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The potential effects of the ECCAS¹ Free Trade Area on Trade Flows

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Abstract

Analyzing some trade indicators and estimating a gravity model, this paper assesses the potential effects of an effective implementation of the ECCAS FTA. Launched since January 2004, the ECCAS FTA is not yet established: the main reforms that should be undertaken by the various members are still awaited. The results show that the potential for increasing intra-ECCAS trade, following the FTA, is limited by the narrow range of goods produced and exported by members; the fact that members have comparative advantages for similar products in which they are not important consumers; and the low complementarity in their trade profiles. To accelerate industrial development through a pooling of productive resources and capacities could improve the complementarity of the production structures in the sub-region and thus, increase the possibilities of intra-industry trade, key of intra-trade growth in model FTA.

Keywords: *ECCAS, Gravity model, Free Trade Area, Intra-regional trade, trade indicators.*

JEL Classification: C32, F15

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¹ ECCAS is the abbreviation of “Economic Community of Central African States”.

1 Introduction

The Economic Community of Central African States (ECCAS) was established in 1983 in accordance with the Lagos Action Plan, as one of the pillars of the African Economic Community. ECCAS covers an area of 6,641,000 km² (22% of the total area of Africa) with an estimated population over to 138 million in 2011 (13.3% of the total population of the continent), a density of 20.2 inhabitants per km², and a gross domestic product (GDP) accumulated of nearly 73 billion U.S. dollars (USD) in 2011. ECCAS GDP is unevenly distributed among its ten states members: Angola (36.9%), Burundi (1.6%), Cameroon (19.8%), Congo (7.24%), Gabon (9.09%), Equatorial Guinea (8.07%), Central African Rep. (1.4%), Dem. Rep of Congo (10.18%), Sao Tome and Principe (nd), and Chad (4.7%)².

The Treaty establishing ECCAS was adopted in 1985 with the objectives of adopting, coordinating and harmonizing common policies in order to boost the economic development of member states through a gradual and progressive establishment of a common market and the suppression of barriers among Central Africa states members³. During the early years, ECCAS had adopted a trade liberalization program to be implemented by stages, all this—through a gradual reduction and eventual possible suppression of trade barriers among the states members. The community was planning to become a customs union in 1997 after the creation of a free trade area (FTA) in 1993. But, financial difficulties, due to the non-payment of membership fees by states members, and conflicts in the Great Lakes area did not allow the achievement of these goals. In 1998, the Heads of State undertook to give it new life by establishing an autonomous financing mechanism and widening the competences of the ECCAS Secretariat to

²Data in this paragraph come from the World Development Indicator edited by the World Bank.

³Treaty Establishing the Economic Community of Central African States (ECCAS), Libreville, 1983.

the development of the capacity to maintain peace, security and stability. The re-launch of the ECCAS was also guided by the decision of implementing a FTA by July, 1st 2004 and a customs union, which was initially planned for 2008 and finally postponed to 2012 (ECA/SRO-CA, 2009). The main objective of the ECCAS FTA was to increase trade among states-members and reduce their trade dependence towards the rest of world.

To achieve these objectives, several measures have been adopted by the sub-regional decision-makers. The Decisions No. 03 and 04/CEEAC/CCEG/XI relating to the ECCAS Preferential Tariff (TP/ECCAS) and to the modalities of the establishment of the ECCAS Compensation Fund were thus adopted⁴. Some changes in chapter VI of the Treaty and Protocols on rules of origin and non-tariff barriers have also been adopted to make them more consistent with the establishment of the FTA⁵. These decisions have been added to certain provisions of the ECCAS Treaty on intra-trade liberalization, including articles 27 and 33. These articles compel states members to reduce, soften and ultimately remove quota system and other non-tariff barriers to trade among states members⁶. We also notice that the articles 36, 37, 47 and 67 which define the rules for transit and trade facilitation inside the community⁷.

An important aspect of the trade liberalization in the ECCAS is the fact that the tariff reduction was centered on the concept of “shared territoriality”. This concept implies applying the CEMAC⁸ Generalized Preferential Tariff (TPG/CEMAC) in trade among ECCAS states members that belong to the CEMAC zone and the TP/ECCAS in trade among the other ECCAS states

⁴See Protocol on the Fund for Compensation for Loss of Revenue.

⁵See Protocol on the Rules of Origin for products to be traded between member states of the ECCAS.

⁶See Protocol on Non-Tariff Trade Barriers.

⁷See Protocol on Transit and Transit facilities.

⁸The Economic and Monetary Community of Central Africa (CEMAC) is an organization established by six of the ten member states of ECCAS (Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea and Gabon) to promote economic integration among them and that share a common currency, the CFA franc.

members that do not belong to the CEMAC zone. The aim of this strategy was to improve the vested interests and achievements of the other institutions in the region, especially the CEMAC zone, and to avoid conflicts with existing institutions, given ECCAS' failure to meet the time frame of its treaty and annexed protocols (ECA, 2006). It was also expected that the ECCAS tariff regime will be at the same level as the CEMAC one by the end of the transitional period; from July 1st, 2004 to January 1st, 2007. The tariff reduction proposed by the TP/ECCAS should be 100% of reduction on January 1st, 2006 according to the following schedule:

- For local products, traditional handicrafts and other minerals: 100% of tariff reduction from July 1st, 2004;
- For minerals and manufactured products from the community:
 - 50% of reduction from July 1st, 2004,
 - 70% of reduction from January, 1st 2005,
 - 80% of reduction in January, 1st 2006,
 - 100% of reduction in January, 1st 2007.

Almost a decade after its official launching, the ECCAS FTA is not yet in effect: “no State has so far executed the Decisions relating to the FTA”.⁹ Moreover, it should be noticed that the intra-regional trade is still very low. Indeed, intra-ECCAS exports moved to an average of 1.1% of total exports in 2001 to 0.9% in 2011 and imports turned down from 2.41% of the total imports to 2.39% according to UNCTAD data¹⁰. During the same period, trades with the rest of the world have slightly increased from 0.27% to 0.65% according to the same data sources. Given this

⁹ Communiqué Final de la XVe Session ordinaire de la Conférence des Chefs d'Etat et de Gouvernement de la CEEAC, N'Djamena, 15 Janvier 2012.

¹⁰ UNCTAD Handbook of Statistics, 2013.

weak intra-ECCAS trade and the reluctance of the member states to implement the decisions relating to the FTA, we may wonder about the potential gains or losses that will derive from such an initiative.

Reluctance to liberalize trade is an ongoing concern of states that can only be overcome if the gains are visible and shared (FAO, 206). So, will the implementation of the FTA contribute to increase the intra-ECCAS trade? This question is particularly relevant due to the fact that regional cooperation and integration is considered since the independences of African countries, as an important opportunity for them to integrate the world's economy (UNECA, 2012). According to the trade literature, regional trade integration offers both a response to the structural challenge of the narrowness of domestic markets and increase policy predictability (WTO, 2011). Regional integration may also help to achieve economies of scale and to strengthen supplies and competitiveness capacities by offering to companies the possibilities to access to the market of the neighbors (Gillson, 2010). Regional integration is considered as a training ground for better integration into the multilateral trading system. Based on the experience of the European Union, Political scientists have long been seen regional trade agreements as a key factor in regional political integration.

The aim of this paper is to assess the potential effects of the ECCAS FTA on trade flows among its member states, following an effective implementation of the FTA. So, if the Decisions concerning the ECCAS FTA are effectively implemented, could we expect an increase of intra-trade flows? If this is the case, will this increase be a trade creation or a trade diversion? These are the main questions on which this paper focuses.

To answer all of these questions, this work will be divided into four sections as follows: Section 2 reviews the existing literature on the effects of RTAs in Africa in general and in Central Africa in particular. The third section analyzes the potential effects of the ECCAS FTA using some trade indicators. The fourth section performs the same analysis by estimating a gravity model. The last section presents the conclusions and policy recommendations drawn from these analyses.

2 Literature review

Empirical studies on the effects of the RTAs are based on the theory of trade creation and trade diversion exposed by Viner (1950). The aim of such studies is usually to identify which of these two effects is more likely to occur or to win. Since Viner (1950), several studies, using a gravity model, have been conducted to discern the effects of RTAs in sub-Saharan Africa (SSA) on trade among member states, but their results are not conclusive: while some empirical studies find a positive effect of RTAs in SSA on intra-trade, others argue that these agreements do not have an impact on intra-Africa trade. Studies on the RTAs in Central Africa will not be left out of this trend.

Foroutan and Pritchett (1993) were the first to use a gravity model to evaluate the intra-African trade potential and to compare it to its current level. Following the same approach, Elbadawi (1997) showed that the experience of regional trade integration in SSA has been a failure, like those in the other developing regions (e.g. Latin America). This skepticism about the effects of RTAs on intra-African trade has been supported subsequently by many other authors like Lyakurwa (1997), Longo and Sekkat (2000). Conversely, Cernat(2001), Carrere(2004), Coulibaly (2007), Afersorgbor and Bergeijk (2011) found that RTAs among African countries

have significantly increased trade among states members. Cernat (2001), studying the case of ECOWAS, SADC and COMESA for the years 1994, 1996 and 1998, found a highly increase in trade among the states members of ECOWAS and SADC (compared to non-members) following trade liberalization into these communities. These results were confirmed by Carrère (2004) who also found that ECOWAS and SADC have contributed to the increase of trade among their states members during the term 1962-1996. Afersorgbor and Bergeijk (2011), using a gravity model for 35 countries for the term 1995-2006, found that the SADC and ECOWAS had a positive and significant effect on intra-trade flows.

Few empirical studies have been conducted to discern the trade effects of RTAs in Central Africa in general and in the ECCAS in particular. Musila (2005) used a gravity model to study COMESA, ECCAS and ECOWAS for the term 1991-1998. He found a net trade creation for COMESA and ECOWAS but not for ECCAS. Avom (2005) and Gbetnkom and Avom (2005), still within the framework of an augmented gravity model, revealed that the CEMAC, that include six of the ten members of ECCAS, have had a very little effects on intra-CEMAC trade. Mata (2008), in an analysis of the effects of the CEMAC for Cameroon, Congo and Gabon concluded that the creation of the CEMAC has not improved trade integration between these states. EboTurkson (2012), comparing the impact of RTAs in Africa and the impact of the Lomé preferential trade agreement with the EU on SSA countries trade through a gravity model over the term-1960-2006, also found that ECCAS had no positive effect on trade among its member states unlike ECOWAS, EAC, SADC and IGAD had a positive impact on their intra-trade, and that positive effect was sometimes greater than the effect of the non-reciprocal trade agreements with the EU. These results, however, are contrary to those of Carrère (2006), Gbetnkom (2008) and Mbouandi Njinkam and Avom (2013). Using a gravity model on panel data for 150 countries

over the term—1962 to 1996, Carrère (2006) found that ECOWAS, SADC, CEMAC and COMESA agreements had positive effects on their intra-trade flows. These positive effects for CEMAC agreement are confirmed by Gbetnkom (2008) who found an overall positive impact of being member of this community on intra-trade after the 1994 reforms. Mbouandi Njinkam and Avom (2013), still in the context of a gravity model for the term 1995-2010, found that internal trade creation predominate over trade dispersion among ECCAS' member states.

The first observation we notice by going through this literature is that there is, no specific study intended to the intra-ECCAS trade liberalization. The community is almost considered in general studies on RTAs in Africa, which does not take into account certain characteristics of the sub-region, including the long period of lethargy in the 90s, which has not permit the implementation of the trade liberalization scheme originally planned by the 1985 ECCAS Treaty. This may be a justification for the findings of Musila (2005) and Ebo Turkson (2012) who did not find a positive effect of ECCAS on intra-trade flows. In addition, these studies are ex post studies that have been made, assuming effective trade liberalization in that community¹¹. But as noted by the CECG (2012) and WTO (2013)¹², the proposed reforms to liberalize trade are still awaited. Therefore, these studies are primarily assessments of membership of the same community than assessments of trade liberalization within the area as expected under the FTA.

This work has two main contributions. First of all, it is an ex ante assessment of the effects of an effective liberalization of intra-ECCAS trade as expected with the implementation of the FTA. Secondly, its dual methodological approach has not only the advantage to predict the potential

¹¹Even the recent study of Mbouandi Njinkam and Avom (2013) considered that the FTA of the ECCAS is already implemented.

¹² WTO (2013), Box 2.2, page 26.

effects of the implementation of the FTA on intra-trade, but mostly to explain why to expect such effects. Such approach highlights the areas that need policy interventions to strengthen the benefits that could result from the ECCAS FTA. Then, this study is important for ECCAS member states as well as development institutions accompanying reforms in order to develop adjustment policy measures to mitigate potential negative impacts and maximize potential benefits.

3 The trade indicators analysis of the potential effects of the ECCAS FTA

This section uses trade indicators to draw specific inferences about the potential effects of the implementation of the ECCAS FTA. Mikic and Gilbert (2007) define a trade indicator as an index or a ratio used to describe and assess the state of trade flows and trade structure of an economy. Given the simplicity of these indicators, Plummer, Cheong and Hamanaka (2010) argued that they can be used at the initial stage of each decision to take a measure of trade policy, including the decision to join or not a FTA. The idea is that the gains or losses that will derive from a FTA depend on the structure and existing trade links among states members.

In this study, we examine the following indicators: the intra-regional trade share, the export diversification index, the revealed comparative advantage index and the trade complementarity index.

3.1 The intra-regional trade share

This trade index shows the relative importance of trade among the members of a FTA compared to their total trade. It is defined as the ratio of trade between the countries of the region on the total trade of these countries. The formula for its calculation is as follows:

Intra-regional trade share = T_i/T_w , where:

T_i is the exports of region i to region i plus imports of region i from region i.

T_w is the total exports of region i to the world plus total imports of region i from the world.

A high value of this ratio, close to 1, indicates that members of a future FTA have low initial trade costs among them compared to trade costs with non-member countries (Plummer et al., 2010). Therefore, the implementation of the FTA would have significant positive effects as it will promote trade between the “natural trading partners”. Conversely, a low ratio resulting from high trade costs between members of a future FTA, predicts a smaller effect of that FTA on intra-trade as it will promote trade between “non-natural partners”.

Table 1: Intra-trade of major African RECs. in % of theirs total trades. 1995-2000

	1995		2000		2005		2010		2011	
	Export	Import								
CEN-SAD	7.67	5.8	6.73	6.6	6.23	7.07	6.88	6.26	7.59	6.03
COMESA	5.56	4.43	4.82	5.01	5,235	6.34	7.9	6.9	8.05	5.64
CAE	17.21	10.67	17.79	12.77	18.52	10.53	20.59	9.25	19.37	8.22
CEEAC	1.07	2.19	0.91	2.43	0.78	2.35	1.59	3.54	0.91	2.39
CEDEAO	9.74	8.4	9.09	12.45	8.76	12.47	8.27	9.87	8.19	8.81
IGAD	11.87	7	10.98	9.15	9.9	5.41	8.49	4.49	8.45	4.1
SADC	..		12.41	18.77	9.32	15.83	11.22	14.65	9.89	13.36
UMA	3.89	3.63	2.26	3.27	1.91	3	2.69	2.92	3.56	3.62

Source: Author construction based on the UNCTADSTAT data.

Table1 above shows that official exports between ECCAS countries are stagnant: while intra-ECCAS exports accounted for only 1.07% of its total exports in 1995, this proportion is somewhat deteriorated to be at 0.9% in 2011. This low level of trade among ECCAS member states is also evident looking at the intra-imports. Here we see that the intra-imports also remained low but stable at around 2% between 1995 and 2011. Finally, we note that among the eight Regional Economic Communities (RECs) recognized by the African Union as pillars of the African Economic Community, ECCAS is the one that trade lesser with itself: while the proportion of intra-ECCAS exports is only around 0.9% in 2011, this proportion is 19.37% for EAC; 9.89% for SADC; 8.85% for IGAD; 8.19% for ECOWAS and 8.05% for COMESA.

The implication of this low intra-regional trade share for ECCAS FTA is that the preferential trade liberalization will have a lesser effect on trade among member States As stated above, the low share of intra-ECCAS trade means that ECCAS member states are not “natural trading partners” because their initial trade cost are higher than their trade costs with the rest of the world. According to Plummer (2010), the implementation of the ECCAS FTA could result in a trade diversion.

3.2 The export diversification index

It is generally known that countries with a larger export base are those who derive greater benefits from a RTA. In fact, countries that have diversified their exports are those that produce a wider range of products that can be traded with regional partners in the framework of a RTA (Yeats, 1998). If only a limited number of these products exist, members of a RTA may have to rely heavily on third countries for a significant portion of their key imports. This fact should reduce their commitment to implement the FTA rules.

One way to measure the diversification of an economy is to measure the degree of market concentration. Among the myriad of index developed to measure the degree of market concentration, academician used more often the Herfindahl-Hirschman index. It has been standardized in order to obtain values between 0 and 1. The nearest value to 1 represents the highest concentration. The Herfindahl-Hirschmann is calculated using the following formula:

$$H_i = \left[\sqrt{\sum_{i=1}^n (x_i/X)} - \sqrt{1/n} \right] / \left[1 - \sqrt{1/n} \right]$$

Where H_i is the diversification index of the country i , x_i is the value of exports of the product (c), $X = \sum_{c=1}^n x_c$ and n = number of product groups (SITC Rev. 3, 3-digit).

The idea behind this index here is that if the RTA member states have a narrow range of goods to export, this will limit the effects of trade liberalization among them. These effects will be especially limited as the member states exports are concentrated in products that are not major imports for each other (Yeats, 1998).

We notice, through the Table 2 below, that the exports of ECCAS countries are highly concentrated and this concentration seems even to increase over the time for countries like Angola, Equatorial Guinea and Chad. This may be explained by the high concentration of economic activities in these countries around the exploitation and export of crude oil. Cameroon, Central African Republic and Sao Tome & Principe are the main economies of the sub -region with relatively diversified exports. However, this diversification seems fragile and changes so slowly over the time due to a complex and unattractive business environment that discourages investment especially in manufacturing (CEA/BSR-AC, 2010).

Table 2: Export diversification index of ECCAS member states, 1995-2010.

	1995	2000	2005	2010
AGO	0.896047	0.882604	0.944456	0.965351
BDI	0.583501	0.692833	0.608444	0.551099
CMR	0.320353	0.443176	0.421407	0.370314
CAF	0.400932	0.679933	0.44	0.331587
TCD	0.709649	0.731281	0.720275	0.854037
COG	0.752705	0.674731	0.786171	0.78596
COD	0.525003	0.601545	0.414739	0.385074
GNQ	0.522155	0.799015	0.921665	0.751039
GAB	0.806862	0.734602	0.769535	0.726036
STP	0.491524	0.403587	0.614244	0.387785

Source: Author construction based on the UNCTADSTAT data.

This excessive concentration of exports in the sub-region is an obstacle to the development of intra-regional trade flows because it offers a very narrow range of tradable goods among countries. The potential of intra-ECCAS trade is thereby decreased, even with the suppression of trade barriers as previewed by the FTA, due to the weakness of the supply capacities of tradable goods between its member states. This effect is even stronger as the exports of ECCAS member states are concentrated on the same small number of products, including agricultural commodities and mining products.

3.3 The revealed comparative advantage index

Traditional trade theory states that the gains from trade come from specialization in the sectors where a country has a comparative advantage, that means, the sectors in which the country produces relatively more efficiently than competitors. This difference among countries increases trade and makes it mutually beneficial. Nevertheless, comparative advantage is a dynamic concept and changes that may intervene therein are important determinants in predicting the effects of industrial and trade relations among the members of a FTA. According to Venables (2002), the effects of FTA depend on the comparative advantage of each member relating to his

pairs, and also relating to the rest of the world. The idea is that members of a FTA that have quite similar comparative advantages (especially in similar products) are less likely to have a permanent increase in their trade relationship resulting from preferential trade liberalization.

Balassa (1965) and Vollrath (1991) showed that it is possible to reveal the comparative advantages of a country by calculating its revealed comparative advantage index (RCA). The original RCA index, known as the Balassa index, is the ratio of the share of the exports of product c in the total exports of country i (x_c^i / X_i) with respect to the share of world exports of product c on total world exports (x_c^w / X_w). Mathematically, we have:

$$RCA_c^i = (x_c^i / X_i) / (x_c^w / X_w)$$

If the RCA index is greater than 1, then the comparative advantage is revealed as the share of product c in the exports of country i is larger than the share of that product in world exports. If RCA is less than 1, then a comparative disadvantage is revealed.

Table 3 below shows the relative value of the RCA index in exports of ECCAS member states. When reading this table, Burundi, Cameroon and Sao Tome & Principe have a comparative advantage in the export of food products while Burundi is the only one that has a comparative advantage for Beverages and Tobacco. Apart Central African Republic and Burundi, the other countries in the sub-region have a revealed comparative advantage in the export of oils and minerals products, but this advantage seems to erode over the time in most of these countries, except Chad and Equatorial Guinea where large reserves of oil have been discovered and are in exploitation since a decade.

Table 3: Revealed comparative advantage of ECCAS member states. 1995-2010.

		CTCI 0 + 22 + 4	CTCI 1	CTCI 3	CTCI 5	CTCI 7	CTCI 27 + 28 + 68 + 667 + 971	CTCI 5 to 8 - 667 and 68
AGO	1995	0.1248	0.0003	128,536	0.0001	0.0055	0.9966	0.0063
	2010	0.0051	0.0033	62.727	0.0008	0.0204	0.1518	0.0122
BDI	1995	71.604	11.379	0.0017	0.0239	0.011	80.785	0.0291
	2010	107.955	26.772	0.0881	0.1817	0.088	21.373	0.11
CMR	1995	3.276	0.4445	39.731	0.069	0.0228	15.428	0.0928
	2010	36.988	0.4354	27.531	0.1198	0.0805	0.5301	0.1591
COG	1995	0.216	0.029	109.100	0.0316	0.0096	0.3909	0.0652
	2010	0.0415	0.0683	52.759	0.0045	0.1968	0.9094	0.1286
GAB	1995	0.0233	0.0001	113.298	0.0457	0.0103	0.4488	0.0267
	2010	0.0509	0.3181	48.286	0.0159	0.0738	13.114	0.0752
GNQ	1995	0.9429	0.0663	45.262	0.0013	0.0137	0.0072	0.0942
	2010	0.004	nd	60,151	0.1475	0.0369	0.084	0.047
CAF	1995	16.274	13.653	0.0079	0.0488	0.1408	126.269	0.1132
	2010	129.106	0.2429	0.0438	0.0879	0.1403	56.207	0.142
COD	1995	0.811	0.3318	14.149	0.0313	0.0256	166.891	0.0385
	2010	0.1224	0.4226	0.8291	0.3214	0.016	121,428	0.0691
STP	1995	73.482	0.8501	nd	0.5369	0.4849	0.0176	0.524
	2010	61.339	0.0688	nd	0.2525	0.463	0.0628	0.8894
TCD	1995	0.1634	0.1125	0.0013	0.0097	0.1346	0.0053	0.0825
	2010	0.0121	0.0042	60.687	0.0394	0.0093	0.0302	0.0264

Source: Author construction based on UNCTADSTAT data.

Note: SITC 0 + 22 + 4 = Food.

SITC 1 = beverages and tobacco.

SITC 3 = Fuels.

SITC 5 = Chemicals.

SITC 7 = Machinery and transport equipment

SITC 27 + 28 + 68 + 667 + 971 = ores, metals, gemstones and non-monetary gold.

SITC 5 to 8 less 68 = 667 and manufactured by degree of manufacturing items.

Table 3 also reveals a comparative disadvantage of ECCAS member states for the exploitation of chemicals, manufactured goods, machinery and transport equipment. This reflects the inability of central Africa countries to transform and bring value added to their huge forest and mineral resources.

The implication of such analysis on potential trade effects of the ECCAS FTA is evident: The fact that these countries have the same comparative advantages and disadvantages reduces the

possibilities of trade among them. These trade opportunities will be more limited as the level of product differentiation among these countries is very low and that these countries are net importers of manufactured goods for which they have a proved comparative disadvantage.

3.4 The trade complementarity index

The success or failure of economic integration area depends in part on the degree of complementarity of the economic structures of its member states. The trade complementarity index therefore evaluates the relevance of preferential trade agreements between two or more economies, by measuring the extent to which the export structure of a potential partner matches the imports from the other potential partner. This indicator is calculated using the following formula:

$$Com_{ci} = 1 - (\sum |m_{ci} - x_{ci}|) / 2$$

Where x_{ci} is the part of the property c in the exports of country i, and m_{cj} is the part of the property c in the country's imports j. This index may be calculated for all possible combinations between exporters and importers, including groups of countries. The values range between 0 and 1: 1 for pairs of countries that exports and imports structures perfectly match up and 0 for pairs of countries whose exports and imports structures are completely different.

According to table 4 below, there is a very low complementarity among the trade profile of ECCAS FTA member states and this situation does not seem to improve with time. However, countries like Cameroon, Chad and Sao Tome & Principe are economies whose exports are relatively meeting the import requirements of other members of ECCAS due to a relative density and diversity of their industrial sectors. Cameroon is the economy that imports may be the most

covered by the sub-regional supply, especially with regard to imports of petroleum products. It is also the country that can cover most notably sub-regional needs for agro-industrial goods.

Table 4: Trade complementarity index among ECCAS member states, 1995-2000.

Importer→		AGO	BDI	CMR	CAF	TCD	COG	COD	GNQ	GAB	STP
AGO	1995		0.035	0.021	0.038	0.0361	0.039	0.042	0.019	0.037	0.023
	2010		0.031	0.258	0.018	0.016	0.016	0.016	0.015	0.018	0.016
BDI	1995	0.039		0.034	0.042	0.037	0.031	0.032	0.041	0.044	0.040
	2010	0.071		0.061	0.066	0.063	0.068	0.067	0.061	0.073	0.056
CMR	1995	0.066	0.082		0.102	0.079	0.069	0.079	0.0767	0.083	0.087
	2010	0.097	0.150		0.162	0.140	0.114	0.162	0.154	0.126	0.137
CAF	1995	0.086	0.095	0.080		0.088	0.064	0.103	0.086	0.084	0.065
	2010	0.052	0.063	0.044		0.050	0.058	0.064	0.044	0.056	0.037
TCD	1995	0.034	0.029	0.028	0.025		0.023	0.042	0.034	0.025	0.025
	2010	0.034	0.111	0.264	0.140		0.042	0.148	0.108	0.059	0.200
COG	1995	0.037	0.064	0.042	0.063	0.067		0.069	0.038	0.049	0.049
	2010	0.024	0.079	0.270	0.075	0.072		0.082	0.064	0.054	0.070
COD	1995	0.026	0.031	0.033	0.041	0.028	0.032		0.024	0.029	0.031
	2010	0.058	0.076	0.203	0.060	0.052	0.059		0.048	0.064	0.049
GNQ	1995	0.019	0.073	0.037	0.129	0.141	0.174	0.113		0.048	0.033
	2010	0.010	0.009	0.248	0.010	0.007	0.007	0.010		0.013	0.005
GAB	1995	0.017	0.026	0.026	0.031	0.026	0.026	0.029	0.023		0.030
	2010	0.028	0.028	0.268	0.031	0.030	0.030	0.041	0.030		0.025
STP	1995	0.151	0.181	0.154	0.157	0.186	0.168	0.156	0.170	0.169	
	2010	0.203	0.131	0.118	0.141	0.127	0.158	0.119	0.133	0.189	

Source: Author construction based on UNCTADSTAT data.

This low complementarity indicates that there are fewer products for which ECCAS member states are exporters and importers respectively and have high stakes in their respective trade profiles. The similarity of production and export profiles in the sub-region shows that they have few goods to share, especially because they are all producers and exporters of raw materials (wood, crude oil, etc.). The implication is a low potential for increasing intra-regional trade within the ECCAS zone after an effective implementation of the FTA. But, some countries in the

sub-region as Cameroon will have the possibility to expand their trade by providing some products to other countries in the sub-region.

4 The gravity potential effects of the ECCAS FTA

This section completes the analysis using trade indicators above done by a more rigorous econometric analysis: the estimation of a gravity model. The ECCAS FTA being not yet in force, the econometric approach that is often used is an *ex ante* situation is the use of a computable general equilibrium (CGE) model. However, these models are rarely used due to the complexity of their specification and the weak availability of necessary data (Greenaway and Milner, 2002). The *ex post* approach used here, through a gravity model, is to estimate post trade liberalization situation and then, to deduce from this estimate the potential impact of a FTA (Frankel, 1997; Choi and Scott, 2001; Greenaway and Milner, 2002; DeRosa and Gilbert, 2005). The potential for greater trade under a prospective FTA may be assessed by the significance and the magnitude of the estimated coefficients of the explanatory variables representing the prospective trade agreement (DeRosa and Gilbert, 2005).

4.1 The gravity model specification

The gravity model applied in international trade was developed independently by Tinbergen (1962) and Pöyhönen (1963), in reference to the Newtonian theory of gravitation. In the basic model, the volume of trade between countries is an increasing function of their size measured by their national income, and a decreasing function of transport costs approximated by the distance between their two economic centers. Mathematically, this is expressed as follow:

$$X_{ij} = A \left(Y_i Y_j / D_{ij} \right), \quad i \neq j^{13}, \quad D_{ij} \neq 0 \quad (1), \text{ where,}$$

X_{ij} is trade flows between countries i and j , Y_i and Y_j are economic sizes of country I and j (with respect to GDP, GNP or per capita GDP), D_{ij} is the distance between countries. A is proportionality constant.

Since Tinbergen (1962), the gravity model has been widely used and increasingly improved in empirical studies of international trade. Recent theoretical and empirical studies gave more legitimacy to this model by including other important determinants of bilateral trade, as population, language / ethnicity, etc. (Anderson, 1979; Evenett and Keller, 2002; Frankel, 1997, Anderson and Van Wincoop, 2003). The gravity model is now express of the form:

$$X_{ij} = \frac{(Y_i Y_j)(Pop_i Pop_j)}{D_{ij}} * B \quad (2)$$

Where $Pop_{i(j)}$ represents the populations of countries i and j , and B represents one or more factors that promote or restrict trade (language, colonial relationship, common border, etc.). If we introduce logarithms for the both side, the gravity equation becomes linear:

$$\ln X_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln Pop_i + \beta_4 \ln Pop_j + \beta_5 \ln D_{ij} + \beta_6 B_{ij} + u_{ij} \quad (3)$$

The estimate of such equation can provides an appropriate framework for assessing the potential impact of RTAs on the level and direction of trade. For that, we follow the approach developed by Frankel (1997), Choi and Scott (2001) and De Rosa and Gilbert (2006). This approach is to consider not only the existing RTAs in the gravity equation, but also the future RTAs. The potential growth of internal trade in a future FTA, such as ECCAS, could thus be assessing through the significance and magnitude of the estimated coefficient of the explanatory variable

¹³ In this study, i and j represent respectively the exporting country and the importing country.

representing the FTA (De Rosa and Gilbert, 2006). Also in order to isolate the likely trade creation and trade diversion effects deriving from the implementation of a FTA , we will follow the approach developed by Frankel (1997) and Carriere (2004) by introducing three dummy variables ($ECCAS_{intra}$, $ECCAS_{crea}$, $ECCAS_{div}$) indicative of membership or not of the ECCAS FTA . The gravity equation is then specified as follows:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ij} + \beta_4 \ln Pop_{it} + \beta_5 \ln Pop_{jt} + \beta_6 \ln RER_{ijt} + \beta_7 Landlocked_{ij} + \beta_8 Comborder_{ij} + \beta_9 ComLang_{ij} + \beta_{10} ECCAS_{intra} + \beta_{11} ECCAS_{crea} + \beta_{12} ECCAS_{div} + u_{ijt} \quad (4)$$

- X_{ijt} are trade between countries i and j.
- $Y_{it(jt)}$ represent the GDPs of countries i and j.
- $Pop_{it(jt)}$ are the populations of countries i and j
- D_{ij} is the distance between countries i and j. $Landlocked_{ij}$ is a dummy variable that takes the value 1 if one country is landlocked, 2 if the two countries are, and 0 if no country is.
- $Comborder_{ij}$ is a dummy variable equal to 1 if countries i and j share a common border and 0 otherwise.
- $Comlang_{ij}$ is a dummy variable equal to 1 if countries i and j use a common official language, and 0 if otherwise.
- RER_{ijt} is the real exchange rate between country i and country j.
- $ECCAS_{intra}$ captures the variation of trade flows among ECCAS members following the implementation of their FTA. It takes the value 1 if countries i and j belong to the ECCAS FTA and zero otherwise.

- $ECCAS_{crea}$ captures the evolution of trade flows among ECCAS members and the rest of the world. This variable indicates whether the FTA will lead to trade creation or not. It takes the value 1 if the importing country belongs to ECCAS and the exporting country does not.
- $ECCAS_{div}$ indicates whether the implementation of the ECCAS FTA lead or not to trade diversion. It takes the value 1 if the exporter is member of the ECCAS and the importer is not.

4.2 Data sources

Bilateral trade is here measured by the value of exports between countries i and j. We measure this variable as imports of country j from country i. The choice of this measure is justified by the fact that countries tend to register more imports than exports, mostly taxation purposes. This measure also has the advantage of taking into account transport costs as imports are recorded c.i.f value. Trade data used here come from UNCOMTRADE database downloaded via the World Integrated Trade Solution (WITS) developed by the World Bank.

Data on GDPs and populations are taken from the World Development Indicators (WDI) database collected by the World Bank.

The real exchange rate between the country i and country j is calculated from the nominal exchange rate of these countries and their consumer prices indices according to the following formula:

$$RER_{ijt} = \left(\frac{CPI_{it}}{CPI_{jt}} \right) \left(\frac{NER_{it}}{NER_{jt}} \right)$$

Where $CPI_{it(jt)}$ are the consumer price index of countries and j and $NER_{it(jt)}$ are the nominal official exchange rates. The data for these variables come from the International Financial Statistics (IFS) database of the International Monetary Fund.

All the other variables come from “the Gravity Dataset” and the “Distance” database for geographic data, both developed by the CEpii¹⁴.

Concerning the sampling, Fontagné et al. (2002) noted that the heterogeneity of the samples is one of the serious problems that often fail to take into account in many studies using gravity models. UNCTAD (2009) argues that this bias could explain why studies using more heterogeneous samples don't find any positive effect of RTAs on trade between the members, while more homogeneous samples generally show such an effect. To avoid this bias, Foroutan and Pritchett (1993) and Elbadawi (1997) suggests a restriction of the sample of countries, so as to include only countries belong or not to the RTA but which have a per capita GDP below 3000 US dollar. . So, our sample includes 29 exporting countries and 49 partners over the period 2000-2010 (see annex).

4.3 The estimation strategy

To estimate a gravity model with panel data, two estimation techniques are commonly used: estimation with fixed effects and estimation with random effects. The main assumption of the fixed effects model is that the specific effects of each pair of countries may be correlated with the independent variables without being correlated with the error term. The random effects model is an alternative to the estimation with fixed effects. It always takes into account

¹⁴Centre d'Etudes Prospectives et d'Informations Internationales.

unobserved heterogeneity, but allows the inclusion of variables that could be correlated with the fixed effects (including those that do not vary over time). To decide between these two techniques, the Hausman test should be performed.

Kepartsoglou, Karlaftis and Tsamboulas (2010) reviewed the literature on the effects of RTAs using gravity models, and found a clear preference for the use of fixed effects because they control both the heterogeneity between countries and the multilateral resistance to trade. However, Egger (2000, 2005) noted that the random effects model should be used if the estimation is interested by time invariant effects as is the case of many RTAs. Indeed, since the dummy variables representing a RTA are often defined over the entire study period, these variables change only when there are changes in the composition of the RTA during the period (Carrere, 2006). In this study, the composition of ECCAS FTA, which is our main variable of interest, has not varied during the period. This makes the random effects estimation most appropriate for this study, because fixed effects estimation will not allow us to have coefficient for our main variable of interest.

4.4 Estimation Results

Table 3 below shows that the variables of our conventional gravity equation generally have the expected sign.

The distance variables and Landlocked have significant negative coefficients as expected, supporting the negative impact of transport costs on trade. This inverse relationship between transport costs and trade is confirmed by the positive and significant sign of common border variable, which measures the effect of the proximity of the two partners on their trade.

Concerning our mains variables of interest, the variable $\ln D_{ij} t$ has a positive but not significant coefficient. That sign indicates a positive sensitivity of intra-ECCAS trade to trade liberalization initiative in the ECCAS area. But by applying the formula, it might be extrapolated that the gross increase of intra-ECCAS trade following an effective implementation of the FTA will be less than 15%. But in view of the low level of the intra-ECCAS trade, it seems not logical to conclude that this result does imply a substantial positive potential effect of the ECCAS FTA on the trade flows among its member states.

Table 5: Estimation results

Variables	Lnimports
$\ln D_{ij} t$	-1.129*** (0.098)
$\ln GDP_i$	0.739*** (0.0657)
$\ln Pop_i$	0.264*** (0.0715)
$\ln GDP_j$	0.981*** (0.0569)
$\ln Pop_j$	0.107 (0.0659)
$comlang_off_{ij}$	0.356* (0.190)
$comborder_{ij}$	1.354*** (0.305)
$comcol_{ij}$	1.460*** (0.210)
$landlocked_{i(j)}$	-1.314*** (0.129)
$eccas_{intra}$	0.133 (0.341)
$eccas_{crea}$	-0.461*** (0.175)
$eccas_{div}$	-0.900*** (0.199)
Constant	-29.89*** (1.336)
Observations	10,317
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1	

$ECCAS_{crea}$ and $ECCAS_{div}$ have significant negative coefficients. The signs of these coefficients mean that the implementation of the FTA ECCAS will affect negatively the ECCAS members' states imports from the rest of the world. So, the marginal increase in intra-trade following the implementation of the FTA will be at the expense of trade with the rest of the world. According to Viner (1950), this is a pure trade diversion, means that the increase in intra- trade that will result of the implementation of the FTA will not be a creation of new trade flows but rather a replacement of existing trade flows from the rest of the world. This could lead to a deterioration of the consumers' welfare in the sub-region as they will spend more to buy community's goods that will replace the cheapest ones from the rest of the world.

5 Conclusion

The main purpose of this paper was to evaluate the potential effects of the ECCAS FTA on trade flows among its member States, using two complementary methodological approaches: the analysis of some trade indicators and the estimation of an augmented gravity model.

The first approach showed that the potential to increase intra-ECCAS trade, following the implementation of the FTA, is limited by three main factors. The first factor is the narrow range of goods produced and traded by its member States. The second factor is that these countries have comparative advantages for the same products for which they are not important consumers. The last factor is the low complementarity of their trade profiles, showing that these countries have only few goods to trade between them.

The gravity model estimation revealed that an effective implementation of the ECCAS FTA will have a positive but not significant effect on trade flows among members. The small 15% of

potential increase of intra-ECCAS trade found by this model confirms the limited possibilities of trade within the ECCAS demonstrated by the previous analysis of trade indicators. In addition, this marginal increase in intra-ECCAS trade would be the consequence of a trade diversion from the rest of the world.

The main policy recommendation we may draw from this study is that to fully benefit from trade creation effects the theoretical literature associated with the creation of a FTA, the ECCAS countries must overcome production capacities constraints they are currently facing and especially, those relies to their production and trade structures. This imply for these countries to accompany the trade liberalization process by an active common industrial policy, based on the transformation of their huge natural resources. This industrialization could be built by mutualizing their production capacities, structuring and mastering the value chains at the sub regional level. This could be done for example by creating industrial pools in the sub-region and distribute them between the member states based on their comparative advantages and strengths to foster manufactures with critical size to supply the entire sub-region at a competitive cost. Such strategy will not only enable the sub-region to ensure the necessary inputs for the local industry, but also to multiply opportunities for intra-industry trade, key of intra-trade growth in some model FTA like the European Union and, the NAFTA.

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Annex

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