liberalization Scheme (ETLS) ensures that there is a free movement of goods and people within ECOWAS. The ETLS came into force in January 1990 and it comprises a set of protocols that guide transit operations and the movement of goods and people across the region (West Africa Trade Hub Technical Reports, 2010). The full implementation of ECOWAS free trade area with a common external tariff will hopefully ensure the removal of tariff and non-tariff barriers to trade within the region and eventually transform the ECOWAS region into a full custom union as well as a common market to facilitate trade within the region. The difficulty in implementation of the ECOWAS trade liberalization scheme has been ascribed largely to the unwillingness of many member states to implement its provisions relating to elimination of tariff and non-tariff barriers to trade and the functioning of a compensation mechanism that mitigates the loss in tariff revenues.

The major focus of the ETLS as a scheme is to encourage the local manufacturing outfits to compete favorably with imported products that may be dumped in the sub-region's market as well as remove tariff and non-tariff barriers (NTBs) to trade between the countries of the region (Central Bank of Nigeria, 2006). It is also expected to encourage entrepreneurial development because it provides preferential treatment among ECOWAS member states. The ETLS scheme covers three groups of products namely:

1. Unprocessed goods which including fish, plant or minerals that have not undergone industrial transformation.
2. Traditional handicraft products including products made by hand with or without the use of tools or machineries such as wood, articles of wood, basket works, carpet mats, lace embroidery etc.
3. Industrial products.

Some opportunities that are expected to be realized for the effective implementation of the ETLS by the ECOWAS member countries and their companies are as follows:

- ✓ It will encourage local manufacturing to compete favorably with cheap imported products.
- ✓ The ETLS will encourage entrepreneurial development.
- ✓ Exporters from member countries will have larger markets for their products within the framework ETLS.
- ✓ ETLS has the potentials for reducing unemployment rate in member states.

Despite the opportunities latent in the ETLS, the scheme has been faced some challenges, which include the following:

- ✓ Lack of legal status hence the charging of full duties by Custom Authorities.
- ✓ Barriers to movement of goods due to road blocks at border posts.
- ✓ Lack of adequate awareness and sensitization of the scheme, hence inability of companies to tap fully its opportunities.
- ✓ Rejection of some products by member states from total tariff exemption even after admission of companies to the scheme.

The degree of implementation of the ETLS protocols will to a large extent explain the level of regional integration in ECOWAS. Moreover, a combination of ETLS and ECOWAP should provide sufficient incentive to promote agricultural integration, production, and trade within the region.

Methodology

Descriptive, statistical and econometric analyses for the period 1995–2009 were employed in order to achieve objectives of the study. The descriptive analysis was considered

appropriate in assessing the level of economic integration in ECOWAS Members. On the other hand, the statistical analysis mostly in the form of correlation analysis was relied on to examine the effect of economic integration process in promoting agricultural exports in ECOWAS. The econometric analysis was employed to examine the role of economic integration in trade facilitation. The data utilised were sourced from ECOWAS trade data, World Trade Indicators, World Governance Indicators and World Development Indicators. The last three sources of data are available online at World Bank Database (<http://data.worldbank.org/>) .

The Econometric Model

We specify the baseline model for trade facilitation as follows:

$$TF = days_i = f(Institution, Infrastructure, Macro) \quad (1)$$

Where:

TF = Trade Facilitation proxied by one of its key indicators – number of days taken to process exports (*xdays*) or imports (*mdays*) by country *i*.

Institution = Political institutional factors proxied by rule of law index and control of corruption index. Data on political institution are sourced from the World Governance Indicators (WGI).

Infrastructure = Service infrastructure measured by number of internet users per 100 inhabitants and Telephones lines (fixed + mobile) per 100 inhabitants. Data on Service infrastructure are sourced from the World Development Indicators (WDI). Efforts were made to include electricity production/consumption as one of the indicators of infrastructure; however, the data for most ECOWAS members over the study period were not available.

Macro = Macroeconomic factors measured by Per capita real Gross Domestic Products (PCR GDP). Data on macroeconomic factors are sourced from the World Development Indicators (WDI).

In more explicit form, equation (1) in its static form is decomposed into number of days taken to process exports or imports equations and may be re-written as follows:

$$xdays_{it} = \delta_0 + \delta_1 institution_{it} + \delta_2 infrastructure_{it} + \delta_3 macro_{it} + \epsilon \quad (2)$$

$$mdays_i = \beta_0 + \beta_1 institution_{it} + \beta_2 infrastructure_{it} + \beta_3 macro_{it} + \epsilon \quad (3)$$

Where:

$xdays_{it}$ = number of days taken to process exports by country i to country t ,

$mdays_{it}$ = number of days taken to process imports by country i from country t , and

ϵ and ϵ are the disturbance error terms that are subject to the usual assumptions.

On a priori ground, we expect: $\delta_j < 0$ and $\beta_k < 0$. Where: j and $k = 0, 1, \dots, 3$.

Other variables are as previously defined.

Equation (1) may also be explicitly specified in its dynamic form and decomposed into number of days taken to process exports or imports equations as follows:

$$xdays_{it} = \delta_0 + \delta_1 xdays_{i,t-1} + \delta_2 institution_{it} + \delta_3 infrastructure_{it} + \delta_4 macro_{it} + \epsilon \quad (4)$$

$$mdays_i = \beta_0 + \beta_1 mdays_{i,t-1} + \beta_2 institution_{it} + \beta_3 infrastructure_{it} + \beta_4 macro_{it} + \epsilon \quad (5)$$

We also expect the following theoretical relationships: $\delta_j < 0$ and $\beta_k < 0$.

Where: j and $k = 0, 1, \dots, 4$.

Next, the baseline equation for agricultural export is specified in its functional form as follows:

$$agricex = f(integration, institution, infrastructure, TF, agripdtn) \quad (6)$$

Where:

$agricex$ is defined as agricultural export and measured as a percentage of country i GDP.

integration is the trade integration variable and is proxied by intra regional export share of country *i*.

institution is the political institution variable and is proxied by the regulatory quality (*RQ*) indicator for country *i*.

TF is trade facilitation variable which is proxied here by number of days taken to process exports (*xdays*). This is because the emphasis is on the influence of trade facilitation on agricultural export.

agripdtn is annual agricultural production of country *i*.

infrastructure remains as previously defined.

In more explicit terms, equation (6) in its static and dynamic forms may be re-written respectively as follows:

$$\begin{aligned} agricex_{it} = & \gamma_0 + \gamma_1 integration_{it} + \gamma_2 institution_{it} + \gamma_3 infrastructure_{it} + \gamma_4 TF_{it} \\ & + \gamma_5 agripdtn_{it} + \varphi \end{aligned} \quad (7)$$

$$\begin{aligned} agricex_{it} = & \pi_0 + \pi_1 agricex_{i,t-1} + \pi_2 integration_{it} + \pi_3 institution_{it} \\ & + \pi_4 infrastructure_{it} + \pi_5 TF_{it} + \pi_6 agripdtn_{it} + \omega \end{aligned} \quad (8)$$

Where φ and ω are the disturbance terms that are assumed to be purely random and normally distributed.

In terms of theoretical relationship, we expect: $\gamma_0, \gamma_1, \gamma_2, \gamma_3, \gamma_5 > 0$; and $\gamma_4 < 0$

And $\pi_0, \pi_1, \pi_2, \pi_3, \pi_4, \pi_6 > 0$; and $\pi_5 < 0$

Model Estimation Techniques

The study utilizes panel data of variables from the 15 ECOWAS member states which spans through the period 2003 to 2008. Equations (2, 3 and 7) are estimated using the panel fixed effect estimator and equations (4, 5 and 8) are estimated using the system Generalized Methods of Moments (system GMM). The problem of endogeneity in dynamic panel models is always a major issue in the literature. Instrumental Variable (IV) estimation is often employed to deal with this problem. However, the IV estimation method is only useful if the instruments are good. In other words, the instruments must be

strongly correlated with the potentially endogenous variables, and they must be genuinely exogenous to the model. It is usually very helpful to over-identify the model (i.e., include more instruments than potentially endogenous variables); of course, whenever this is possible in IV estimation. This is to allow the researcher to test for instrument exogeneity and excludability.

The two commonly used methods in IV estimation are the Two Stage Least Squares (TSLS) and the Generalized Methods of Moments (GMM). The GMM method produces identical results to TSLS for just identified models, but can give more precise estimates with over-identified models. Besides, the GMM method uses internal instruments unlike the TSLS method where the researcher has to search for suitable external instruments. The GMM method of IV estimation is therefore considered appropriate for estimation in this study. For robustness checks and to account for the presence of time (in)variant explanatory factors in the specified model, the fixed effects method of estimation will also be utilized in this study.

Data Presentation and Analyses

The analysis in this section utilizes descriptive technique, which relates agricultural export to the issue of trade facilitation in ECOWAS sub-region. Intra-regional trade share of total trade volume within ECOWAS is presented in Table 1. The figures covered in Table are from 1999 to 2009 as reported in ECOWAS trade data; however, a gap of one year was observed to make the table compact and easily comparable.

Table 1: ECOWAS Member States Export and Import within the Group

	Imports from ECOWAS (as % of total imports value)						Exports from ECOWAS (as % of total Exports value)					
	1999	2001	2003	2005	2007	2009	1999	2001	2003	2005	2007	2009
1 Benin	11.0	13.7	19.9	26.7	24.9	39.4	13.5	24.0	21.9	22.0	21.3	18.3
2 Burkina Faso	32.2	22.0	87.8	23.8	32.2	25.6	23.8	27.2	44.6	27.6	25.9	25.8
3 Cape Verde	0.1	3.0	0.5	0.4	14.9	1.6	1.4	2.1	8.1	7.2	4.1	1.5
4 Cote d'Ivoire	20.8	24.6	17.5	24.8	28.7	26.1	15.0	20.7	16.2	25.7	5.9	32.8
5 Gambia	52.1	8.0	11.1	55.1	26.5	19.8	7.3	10.7	8.6	15.7	10.0	13.4
6 Ghana	10.4	7.6	11.6	9.7	32.1	7.8	9.9	15.3	18.6	17.5	10.4	14.1
7 Guinea	1.4	1.6	9.8	27.4	10.1	6.1	8.9	18.5	8.8	25.4	3.3	3.5
8 Guinea Bissau	...	0.1	0.1	1.5	0.1	...	...	22.9	18.8	53.9	39.2	...
9 Liberia	...	...	...	...	...	...	...	...	...	...	...	...
10 Mali	19.2	13.0	9.1	10.4	9.0	13.2	29.4	33.7	36.4	35.5	46.6	41.2
11 Niger	39.5	45.1	40.8	30.3	31.3	45.8	30.8	34.1	31.5	29.2	23.5	18.8
12 Nigeria	6.5	4.5	4.6	4.0	4.2	8.0	0.5	4.3	2.4	6.1	2.3	3.3
13 Senegal	16.9	17.1	26.5	30.0	37.4	31.9	10.2	19.9	22.8	21.9	17.3	26.2
14 Sierra Leone	33.0	65.3	28.2	11.6	47.4	91.9	26.7	34.4	28.5	33.6	87.4	44.3
15 Togo	16.0	46.2	46.7	53.5	60.0	68.7	19.9	14.2	14.1	13.3	12.2	14.3
ECOWAS	11.5	9.6	10.2	8.4	10.1	12.5	11.7	16.2	13.6	19.9	11.5	17.0

Source: Compiled from ECOWAS Trade Data and World Trade Indicators

As can be seen in Table 1, imports from ECOWAS as a percentage of total import value range between 8.4 and 12.5%. Similarly, exports from ECOWAS as a percentage of total export value are between 11.5 and 19.9%.

In terms of regulatory environment and service infrastructure, the figures are rather unimpressive as shown in Table 2. The average figures on regulatory quality for ECOWAS were all negative on a scale of between -2.5 and 2.5 suggesting that regulatory quality is quite low in the region. Furthermore, the average for ECOWAS sub-region was far lower than those of the world average as well as the average for WTO members. Data for service infrastructure show that internet users per 100 people in the ECOWAS region range between 0.01 and 4.56 compared to the world average which ranged between 1.46 and

23.38 during the years 1996 to 2008. Similarly, the values for ECOWAS were far lower than those of the WTO average that ranged between 1.54 and 27.39 for the same period.

Table 2: Indicator of Regulation and Infrastructures

Country	Regulatory Quality							Internet users (per 100 people)						
	1996	1998	2000	2002	2004	2006	2008	1996	1998	2000	2002	2004	2006	2008
Benin	0.17	-0.11	-0.13	-0.40	-0.50	-0.44	-0.46	0.00	0.05	0.23	0.70	1.18	1.54	1.85
Burkina Faso	-0.08	-0.32	-0.08	-0.11	-0.35	-0.44	-0.32	0.00	0.04	0.08	0.20	0.39	0.63	0.92
Cape Verde	-0.75	-0.26	0.12	-0.23	-0.30	-0.15	-0.02	..	0.47	1.82	3.52	5.32	6.81	20.61
Cote d'Ivoire	-0.04	-0.07	-0.42	-0.48	-0.99	-0.94	-0.93	0.01	0.06	0.23	0.50	0.85	1.52	3.21
Gambia, The	-1.77	-0.36	-0.23	-0.55	-0.37	-0.40	-0.44	0.04	0.21	0.92	1.80	3.31	5.24	6.88
Ghana	0.11	-0.10	0.00	-0.40	-0.31	-0.02	0.08	0.01	0.03	0.15	0.83	1.72	2.72	4.27
Guinea	0.19	-0.56	-0.54	-0.95	-0.91	-1.03	-1.15	0.00	0.01	0.10	0.40	0.51	0.64	0.92
Guinea-Bissau	0.13	-1.34	-1.28	-0.97	-1.14	-1.00	-1.22	..	0.02	0.23	1.02	1.81	2.06	2.35
Liberia	-3.13	-2.06	-1.86	-1.79	-1.86	-1.40	-1.32	..	0.00	0.02	0.03	0.03	..	..
Mali	-0.01	-0.28	-0.17	-0.37	-0.46	-0.39	-0.33	0.00	0.02	0.15	0.24	0.44	0.74	0.98
Niger	-1.19	-0.68	-0.61	-0.66	-0.56	-0.60	-0.52	0.00	0.00	0.04	0.13	0.19	0.29	0.55
Nigeria	-1.13	-0.93	-0.67	-1.23	-1.33	-0.99	-0.62	0.01	0.03	0.06	0.32	1.28	5.53	7.27
Senegal	-0.36	-0.19	-0.07	-0.20	-0.26	-0.28	-0.29	0.01	0.08	0.40	1.01	4.39	5.61	8.35
Sierra Leone	-0.92	-1.29	-1.37	-1.29	-1.02	-1.07	-0.86	0.00	0.01	0.12	0.18	0.20	0.23	0.25
Togo	0.58	-0.52	-0.67	-0.72	-0.77	-0.99	-1.05	0.01	0.31	1.91	3.60	3.78	5.21	5.42
ECOWAS														
Average	-0.55	-0.60	-0.53	-0.69	-0.74	-0.68	-0.63	0.01	0.09	0.43	0.97	1.69	2.77	4.56
WTO														
Average	0.19	0.20	0.19	0.17	0.16	0.17	0.19	1.54	4.32	8.99	15.31	20.01	24.34	27.39
World	-0.05	-0.03	-0.03	-0.04	-0.02	-0.02	-0.01	1.46	3.99	8.21	13.89	18.66	23.02	23.38

Source: Compiled from World Trade Indicators

Some basic trade facilitation indicators for the ECOWAS region such as number of documents required for exports/imports and number of days required for processing exports/imports are shown in Table 3. In all the categories, average figures for ECOWAS are higher than the averages for the world and the WTO members suggesting that trade facilitation in ECOWAS region is rather low when compared to the rest of the world.

Table 3: Some Trade Facilitation Indicators

Country	Days				No. of		Days for		Cost to export a		Cost to import a	
	No. of documents		Required for		documents		import		container (USD)		container (USD)	
	for export		exports		for import		import		2006	2008	2006	2008
	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008
Benin	7.00	7.00	34.00	32.00	7.00	7.00	41.00	37.00	1167.00	1237.00	1202.00	1393.00
Burkina Faso	11.00	11.00	45.00	45.00	11.00	11.00	54.00	54.00	2096.00	2262.00	3522.00	3830.00
Cape Verde	5.00	5.00	21.00	19.00	5.00	5.00	21.00	18.00	1024.00	1325.00	1024.00	1129.00
Cote d'Ivoire	10.00	10.00	23.00	23.00	9.00	9.00	43.00	43.00	1653.00	1904.00	2457.00	2437.00
Gambia, The	6.00	6.00	23.00	24.00	8.00	8.00	23.00	23.00	889.00	831.00	949.00	922.00
Ghana	6.00	6.00	21.00	19.00	9.00	7.00	42.00	29.00	822.00	1003.00	842.00	1130.00
Guinea	7.00	7.00	33.00	33.00	9.00	9.00	32.00	32.00	570.00	820.00	995.00	1391.00
Guinea-Bissau	6.00	6.00	25.00	25.00	1.00	6.00	24.00	24.00	1445.00	1545.00	1749.00	2349.00
Liberia	..	10.00	..	20.00	..	9.00	..	17.00	..	1232.00	..	1212.00
Mali	9.00	8.00	44.00	38.00	11.00	11.00	65.00	42.00	1752.00	2012.00	2680.00	2902.00
Niger	8.00	8.00	59.00	59.00	10.00	10.00	64.00	64.00	2945.00	3545.00	2946.00	3545.00
Nigeria	10.00	10.00	26.00	25.00	9.00	9.00	46.00	42.00	1026.00	1179.00	1047.00	1306.00
Senegal	11.00	6.00	20.00	14.00	11.00	5.00	26.00	18.00	828.00	1078.00	1720.00	1920.00
Sierra Leone	8.00	7.00	31.00	29.00	7.00	7.00	34.00	34.00	1282.00	1448.00	1242.00	1535.00
Togo	6.00	6.00	24.00	24.00	8.00	8.00	29.00	29.00	872.00	940.00	894.00	963.00
ECOWAS												
Average	7.86	7.53	30.64	28.60	8.21	8.07	38.86	33.73	1312.20	1490.70	1662.10	1864.30
World Average	7.15	6.73	26.86	24.68	8.27	7.51	31.66	27.48	1234.90	1363.40	1422.50	1577.70
WTO Average	7.01	6.55	24.25	22.15	8.04	7.23	29.01	24.76	1155.70	1302.00	1334.00	1512.50

Source: Authors' compilation from World Trade Indicators

Across the ECOWAS member states, Niger recorded the highest number days required for export at 59 days in 2008, which is more than double that of the world, WTO and ECOWAS averages, thereby becoming the least performer in the region. In contrast, it takes 14 days in Senegal to prepare documents for export in 2008 and this is less than the averages for the world, WTO and ECOWAS sub-region. Considering the number of days required to process documents for import, Niger maintained the highest number at 64 days thereby retaining her position as the least performer in the region. Again, this is more than double the World and WTO averages for the same year. This is followed by Burkina Faso where it takes 54 days to process documents for import in 2008. The best performer in the region for 2008, in terms of number of days to process documents for import is Liberia closely followed Cape Verde and Senegal where it takes 17 and 18 days respectively.

Interestingly, these are also less than the averages for the world, WTO and ECOWAS sub-region.

In terms of cost of exporting and importing a container, in 2008 it cost \$3,545.00 to export/import a container in Niger. It cost \$2,262.00 to export and \$3,380.00 to import a container in Burkina Faso in 2008. These two countries top as most expensive countries to import or export a container in the region for the year 2008. These figures are by far greater than the averages for the world, WTO and ECOWAS sub-region. Looking at the least cost country in the region, Guinea tops the list for cost of exporting a container at \$820.00 while Gambia tops the list for cost of importing a container at \$922.00. Clearly, these figures are less than the averages for the world, WTO and ECOWAS sub-region.

The implication of the above findings is that ECOWAS members that have the highest number of days to process documents for import/export appear to experience the highest cost. Thus, efforts tailored at reducing the bureaucratic bottleneck of document processing will go a long way in reducing the cost of importation/exportation and consequently, facilitate the process of trade in the sub-region. The correlation coefficients between the number of documents required for export/import as well as number of days to process documents for export/import and agricultural exports had negative values (about -4.50). This means that reduction in the number of days for processing export/import will be accompanied by increased agricultural export.

Table 4A: Agricultural exports as % of GDP

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Benin	..	..	..	16.91	16.26	15.61	13.92	13.87	14.1	12.75	12.17	..	..	..
Burkina Faso	7.39	6.71	6.18	6.11	6.05	6.05	6.54	5.21	6.17	6.65	..	..	..	..
Cape Verde	..	..	1.92	0.94	..	0.73	..	0.42	0.81	0.65	..	..	2.31	..
Cote d'Ivoire	28.54	27.98	26.15	25.32	24.11	23.75	24.05	30.67	27.32	24.26	21.86	21.01	20.69	20.44
Gambia, The	19.38	21.61	21.01	25.35	21.55	19.19	21.08	17.87	14.94	15.54	18.1	18.21	16.15	1.14
Ghana	..	11.62	9.8	18.48	15.89	14.46	12.62	..	17.65	23.25	11.06	13.1	14.33	9.97
Guinea	1.34	0.77	1.31	0.82	0.63	1.06	0.51	0.47	..	..	..	..	..	1.75
Guinea-														
Bissau	9.39	..	..	..	..	..	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mali	..	13.26	21.29	11.57	10.26	8.49	6.58	6.11	8.49	8.57	6.31	5.96	4.73	3.88
Niger	2.92	5.63	4.02	4.98	5.47	7.66	6.97	5.7	5.33	5.07	3.2	3.83	2.48	2.38
Nigeria	..	1.5	0.1	0.14	0.16	0.06	0.01	0.24	0.01	..	..	0.15	..	0.86
Senegal	..	3.24	2.75	3.99	3.22	10.62	9.97	4.16	7.44	7.1	5.62	8.19	5.88	3.61
Sierra Leone	..	..	..	..	..	..	..	5.91	..	..	..	..	..	..
Togo	17.46	17.34	16.15	12.62	13.82	11.71	7.91	11.35	11.01	11.55	9.51	..	8.2	..
ECOWAS														
Average	12.35	10.97	10.06	10.6	10.67	9.95	10.01	8.5	10.3	11.54	10.98	10.06	9.35	5.5
World														
Average	7.87	7.48	7.47	7.29	6.76	6.89	6.69	6.75	6.92	7.18	7.16	7.03	7.19	5.44
WTO														
Average	8.06	7.56	7.74	7.59	6.91	7.01	6.86	6.65	7.04	7.36	7.35	7.14	7.22	5.53

Source: Authors' compilation from World Trade Indicators

Table 4A shows that average agricultural exports as a percentage of GDP for ECOWAS countries is higher than the averages for the world and the WTO members during the period 1995 to 2008. This is indicative of the relative dominance of the agricultural sector in most of ECOWAS member states when compared to the rest of the world. However, an examination of Agricultural Export Share in World Agricultural Export Market in Table 4B shows that the average for ECOWAS region is far below the averages for the world and the WTO members.

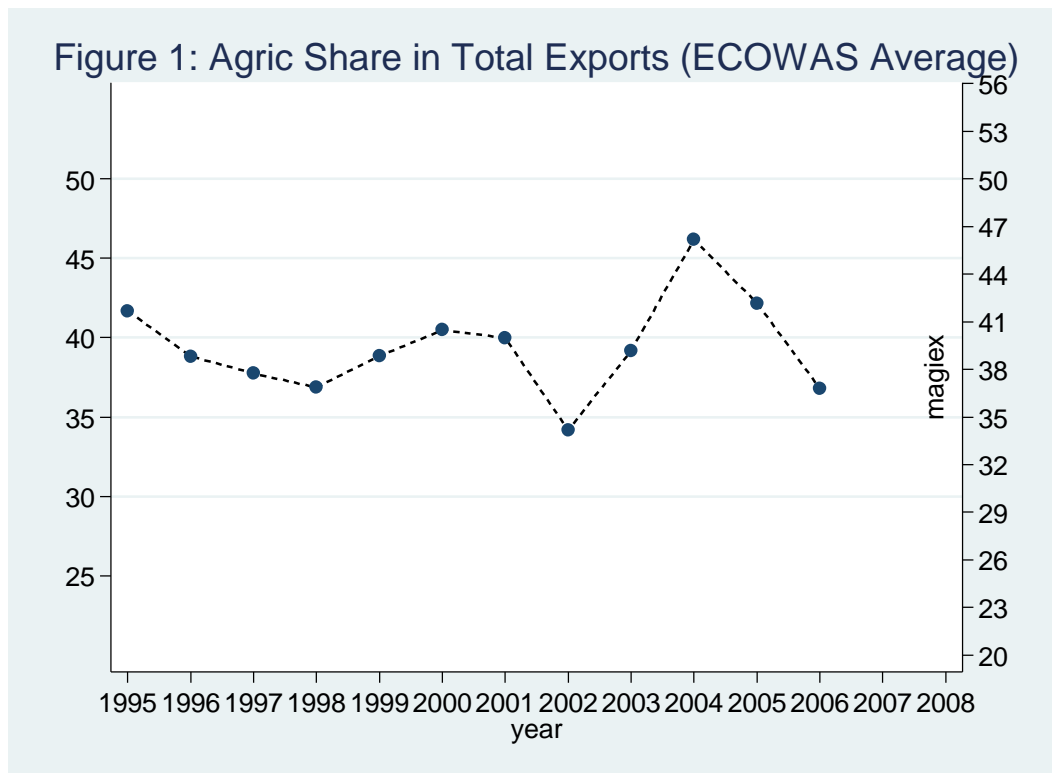
Table 4B: Agricultural Export Share in World Agricultural Export Market

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Benin	..	..	..	0.03	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	..	..
Burkina Faso	0.02	0.03	0.03	0.04	0.04	0.03	0.03	0.02	0.04	0.05	0.05	..	..	..
Cape Verde	..	..	0	0	..	0	..	0	0	0	0	..	0	..
Cote d'Ivoire	0.45	0.46	0.51	0.58	0.54	0.44	0.44	0.59	0.55	0.48	0.48	0.42	0.37	0.4
Gambia, The	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ghana	..	0.22	0.13	0.14	0.15	0.12	0.12	..	0.19	0.18	0.18	0.16	0.21	0.13
Guinea	0.01	0.01	0.01	0	0	0	0	0	..	..	..	..	..	0.01
Guinea-Bissau	0	..	..	..	..	..	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mali	..	0.05	0.05	0.04	0.04	0.03	0.03	0.04	0.06	0.06	0.06	0.04	0.03	0.03
Niger	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Nigeria	..	0.07	0	0.01	0.01	0.01	0	0.03	0	..	..	0.03	..	0.15
Senegal	..	0.01	0.01	0.02	0.01	0.07	0.07	0.02	0.07	0.07	0.06	0.04	0.06	0.04
Sierra Leone	..	..	..	..	..	..	..	0.01	..	..	..	..	..	..
Togo	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.02	0.02	0.02	0.01	..	0.01	..
ECOWAS														
Average	0.07	0.09	0.07	0.08	0.08	0.06	0.07	0.07	0.09	0.09	0.09	0.1	0.09	0.1
World Average	0.83	0.76	0.71	0.71	0.69	0.62	0.62	0.62	0.63	0.64	0.66	0.67	0.76	0.8
WTO Average	0.91	0.83	0.81	0.82	0.78	0.72	0.71	0.72	0.72	0.73	0.76	0.78	0.85	0.91

Source: Authors' compilation from World Trade Indicators

Trends in Agricultural production and Export

This section reports the trend in agricultural value added and agricultural export in the ECOWAS Sub-region. The summary of agricultural share of total export for ECOWAS is presented in Figure 1.



Source: Authors' Computation using STATA 11.2

Overall, the figure reveals a fluctuation in the relative share of agricultural export over the period. It is noteworthy that while the absolute value of agricultural export is said to have increased by about 95% between 1998 and 2008 (ECOWAS Commission, 2010), its relative share in total export has not experienced similar growth. Precisely, the agricultural share in total export increased from its lowest value 2002 to its peak in 2004 and started declining afterwards.

In Figure 2, the average growth rate of agricultural production for ECOWAS shows a pattern of sustained growth between 1995 and 2008. From its growth rate of about 21.2% in 1995, it steadily rose to about 22.3% in 2008. Associating the period of highest average growth rate of agricultural production with the post ECOWAP period, it suggests policy effectiveness of ECOWAP in terms of enhanced agricultural productivity.

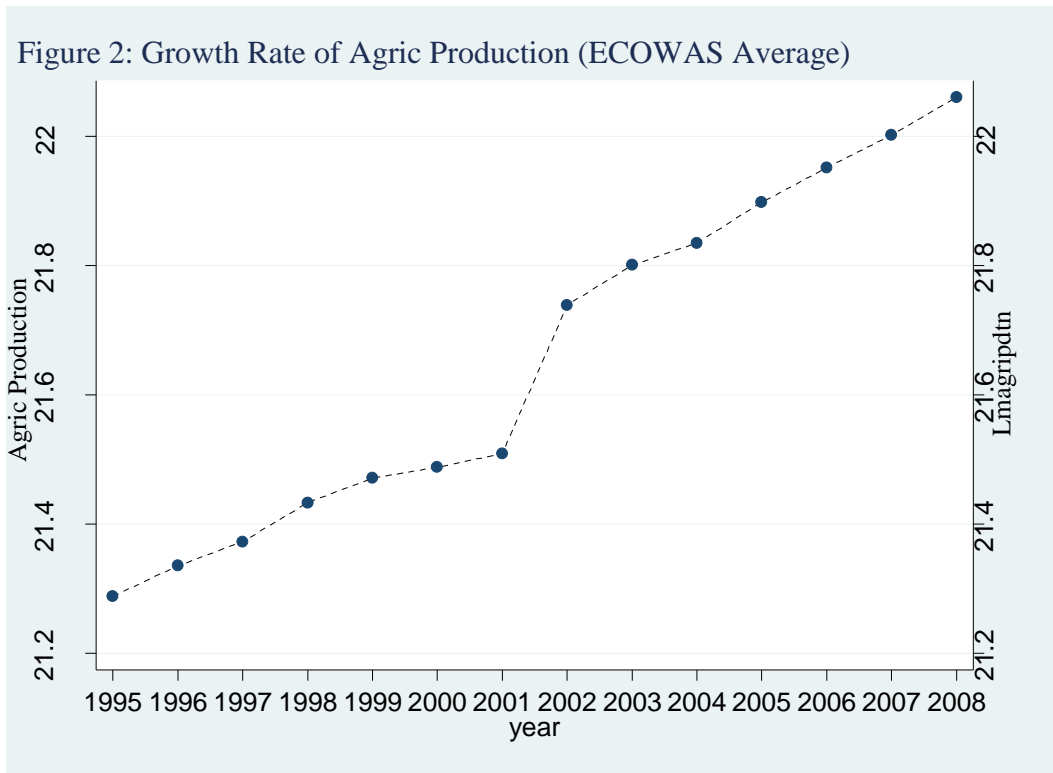
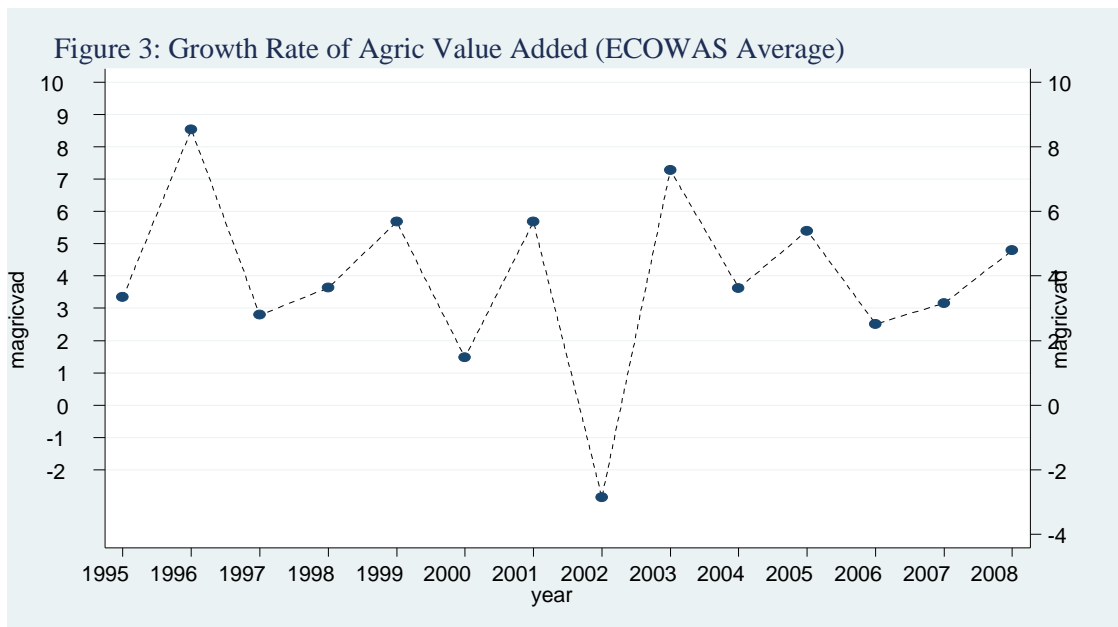


Figure 3 shows the average growth rate of agricultural value added for ECOWAS. The pattern here is similar to that of relative share of agricultural export in total export.



Source: Authors' Computation using STATA 11.2

The highest recorded average growth rate was in 1996 at about 8.6% and it fluctuated to its lowest growth rate of about -3.1% in 2002. Thereafter, it recovered sharply the following year to about 7.5% and declined again to about 2.5% in 2006. It subsequently increased in 2007 and 2008 to about 3% and 5% respectively.

An important observation here is the 2002 values for both agricultural export share in total export and that of agricultural value added when they were at their minimum. This suggests a close link between agricultural value added and agricultural export in the sub-region. Moreover, the correlation coefficient between agricultural production and agricultural export share in total export for ECOWAS is 0.69. This supports the existence of a close relationship between agricultural production and agricultural export in the sub-region.

Econometric Results and Discussion

The results obtained from the estimation of the econometric models are presented and discussed in this section. The static and dynamic panel data model estimation results for equations 2 to 5; 7 and 8 are reported in columns 1 to 6 of Table 5. Two estimators – the fixed effects and the one-step system GMM are employed in estimating models for number of days required to process export and import as well as agricultural export. An underlying advantage of the dynamic system GMM estimation is that all variables from the regression that are not correlated with the error term (including lagged and differenced variables) can be potentially used as valid instruments (Greene, 2008). Optimal set of internal instruments were utilized by engaging the collapse option in the system GMM results. All estimations are robust to heteroscedasticity or autocorrelation. This is irrespective of whether they are considered under fixed effect or the system GMM. For the dynamic panel data models, the lagged dependent variables (*xdays* and *mdays*) appear as predetermined and endogenous variables. Hence, we control for endogeneity of these variables in its lagged form as regressors by using internal instruments; namely, lagged levels of the standard differenced equation and lagged differences of the levels equation.

Table 5: Estimated Empirical Results

Dependent Variable	xdays (1)	mdays (2)	agricex (3)	xdays (4)	mdays (5)	agricex (6)
Estimator	Fixed effects	Fixed effects	Fixed effects	System GMM	System GMM	System GMM
Regressors						
l.xdays				1.329156* (6.51)		
l.mdays					1.233* (9.47)	
l.agricex						0.655* (3.41)
xshare	-0.233* (-3.15)		0.025 (0.79)	-0.119*** (-1.91)		0.118** (2.28)
mshare		0.031 (0.23)			-0.025 (-0.24)	
RL	-5.211 (-0.72)	-8.275 (-0.86)		-0.662 (-0.15)	-1.274 (-0.28)	
CC	-3.338 (-1.09)	-2.388 (-0.56)		-0.447 (-0.09)	-0.572 (-0.11)	
PCRGDP	-1.054* (-4.52)	-1.216* (-3.72)		0.028 (0.45)	0.027 (0.47)	
ITNET	-0.181** (-2.27)	-0.193*** (-1.73)	-0.099** (-2.44)	0.094 (0.89)	0.052 (0.67)	-0.121** (-2.02)
TEL	-0.064** (-2.26)	-0.031 (-0.79)	0.042** (2.48)	0.049 (0.88)	0.075 (1.34)	0.046** (2.30)
xdays			-0.071* (-3.02)			-0.086* (-2.95)
agripdtn			7.22*** (1.69)			8.65*** (1.65)
RQ			-0.674 (-0.43)			1.219 (0.89)
CONS	98.262* (6.70)	106.875* (5.36)	5.675** (2.65)	-16.884 (-1.39)	-20.209** (-2.41)	1.117 (0.64)
No. of Group	13	13	15	12	12	15
Instruments				12	12	12
Time dummy				Yes	Yes	Yes
rho	0.983	0.980	0.904			
R ²	0.366	0.126	0.003			
F-stat	9.03	4.34	5.48	25.30	28.94	8.89
(P-value)	(0.000)	(0.003)	(0.0001)	(0.000)	(0.000)	(0.000)
F-stat (residual)	12.40	21.05	25.81			
(P-value)	(0.000)	(0.000)	(0.000)			
AR(2) (p-value)				(0.812)	(0.450)	(0.501)
Sargan (p-value)				(0.855)	(0.181)	(0.064)

Notes: *t*-statistics are reported in parenthesis below each coefficient

* (**) *** indicate significant at 1, (5) and 10 % level respectively.

We begin the interpretation of results in Table 5 by examining some specification or diagnostic tests. The estimates of ρ in columns 1, 2 and 3 suggest that almost all the variation in *xdays*, *mdays* and *agricex* are due to differences in number of days required to process exports and imports as well as agricultural exports respectively across ECOWAS countries. The F- tests that the residuals are zero indicate that there are significant country level effects which make the use of the pooled OLS inappropriate.

For the system GMM in columns 4, 5 and 6, the Arellano-Bond test for autocorrelation is applied to the differenced residuals in order to purge the unobserved and perfectly autocorrelated idiosyncratic errors. These results are reported as AR (2) in the lower portion of table 5. The null hypothesis is rejected at a level of 0.05 if $p < 0.05$. If the errors are serially uncorrelated, then the null of no serial correlation will be rejected at order 1 but not at higher orders. This indeed is the case with results in columns 4, 5 and 6. Here, it can be concluded that there is no evidence of serial correlation at the 5% level of significance. Given this results, the estimates can be regarded as consistent.

Next, we employ the Sargan statistic to test for instrument validity by comparing the number of instruments used in each case and the related number of parameters. Given the one-step, non-robust system GMM estimation, the Sargan statistic which is the minimized value of the one-step system GMM criterion function, is applicable. Only the respective p-values are reported for this test results in the lower part of table 5. Here, the null hypothesis that the population moment condition is valid is not rejected if $p - value > 0.05$. The summary statistics in columns 4 and 5 indicate that the one-step system GMM dynamic panel models for the 15 ECOWAS countries have 12 instruments and 10 parameters each. This represents a total of 2 over-identifying restrictions in each case. For column 6, there are 15 instruments and 11 parameters which represent 4 over-identifying restrictions. Hence, the Sargan statistic does not reject the Over-Identifying Restrictions (OIR), but confirms that the instrument set is valid.

The F-statistic is the small-sample counterpart of the Wald (Chi Squared) statistic and it is a measure of the overall significance of the estimated models and the values here in each of the specifications are considerably satisfactory with level of significance being 1% in each case. This of course is indicative that all the exogenous variables jointly explained significantly, the trade facilitation process and agricultural exports in ECOWAS countries over the study period.

The results of the estimated fixed effect models are broadly and satisfactorily consistent with theoretical expectations. An inspection of these results reveals that with the exception of the political institutional variables (rule of law and control of corruption), all explanatory factors in column one significantly explain variations in the number of days required to process export (*xdays*) across the 15 ECOWAS countries. Precisely, the trade integration variable, *xshare* is correctly signed (negative) and highly significant at the 1% level. A 100 % increase in this variable will lead to about 23 % reduction in the number of days required to process export across the 15 ECOWAS countries which implies greater trade facilitation.

Similarly, the macroeconomic variable, per capita GDP is negatively signed and highly significant at the 1 % level. The coefficient of this regressor suggests that a 100 % increase in per capita GDP will give rise to about 105 % reduction in *xdays* which also is desirable for greater trade facilitation. The service infrastructure variables *itnet* and *tel* are also correctly signed (negative) and each significant at the 5 % level. A 100 % increase in the number of internet users per 100 inhabitants will result in about 18 % reduction in *xdays*. A 100 % increase in the number of telephone users per 100 inhabitants will result in about 6 % reduction in *xdays*. These are also desirable for greater trade facilitation in ECOWAS countries. The constant term of 98.26 is highly significant at the 1 % level and it suggests that in the absence of all the explanatory factors in this equation, it will take about 98 days to process export across the 15 ECOWAS countries.

A look at the results in column 2 (number of day required to process import across the 15 ECOWAS countries (*mdays*)) reveal that most of the explanatory factors have the expected

negative sign. However, only the macroeconomic variable (PCGDP) and the service infrastructure variable (*ITNET*) are significant at the 1 and 10 % levels respectively. From these results, it is evident that a 100 % increase in PCRGDP will lead to about 121 % reduction in *mdays* and a 100 % increase in *ITNET* will lead to about 19 % reduction in *mdays*. These of course are quite desirable for greater trade facilitation in the ECOWAS region. The constant term of 106.87 is also highly significant at the 1 % level and it indicates that when all the explanatory factors in this model are zero, it will take about 106 days to process import across the ECOWAS countries. The political institutional variables are as in the previous case correctly signed but statistically insignificant. This clearly suggest the need to strengthen political institution across the ECOWAS member states for greater and more significant role in facilitating trade in the region.

In column 3, the agricultural exports equation results are largely consistent with the *a priori* expectations. The trade integration variable (*xshare*) has the expected positive sign but is statistically insignificant. This suggests that more effort towards greater trade integration is still required to boost agricultural exports of ECOWAS member states. The service infrastructure variables *itnet* and *tel* are significant at the 5 % level but only *tel* is correctly signed. This result suggests that a 100 % increase in the number of telephone users in ECOWAS countries will lead to about 4 % increase in agricultural exports of ECOWAS member states. The trade facilitation indicator (*xdays*) has the expected negative sign and is highly significant at 1% level. The coefficient shows that a 100% reduction in the number of days required to process documents for exports will lead to about 7% increase in agricultural exports of ECOWAS member states. Expectedly, agricultural production is positively signed and statistically significant at 10% level. Precisely, the result for agricultural production variable indicates that a 10% increase in agricultural production will lead to about 72% increase in agricultural exports of ECOWAS member states. The political institution factor, regulatory quality is wrongly signed and statistically insignificant. This clearly points at the presence of very poor and counterproductive regulatory environment that are largely due to weak institutions across ECOWAS member states.

Results for the system GMM estimator in columns 4 and 5 of Table 5 are less impressive. Although a number of the variables are with the expected negative signs, they are largely statistically insignificant. An inspection of these results shows that only the trade integration variable, *xshare* and the lagged *xdays* significantly explain variations in *xdays* at the 1 and 10% levels respectively. Specifically, a 100% increase in *xshare* will lead to about 12% reduction in *xdays* thus allowing for more trade facilitation in the region. For the number of days required to process import in ECOWAS countries, only the lagged dependent variable, *L.mdays* and the constant term are significant. Again a good number of the other explanatory variables are with the expected negative sign.

Interestingly, results in column 6, the agricultural exports equation are largely statistically significant and correctly signed. All explanatory variables except RQ in this equation are statistically significant either at the 1 or 5% levels. The trade integration indicator, *xshare* is positive and suggests that a 10% increase in the intra-regional export share of total exports will produce about 1.18% increase in agricultural exports across the 15 ECOWAS countries. The *itnet* variable is wrongly signed but the other service infrastructure variable; *tel* has the expected positive sign. A 100% increase in the number of telephone users will lead to about 4.6% increase in agricultural exports across the 15 ECOWAS countries. The trade facilitation variable, *xdays* has the expected positive sign and a 10% reduction in the number of days required to process exports will lead to about 0.8% increase in agricultural exports of the 15 ECOWAS countries. As expected, the macroeconomic factor measured by agricultural production is positively signed and also statistically significant at 10% level. This result indicates that a 10% increase in agricultural production will lead to about 86% increase in agricultural exports of ECOWAS Member States. The regulatory quality variable is correctly signed but statistically insignificant which again suggest that political institutions are too weak to significantly promote agricultural exports across the 15 ECOWAS countries.

Policy Implication of Findings

From the results presented and discussed above, some implications can be drawn as follows:

First, the study found that in the export equation, the indicator of economic integration had the right negative sign, which was statistically significant at 1%. The implication of this finding is that the level of economic integration has the capacity of facilitating trade within the ECOWAS sub-region. The policy recommendation emanating from this is that when the member states are truly committed to the agenda of economic integration, the extent of trade facilitation will be increased. This is particularly of great importance with respect to the reduction of number of days that will be required for preparing documents for export. Thus, if the sub-region is to enhance trade facilitation, it is crucial that there will be greater commitment to the issue of economic integration among the member countries.

Another important finding from the dynamic panel estimation is that the previous level of trade facilitation is highly significant and it positively influences the current level of trade facilitation in both export and import equations. This implies that to facilitate trade in next year, the current year level of trade facilitation is essential. This is imperative as there seems to be somewhat path dependence in the process of trade facilitation. In other words, there is room to learn from past experience given the fact that previous level of trade facilitation will increase that of the current level. Thus, commitment to trade facilitation process in the current period will positively and significantly facilitate trade in the coming year.

It was also established that macroeconomic performance using real per capita income was statistically significant in impacting the extent of trade facilitation in both export and import equations especially in the fixed effects model. The implication of this finding is that the level of macroeconomic performance is crucial in determining the level of trade facilitation in ECOWAS sub-region. This lends support to the issue of macroeconomic convergence criteria that when economies in a given sub-region are tending towards convergence, the extent of trade facilitation will be enhanced (McCarthy, 2002). In other

words, an improvement in economic growth of the integrating economies (ECOWAS for instance) will have significant influence in facilitating trade.

The study also found that the indicators of service infrastructure especially internet provision had significant impact on trade facilitation. This finding is important given the fact that infrastructural provision is essential for improving trade facilitation. The policy implication of this is that given the advancement in information and communication technology (ICT) there is need for ECOWAS member states to embrace the process of ICT in its operations as it has the ability of facilitating trade especially with respect to reducing the bureaucratic delay that are associated with the time required to prepare documents for export. Thus, the increased use of ICT in the operations of various customs activities in the member states will go a long way in facilitating trade in the sub-region.

It was equally observed in the study that the indicators of institutional quality especially control of corruption and rule of law had the expected negative sign though not statically significant. The implication of this is that strengthening the institutional framework in ECOWAS sub-region especially curbing the menace of corruption and adherence to the rule of law has the potential of facilitating trade. This calls for more commitments on the ECOWAS member governments on the need to intensify the fight against corruption and the adherence to the rule of law in their countries as such efforts has great potential in the process of trade facilitation.

With regards to the role of economic integration and trade facilitation on agricultural exports, it was found that economic integration has positive influence but not statistically significant. This implies that more effort is needed to improve trade integration in order to promote agricultural exports in the sub-region. On the other hand, trade facilitation indicator was found to be highly significant with a negatively signed coefficient. The policy implication of this finding is that policies designed to improve trade facilitation in the region will lead to a significant increase in agricultural exports of ECOWAS sub-region. Furthermore, it was established that agricultural production positively and significantly impact on agricultural export. This means that policies that are targeted

towards enhancing the level of agricultural production will in no small measure improve the level of agricultural exports in ECOWAS sub-region.

Recommendations and Conclusion

The study examined the role of trade facilitation and economic integration in promoting agricultural export performance in ECOWAS member states using descriptive, statistical and econometric analyses. From the findings, the following policy recommendations are highlighted:

- ✓ There is a need for incentive to encourage greater level of implementation of the ETLS protocols by individual ECOWAS member states in order to enhance the level of regional integration in the sub-region. As matter of deliberate policy, it is imperative for ECOWAS Commission to assist member states in effectively combining the ETLS and ECOWAP policy initiatives in order to promote agricultural integration, production, and trade within the region.
- ✓ In view of the finding that suggests low regulatory quality and service infrastructure in the sub-region, it is recommended that efforts should be made to improve the quality of regulation as well as infrastructural provisions in ECOWAS member states. This is very imperative as indicators of institutional quality and service infrastructures were also found to be relevant in facilitating trade in the sub-region.
- ✓ It was observed that few ECOWAS members are doing relatively well in terms of some trade facilitation indicators. Those not doing so well should be encouraged make efforts by relaxing the stringent bureaucratic processes in order to reduce the number of days required to process documents for import/export. This will consequently facilitate trade including agricultural export.
- ✓ There is also the need to consolidate the observed gains from the ECOWAP policy initiative given the finding that associate the period of highest average growth rate of agricultural production with the post ECOWAP period.

- ✓ The finding the level of macroeconomic performance was crucial in determining the level of trade facilitation in ECOWAS sub-region raises the need for improvement of macroeconomic performance in ECOWAS member states in order to enhance the extent of trade facilitation within the sub-region. Thus, an improvement in economic growth of the integrating economies in ECOWAS will have significant influence in facilitating trade in the sub-region.
- ✓ The fact that economic integration and trade facilitation were found to significantly influence agricultural exports means that effort to improve economic integration and trade facilitation in the region will significantly increase agricultural exports in the ECOWAS sub-region.
- ✓ Finally, the results show that agricultural production had direct and significant impact on agricultural export, which underscores the fact that policies aimed at improving agricultural production will ultimately enhance agricultural exports in ECOWAS sub-region.

The study therefore concludes that trade facilitation and economic integration in ECOWAS have a vital role to play in promoting the performance of agricultural exports in the sub-region. The ECOWAS regional agricultural policy initiative and the ECOWAS free trade area can be strengthened in order to achieve the goals of regional integration and improved trade facilitation as well as agricultural exports performance.

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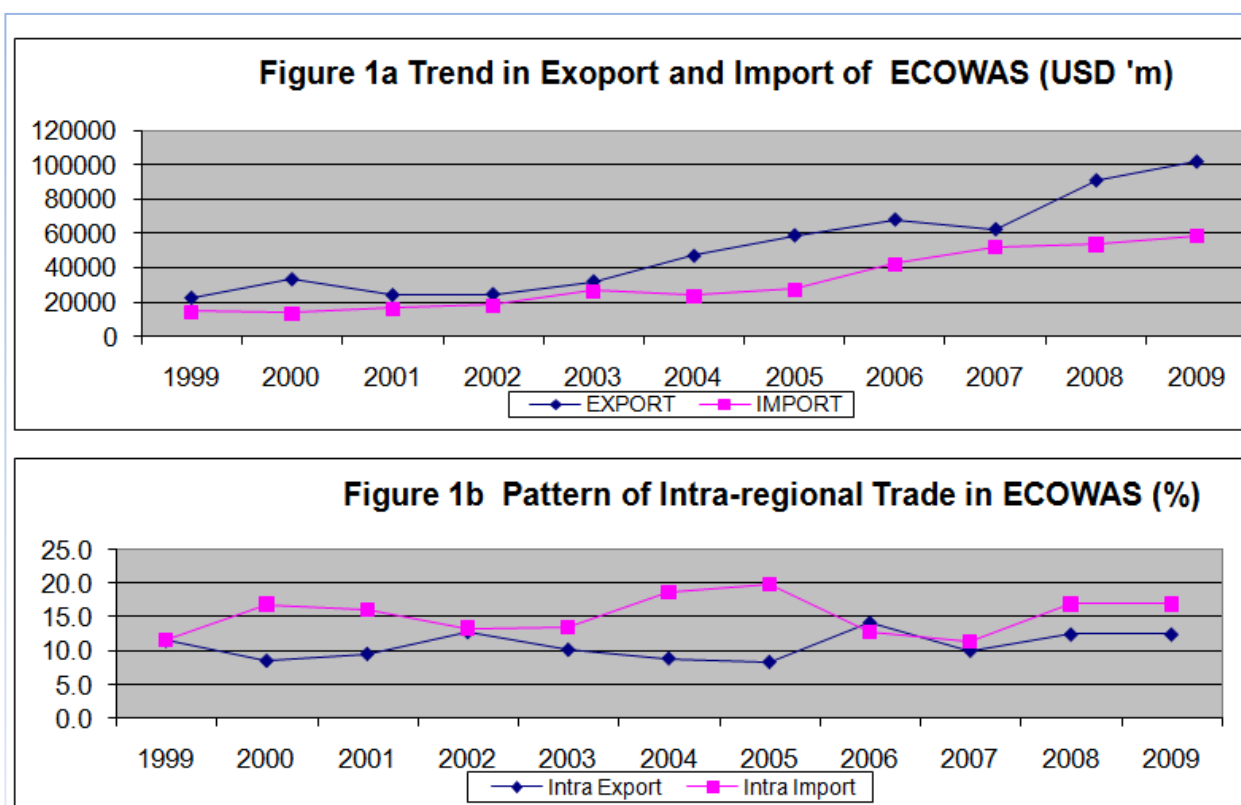
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Appendix

Table A1: ECOWAS Trade share in World Market (%)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
import share	11.67	17.00	16.23	13.50	13.57	18.82	19.94	12.97	11.52	17.04	17.04
Export share	11.53	8.58	9.60	12.83	10.22	8.93	8.40	14.18	10.06	12.46	12.46

Source: Computed from ECOWAS Trade Data and World Trade Indicators



Source: Computed from *ECOWAS Trade Data* and World Trade Indicators