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INTRA-REGIONAL TRADE FACILITATION: A COMPARATIVE ANALYSIS BETWEEN ECCAS AND ECOWAS

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Abstract

Nowadays regional integration is considered as an important factor for economic development. In fact it is considered as a tool for resolving political, social and economic challenge. In the drive to achieve successful regional integration, Africa has not been left out. It is worth noting that, West Africa has been the first since 2000 in intra-zone exportation while Central Africa zone has been the last till date. The objective of this paper is to analysis comparatively the impact of trade facilitation in the intra-regional trade between ECOWAS and ECCAS by evaluating the important of economic infrastructures and customs environment. We constructed an aggregated economic infrastructures index (transport, energy and ICT) by using Principal Component Analysis (PCA) and estimate a gravity model, over the period 2006 to 2012 using UNCTAD, CEPII and World Bank data. Our results are in line with the expected behavior of the gravitational model. On the one hand the economic infrastructures (index) have a positive impact on the intra-ECCAS and no impact on intra-ECOWAS trade. These three indicators individually have a positive impact on the intra-ECOWAS trade and no impact on the intra-ECCAS trade. On the other hand, the number of day for export have a positive (contrary to the theory) significant impact on trade in the ECCAS, but the indicators of customs environment have not impact on intra-ECOWAS trade.

Keywords: Economic infrastructures, augmented gravity model, ECCAS, ECOWAS, trade facilitation.

JEL Classification: C23, H54, O24, R58

Introduction

In most developed countries, economic growth and economy stability is due the high level of international and intra-regional trade motivated by good economic infrastructure. As trade is an important driver of growth and infrastructure is a necessity for trade, infrastructure development has a key role to play in economic development. Transport network, communication technology and energy are the major obstacle to most developing countries' trade. Poor infrastructure and institutions contribute to high trade cost along in sub Saharan countries. High trade cost has a negative impact on a country economic performance in several ways (Perez et al, 2008). Moreover, data and evidence suggest that African countries have some of the highest trade costs in the world.

In recent years, the ECCAS countries are the major exporters of oil, have good oil prices, but witnessing irregular growth rate⁵. This instability is due to the fact that the countries of this region are highly dependent on the export of unprocessed agricultural products, especially the extractive industries with low added value⁶. Economic integration in the region remains an elusive goal for several reasons. Besides the diversity of currency in the region, and the fact that some countries in the region belong simultaneously to several other sub-regional groups, this region is not only faced with low infrastructure and are of inadequate quality, but also low trade. If international trade is low, intra-regional trade is very low, this shows that the economic structures of neighboring countries do not have the necessary complementarities for trade expansion, or the regional context is more trade restrictive than is the global environment. However, trade between developing countries has considerable potential to expands, which is an important foundation to establish economic cooperation between them based on the potential of mutually beneficial trade and investment (Abdoulahi, 2005).

⁵ The countries of ECCAS producing oil are Angola, Cameroon, Congo, Gabon, Chad and Equatorial Guinea. These countries have very high rates of growth since the late 1990s, including 95.3% in 1997; 67.8% in 2001 and 32.6% in 2004, there has also been periods of recession as -0.81% in 2010 (UNCTAD, 2012).

⁶ Fuels represent 94.8% of exports of Equatorial Guinea, 81.9% of the Congo; while exports of miscellaneous manufactured products account for 0.1% in Equatorial Guinea and Congo 0.7% in 2010 (UNIDO / UNCTAD, 2011). The index of export concentration remains close to 1 in the CEMAC countries [Equatorial Guinea (0.75); Congo (0.8); Chad (0.93); Gabon (0.7), reflecting a productive structure that has not really changed, except in CAR (0.32) and Cameroon (0.38) in 2011]. These two countries are also those that the manufacturing industries contributes highest to GDP, respectively 6.6% and 16.3%, unlike Chad, which is the first oil-producing countries in the region with 5.6% in 2011 (Annual Statistics for Africa, 2012).

If trade policy reforms are essential to improve incentives and encourage efficiency, they would be even more valuable if the transaction costs arising from natural obstacles were generally lowered (Lisinge, 2005).

WTO (2004), also shows that a mile on the Douala-Ndjamena road is three times more expensive than the Maputo-Johannesburg road. In fact, infrastructure is identified in the literature as an important element of trade facilitation, along with other natural barriers. ECA (2008) shows that transport costs are high in Africa in general and particularly in landlocked countries, they reach an average of 14% of the exported value against 8.6% for the developed countries.

Certainly, adequate infrastructures lead to any increase in productivity that in turn encourages growth. Infrastructures are a set of capital goods that improve the performance of private factors. They are used by businesses to produce goods and services, and are called directly productive assets (Hirschman, 1958).

Hansen (1965) was the first to propose a precise classification infrastructure. He distinguishes social infrastructure, whose function is to maintain and develop human capital (such as education, social services and health) and economic infrastructure, whose characteristic is to participate in the production process. Gramlich (1994) called capital infrastructure from an economic point of view, transport, energy, information technology and communication (ICT), irrigation. However, we can add the financial infrastructure that is necessary to accelerate growth, particularly through industrialization (Hansen, 1965).

Moreover, the deplorable state of infrastructure in Sub-Saharan Africa hampers economic growth of countries in about two percent every year and reduces up to 40% productivity firms (WB, 2009).

Infrastructures are necessary to accelerate the integration in a region, particularly with regard to trade and investment. In fact, they are crucial to support and increase the intra and inter zone trade. Increased in trade and FDI inflows, combined with other factors such as financial integration will result in the formation production network and supply chains (Bhattacharyay , 2009). Infrastructures will be an important factor for integration because they permit connection between countries and expand the market, reduce transport costs and trade, establish links with the valued chain at regional and global levels to facilitate regional economic cooperation and integration through physical connectivity. For this it is necessary to facilitate access to primary services (electricity and water) and trade related infrastructure, including transport, and ICT.

This study comes in close line with phases 2, 3 and 4 of the six phases of the project to build the AEC driven with the Abuja Treaty, which entered into action in 1994, with the vision of regional integration in Africa. In fact, phase 2, which was completed in 2007 on concerned intra and inter-REC harmonization integration; Phase 3 to be completed in 2017, concern the creation of a free trade zone and a customs union in each regional bloc; and phase 4 to be completed in 2019, the coordination and harmonization of tariff and non-tariff systems among RECs for the establishment of the free trade area, to dominate in a continental customs union. ECCAS and ECOWAS have known different advancement on the implementation of these three phases, which could impact trade integration. Both RECs have completed Phase 2, Phase 3 is still in the implementation process, and ECCAS has completed the implementation of the Free Trade Area (ECA, 2012).

Despite the similar pattern of implementation of different phases mentioned above, the evolution of intra-regional trade is very different in the two RECs. In fact, the increase in intra-regional trade has been one of the major concerns of African countries and their regional economic communities in their economic integration efforts. Despite the importance given to this issue and many regional trade agreements implemented to promote regional trade, the share of intra-RECs remained fairly low (Abdoulahi, 2005).

However, in recent years, it is clear that some RECs such as ECOWAS record a constant change in their intra-regional trade , while others such as ECCAS which is also the least integrated of Africa, regress in her zone with less than 2% of intra-zone trade in 2010 (ECA , 2011). The evolution of ECOWAS becomes an example to follow in Africa. In fact, since the implementation of the Abuja Treaty, the CER knows evolution increasingly growth in its intra-zone trade. Intra- west African exports moved from \$ 2.6 billion in 1996 to \$ 10 billion in 2008 and a peak of 12 billion dollars in 2012, while Central⁷ Africa witness a very slow increase ; \$ 180 million in 1996, \$ 920 million in 2008 and \$ 875 million in 2012. During the same period , the North intra- Africa exports rose respectively 1.5 billion 7.3 billion and 9 billion dollars; 1.3 billion to \$ 3.8 billion and \$ 5.9 billion in East Africa , 2.5 billion to \$ 5.3 billion and \$ 2.9 billion in South Africa.

As a percentage of total trade over the same period, intra-ECOWAS exports rose from 9.9% to 9.3% and 7.3%; at the same period 1.3%, 0.8% and 0.7% in the ECCAS; 12.5%, 14% and 14.5% in East Africa; 7.5%, 6.2% and 3% in South Africa and finally 3.8%, 3.4% and 4.5% in

⁷ since we are focused on central Africa and west Africa, we can summarize these two zones respectively to economic and regional ECOWAS and ECCAS Communities since 10 countries of Central Africa 11 belong to the ECCAS (except Rwanda) and 15 countries in West Africa on 17 belong to the ECOWAS (except Mauritania and Saint Helena).

North Africa. The economic performance of ECOWAS has led to improved macroeconomic management. The recent increase in prices in raw material (especially oil and minerals) was beneficial to countries rich in resources in West Africa and stimulated stronger growth in the entire region. In 2010, an increase of 6.2% in real GDP was witnessed in the region and it was equally higher of in African RECs (CEDEAO DSIR, 2011).

Despite many challenges and regional realities, integration has progressed due to the conditions established such as the customs union, free movement of people and goods, the ECOWAS passport etc. Indeed, trade integration is an important aspect of regional integration. The regional integration efforts in both zone of interest (West Africa and Central Africa 15 countries 10 countries) are carried out respectively by the Economic Community of West African States (ECOWAS) and the Community Economy of Central African States (ECCAS). Strategy regional integration Papers of the two zones are based on certain key areas, including macroeconomics, transportation corridors, ports, energy, management of trans-boundary basins, ICT, trade, and development private sector.

Based on this observation, the objective of this paper is to make a comparative analysis of trade facilitation on intra-regional trade between ECOWAS and ECCAS. Although the issue of trade integration is important, most studies are just interested in infrastructure such as transport routes as a factor in trade integration. Our study contributes to the literature by focusing simultaneously on three types of economic infrastructure (transport, energy and ICT), through the construction of a composite index for the aggregate. Bhattacharyay (2009) showed that these three types of infrastructure are vectors of integration, especially in a region where some countries are no accessible.

The rest of the paper is organized as follows: section 2 presents the literature review, Section 3 presents the current situation of trade facilitation and intra-regional trade in the two RECs, section 4 will be methodology and results, and Section 5 will be the conclusion.

2. LITTERATURE REVIEW.

Several factors have been identified in the literature as trade facilitation factors between countries of the same region or even different regions.

a)Port efficiency, Customs and regulatory environment

The results of the studies done in this area indicate that the expected expansions in trade due to improvements in trade facilitation are quite significant. Otsuki et al. (2001) finds that 10 percent tighter EU standard on aflatoxin contamination levels would reduce African exports

by 4.3 percent for cereals and 11 percent for nuts and dried fruit. Flink et al. (2002) find that 10 percent decrease in communication costs is associated with an 8 percent increase in bilateral trade. Wilson et al. (2003; 2005), Soloaga et al. (2006), Djankov et al. (2006), Persson (2008), Lee and Park (2007), Nordås et al. (2006) and Iwanow and Kirkpatrick (2007) all tend to find significant effects on trade volumes.

Wilson et al. (2005), measures and estimates the relationship between trade facilitation and trade flows in manufactured goods in 2000-2001 in global trade, considering four important categories: port efficiency, customs environment, regulatory environment, and service sector infrastructure. They have concluded that gains from own reforms are much larger in South Asia. When consider port efficiency South Asia gains more as an exporter with their own improvements. Djankov et al. (2006), show that each additional day that a product is delayed prior to being shipped reduces trade by at least one percent and delays have an even greater impact on developing country imports and exports of time sensitive goods, such as perishable agricultural products. According to UNCTAD (2001), a one percent reduction in the cost of maritime and air transport could increase Asian GDP by \$3.3 billion and a one percent improvement in productivity in wholesale and retail services could increase GDP an additional \$3.6 billion. According to Freund and Weinhold (2000), a 10 percent increase in relative number of Web hosts in one country would have increased trade flows by one percent in 1998 and 1999.

World Bank (2007) identifies a number of constraints in South Asia in terms of trade facilitation: (i) limited road density, rail lines, and mobile tele-density per capita, (ii) lengthy customs and port clearance times, (iii) poor transport and communications, (iv) the fact that trucks of one country are not allowed across the border to deliver cargo, (v) regulatory constraints introduced at the gateways and border crossings, (vi) costly domestic transport owing to the distance between the production area and the major ports, and (vii) fragmented trucking industries and old and inefficient truck fleets (Weerahewa, 2009).

Dennis and Shepherd (2007) use the number of 8-digit product lines for every two-digit sector exported from developing countries to the EU in 2005 as a measure of export diversification – this being seen as export growth at the extensive margin. They find that export costs, defined as the official fees levied on a 20-foot container leaving the exporting country, have a significantly negative effect on the number of product lines exported in every 2-digit sector.

Sadikov (2007) makes use of the Doing Business Database to measure trade facilitation-related border barriers as the number of signatures that an exporter has to collect from the

authorities to export a good. Bilateral export volumes are then regressed on this as well as other gravity controls, while allowing homogeneous and differentiated goods to have different effects. Sadikov draws the conclusion that export volumes of differentiated products are more sensitive to changes in export signatures than exports volumes of homogeneous goods.

Martínez-Zarzoso and Márquez-Ramos (2008) study the effect of trade facilitation on sectoral non-zero trade volumes in 2000. Including variables from the Doing Business Database, which measure the costs and time involved in exporting and importing, they conclude that export volumes of homogeneous and reference-priced goods are less time-sensitive than export volumes of differentiated goods.

b) Service infrastructures (individual sector or aggregated)

Hence Bougheas and al (1999) examined the effect of infrastructure on trade through its influence on transport costs by introducing infrastructure model Dornbusch-Fischer-Samuelson (DFS, 1977). They explicitly model the formation of transport costs and showing that infrastructure (the stock of public capital and the length of the highway), through reduced transport costs enhance trade. The methodology used is based on the augmented gravity model of bilateral trade flows between the six member countries of the European Union and nine other European countries. The results showed that the infrastructure has a positive and significant effect on the volume of trade between the countries concerned. Limao and Venables (2001), show that one of the first obstacles to trade between the countries of sub-Saharan Africa is the geographical barriers. Hutchinson (2002) focuses on the determinants of trade by checking if the language is relevant to explain the increase in trade between the two countries. Using a gravity model, it specifically examines the importance of English in the volume of trade of the United States. This result is a contrary to economic theory that trade between countries that speak the same language is more pronounced when countries do not have the same language.

Indeed, the author shows that all things being equal, a country with 10% of the population uses English as their first language will receive 1.3 % more U.S. exports and 1.3% sells more products to the United States. However, a country where 10% of the population uses English as a second language will receive 1.7% more U.S. exports and 2.3% sell more products to the United States. The share of the population who speak English as a second language is 1.3 times greater for exports and 1.75 times higher for imports from the United States the share of the population uses English as first language.

Sekkat and Longo (2004), show that the material and non material infrastructures, especially transportation by road and telecommunications variables included in the gravity equation have the expected sign and emphasize the role played by intra-block effects on the market. This means therefore that preferential agreements have increased trade between countries that have signed the same preferential agreements.

Fujita (2005), analyzing the role of infrastructure in facilitating trade noted that, East Asia has strongly integrated its manufacturing system, which has permitted the region to become a platform for export.

Stone and Strutt (2009), showed that infrastructure development plays a key role in economic development. For them, this is backed by fact that trade is an important determinant of economic growth and infrastructure is a necessity for trade. Indeed, from a static general equilibrium model, these authors concluded that good transport infrastructure reduce transaction costs and facilitate trade, and further increases the potentials of intra-regional trade in the sub- region of Great Mekong.

Bhattacharyay (2009), examines the role and need of infrastructure (transport, energy and ICT) on integration of ASEAN, which is considered as one of the largest regional economic communities in the world. The author emphasizes the role of infrastructure in quality and quantity as a factor which leads to increase in economic growth, investment, trade and reduces the disparity between countries in the same region. He shows that trade integration in ASEAN has been brought about largely by the market.

Notwithstanding, a large trade and foreign direct investment (FDI) have been favored by oriented policies and infrastructural development , as well as other factors such as financial integration and the formation of production networks. The author stipulates that over 50 % of Asia's exports are intra- regional, and concludes that infrastructure is crucial in supporting and enhancing intra-ASEAN trade on the one hand , and secondly trade with other partners.

Pavel et al (2009), in their study verify the theoretical argument that Information Technology and Communication (ICT) promote exchanges between countries when they have very advanced and similar levels of technology. By focusing on the European Union, the authors use a gravity model to assess the impact of ICT on trade union over the period 1995-2007. To this end, the authors construct an indicator of ICT, based on ICT development index and they also use two techniques estimates based on the arguments by Baldwin and Taglioni (2006) and Stack (2009). These results show that the development of ICT has a positive and significant impact on EU trade and fall in line with economic theory; in fact, two countries

with an ICT network are trading 33% more than two countries do not have the same level of ICT development.

Portugal-Perez and Wilson (2010), from an aggregate index of infrastructure, these authors analyze the impact of infrastructure on export performance of 101 developing countries over the period 2004-2007. They found that trade reforms increased export performance, particularly infrastructural investment and these reforms aimed at improving the business environment. For example, improving the quality of infrastructure in Egypt almost to the level of Tunisia, that is increase exports by 10.8 percent. These authors also find that the marginal effect of infrastructure on exports decline with per capita income, and on the contrary, the impact of ICT on exports increases in rich countries.

Sandberg and Seale (2012), identified and analyzed the impact of regional integration on volume of bilateral trade in the countries of the Western Hemisphere (consisting of 32 American countries and 31 trading partners). Facts show that trade in the northern hemisphere is heavily influenced by various types relations linked to regionalism (via the representation of regional agreements) and history (through the effects of modern imperial relations). Applying the gravity model, the results show that regional links such as RTAs significantly influence trade. In fact, the small economies of the central region of the hemisphere tend to trade more than large economies, much more self- sufficient. The results also mean that regional agreements CARICOM and CACM strongly influenced the commercial relations between Member States. MERCOSUR and NAFTA, the results from the gravity model show that these agreements had very little effect on trade of member countries.

Concerning other factors that stimulate intra-regional trade, some studies in Sub-Saharan Africa are specifically interested in showing that the implementation of preferential trade arrangements have no impact on terms of trade creation in the sub continent (Ariyo and Raheem, 1991 and Melo et al 1992). On the other hand, Foroutan and Pritchett (1993) show that the level of intra-Saharan Africa trade is not as weak as some studies reveal, but that the observed level of intra-Saharan Africa trade is higher than the reported level. It is worth noting that one of the reasons of low intra-regional trade is inadequate infrastructure in volume and quality. Musila (2005), focusing on the three economic communities and regional COMESA, ECCAS and ECOWAS, found that, the intensity of the creation of trade zone is stronger in ECOWAS countries followed by those of COMESA. Avom (2005), in a study carried in CEMAC countries, used the Hausman-Taylor estimator (1981) in the framework of an improved gravity model to show that the participation of monetary union has very little effect on trade region. Coulibaly and Fontagné (2005) in their simulations estimated that the

intra- WAEMU trade could be triple if all road linking member countries were tarred. Agbodji (2007), assessing the impact of fraud in cross-border trade within WAEMU, constructed an index of infrastructure with two indicators and three variables (transport and communication, specifying the number of kilometers of roads, rail, and the number of telephone line). Using a dynamic gravity model, the author shows that the premium on the parallel market and the tax burden has encourage bilateral trade fraud; notwithstanding the infrastructure has a positive impact on trade within WAEMU. Njinkeu et al, (2008), analyzed the impact of infrastructure services on exports in Africa, pointing out that infrastructure services are the major factors that stimulate intra-African trade. Foster and Briceño- Garmendia (2009) argued that the conditions of roads in sub-Saharan Africa are relatively good; the speed of movement of the cargo does not exceed an average of 10 km / hour mainly because of the difficulties to cross borders and crossing ports. Looking at the case of CEMAC countries, the authors show that the transport of a container at the Douala sea port in Cameroon, Bangui in CAR and Chad in N'Djamena takes on average two to five weeks. However, note that this length of time has reduced in recent years between Cameroon and CAR, with the tarring of the Central Africa portion from the border with Cameroon (Garoua - Boulai) to Bouar CAR.

Indeed, the Doing Business indicators of the World Bank show that the administrative procedures within the CEMAC in Central Africa has increased by 20% the dateline of exports and imports transport relative to that which can be observed in the WAEMU in West Africa. However, the slowness of the transportation of goods is a problem observed throughout West Africa. Institutional factors, such as poor management of economic policy and internal political tensions are also considered as barriers to trade in sub-Saharan Africa (Sekkat and Longo, 2004). According to UNCTAD (2013), infrastructural development can contribute to economic growth and development especially to those African countries experiencing an infrastructural deficit, reducing transaction costs, increasing the durability of goods, by promoting the expansion of trade and investment, thereby permitting the realization of economies of scale.

In order to find strategies to improve the Ghanaian exports and in turn, promote economic growth, Amoah (2014), analyzes the determinants of Ghana's exports to Africa. The methodology used is based on the estimation of a gravity equation with trade data from 49 countries importing from Ghana. The results show that the WAEMU countries and trade costs (infrastructure, distance ...) can explain Ghana's exports. Indeed, improved infrastructure will increase the Ghanaian trade significantly and positively.

Concerning the analysis of the effects of infrastructure on trade integration, most studies focus transport infrastructure and ICT, in disintegrated manner. Agbodji (2007), based on the WAEMU countries, has constructed an index of infrastructure using both indicators (transport and communication) and three variables (the number of kilometers of road, rail, and the number of line telephone). Thus, after the contribution of Portugal-Perez and Wilson (2010), and based on the fact that transport, energy and ICT are factors that increase trade between countries (Bathacharyay, 2009), we construct an index to aggregate these three types of infrastructure, using principal components analysis (PCA).

3. Status of Trade Facilitation in ECCAS AND ECOWAS

This section consists of comparing trade facilitation situation between ECCAS and ECOWAS REC. As stated earlier, trade facilitation has been defined in a narrow sense as the transportation logistics and custom administration associated with cross border trade. In the recent past, this definition was broadened to include environment where the trade transactions take place. This includes the transparency of trade policy and regulation as well as product standards, infrastructure and technology as it applies to lowering trade costs (World Bank, 2009). Four aspects are commonly addressed under trade facilitation, port efficiency, custom environment, regulatory environment and service sector infrastructure. Port efficiency measures the quality of infrastructure of maritime and airports. Custom environment measures the direct custom costs and administrative transparency of customs and border crossings. Regulatory environment deals with the institutional issues and regulations. The service sector infrastructure represents the extent to which an economy has the infrastructure on telecommunications, financial intermediaries and logistic firms (Wilson and al.2005; Weerahewa, 2009).

Doing Business provides a number of measures on trading across borders. They show the procedural requirements for exporting and importing a standardised cargo of goods. The survey includes the exporting procedures which are divided into four stages, ie. pre-shipment activities (such as inspections and technical clearance), inland carriage and handling, terminal (port) handling, including storage if a certain storage period is required, and finally customs and technical control. The data base has introduced six measurements.

3.1 Custom environment and Regulatory environment

The Doing Business Database has been extensively used by many authors for instance Dennis and Shepherd (2007) used the costs of exporting, Sadikov (2007), used number of signatures and Martínez-Zarzoso (2008) and Márquez-Ramos (2008) used costs and time of exporting

and importing). In this paper we use indicators such as number of documents, days for exports and the cost involve in exports.

Table 1: Export costs in some countries of the world

ECCAS	2006	2014	Change in %	ECOWAS	2006	2014	Change in %	Others	2006	2014	Change in %
Angola	1450	1 860	28	Benin	965	1 030	7	Morocco	577	595	3
Burundi	2287	2 905	27	Burkina Faso	2226	2 455	10	Tunisia	760	775	2
Cameroon	1032	1 379	34	Cape Verde	1074	1 125	5	Tanzania	1212	1 090	-10
Congo	2201	3 795	72	CIV	1744	1 990	14	South Africa	1087	1 705	57
Gabon	1510	2 045	35	Gambia	1199	1 190	-1	USA	960	1 090	14
Equatorial Guinea	1403	1 390	-1	Ghana	624	875	40	France	1235	1 335	8
CAR	4581	5 490	20	Guinea	730	915	25	Germany	770	905	18
DRC	2597	3 155	21	Guinea Bisau	1445	1 448	0.2	UK	990	1 005	2
Sao-Tome and Principe	690	690	0	Liberia	1032	1 220	18	Brasil	630	2 215	252
Chad	4867	6 615	36	Mali	1752	2 440	39	Thailand	848	595	-30
				Niger	2743	4 475	63	India	864	1 170	35
				Nigeria	1026	1 380	35	China	390	620	59
				Senegal	958	1 225	28	Indonesia	486	615	27
				Sierra Leone	1082	1 185	10	Mexico	1302	1 450	11
				Togo	463	940	103	Singapore	416	460	11

Source: Authors using doing business data

Equatorial Guinea is the only country in the ECCAS that have witness a decline of about (1%) of export costs between 2006 and 2014. these costs were stable in Sao-Tome and Principe, and an increase in all other countries in the region since 2006, the largest increase in costs was in Congo (72%) and the smallest in CAR (20%). In ECOWAS only Gambia had a reduction

in export costs (1%). The Togo who nevertheless has a developed harbor recorded the largest increase (103%) of export costs, while the smallest increase was in Guinea Bissau (0.2%). Regarding the selected African countries, Tanzania recorded the largest decrease (10%). However, it is necessary to point out that Brazil is the country where the export costs increased the most (252%) between 2006 and 2014.

Table 2: Days Needed for Exports in some countries of the world

ECCAS	2006	2014	Change in %	ECOWAS	2006	2014	Change in %	Others	2006	2014	Change in %
Angola	64	40	-38	Benin	34	26	-24	Morocco	16	11	-31
Burundi	47	32	-32	Burkina Faso	45	41	-9	Tunisia	16	13	-19
Cameroon	27	23	-15	Cape Verde	22	19	-14	Tanzania	30	18	-40
Congo	50	50	0	CIV	23	25	9	South Africa	25	16	-36
Gabon	19	20	5	Gambie	23	23	0	USA	6	6	0
Equatorial Guinea	29	29	0	Ghana	47	19	-60	France	19	10	-47
CAR	57	46	-19	Guinea	34	36	6	Germany	8	9	13
DRC	46	44	-4	Guinea Bissau	27	25	-7	UK	18	8	-56
Sao-Tome and Principe	27	26	-4	Liberia	20	15	-25	Brasil	18	13	-28
Chad	78	73	-6	Mali	44	26	-41	Thailand	24	14	-42
				Niger	59	57	-3	India	27	16	-41
				Nigeria	41	22	-46	China	23	21	-9
				Senegal	21	12	-43	Indonesia	22	17	-23
				Sierra Leone	31	25	-19	Mexico	13	11	-15
				Togo	34	24	-29	Singapore	6	6	0

Source: Authors using doing business data.

Regarding the delay in days for export, it is clearly increasing in Gabon, five days more,

between 2006 and 2014. However, all other ECCAS countries have made efforts in this direction. If the number of days to export is stable in the Congo and Equatorial Guinea, it is decreasing in all other countries in the region, with a more significant decrease in Angola (38%, a reduction of 16 days between 2006 and 2014). In ECOWAS, we observe that, the number of days increased in Ivory Coast (2 days more) and Guinea (2 days more). All other countries in the region have declined by these deadlines, with the largest decline in Ghana 60%, a reduction 28 days between 2006 and 2014. Ghana is top ahead of the UK (-56% a reduction of 10 days) and to all the emerging countries in our sample.

Table 3: Number of document for export in some countries of the world

ECCAS	2006	2014	Change in %	ECOWAS	2006	2014	Change in %	Others	2006	2014	Change in %
Angola	10	10	0	Benin	7	6	-14	Morocco	6	5	-17
Burundi	9	9	0	Burkina Faso	11	10	-9	Tunisia	4	4	0
Cameroon	9	11	22	Cape Verde	7	7	0	Tanzania	9	7	-22
Congo	11	11	0	CIV	9	9	0	South Africa	7	5	-29
Gabon	5	6	20	Gambie	6	6	0	USA	3	3	0
Equatorial Guinea	7	7	0	Ghana	6	6	0	France	7	2	-71
CAR	8	9	12.5	Guinea	7	7	0	Germany	4	4	0
DRC	8	8	0	Guinea Bisau	6	6	0	UK	4	4	0
Sao-Tome and Principe	8	8	0	Liberia	10	10	0	Brasil	6	6	0
Chad	7	8	14.3	Mali	7	6	-14	Thailand	9	5	-44
				Niger	8	8	0	India	9	9	0
				Nigeria	10	9	-10	China	8	8	0
				Senegal	11	6	-45	Indonesia	4	4	0
				Sierra Leone	8	7	-13	Mexico	4	4	0
				Togo	8	6	-25	Singapore	3	3	0

Source: Authors using doing business data.

Regarding the number of documents required for export, this table shows that the ECCAS countries are more demanding compared to ECOWAS countries and also comparing to other countries selected for this analysis. Indeed, the number of documents required is stable or declining elsewhere. While it increases year after year in some ECCAS countries (Cameroon, Gabon, Chad and CAR) and is stable in the rest of the countries. Cameroon is the only country in the region that trade with the rest, but his situation is put to doubt because it has the highest increase (+2 documents). This Increasing the export costs could discourage exporters. Whereas, the ECOWAS countries have similar behavior to that of developed and emerging countries. The number of documents is stable in some countries in the region or sharply lower in others like Senegal (45%, a reduction of 5 document export), so it comes before the first emerging country (Thailand 44%, a reduction of 4 documents) and behind France, which has declined by 71%, with a reduction of 5 export documents. France, which is experiencing a sharp decline in its foreign trade in recent years, has made enormous efforts to boost its exports.

Globally, Thailand appears to be the country with the highest progress in terms of trade facilitation, especially on the three indicators that have been presented. Also, landlocked countries have time and cost to export higher than the rest of the country regardless of the region.

3.2 Economic infrastructure (ECCAS and ECOWAS)

This section consists of comparing the situation of economic infrastructure (transport, energy and ICT) in two RECs (ECCAS and ECOWAS).

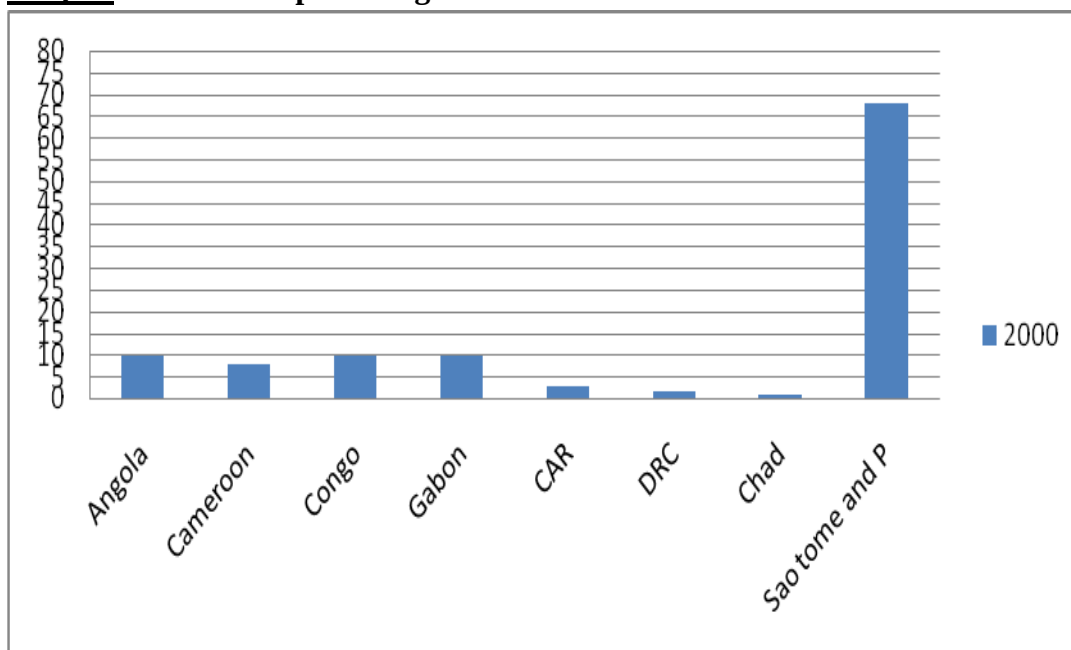
a) Transport Infrastructures

Concerning transportation in RECs, the road transport remains the utilized mean of transportation. Rail transport is just in a few countries, and its utilization remains marginal as well as shipping. Looking at air transport, only few countries have a national company. There are often not allowed to fly in some countries due to technical problems, and are classified in the group of companies at risk.

Looking at the road transport, the main roads of intra-regional trade in both CER and ECCAS are deplorable. It is almost impossible to move in capitals because of congestion become the regular, as well as in rural areas, because of the narrowness or bad roads, often unpaved. These roads hinder transport of goods from the rural areas to the cities, especially in the rainy

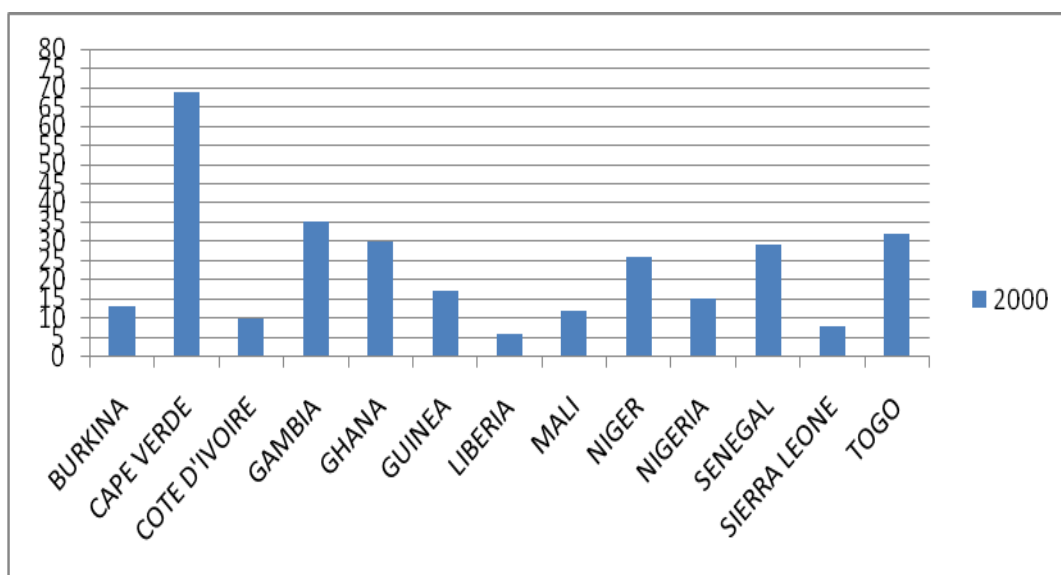
season, and leads to a fall in revenue for producers and increase in prices that reduces purchasing power.

Graph1: Paved road percentage in the ECCAS countries in 2004 and 2010



Source: By the authors using World Bank data.

Graph2: Paved road percentage in the ECOWAS countries in 2000



Source: By the authors using World Bank data.

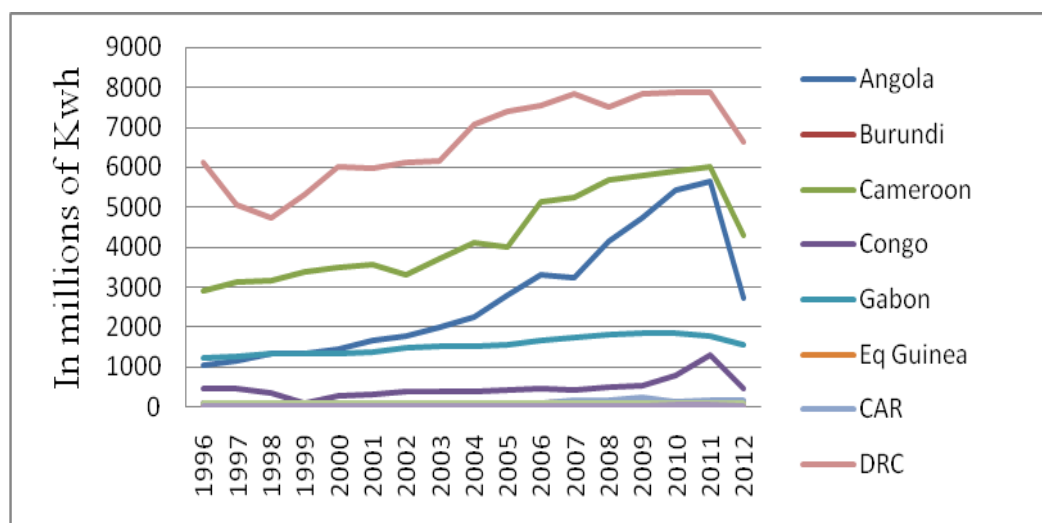
The percentage of tarred road is higher in ECOWAS countries, with few tarred are Liberia with 6% and Sierra Leone with 8%, while the highest percentage is in Cape Verde that is 69%. In all other ECOWAS countries, the proportions of tarred roads are more than 10%. However, ECCAS, except Sao Tome which has about 70% of tarred roads, no other country

in the region exceeds 10%. Worse of all, three countries of the region (CAR, DRC and Chad) do not have up to 3% of tarred road. Note that in emerging countries the proportion of tarred roads stand at 80% and even 100% in Singapore.

b) Energy

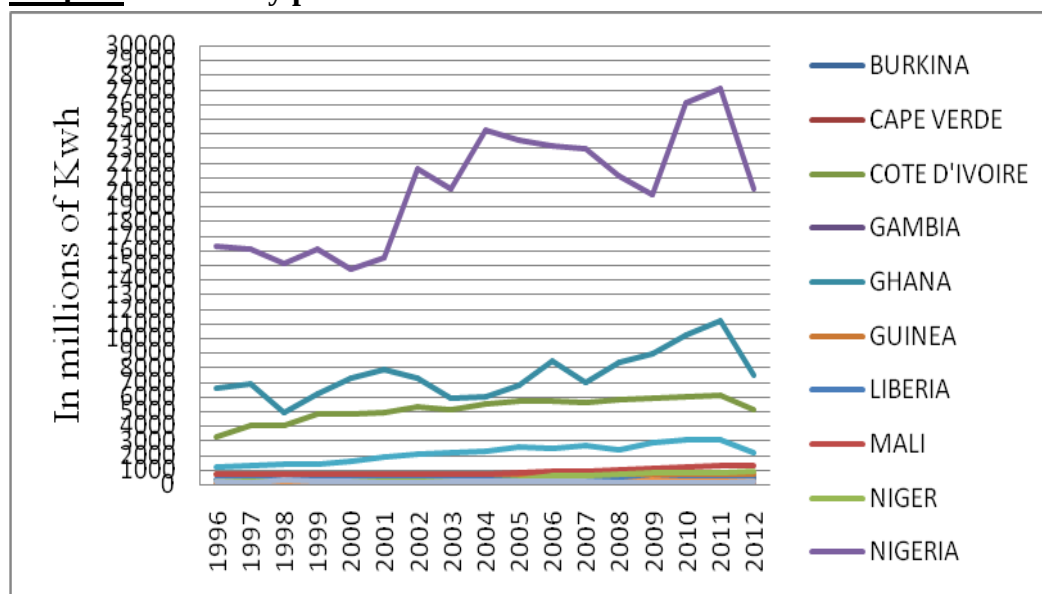
Energy is seen as the principal constraint faced most large enterprises in the world (BM, 2012). There is poor supply of electricity in most of the two REC while there are increases in demand of electricity.

Graph 3: Electricity production in Kilowatt hour in the ECCAS countries



Source: By the authors using World Bank data.

Graph 4: Electricity production in Kilowatt hour in the ECOWAS countries



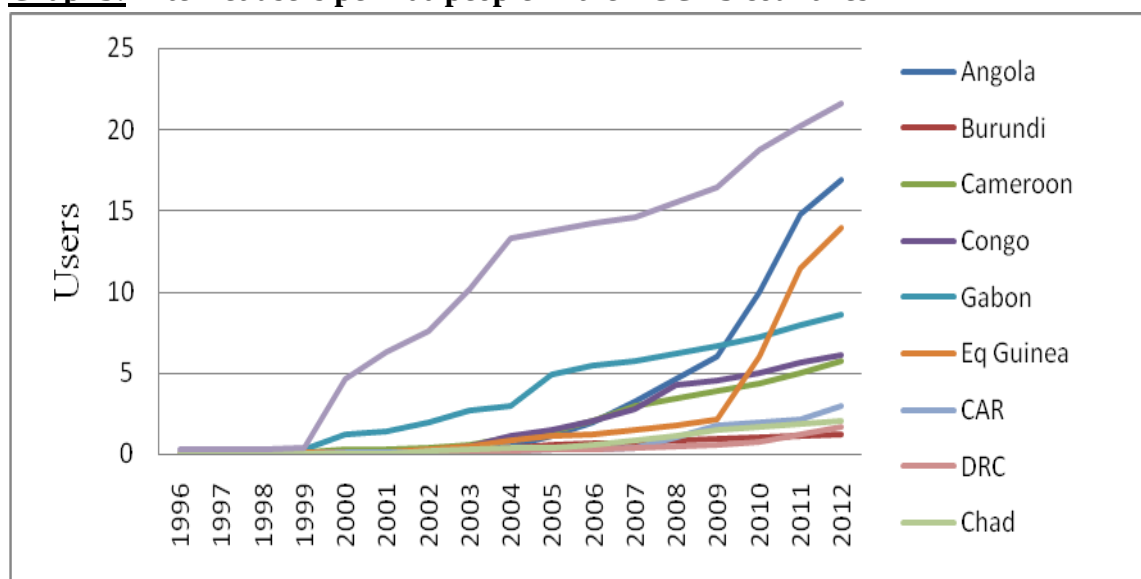
Source: By the authors using World Bank data.

It is noticed that electricity production is higher in ECOWAS countries. The finding is more relevant when comparing countries that are almost similar in terms of population size, specifically, Cameroon and Angola in ECCAS and Ghana and Cote d'Ivoire in ECOWAS with population between 19 and 25 million; electricity production is about 8 billion kWh in Ghana and 5 billion kWh in Côte d'Ivoire, while it is less than 5 billion kWh in Cameroon and Angola. The ECOWAS countries produce and consume more than ECCAS, here the industrial transformation is in the process in ECOWAS hence there is an increasing need of electricity is important.

c) Information and Communication infrastructure

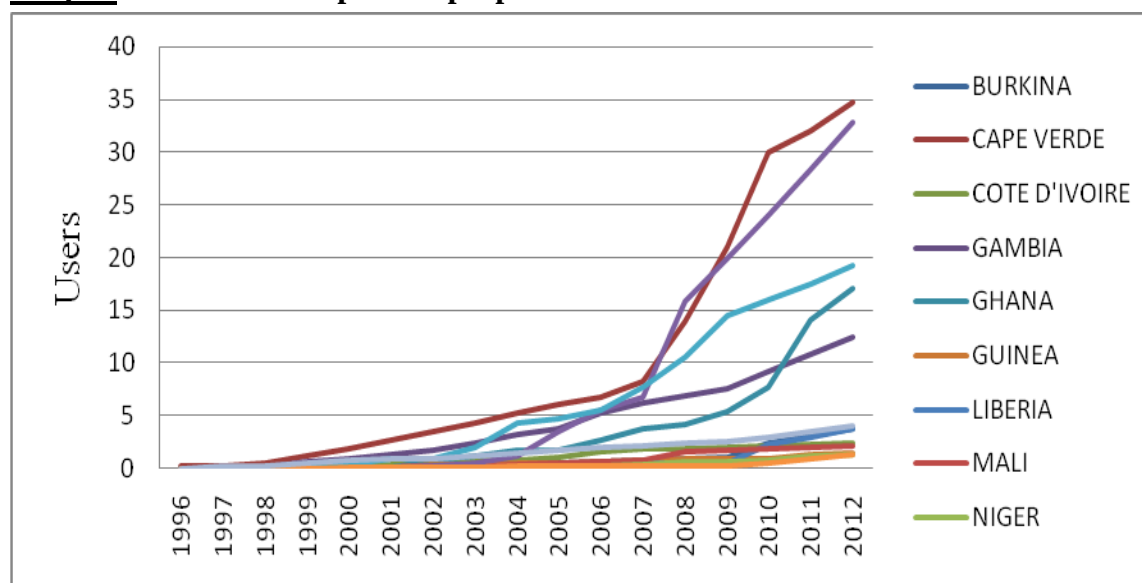
Looking at ICT, efforts are most notable in the two RECs. We noticed a significant increase particularly as to what concerns the use of the internet and mostly with respect to mobile phone subscribers. However, this performance is not homogeneous in the two RECs.

Graph5: Internet users per 100 people in the ECCAS countries



Source: By the authors using World Bank data.

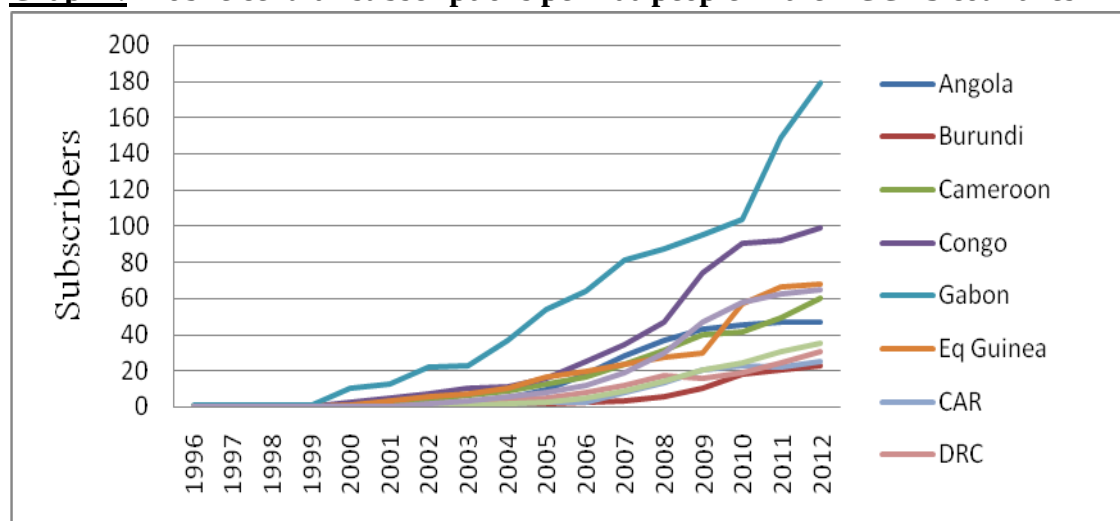
Graph6: Internet users per 100 people in the ECOWAS countries



Source: By the authors using World Bank data.

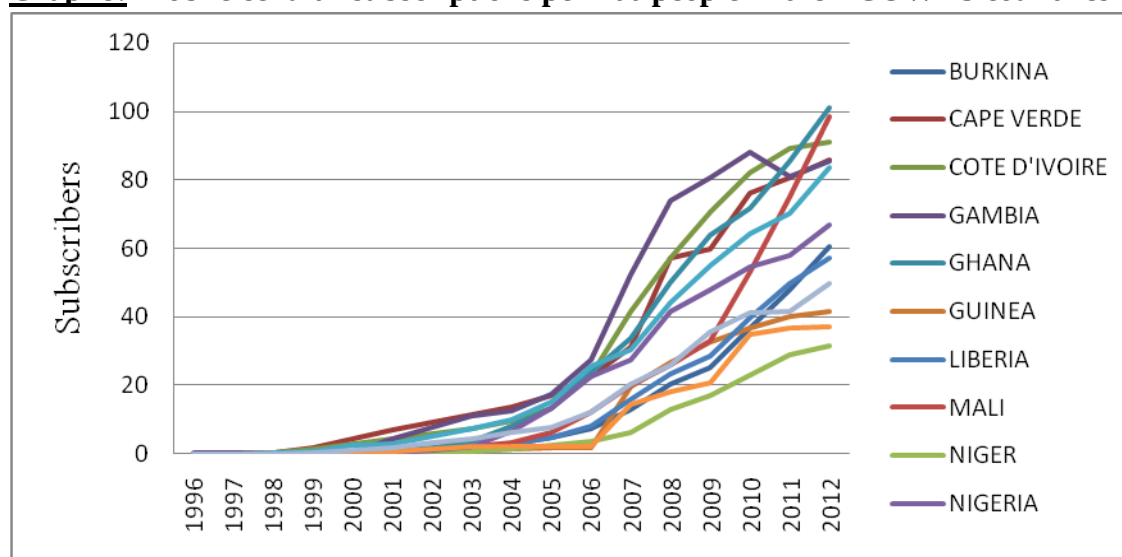
It is noticed that some ECOWAS countries like Cape Verde and Nigeria or Ghana are experiencing a significant increase concerning the introduction of internet in 1996, notable more than 30 internet users per population for first two countries in 2012. Despite this progress, it seems that access to the internet remains a luxury for households and businesses and even some branches of public administration in the two RECs. Notwithstanding, in ECCAS, only Sao Tome and Principe has 20 Internet users per 100 inhabitants in 2012. It is unfortunate that the economic leader in the ECCAS such as Angola, the DRC or the Cameroon country are still lagging behind in this area which could reduce transaction costs and facilitate trade in the region.

Graph7: Mobile cellular subscriptions per 100 people in the ECCAS countries



Source: By the authors using World Bank data.

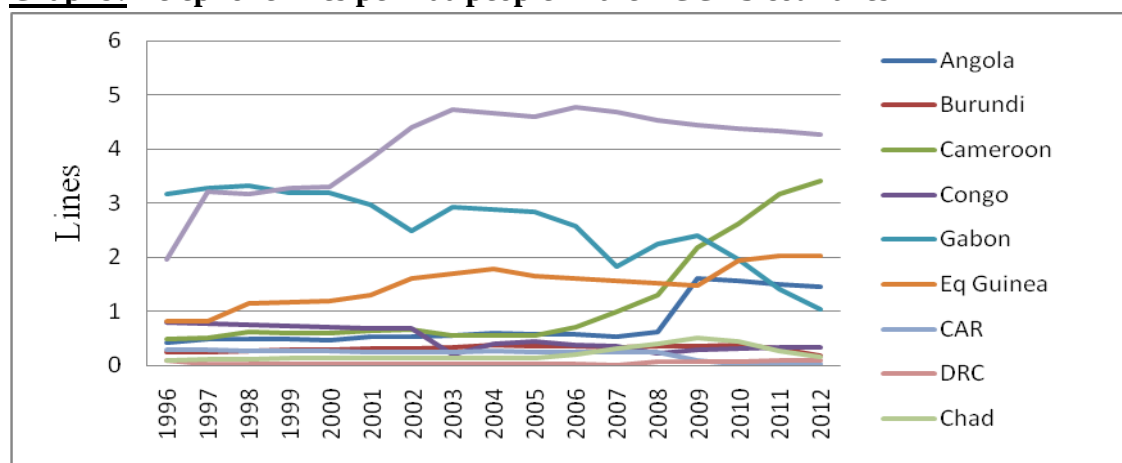
Graph8: Mobile cellular subscriptions per 100 people in the ECOWAS countries



Source: By the authors using World Bank data.

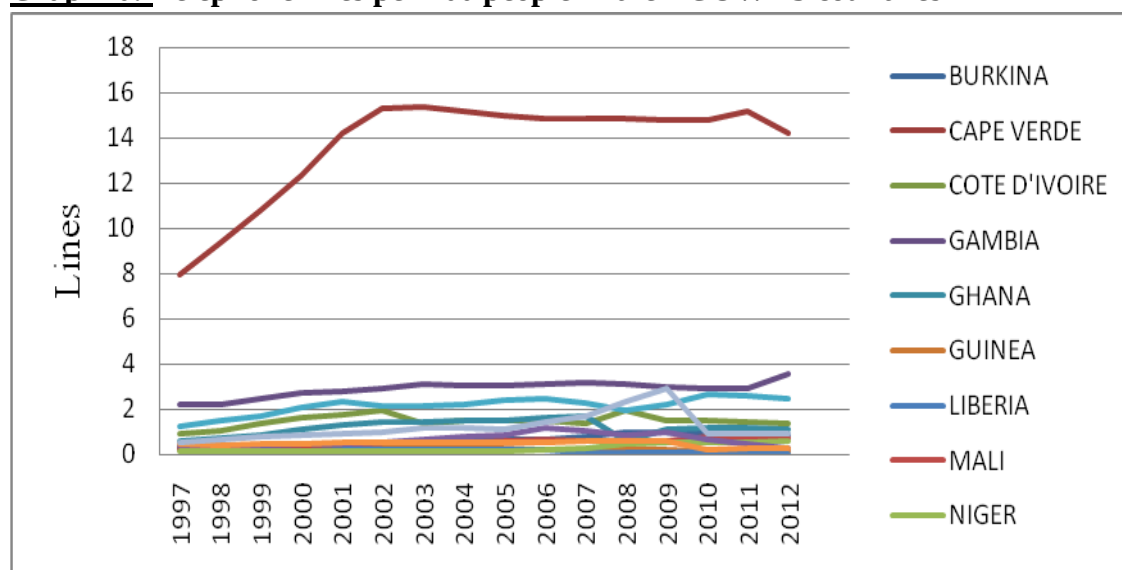
Looking at this indicator, efforts are seriously made in both RECs and countries like Gabon (180 subscribers per 100 inhabitants) and the Congo (99 subscribers per 100 inhabitants) in the ECCAS, Ghana (101 subscribers per 100 inhabitants) and Mali in ECOWAS (98 subscribers per 100 inhabitants) recorded a huge breakthrough, similar in some emerging countries such as Singapore (153 subscribers per 100 inhabitants) and even superior to others such as China (80 subscribers per 100 inhabitants) and Mexico (84 subscribers per 100 inhabitants) in 2012. However, the statistics remain weak in the DRC, which the largest and most populated country in the region, where less than 30 people out of 100 are mobile phone subscribers, and as well as Angola (48 subscribers per 100 inhabitants) which one of the leading countries of ECCAS.

Graph9: Telephone lines per 100 people in the ECCAS countries



Source: By the authors using World Bank data.

Graph10: Telephone lines per 100 people in the ECOWAS countries



Source: By the authors using World Bank data.

Concerning telephone lines, access remains low in both CER. This can be justified by the breakthrough of mobile phones. However, Cape Verde ranks first with more than 14 telephone lines per 100 inhabitants, all the other countries of the two RECs remaining below 5 telephone lines per 100 inhabitants in 2012.

3.4 Intra-regional (ECCAS and ECOWAS)

The Abuja Treaty of 1994, defined in a framework of complete regional integration of the African continent by strengthening economies into a single continental market through a gradual process that will end at the horizon 2028. This treaty aims progressive at eliminating tariff and non-tariff barriers impeding regional trade and the gradual harmonization of customs duties vis-à-vis member countries, the creation of a free trade area and the put in place of a Customs Union with the adoption of a common external tariff, at the sub-regional and continental level, the establishment of an African common market by adopting a common policy in a number of domains such as agriculture, transport and communications, industry, energy and scientific research; harmonization of monetary, financial and fiscal policies (Abdullahi, 2005; ECA, 2012).

Trade policies in the ECCAS are centered on the objectives of unification of national markets and increase investment opportunities (ECA / SRO-CA, 2008). In this context, ECCAS adopted a program of trade liberalization to be implemented by stages. Protocols were adopted to remove tariff and non-tariff barriers and implement additional programs designed

to improve the exchange and ensure better development such as the harmonization of macroeconomic policies, infrastructure development transportation and communication etc. However, the results achieved remain discrete despite some advances made, based on the model of the trade regime of the CEMAC.

Since 2007, ECCAS is carrying out actions to establish a free trade area (FTA). Coordination and harmonization of activities and the gradual elimination of tariff and nontariff barriers have been made; the customs union was also established in 2011. It worth Specifying that the free movement of persons that should proceed by the free movement of goods and of capital is difficult to be applied (CEA, 2012).

Certainly, ECCAS have many problems in their integration. Add to the infrastructure problem, we have an excessive delays and unseen circumstances related to poor administration, especially the customs administration, and the diversity of currency found in RECs (the CFA franc, the franc Burundi, Angola Kwanza, the Franc Congolese, and Dobra of Sao Tome and Principe in the ECCAS and the CFA Franc, Naira, Cedi, the Guinean Franc, Leone, Gambian Dalasi, the Liberian dollar, Escudo), where only the CFA franc and the Liberian dollar is convertible in international trade. Also, membership of some countries of several other sub-regional groups.

In ECCAS, Angola and the DRC also belong to the Southern African Development Community (SADC), Burundi and the DRC to the Common Market for Eastern and Southern Africa (COMESA), CAR, Chad and Sao Tome and Principe also belong to the CEN-SAD, Burundi to the Community of East Africa (ECA) while Cameroon, Gabon, Congo and Equatorial Guinea, CAR and Chad are also members of CEMAC, which makes the effectiveness of these agreements to be difficult and also diverts trade between countries in the region⁸.

ECOWAS was established in May 1975. The establishment of the Free Trade Area (FTA) within the ECOWAS region began in 1979, with the total elimination of trade restrictions for local products, works of traditional art and the finished products was adopted. In 2003, it was recommended that countries in the region adopted a new plan to liberalize trade, applying to all the arrangements of the new plan in order to strengthen the area of free trade by 2004.

⁸Note that since 2012 report on regional integration in Africa, the African Union and the Economic Commission for Africa recognize only eight RECs (CEN-SAD, ECA, COMESA, ECCAS, ECOWAS, SADC, AMU, and IGAD).

The program of trade liberalization in the region is based partly on the free movement of local products and handicrafts without payment of import duties and taxes, and secondly, on the gradual abolition of Customs and taxes of equivalent effect on industrial products originating in the Community. Local products, that is to say, the animal, mineral or vegetable has not undergone any industrial processing, and products of traditional crafts circulate freely in total exemption from duties and taxes without no quantitative or qualitative restrictions.

Regarding industrial products tariff, dismantling these products did not start in 1981 as planned so, a program to eliminate tariffs on industrial products during the period 1990-2000 was adopted. Based on an evaluation on measures taken by the Member for internal tariff dismantling States, it should be noted that all countries have implemented trade liberalization policy entirely.

The movement of unprocessed goods between member States is exempt from customs duties and taxes, and these products are not subject to any quantitative restriction or administrative. To qualify for exemption, unprocessed goods and traditional handicraft products must come from member States and accompanied by a certificate of origin, as well as an export declaration of the Commission ECOWAS.

In the context of the implementation of the program of trade liberalization, the emphasis has been placed on the establishment of the FTA executed through the Plan to liberalize trade in the region to promote intra-community trade through removal of tariff and non-tariff import and export of products from the member states.

Several activities have already been carried out, a bank for investment and development establishment in 1999, to facilitate financial transactions. Its objectives are to fund, promote and facilitate the growth and economic development in member states through the provision of a broad range of financial products and services to businessmen wishing to engage in viable commercial projects.

Specialized agencies, including the West African Monetary Agency have also emerged, with a mandate to ensure, coordinate and implement the monetary cooperation program in the region, but also to encourage and promote the implementation of exchange rate determined by the market, to boost intra-regional trade. As a multilateral payment facility, it should improve the sub-regional trade.

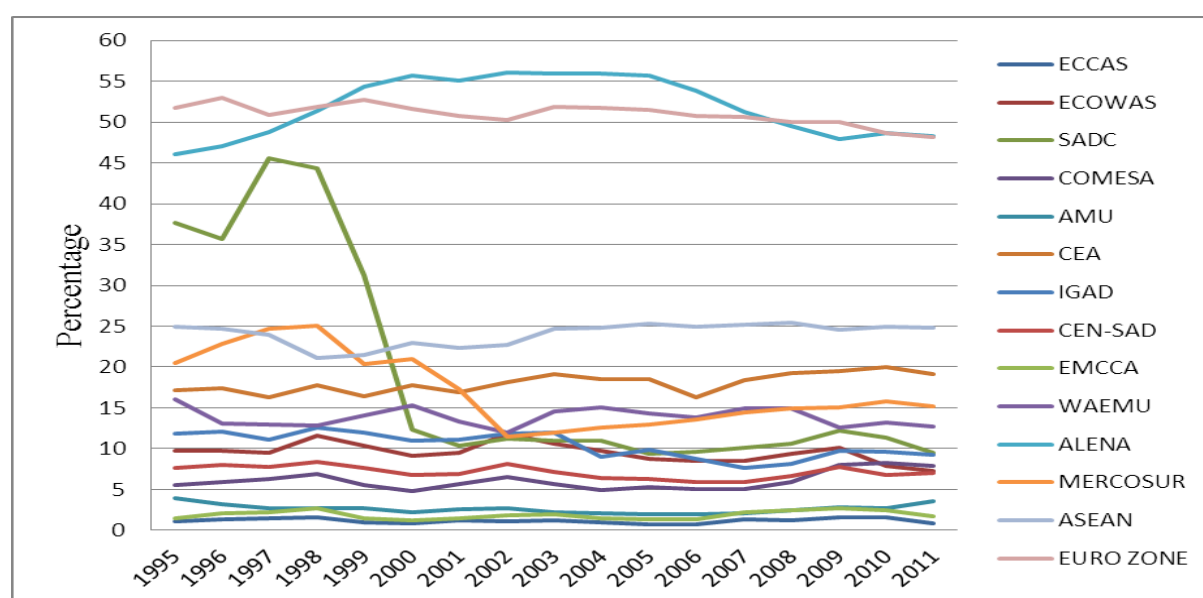
Negotiations to develop terms of reference for the implementation of the single currency continued in 2008, and the goal of creating a monetary union in ECOWAS is set for 2020. Presently, the preferential trade regime in the region is effective. Another important aspect of integration is the development of regional infrastructure include accelerating the

implementation of programs adopted for the development of transport and solving problems related to the energy crisis.

Freedom of movement is effective in ECOWAS not unlike all other parts of Africa, but only the first three phases of the relevant protocol (entry without a visa for up to 90 days) was fully implemented in all ECOWAS countries (CEA, 2012).

In ECOWAS, all countries are also members of the CEN-SAD and eight WAEMU⁹ members.

Graph 11: Intra-regional trade comparison

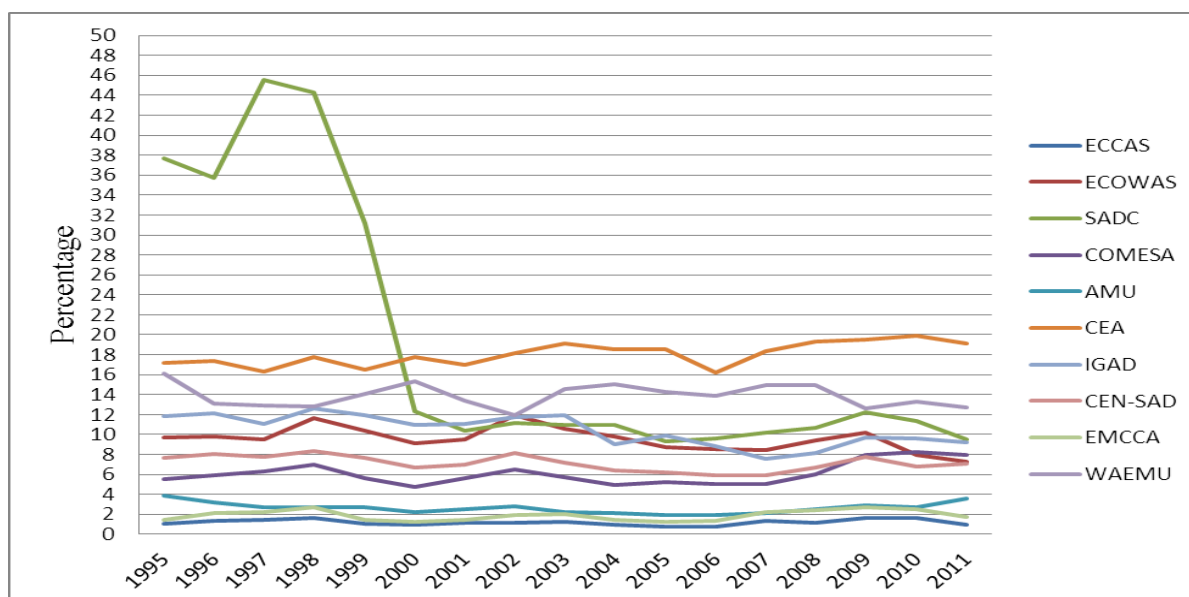


Source : Authors using UNCTAD data

This graph shows that the intra-REC trade has not changed in some areas, while it is growing in others. However we note that the Eurozone and NAFTA ranks first with about 48%, followed by ASEAN 25%, ECA with 18%, 15% for Mercosur and the WAEMU with 13 %. The rest of the RECs records less than 10% of trade and ECCAS came last less than 2%. To better observe the weak intra-ECCAS trade, we make a presentation of the evolution of intra-REC trade limited to Africa.

Graph 12 : Intra-CER trade evolution in Africa

⁹The eight countries of the ECOWAS member and WAEMU are: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo.



Source : Authors using UNCTAD data

This graph shows that since the adoption of the Abuja Treaty that guides African Integration, the intra-ECCAS trade remains the lowest in Africa. It did not reach the 2% throughout this period and is 1.5% in 2010. Our concern here is that, it is also lower than the intra-EMCCA which has repeatedly exceeded 2% before stabilising at 2% in 2010. Similarly we find out that intra-WAEMU is almost double that of the ECOWAS respectively 13% and 7% in 2010. EMCCA and WAEMU are monetary unions belonging respectively to ECOWAS and ECCAS, one can conclude that sharing the common currency has already and will have a significant impact on the policies to be implemented to increase trade in these RECs.

However, it should be noted that intra-CEA trade is the largest in Africa since the 2000s, when the intra-SADC trade fell by 12% and is about 10% in 2010, while the ECA is 17%. We realize that trade integration policies are more consistent in ECOWAS where all countries are members of CEN-SAD, while in ECCAS only CAR and Chad are members of CEN-SAD. There is thus a process for non integrated of ECCAS countries since integration efforts are limited by the multitude of belonging which significantly reduces intra-ECCAS.

Table 4 : Exportations inter-zone in percentage (Central Africa)

YEAR	1995	2000	2005	2012
PARTENERS	Central Africa	Central Africa	Central Africa	Central Africa
Central Africa	18.17	24.70	47.03	33.00
West Africa	8.60	19.88	27.71	18.47
North Africa	4.57	5.67	16.28	14.08
East Africa	1.74	9.92	2.32	5.14
South Africa	66.93	39.82	6.65	29.31
Total	100	100	100	100

Source: The authors using UNCTAD data

This table shows that since 1995, Central Africa realized only 50% of its exportations inter-zone trade. Although inter- zone exportations in Central Africa increases as years passes by, that is from 18.17% in 1995 to 47.03% in 2005 before the drop to 33% in 2012, Central Africa realized the great part of its inter African exportation with South Africa zone (67% in 1995, 40% in 2000 and 29% in 2012) with two big countries of the ECCAS.(Angola, Democratic Republic of Congo) by the surface area and Economic weight at the SADC.

Table 5 : Exportations inter-zone in percentage (West Africa)

YEAR	1995	2000	2005	2012
PARTENERS	West Africa	West Africa	West Africa	West Africa
West Africa	57.09	72.92	75.05	80.22
Central Africa	11.05	10.87	12.68	9.33
North Africa	3.67	2.48	3.30	6.77
East Africa	0.34	0.43	0.91	0.79
South Africa	27.85	13.30	8.06	2.89
Total	100	100	100	100

Source: The authors using UNCTAD data

Contrary to table 1 which shows the trade among the CEEAC countries mostly out of CER, table 2, shows that since 1995, West Africa zone realized more than half of its exportation in her zone. This intra-zone exportation improves as years goes on. That is 57% in 1995, to 73% in 2000 and 80% in 2012.

Contrary to CEEAC or countries belonging to the five other CER countries and to the Regional African Groupings (CEA, COMESA, CEMAC, SADC, CENSAD)¹⁰, this reduces intra-CEEAC trade, efforts of Commercial Integration are more advance in the CEDEAO were countries of this region belong to CEN-SAD and UEMOA, this justifies the importance of intra- CEDEAO¹¹.

Table 6 : Parts of inter-zone export in percentage in 2012 (ECCAS)

ZONES PAYS	West Africa	Central Africa	North Africa	East Africa	South Africa	Total
Angola	0.19	1.11	0.31	0.12	98.26	100
Burundi	0.06	29.84	7.62	60.25	2.23	100
Cameroon	27.29	63.66	3.94	0.36	4.75	100
Congo	20.59	45.24	15.87	14.89	3.41	100
Gabon	24.44	50.70	9.82	0.14	14.90	100
Equato Guinea	21.92	3.04	0.60	0.02	74.42	100
CAR	6.92	50.36	38.91	0.27	3.54	100
DRC	0.30	2.04	54.02	33.06	10.57	100
Chad	47.00	34.60	18.21	0.04	0.16	100
Sao tome and P	50.34	27.55	16.83	3.21	2.07	100

Source: The authors using UNCTAD data

Regarding the 2012 statistics, we notice that the African trading partner of Cameroon, Congo, Gabon and CAR are the ECCAS countries. Contrary to Angola, Equatorial Guinea, Burundi, DRC, Sao-Tome and Principe and Chad which trade more outside of ECCAS.

¹⁰ Efforts of Commercial Integration in the CEEAC are limited because they belong to CER. In fact with CEEAC, Angola belong also to SADC; Burundi to CAE and COMESA, DRC to COMESA and SADC, Sao-tomé et Principe to CENSAD, CAR and Chad to CENSAD and CEMAC, while Cameroon, Congo, Gabon, and Equatorial Guinea belong to CEMAC.

¹¹ It is necessary to precise that CEN-SAD is the CER of Africa which has the largest number of members. (29 members).

COMESA has 19 members.

CEDEAO has 15 members.

CEEAC has 10 members.

CEA has 5 members.

SADC has 5 members.

IGAD has 7 members.

UMA has 5 members.

Table 7: Parts of inter-zone export in percentage in 2012 (ECOWAS)

ZONES PAYS	West Africa	Central Africa	North Africa	East Africa	South Africa	Total
Burkina	61.60	0.48	3.28	4.36	30.29	100
Cape Verde	51.32	9.48	17.16	10.75	11.29	100
Cote d'Ivoire	73.77	11.53	3.85	0.33	10.52	100
Gambia	97.10	0.49	0.92	0.90	0.60	100
Ghana	45.65	10.61	1.72	0.51	41.50	100
Guinea	36.18	0.45	53.66	2.24	7.47	100
Liberia	5.07	0.00	91.29	1.27	2.37	100
Mali	29.82	0.08	1.03	0.22	68.86	100
Niger	97.01	0.77	1.65	0.36	0.21	100
Nigeria	47.78	12.43	4.15	0.10	35.54	100
Senegal	86.28	12.19	0.66	0.69	0.17	100
Sierra Leone	58.53	0.06	15.66	19.59	6.17	100
Togo	88.97	7.71	3.02	0.21	0.08	100

Source: The authors using UNCTAD data

Contrary to ECCAS, this table shows that the main partners of the ECOWAS countries are in the West Africa their natural area. Except for Guinea, Liberia and Mali which trade more than 50% outside of ECOWAS zone.

4. Methodology and Results

The first stage of our methodology consist of: building our economic infrastructure indices for the two RECs countries (ECCAS, ECOWAS). Following Mitra et al (2012), the index of economic infrastructure (transport, energy and ICT) is build from a principal component analysis (PCA), and involves 10 countries of ECCAS and 13 ECOWAS countries. Only quantitative indicators are taken into consideration.

- ❖ For transport: the length of the road network. The roads are the main means of transport and trade between the countries of ECCAS and ECOWAS, their impact should be very significant in terms of increased trade.
- ❖ For energy: the production of electricity is in Kilowatt / hour. Electricity is considered one of the belts of economic activity and may encourage the development of the private sector and thus lead to the diversification of the economy and thus increase trade in a region.

- ❖ For ICT: the number of telephone lines per 100 inhabitants, the number of internet users per 100 inhabitants and mobile phone subscribers per 100 inhabitants. ICT can increase efficiency and productivity, as well as reduce transaction costs.

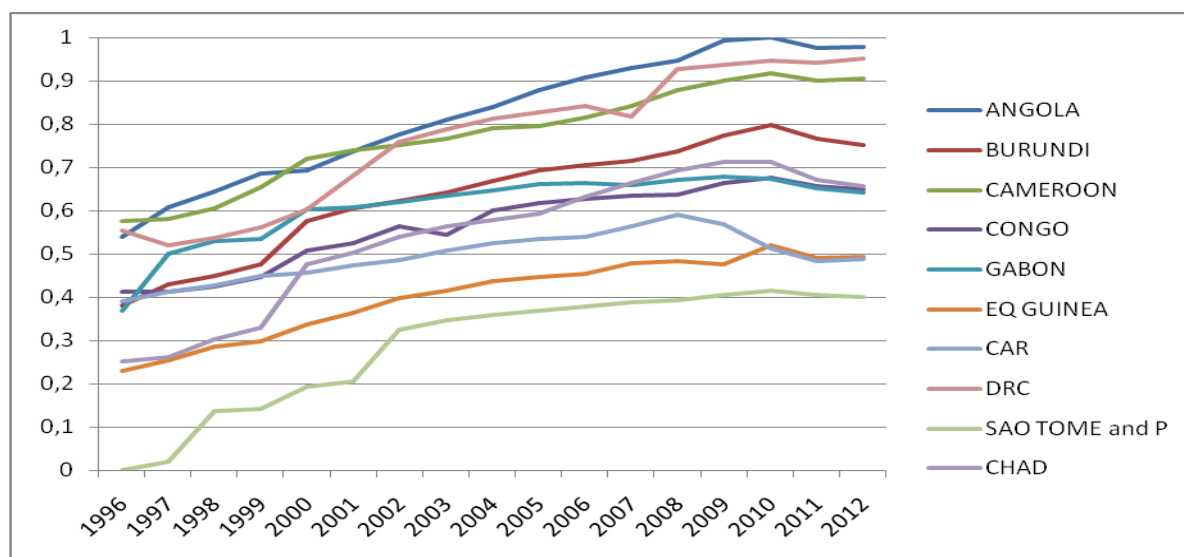
Our aggregate indicator of economic infrastructure called "INFRA" is calculated as a weighted average of the main components of the logarithm of initial indicators mentioned above. This method overcomes the multicollinearity problems associated with the presence of a large number of potential collinear indicators (Mitra and al, 2012). Since the primary variables (indicators) are different currencies and different scales, we first normalize these indicators in a continuous scale from 0 to 1.

The results of PCA are at the appendix.

Moreover, analyzing the eigen values of the correlation matrix shows that the first principal component accounts for 60% from the total variance for ECCAS indicators, and 66% of the total variance indicators for ECOWAS and constitutes what we call "INFRA" that we introduce in the regressions as aggregate index of economic infrastructure.

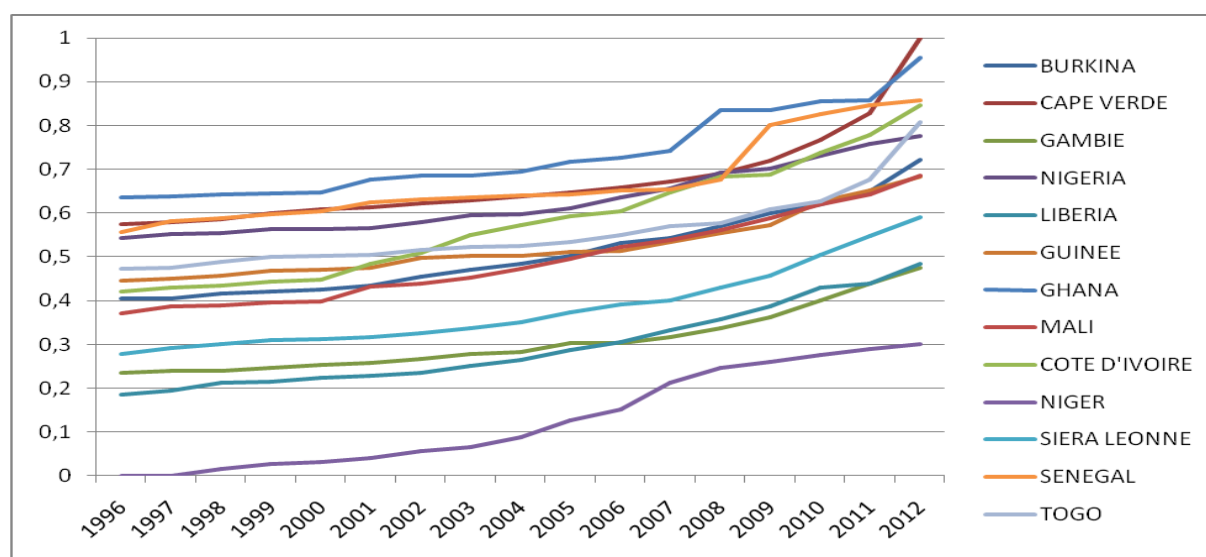
The index is Standardized on a scale from 0 to 1, allows us to compare each countries of REC (ECCAS, ECOWAS). Thus, a high value indicates that the country is more advanced than the other on economic infrastructure.

Graph 9: Economic infrastructures index in the ECCAS countries



Source: By authors using WDI data

Graph 10: Economic infrastructures index in the ECOWAS countries



Source: By authors using WDI data

The graphs show that in all countries of ECCAS and ECOWAS the index has an increasing trend. In the ECCAS, this trend is more important in Angola (0.98), DRC (0.95) and in Cameroon (0.91) where the economic infrastructure index is greater than 0.5 (these countries represent more than 70% of regional GDP) but lower than 0.7 in all other countries of the region in 2012. The last country in the region is Sao Tome and Principe with an index of 0.4 in 2012

In ECOWAS, Cape Verde (1) recorded the highest development index in terms of economic infrastructure, Ghana (0.95) is second. Six countries in the region have a higher index and 0.7 ledernier countries in the region is the Niger with a 0.3 index in 2012.

The second step includes: estimating the impacts of the trade facilitation indicators on both ECCAS and ECOWAS intra-regional trade. Given the lack of data on other aspects of the trade such as trade in services, we consider only trade in goods.

The pioneering work of Tinbergen (1962), gave rise to a vast theoretical and empirical literature on the gravity model related to trade. In its simplest form the gravity model on trade postulates that trade flows from country i to country j , is proportional to the product (GDP) of the two countries, and inversely proportional to their distance. In these variables, we generally include other factors that may influence trade (and Tenreyro Silva, 2005).

However, several versions of the gravity model have been developed (Anderson and Wincoop, 2004). The gravity model that we have retained is inspired from that of Portugal-Perez and Wilson (2010). Unlike these authors, our model is enriched with economic

infrastructure of both partners (INFRA_i, INFRA_j) and other variables that may increase or divert the intra-REC trade. The specification of the linearized model of the following form:

$$L \exp_{ijt} = \alpha_i + \lambda_t + \alpha_1 LGDP_{it} + \alpha_2 LGDP_{jt} + \alpha_3 LDIST_{ij} + \alpha_4 LPOP_{it} + \alpha_5 LPOP_{jt} + \alpha_6 DTRA + \alpha_7 DTAG + \alpha_8 TRAF_A + \varepsilon_{ijt} \quad (1)$$

Then when we decompose DTRA and DTAG we obtain:

Model 1: ECCAS

$$L \exp_{ijt} = \alpha_i + \lambda_t + \alpha_1 LGDP_{it} + \alpha_2 LGDP_{jt} + \alpha_3 LINFRA_{it} + \alpha_4 LINFRA_{jt} + \alpha_5 LDIST_{ij} + \alpha_6 LPOP_{it} + \alpha_7 LPOP_{jt} + \alpha_8 BORD_{ij} + \alpha_9 CUR_{ij} + \alpha_{10} COL_{ij} + \alpha_{11} LANG_{ij} + \alpha_{12} LLOCK_i + \alpha_{13} EMCCA_i + \alpha_{14} CENSAD_i + \alpha_{15} CAE_i + \alpha_{16} SADC_i + \alpha_{17} COMESA_i + \alpha_{18} LND OEXP_i + \alpha_{19} LND AEXP_i + \varepsilon_{ijt} \quad (2)$$

Model 2: ECOWAS

$$L \exp_{ijt} = \alpha_i + \lambda_t + \alpha_1 LGDP_{it} + \alpha_2 LGDP_{jt} + \alpha_3 LINFRA_{it} + \alpha_4 LINFRA_{jt} + \alpha_5 LDIST_{ij} + \alpha_6 LPOP_{it} + \alpha_7 LPOP_{jt} + \alpha_8 BORD_{ij} + \alpha_9 CUR_{ij} + \alpha_{10} COL_{ij} + \alpha_{11} LANG_{ij} + \alpha_{12} LLOCK_i + \alpha_{13} WEAMU_i + \alpha_{14} LND OEXP_i + \alpha_{15} LND AEXP_i + \varepsilon_{ijt} \quad (3)$$

EXP_{ij}: bilateral exportation among countries of ECCAS

GDP_i: is the GDP of member country, proxy to the market size in this country.

GDP_j: is the GDP of member country, proxy to market size in this country.

POP_i : population of export countries.

POP_j : population of member countries

DIST_{ij}: is the distance between the capitals of the two partners. The capitals are considered malls. This is the proxy of transport costs, but also captures the cultural and historical effects favoring exchanges between neighboring countries. All things being equal, the insolated countries trade less than those located near major markets.

DTRA: is a vector of five traditional dummy variables. The first four variables take the value 1 when both partners have a common colonial (COL_{ij}), language (LANG_{ij}), border (BORD_{ij}) or a common currency (CUR_{ij}), and 0 otherwise. Similarly, the fifth variable (LLOCK_i) takes the value 1 one when the exporting country is land locked, and 0 otherwise.

DAGR: is a vector of dummy variables that characterize other regional groups which are countries that belong to ECCAS and ECOWAS and permit us to see the effect of sub-regional trade agreements (creation or diversion) on trade. The first four variables take the value 1 when the exporting country also belongs to the CEMAC, SADC, the COMESA, CEA, UEMOA, and 0 otherwise.

TRAFA: is a vector of trade facilitation variables. INFRA_i and INFRA_j, are the economic infrastructure index (transport, energy and ICT) of the exporting and partner country;

NDOEXP is the number of documents for export, NDAEXP is the number of days for export.

α_i , is the specific effect of country of origin that captures the effect of other geographical or cultural determinants not taken into account by the other variables in the model

λ_t is the temporal effect, similar to all countries, which captures effects such as those of inflation on the value of the flow of exchange (Baldwin and Taglioni, 2006).

ε_{it} , error term.

Dummies sub-regional agreements are commonly used in traditional models to assess the creation or trade diversion in the direction of Viner (1950). Thus, for agreement dummy variable equal to 1 is introduced when a country is a member of the agreement and 0 otherwise. The coefficient is used to assess the impact of the agreement on external flows. Trade creation results have a positive sign.

More so, the gravity model shows a normal level of bilateral trade between countries. Therefore, by introducing dummy variables for sub-regional agreements, these variables capture the "atypical" levels of trade resulting from regional agreements. Thus, these variables are used to isolate the impact of regional trade agreements in terms of creation or trade diversion (Soloaga and Winters, 2001).

L: indicates that the variable is logarithm form, which permits the interpretation in terms of elasticity coefficient.

The diversion of exports takes place when the propensity to export to the others REC increases while the overall tendency to trade with other members of the ECCAS or ECOWAS decreases.

The estimation of our models by the OLS can be a source of bias. Indeed, the OLS estimator is assumed that an identical model for each pair of countries. This amounts to considering that there are no special features or characteristics concerning bilateral relations other than those reflected by the model. However, it may happen that the selected variables in the model do not realize fully the many characteristics that explain the intensity of trade relations, which leads to the bias of omission and incorrect specification of the model.

The multidimensional nature of our data leads us to estimate our model by a method that captures the specific effects for a set of unobservable characteristics and eliminate a source of bias present in the OLS, particularly affecting trade agreements dummy variables. The easiest solution to overcome the correlation between specific effects and the explanatory variables is

to eliminate the specific effect by using the Within estimator or by any other estimator that eliminates the specific effect, for example the first difference estimator (Sevestre, 2002).

However, these transformations do not allow to estimate the impact of an invariant explanatory variable in time, including regional trade agreements (Kpodar, 2007) of all variables, including. To remove this ambiguity, use the instrumental variable estimator Hausman-Taylor. To do this, we have two groups of explanatory variables; a first group comprising n_1 variables that vary between individuals and over time, and a second group comprising n_2 invariant variables over time.

Expected signs:

$GDP_{i,j} > 0$, $INFRA_{i,j} > 0$, $DIST_{ij} < 0$, $POP_{i,j} > 0$, $LANG_{ij} > 0$, $BORD_{ij} > 0$, $COL_{ij} > 0$, $CUR_{ij} > 0$, $LLOCK_i < 0$, $NDOEXP < 0$, $NDAEXP < 0$, $COSEXP < 0$, $CEMAC_i > 0$, $UEMOA_i > 0$, $SADCI < 0$, $COMESA_i < 0$, $CAE < 0$.

The data used come from many bases. GDP, population and economic infrastructures (transport, energy and ICT) come from the World Bank database WDI, those on bilateral exports from UNCTAD, those concerning distances, common colony, border, language, landlock come from Geodist data of Centre d'Etudes Prospectives et d'Informations Internationales (CEPII), and finally those concerning trade facilitation come from Doing Business World Bank database. The study is conducted over the period from 2006 to 2012.

Summary of the results by REC

A number of variants of the model specified were estimated and the results of the econometric estimation are presented in tables 11-13.

ECCAS

FIXED EFFECTS ESTIMATOR

VARIABLES	(1) ModelFE1 lexpij	(2) ModelFE2 lexpij	(3) ModelFEC3 lexpij	(4) ModelFE4 lexpij
lgdpi	-0.584 (0.631)	-0.253 (0.656)	-0.00125 (0.567)	-0.335 (0.639)
lgdpj	-0.146 (0.151)	0.346*** (0.124)	0.330*** (0.123)	0.255** (0.119)
lpopi	2.236 (2.757)	0.374 (2.633)	-0.612 (1.027)	1.769 (2.519)
lpopj	-0.729*** (0.166)	-0.108 (0.122)	-0.109 (0.121)	-0.422 (0.311)
ldistij	-0.670*** (0.172)	-0.738*** (0.174)	-0.746*** (0.172)	-0.731*** (0.175)
colij	2.716*** (0.436)	3.523*** (0.418)	3.517*** (0.416)	3.426*** (0.410)
curij	0.160 (0.518)	-1.383** (0.628)	-1.347** (0.624)	-0.997** (0.494)
langij	1.145*** (0.380)	0.518 (0.357)	0.570 (0.352)	0.536 (0.357)
bordij	2.131*** (0.386)	2.268*** (0.400)	2.298*** (0.397)	2.195*** (0.394)
lnaexpi	0.109** (0.0468)	0.133*** (0.0478)	0.0921** (0.0377)	0.119** (0.0470)
emccai	1.737*** (0.530)	1.584*** (0.538)	1.593*** (0.537)	1.641*** (0.530)
linfrai	-5.080 (4.204)			
linfraj	8.508*** (2.005)			
lelecti		0.383 (0.322)	0.168 (0.257)	
lelectj		-0.0666 (0.0534)	-0.0670 (0.0530)	
llocki				
lroadi				-0.573 (1.465)
lroadj				0.261 (0.320)
Constant	-7.773 (40.04)	-7.303 (38.40)	7.536 (14.71)	-13.93 (40.23)
Observations	630	630	630	630
R-squared	0.392	0.376	0.376	0.374
Number of i	10	10	10	10
F	30.09	28.18	28.23	27.91
Tbar	63	63	63	63

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

HAUSMAN-TAYLOR ESTIMATOR

VARIABLES	(1) ModelHT1 lexpij	(2) ModelHT2 lexpij	(3) ModelHT3 lexpij	(4) ModelHT4 lexpij	(5) ModelHT5 lexpij
lpopi	0.450 (0.918)	-1.571 (1.638)	-0.612 (1.027)	0.276 (1.220)	1.168 (0.875)
lpopj	-0.732*** (0.165)	0.547*** (0.139)	-0.109 (0.121)	-0.423 (0.307)	-0.728*** (0.166)
ldistij	-0.679*** (0.171)	-0.432** (0.170)	-0.746*** (0.172)	-0.739*** (0.174)	-0.671*** (0.172)
colij	2.713*** (0.433)	2.036*** (0.428)	3.517*** (0.416)	3.420*** (0.408)	2.745*** (0.435)
cuij	0.207 (0.513)	-0.355 (0.443)	-1.347** (0.624)	-0.958* (0.490)	0.146 (0.519)
langij	1.190*** (0.374)	2.167*** (0.396)	0.570 (0.352)	0.589* (0.352)	1.129*** (0.378)
bordij	2.164*** (0.383)	2.580*** (0.374)	2.298*** (0.397)	2.225*** (0.391)	2.133*** (0.387)
lndaexpi	0.0753** (0.0358)	0.116*** (0.0417)	0.0921** (0.0377)	0.0822** (0.0371)	0.0602* (0.0349)
infrai	-3.723 (3.923)				-3.308 (3.976)
infraj	8.542*** (1.987)				8.474*** (2.002)
lgdpi	-0.371 (0.546)	-0.200 (0.594)	-0.00125 (0.567)	-0.0915 (0.541)	-0.654 (0.576)
lgdpj	-0.165 (0.150)	-0.187 (0.123)	0.330*** (0.123)	0.238** (0.117)	-0.143 (0.151)
llocki	-4.585 (2.882)	-5.246 (6.614)	-3.326 (3.026)	-3.688 (2.683)	-5.710 (4.207)
lintui		-0.829*** (0.262)			
lintuj		1.302*** (0.169)			
lelecti			0.168 (0.257)		
lelectj			-0.0670 (0.0530)		
lroadi				-0.469 (1.140)	
lroadj				0.262 (0.316)	
cemaci					0.743*** (0.191)
censadi					-1.383 (3.576)
sadci					-2.076 (2.909)
caei					-4.550 (5.663)
comesai					-3.712 (3.235)
Constant	17.74 (13.51)	24.96 (24.96)	7.536 (14.71)	6.060 (12.56)	13.90 (15.62)
Observations	630	630	630	630	630

Number of i	10	10	10	10	10
chi2	393.3	461.1	367.1	364.7	399.5

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

ECOWAS

FIXED EFFECTS ESTIMATOR

VARIABLES	(1) ModelFE1 lexpij	(2) ModelFE2 lexpij	(3) ModelFE3 lexpij	(4) ModelFE4 lexpij
lndoexpi	-0.00124** (0.000610)	-0.000810 (0.000614)	-0.000763 (0.000612)	-0.000721 (0.000611)
lgdpi	-2.112** (1.069)	-2.271** (1.075)	-2.705* (1.624)	-2.289** (1.088)
lgdpj	-0.243 (0.156)	0.289** (0.122)	0.754*** (0.100)	0.797*** (0.0900)
lpopi	9.888*** (2.588)	8.674*** (2.614)	6.937*** (2.686)	8.485*** (2.652)
lpopj	0.201** (0.0815)	0.197** (0.0827)	0.336*** (0.0968)	-0.0667 (0.104)
ldistij	-1.557*** (0.128)	-1.636*** (0.129)	-1.664*** (0.132)	-1.584*** (0.132)
colij	0.0447 (0.340)	0.600* (0.348)	0.266 (0.351)	0.286 (0.350)
curiij	1.388*** (0.226)	1.507*** (0.231)	1.317*** (0.234)	1.539*** (0.243)
langij	0.588* (0.307)	0.161 (0.316)	0.525* (0.317)	0.321 (0.321)
bordij	0.922*** (0.185)	0.748*** (0.187)	0.878*** (0.192)	0.743*** (0.191)
linfrai	-3.219 (2.276)			
linfranj	-9.524*** (1.076)			
lelecti		0.000463 (0.249)		
lelectj		0.613*** (0.0849)		
lintui			0.0399 (0.214)	
lintuj			0.188*** (0.0566)	
lroadi				0.158 (0.441)
lroadj				0.446*** (0.111)
Constant	-85.28*** (25.90)	-83.66*** (26.35)	-54.69 (36.50)	-89.48*** (27.17)
Observations	1,092	1,092	1,092	1,092
Number of i	13	13	13	13

F	124.5	118.3	110.7	111.7
r2_w	0.583	0.571	0.555	0.557
rho	0.962	0.937	0.866	0.933

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

HAUSMAN-TAYLOR ESTIMATOR

VARIABLES	(1) ModelH1 lexpij	(2) ModelH2 lexpij	(3) ModelH3 lexpij	(4) ModelH4 lexpij
ndoexpi	-0.000535 (0.000532)	-0.000167 (0.000510)	-0.000369 (0.000508)	-0.000108 (0.000512)
lpopi	5.471*** (1.898)	4.355*** (1.657)	3.175** (1.494)	4.274** (1.693)
lpopj	0.198** (0.0814)	0.195** (0.0825)	0.342*** (0.0963)	-0.0648 (0.104)
ldistij	-1.560*** (0.127)	-1.637*** (0.129)	-1.664*** (0.131)	-1.586*** (0.132)
colij	0.0462 (0.339)	0.595* (0.347)	0.269 (0.350)	0.284 (0.350)
curij	1.385*** (0.225)	1.504*** (0.231)	1.321*** (0.233)	1.534*** (0.243)
langij	0.589* (0.306)	0.165 (0.315)	0.521* (0.316)	0.325 (0.320)
bordij	0.917*** (0.184)	0.746*** (0.187)	0.881*** (0.191)	0.743*** (0.190)
infrai	-2.946 (2.247)			
infrac	-9.325*** (1.072)			
lgdpi	-0.976 (0.955)	-1.042 (0.911)	-1.177 (1.321)	-1.115 (0.926)
lgdpj	-0.213 (0.155)	0.299** (0.121)	0.748*** (0.0999)	0.804*** (0.0897)
llocki	-4.155 (7.223)	-4.524 (5.559)	-4.008 (3.682)	-4.565 (5.490)
uemoai	0.917*** (0.184)	0.746*** (0.187)	0.881*** (0.191)	0.917*** (0.184)
lelecti		-0.0410 (0.245)		
lelectj		0.607*** (0.0846)		
lintui			0.00228 (0.176)	
lintuj			0.196*** (0.0555)	
lroadi				0.0119 (0.431)
lroadj				0.438*** (0.111)
Constant	-41.33** (18.97)	-42.61** (16.66)	-29.44* (16.93)	-47.73*** (16.67)
Observations	1,092	1,092	1,092	1,092

Number of i	13	13	13	13
chi2	1495	1424	1337	1345
F	106.8	101.7	95.53	96.05

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Coefficient estimates of Trade facilitation

a)Customs environment

ECCAS

The variables number of days for export has a positive and significant impact on trade (with both fixed effects and Hausman-Taylor estimator). This sign is contrary for the theory. The others variables (documents for export) is non-significant.

ECOWAS

Concerning ECOWAS, the number of document for export is negative and significant in various of the model specified.

b)Economic infrastructures

ECCAS

The results show that when each variable characteristic of economic infrastructure are taken individually, the impact on trade in the region is non-significant. However, when these variables are aggregated, that is to say the index of economic infrastructure, the impact is still positive and very significant. The elasticity of this infrastructure index is 8.5 for the partner according to the two estimators. This positive impact of economic infrastructure index was already found by Portugal-Perez and Wilson (2010). Indeed, poor integration of intra-Community trade remains explained by poor infrastructure leading to high costs and the similarity of production structures (Agbodji, 2007). This result has been found by Longo and Sekkat (2004).

ECOWAS

The results show that, when each of the economic infrastructure variables are taken individually, they (road, electricity and internet of partner) have a positive and significant impact on trade in the region, whatever the selected estimator. However, when these variables are aggregated, that is to say the index of economic infrastructure, the impact is always

negative and significant, whatever the selected estimator. The elasticity of this infrastructure is 0.6 for electricity production, 0.2 for internet users and 0.4 for road according to the two estimators.

Coefficient estimates of conventional gravity variables

ECCAS

The GDP of the partner, the common colonial, language, and distance have the expected sign and are significant. The population of the partner is negative but is significant. Thus, trade between ECCAS countries is more intense when the partners have a common land border. Indeed, ECCAS countries that share a common border are those of the EMCCA and they are also the countries of the region which share the most. This positive impact of the common border is linked to the development of transport infrastructure that enable lower transport costs and lower product prices. This impact is evident in the EMCCA with the construction of interconnection roads between Cameroon and CAR, Cameroon and Chad, Cameroon and Gabon, as Cameroon is regarded as the granary of the CEMAC zone. The distance variable has a negative and significant coefficient and confirms the inverse relationship between distance and bilateral trade.

ECOWAS

The population of both countries, the GDP of the partner, the common colonial, language, currency and distance have the expected sign and are significant.

The common language has a positive and significant impact on the trade between the partners; this is due to the fact that the EMCCA and WEAMU countries have French like official language. The coefficient of the variable common currency considered in the literature as one of the main regarding the increase of intra-zone trade it appears non-significant in ECCAS (this can be explained by the diversity of money encountered in the region, mainly because they have no real value in international trade, except the CFA franc is convertible via Euro. This variable is positive and significant in ECOWAS.

Coefficient estimates of Regional Trading Agreements

ECCAS

Specifically on the impact of regional integration agreements, the modelFE1,2,3 and 4 allows us also to understand the impact of membership of ECCAS countries to other RECs, shows a positive and significant coefficient for the EMCCA, while the coefficients of the others RTA

are negative and non-significant (ModelHT5). This means that membership of EMCCA, is a reason for trade creation in the ECCAS. These results confirm those of Foroutan and Pritchett (1993), Elbadawi (1997), Radelet (1997), Ogunkola (1998) and Longo and Sekkat (2004), the fact that regional integration agreements have little or no impact on intra-regional trade, and also the results of our descriptive analysis showed that although Angola achieves more than 98% of its exports to South Africa in particular because of its membership in SADC, the DRC more than 54% of exports in North Africa, Burundi over 60% in the East Africa due to his membership in the CEA, as well as over Equatorial Guinea 74% in the South Africa in 2012. This brings us again to the problem of the difficulty of establishment of trade integration when countries belong to several RECs, particularly because of belonging to several customs unions, and reducing financial efforts since we contribute in all these RECs to which they belong.

ECOWAS

Concerning ECOWAS, WEAMU have a positive and significant impact on trade (ModelHT1, 2, 3 and 4). Unlike ECCAS, ECOWAS countries do not belong to several other sub-regional groupings, and the only membership of eight countries in the region to the WAEMU is a pattern of trade creation in ECOWAS that we have already shown in the descriptive analysis of intra-ECOWAS trade.

Conclusion

The objective of this paper was to carry out a comparative analysis of the trade facilitation impact on the intra-regional trade between ECCAS and ECOWAS. The descriptive analysis of the trade facilitation indicators, economic infrastructure (transport, energy and ICT) and customs environment indicators show that road network and electricity produce in Kwh is more important in ECOWAS countries. The ECCAS countries are more advanced in the utilization of mobile telephone. It is worth noting that the utilization of internet increased base on its impact over low cost of production and the weak transaction between the two REC. Moreover, the economic infrastructure development program is part of the strategy identified to promote trade development in both REC. ECOWAS countries recorded a reduction of the number of days needed for export more important than ECCAS countries, while in regard to the number of documents and the cost for export they remain high in both CER. This

descriptive analysis also show that intra-REC trade is more Important in ECOWAS, specifically, 57% in 1995, 75% in 2005 and 81% in 2012, while ECCAS witness a decrease that is, 11% in 1995, 13% in 2005 and 9% in 2012.

The regression is carried on two gravity model that is from the Within estimator and Hausman-Taylor estimator, showing that the aggregate economic infrastructure have a positive and significant impact on intra-ECCAS trade and no impact in the ECOWAS. However, when these three indicators are took individually, they have a positive and significant impact on intra-ECOWAS trade and no impact in the ECCAS. Concerning the customs environment variables the number of document for export have a negative impact on the intra-ECOWAS trade. Regarding ECCAS, the number of days for export has a positive and significant impact on trade but contrary to the economic theory. The other traditional variables of the gravity model are in accordance with theoretical assumption. Concerning the variables characterized by regional trade agreement, showing that belonging to EMCCA is motive by the creation of trade in the ECCAS. In the ECOWAS, the relationship of eight countries in the WAEMU is motivated by creation of trade.

ECCAS and ECOWAS have to continue the implementation of economic infrastructure development program mentioned in the Regional Integration Strategy Document specifically, the tarring of national and regional roads, increase in the production of electricity and the increase in the utilization and access of internet, in order to break the constraint of development in the private sector which is the source of economic diversification. However, to reach to the intra-ECOWAS trade level, ECCAS countries have to concentrate on the trade development strategy to diversify their economies and be complementary. They have also to continue some strategies already put in place in the EMCCA region in order to avoid diversion existing trade.

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ANNEX

Table 8: Some Summary in ECCAS

Country	Area in thousands of Km 2	Population in millions (2012)	Currency	Official Languages
Angola	1 246 700	20 820 525	Angola Kwanza	Portuguese
Burundi	27 834	9 849 569	Burundi Franc	French
Cameroon	475 650	21 699 631	CFA Franc	French / English
Congo	342 000	4 337 051	CFA Franc	French
Gabon	267 667	1 632 572	CFA Franc	French
Equatorial Guinea	28 051	736 296	CFA Franc	Spanish / French
CAR	622 984	4 525 209	CFA Franc	French
DRC	2 345 409	65 705 093	Congolese Franc	French
Chad	1 284 000	12 448 175	CFA Franc	French
Sao tome and Principe	964	188 098	Dobra	Portuguese
Total	6 641 259	141 942 219		

Source: The authors using African statistical year Book

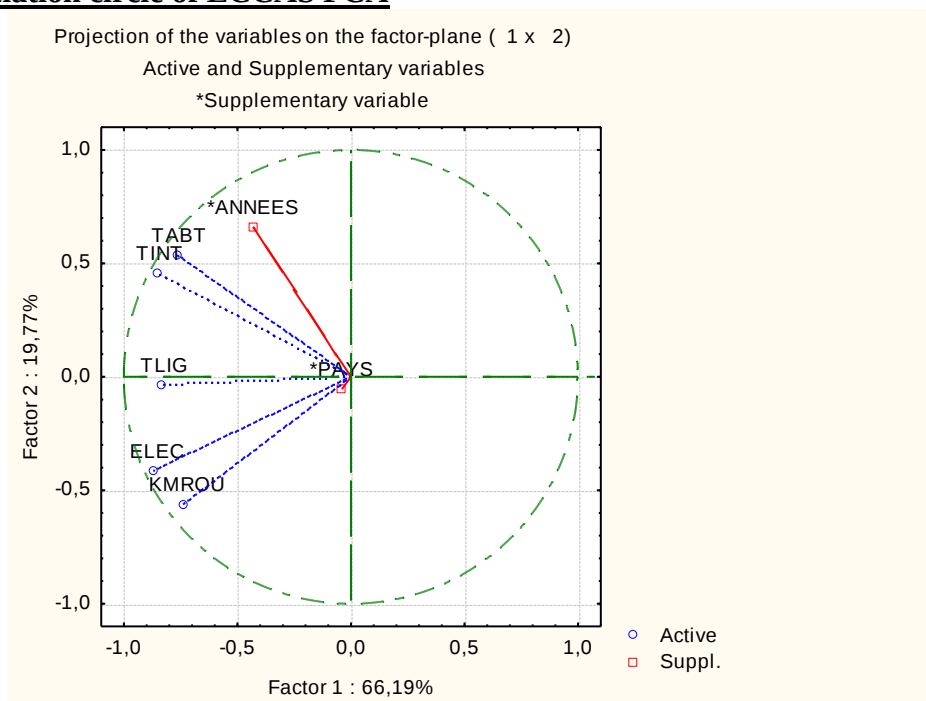
Table 9: Some Summary in ECOWAS

Country	Area in thousands of Km 2	Population in millions (2012)	Currency	Official Languages
Benin	114 763	10 050 702	CFA Franc	French
Burkina Faso	274 000	16 460 141	CFA Franc	French
Cape Verde	4 033	494 401	Escudo	Portuguese
Cote d'Ivoire	322 463	19 839 750	CFA Franc	French
Gambia	11 295	1 791 225	Gambian Dalasi	English
Ghana	238 533	25 366 462	Cedi	English
Guinea	245 857	11 451 273	Guinea Franc	French
Guinea Bissau	36 125	1 663 558	CFA Franc	Portuguese
Liberia	111 369	4 190 435	Liberian Dollar	English
Mali	1 240 192	14 853 572	CFA Franc	French
Niger	1 267 000	17 157 042	CFA Franc	French
Nigeria	923 768	168 833 776	Naira	English

Senegal	196 722	13 726 021	CFA Franc	French
Sierra Leone	71 740	5 978 727	Leone	English
Togo	56 790	6 642 928	CFA Franc	French
Total	5 114 650	318 500 013		

Source: The authors using African statistical year Book

The correlation circle of ECCAS PCA



The correlation circle of ECOWAS PCA

Projection of the variables on the factor-plane (1 x 2)

Active and Supplementary variables

*Supplementary variable

