

REGIONAL INTEGRATION AND ECONOMIC DEVELOPMENT: THE CASE OF SENEGAL IN THE WAEMU

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(Draft version)

Abstract

Traditional approach of regional integration usually argues that South-South trade agreements are likely to generate trade diversion and income divergence. Such arguments are motivated by similarity in supply factors and demand bottlenecks due to the small size of integrated markets. In this paper, we examine the potential for South-South trade expansion by focusing our analysis on Senegal in the WAEMU. More specifically, we seek whether Senegal's participation to the WAEMU might improve its external trade and eventually allow expansion of South-South trade in the sub-region. To do this, we calculate three trade indicators: Balassa's Revealed Comparative Advantage (RCA) index, a Contribution to the Trade Balance (CTB) index, and a relative trade balance index describing the position (POS) of individual countries on international markets. In order to assess the magnitude of competition among WAEMU members in foreign markets, we then look at the export similarity indices. Our calculations show that the number of comparative advantage tends to increase in Senegal, suggesting an improvement in export diversification. Moreover, its export structure is relatively different from its WAEMU partners: the low indices of export similarity indicate that these countries are not in competition in global markets, so that there is significant potential for trade expansion in the sub-region.

Keywords: Trade Creation, Trade diversion, Comparative advantage, regional integration, South-South trade.

JEL Classification : F0, F1, F4, O4, O5

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1. Introduction

While the international debt crisis and the poor economic performance of most Less Developed Countries (LDCs) revealed the failure of import substitution industrialization, the rapidly growing Newly Industrializing Countries (NICs) of East Asia confirmed the early evidence pointed by Little and *al.* (1970) about international trade as an engine of growth¹. This difference in performance played an important role in reshaping policy views regarding development strategies. From the 1980s onwards, international organizations began to recommend export-oriented policies based on market-oriented reforms, reduction of trade barriers and the opening of domestic markets to foreign competition. These requirements embarked most LDCs in a generalized trade liberalisation and strengthened integration into the world economy. As a result, the overall growth in developing countries since 1998 has been driven by export earnings. From 29% in 1996, their share in world trade has increased to 37% in 2006 (UNCTAD, 2007).

On the other side, there has been increasing interest around the world for all sorts of trade agreements. Since the early 1990s, Preferential Trade Arrangements (PTAs) has spread as an alternative to unilateral or multilateral trade liberalization in the scope of the Doha Agenda for Development (DAD). From 20 in 1990, the number of trade agreements notified to the World Trade Organization (WTO) rose to 86 in 2000 and 159 in 2007 (UNCTAD, 2007). On the one hand, growing process of globalization tends to reduce distances and therefore the role of geographical proximity. But on the other hand, regional clustering of industrial activities has pushed into periphery a substantial number of areas. This renewal of interest for trade agreements as another way to integrate markets became a fundamental topic in the public policy debate (Baldwin and Venables, 1995). How do PTAs influence the industrialization process in developing countries? Do such agreements encourage convergence or divergence of real income?

Traditional analysis answers these questions using the ideas of trade creation and trade diversion in the context of comparative advantage (Viner, 1950). According to this approach, North-South and South-South Regional Trade Agreements (RTAs) operate in quite different ways. Early experiments of South-South RTAs in Africa and Latin America demonstrated a welfare reduction for the poorest members, trade diversion prevailing over trade creation in most cases (de Melo and Panagariya, 1993; Cadot and *al.*, 2000). More globally, South-South integration (or 'horizontal regionalism') tends to lead to divergence among member countries (Venables, 2003). This result is explained by the initial income level of member countries and the small size of integrated markets, hardly conducive to efficient industries. The low potential for trade creation also results from the fact that pro-competitive effects, as well as dynamic gains associated with economies of scale could not be exploited between Southern firms (Mayda and Steinberg, 2006). Should South-South integration increase trade between member countries, it would be done at the expense of non-members.

By contrast, if RTAs include relatively high income countries, it is the poorest ones that experience welfare gains from trade creation. North-South integration ('vertical regionalism') would cause convergence, thus bringing an incentive for developing countries to establish trade partnerships with developed countries (Schiff and Winters, 2003). Although characterized increasingly by bilateral agreements between developing and developed

¹ See Edwards (1993) for a broad survey of literature on the relationship between trade orientation and economic performance in the developing countries.

countries², the dynamics of regional integration has been prominently conducted by North-South PTAs.

Relying on an analysis in terms of trade creation versus trade diversion, North-South arrangements are better than South-South arrangements from the point of view of the participating Southern countries. However, the renewal of economic geography, along the lines of Krugman (1991) and Krugman and Venables (1995), has provided new theoretical insights on these phenomena and explain industrial agglomeration as a cumulative causation of centripetal forces. According to Puga and Venables (1998) for instance, economic development can be thought of as the spread of concentration of firms from country to country, and different trading arrangements may have a major impact on this agglomeration process. Their model showed notably that the gains from liberalization through PTA membership are likely to exceed those from unilateral action.

Puga and Venables (1998) also argued that North-South PTAs are likely to offer better prospects for Southern countries. However, relying on the same features, Rieber and Tran (2004) investigated the intra-zone disturbances induced by different scenarios of South-South regional arrangements. Indeed, many developing countries have instead undertaken growing experiments of South-South RTAs: the Common Market of the South (MERCOSUR) or Andean Common Market (ACM) in Latin America, the West African Economic and Monetary Union (WAEMU) or the Economic and Monetary Community of Central Africa (CEMAC) in Africa, the ASEAN Free Trade Area (AFTA) in South-East Asia.

Since the beginning of the New Millennium, South-South trade integration has gained growing interest, due notably to a globalization era driven by the two Asian giants, China and India. For instance, an ASEAN-China Free Trade Agreement (ACFTA) was signed in 2002 and is expected to become effective by 2012. By the same token, relaxed tensions between India and Pakistan led to the formation of the South Asia Preferential Trade Agreement (SAFTA) in January 2004. Yet, despite the implementation of numerous PTAs, intra-regional trade in Africa, and their external trade in broad terms, still remains very small. On the opposite, trade has drastically increased in the South-East Asian area, boosted by the rapid emergence of the Asian giants and the deepening of regional integration through favourable trade policies. This parallel evolution makes us wonder if such intra-regional trade development in South-East Asia has not been done at the expense of non-Asian countries.

Accordingly, our paper examines the potential for South-South trade by focusing our analysis on the case of Senegal in the WAEMU. More specifically, we seek whether Senegal's participation to the WAEMU might improve its external trade and eventually allow expansion of South-South trade in the sub-region. To do this, we start by examining its recent trade flows and participation to RTAs. We then compare international specialization of WAEMU members by calculating three trade indicators: Balassa's Revealed Comparative Advantage (RCA) index, a Contribution to the Trade Balance (CTB) index, and a relative trade balance index describing the position (POS) of individual countries on international markets. Finally, in order to assess the magnitude of competition among WAEMU members in foreign markets, we look at the export similarity indices.

The rest of the paper is organized as follows. Section 2 presents an overall description of Senegal's trade sector in comparison to other countries in the sub-region. Section 3 analyses quantitatively its international specialization by using trade indicators. Section 4 concludes and summarizes the main results.

² This phenomenon is also called "New regionalism" because it includes broader areas than trade of goods and organizes a deep integration that goes beyond what would allow the multilateral framework.

2. Senegal's foreign trade: an overview

2.1. Trade regime

Senegal is a West African developing country who belongs since 2001 to the list of Least Developed Countries (LDCs) established by the United Nations on the basis of three criteria: low income, weak human assets, economic vulnerability. Among factors explaining its addition to the list are bad socio-economic indicators (mainly, low education enrollment and high child mortality rate) and macroeconomic instability. Furthermore, Senegal presents overall characteristics of a traditional society, as its economy is mainly driven by small activities of agriculture and services. In 2005, the primary and tertiary sectors accounted for respectively 17% and 59% of GDP, while the former employed more than 70% of total labour force³.

After its accession to national independence, Senegal pursued an import substitution policy as many developing countries. This policy orientation had very negative effects on its export and growth performance (Annabi and *al.*, 2005). In the early 1980s, with the implementation of the World Bank's structural adjustment program, the country adopted export-oriented policies based on market-oriented reforms, dismantled trade barriers and opened its domestic markets to foreign competition. Senegal has undertaken over the past few years a set of policies aimed mainly at reducing poverty. We can quote all the initiatives notified under the framework of its last Document of the Strategy for Reducing Poverty (DSRP 2) which includes an accelerated growth strategy. Its trade policy stands mainly in the continuity of measures undertaken within the framework of institutional reforms, as well as its participation to RTAs.

Table 1: Senegal's participation to Regional Trade Agreements.

Agreements	Type	Date	Countries
West African Economic and Monetary Union (WAEMU), formerly Economic Community of West Africa (CEAO)	Customs Union	Created in 1973 Notified to the WTO on 27/10/99 and into force since 01/01/00	Senegal, Benin, Burkina Faso, Guinea Bissau, Ivory Coast, Mali, Niger, Togo
Economic Community of West African States (ECOWAS)	Free Trade Agreement	Created in 1975 Revived in 24/07/93 Notified to the WTO on 09/07/05	WAEMU countries, Mano River Union (Guinea, Liberia, Sierra Leone), Nigeria, Ghana, Gambia Cape Verde
CFA Franc Zone	Common Currency		UEMOA countries, CEMAC countries (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon)

Source: Schiff and Winters (2003)

In 1975, Senegal had engaged in a regional agreement with 14 other West African countries known as the Economic Community of West African States (ECOWAS). The agreement was designed to strengthen regional integration in West Africa in order to promote intra-regional trade, seen as favourable to growth and economic development. The Treaty of this agreement was later modified in 1993 to allow deeper progress toward an economic and monetary union. The new treaty included the objectives of creating a central bank, a court of justice, a parliament, an executive secretariat and an economic and cultural council.

³ *World Development Indicators*, World Bank.

On 12 January 1994, following devaluation of the CFA franc, seven over the fifteen countries of ECOWAS which have the particularity of sharing the CFA Franc, launched the initiative of creating a common sub-regional market called West African Economic and Monetary Union (WAEMU). In 1997, these countries were later joined in their negotiations by Guinea-Bissau (Table 1). In addition to these two sub-regional agreements, Senegal has signed with other countries or country groups bilateral trade agreements. Since the creation of the WAEMU, all these bilateral agreements are taken over by the WAEMU. There are however three agreements that Senegal signed regardless of other countries of the union: with Vietnam, the Czech Republic, and Uganda.

RTAs are common in Sub-Saharan Africa and reflect an aspiration to overcome the limitations of small states. In this connection, progress has been made in the continent over the past decade: average applied Most Favoured Nation (MFN) tariffs were cut by half between the 1990s and 2003. In 2007, half of the countries in the region made at least one positive reform to make doing business easier, putting Sub-Saharan Africa in fourth place in business reforms. FDI increased thirteen-fold between 1990 and 2005, from \$1.2 billion to \$16.5 billion (UNCTAD, 2007).

Although African countries belong to numerous RTAs, this has not always been accompanied by significant intraregional trade. Despite severe reduction of applied MFN tariffs, non-border barriers still restrict internal trade: in particular, most countries in the region face high transport costs and have weak institutions to facilitate trade. Among the regional integration schemes at work, the Economic and Monetary Community of Central Africa (CEMAC) displays the lowest intraregional trade share with less than 2% of total trade during the period 2003-2006 (UNCTAD, 2007). By contrast, trade links between the members of the WAEMU and between the WAEMU and other sub-regions in Africa are much more developed. In 2006, 26% of WAEMU's exports went to ECOWAS and 32% to Africa as a whole. Moreover, trade integration in WAEMU has advanced more rapidly and is more successful than ECOWAS in terms of policy-making and institutional framework. Among reasons having facilitated the better progress in WAEMU is the argument of common currency (the CFA Franc). Also, the WAEMU became a total customs union since 2000 with the adoption of a common external tariff (CET) and the dismantling of trade barriers within the union⁴.

In short, it is commonly argued that the recent RTAs in Africa have had more impact on outward-looking trade liberalization, and thus on external trade, than on intraregional trade.

2.2. Trade structure

Senegal is rather open to trade in comparison with its WAEMU partners: in 2005, its merchandise trade in percent of GDP climbed to 55%, slightly above the WAEMU average. However, he registers a persistent trade deficit since the early 1990s, as imports grow on average faster than exports (respectively at a rate of 7.1% and 4.9% per year during the period 1990-2005). This trade balance is consistent with its development level and most West African countries, as domestic demand is mainly supplied by imports.

⁴ Since its creation, it was expected that ECOWAS should move toward a monetary and customs union. However, the project has not moved forward because of some difficulties in the negotiations. The community decided in January 2006 to begin the implementation of the CET which converges to the same structure as the WAEMU. The transitional period for its implementation spanned in the period from 1st January, 2006 to 31st December, 2007. But at the end of this period, there remained unsolved problems, including the establishment of the list of products that will not be subject to the final CET in the case of Nigeria.

Table 2 illustrates Senegal's trade structure; data used here are from the United Nations' division of statistics and the Commodity Trade Statistics Database (COMTRADE). Whereas Senegal is a rice producing country, this cereal is part of its most imported products; we find the same for dairy products. The bulk of Senegalese imports still concentrated on manufactured goods having a very limited national production. Finally, Senegal also imports a great quantity of oil products to serve the local or sub-regional market after transformation.

Table 2: Senegal's foreign trade by product

IMPORTS	1990	1994	2000	2001	2005	EXPORTS	1990	1994	2000	2001	2005
0 à 2 of which	30,34	24,96	23,08	27,20	28,69	0 à 2 of which	48,51	28,65	48,91	43,77	31,60
042 Rice	18,79	18,73	30,52	30,30	36,73	034 Fish, fresh, chilled or frozen	22,90	16,88	28,34	36,72	27,60
022 Milk and cream	7,75	16,15	7,81	6,94	7,82	036 Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	10,11	4,12	48,68	26,98	15,24
3 à 5 of which	27,74	36,26	35,89	30,57	34,76	3 à 5 of which	43,90	57,72	41,22	44,65	44,51
333 Crude petroleum and oils obtained from bituminous minerals	29,03	11,27	52,51	31,88	31,39	334 Petroleum products, refined	28,06	28,24	27,78	34,70	35,06
334 Petroleum products, refined	25,29	37,56	7,42	14,72	27,19	522 Inorganic chemical elements, oxides and halogen salts	21,36	27,80	23,43	21,49	28,54
6 à 8 of which	41,92	38,63	41,02	42,22	36,49	6 à 8 of which	7,58	13,58	9,76	11,33	22,09
781 Passenger motor vehicles (excluding buses)	6,83	5,32	7,53	8,69	7,37	661 Lime, cement, and fabricated construction materials	3,22	2,48	9,35	10,99	16,38
673 Iron and steel bars, rods, shapes and sections	3,11	5,98	2,49	2,99	5,51	784 Motor vehicle parts and accessories, nes	0,71	0,50	0,13	0,80	11,99
9	0,00	0,15	0,01	0,01	0,05	9	0,00	0,05	0,11	0,25	1,80

Source : Authors' calculations

Note: We aggregated trade flows in the following manner: The group "0 to 2" for all goods of the Standard International Trade Classification (SITC) Revision 2, which are raw animals and vegetal products, the group "3 to 5" for chemicals, fuel and oil, the group "6 to 8" for manufactured goods and the group "9" for all unclassified products. For the code 784, parts and accessories concern only tractors and cars.

In front of this strong import constraint, Senegal has very little exports in the world market. Indeed, its exports are mainly concentrated in a very limited number of sectors. There are for example petroleum products, aquatic and chemical products. On the period we consider, on average more than 40% of exports are on the SITC class 0 to 2 products, in which more than 60% are fishery products. Then more than 40% are constituted of Fuel and oil, including more than 30% and 25% respectively for the refined petroleum products and inorganic chemicals. Finally, despite a good evolution, manufactured products occupy a relatively low part of exports. This low export diversity and its high concentration on low value adding sectors, the primary sector, make very difficult the Senegalese export expansion. In addition to that, the country's major companies are facing important managerial problems; let's mention the case of the Chemical Industries of Senegal which are over the past few years in an economic paralysis.

Regarding trading partners, we find that the first supplier country of Senegal is France, for reasons related to colonial history (Table 3). France is indeed a historic partner of Senegal, even if today it does not represent the first destination of Senegalese products. In the sub-region, Senegal imports a lot from Nigeria mainly for petroleum products, because Nigeria is the largest oil producer of the zone. Then in second position comes the Ivory Coast which provides Senegal mainly in manufactured goods and agro-industrial goods. Imports from the

ECOWAS remain globally low, less than 15% per year, the bulk of suppliers are in Europe (France, England).

Senegalese imports from Asia are rising steadily. Asian countries in the forefront of which we find Thailand are mainly suppliers of cereal products, particularly rice. More recently we notice the rise of some countries' (like China and India) share in the country's imports. These countries provide Senegal in other products such as electronic and electric products in the case of China, or vehicles and other machines for India.

Senegal exports more than it imports to the sub-region, particularly with the countries of WAEMU. Since the entry into force of the agreement in 2000, exports to WAEMU are almost continuously rising. They moved from 13.12% in 2000 to 31.65% in 2005, with as first client Mali. Outside the sub-region, India is the second client of Senegal, mainly for chemicals: hence the particular concern granted by the Indian partners of the Chemical Industries of Senegal about their recapitalization. Finally, in the list of its key clients, we find European countries such as France, Italy or Spain to which Senegal exports mainly fishery products.

Table 3: Senegal's foreign trade by country

IMPORTS	1990	1994	2000	2001	2005	EXPORTS	1990	1994	2000	2001	2005
WAEMU	4,70	3,95	2,73	3,12	3,59	WAEMU	13,30	16,00	13,12	14,06	31,65
Ivory Coast	95,36	99,16	96,60	91,72	97,15	Mali	58,79	66,41	49,56	56,14	68,52
Togo	0,03	0,01	0,12	1,27	0,57	Guinea Bissau	4,74	5,65	13,64	0,00	11,60
ECOWAS (out of WAEMU)	7,75	4,60	19,26	10,35	10,89	ECOWAS (out of WAEMU)	3,93	6,44	9,91	10,37	11,12
Nigeria	97,73	98,31	98,48	95,05	95,44	Gambia	24,64	28,40	50,93	37,65	50,80
Ghana	0,00	0,33	1,03	3,01	3,87	Guinea	54,48	28,40	16,90	43,26	30,62
NPI2+3	6,48	7,46	12,28	13,42	15,03	NPI2+3	13,77	20,16	15,02	15,55	16,13
Thailand	45,65	50,54	43,54	57,29	33,09	India	85,02	86,85	86,12	90,99	90,77
China	35,68	33,73	21,84	18,27	23,80	China	0,40	0,05	12,92	7,58	6,91
RDM	81,07	83,98	65,74	73,12	70,49	RDM	69,00	57,39	61,95	60,02	41,10
France	40,88	41,24	41,82	38,13	29,79	France	55,52	36,43	31,40	31,79	25,09

Sources : Authors' calculations

The evolution of the structure of imports remains significantly different from that of exports. Generally we find that even if the share of the West African sub-region (in particular the WAEMU) remains very low, Senegal is turning increasingly toward these countries concerning exports. We also notice that trade with countries of the two sub-regional blocs (WAEMU and ECOWAS) is not uniform, and this appears more on imports where only two countries concentrate almost all of its imports (Ivory Coast and Nigeria). The trade with Asian countries, in contrast to that with European countries, is on an upward sloping trend. However, in this case, at the opposite of trade with the West African sub-region, exports are more concentrated, India totalizing the largest share of Senegalese exports toward this region.

Before the devaluation of the CFA franc, the manufacturing sector of Senegal has experienced serious problems of competitiveness on the world market. This was caused by a failure in total factor productivity, partly linked to the import substitution policy conducted before and to other more structural problems (Latreille and Varoudakis, 1996). This weakness of the productivity gains, overestimating the real exchange rate, justified the devaluation of the CFA franc to reduce the gaps which the economy suffered. While recognizing the benefits of this devaluation undergone by all the CFA-zone, the authors conditioned the continuity of this improvement to a growth strategy with exports as a main engine. Countries would stimulate their sectors able to show greater competitiveness on the world market. However, for Annabi

and *al.* (2005), the fact that Senegal has signed a large number of trade agreements and the fact that since 2001 it belongs to the Least Developed Countries, with all the advantages in terms of treatment it gives to it, have not allowed stimulating significantly its exports. The main reason cited is a lack of competitiveness of domestic products caused by a misalignment on the standards of quality, by high production costs, but also by the multiple grants that benefit foreign competitors on the world market.

3. Regional integration and South-South trade

3.1. A short review of the empirical literature

There exists a considerable literature which addresses regional integration and its impact on economic welfare. South-South regional trade agreements remains a puzzled issue however, as empirical evidence supports the idea that the overall effect might be positive as well as negative, each case requiring a specific assessment (UNCTAD, 2007).

A first set of studies relies on trade data to assess whether international specialization according to comparative advantage may alter economic welfare by creating and diverting trade flows. According to them, regional integration may improve economic welfare if there is simultaneously an increase in trade among member countries and an overall improvement in their comparative advantage. Yeats (1998) or Cadot and *al.* (2000) in the specific case of PTAs in Africa, as well as Schiff (1997) for South-South regional trade agreements in general, showed that developing countries are unlikely to create trade flows between them. Should their trade flows expand, this would happen at the expense of more efficient non-members. In the same vein, the World Bank (2000) concluded that trade diversion is more likely to happen when the initial level of Common External Tariff (CET) jointly defined by member countries in the case of customs unions is high. More globally, empirical studies relying on comparative advantage suggest that the overall effect on welfare would depend, among others, on the characteristics of member countries, the existing degree of trade dependence, initial cost differences and the degree of complementarity in their productive structures (UNCTAD, 2007).

A second set of studies use Computable General Equilibrium (CGE) models in order to measure the actual changes in trade flows and welfare resulting from specific regional arrangements. For example, Evans (1998) or Lewis and *al.* (1999) showed that in some Sub-Saharan regional trade agreements, trade creation prevailed. Flores (1997) concluded to the same results in the case of MERCOSUR. Overall, the majority of empirical studies using CGE models report small effects on both members and non-members, with net trade creation the more likely outcome and positive overall welfare gains (UNCTAD, 2007).

Finally, more recent studies use gravity models to focus on the influence of historical and geographical forces on trade. Indeed, assuming that most countries trade relatively more with their neighbours than with more distant trading partners, there is an unavoidable spatial dimension to regional integration (the so-called ‘neighbourhood bias’). Relying on an approach initiated by Clausing (2001) and Romalis (2005), Mayda and Steinberg (2006) showed that Uganda’s participation to the Common Market of East and South Africa (COMESA) has not created trade flows with other countries. The main explanation is that these countries are not “natural” trading partners arising from geographical proximity. This seems to be a general rule for the Southern countries: whatever the policy aimed at stimulating trade between them, the result might still be low. However, this ‘neighbourhood

bias' argument is not convincing from the perspective of Southern countries, as transaction costs are not a direct function of distance but may depend on supply bottlenecks, infrastructure, macroeconomic conditions, etc. As mentioned in UNCTAD (2007), transaction costs for certain countries in Africa are lower in economic exchanges with countries in the other regions than with neighbouring countries. The growing number of PTAs linking African and Asian countries puts strong evidence on this argument.

In order to assess the potential for South-South trade in the WAEMU, our investigation retains the first approach. Assuming that such potential depends mainly upon static gains at the first stage of regional integration, our study puts stress on the existing degree of trade dependence and complementarity of productive structures among member countries. On the basis of foreign trade data available for Senegal and its trading partners, we calculate indicators of comparative advantage. The results will be complemented by an analysis of export structure similarity.

3.2. Indicators of comparative advantage and export similarity

This section aims at identifying sectors in which the WAEMU members enjoy relative competitive strength and the extent of trade competition among them. Traditionally, the index of Revealed Comparative Advantage (RCA) proposed by Balassa (1965) measures comparative advantage by dividing a country's share of exports in a particular product by the same world's share.

$$RCA_{ij} = \frac{X_{ij}}{\sum_i X_{ij}} \bigg/ \frac{\sum_j X_{ij}}{\sum_i \sum_j X_{ij}} \quad (1)$$

where:

X_{ij} is country j 's exports of commodity i and $\sum_i X_{ij}$ is country j 's total exports

$\sum_j X_{ij}$ is world exports of commodity i and $\sum_i \sum_j X_{ij}$ is total world exports

RCA_{ij} reveals a comparative advantage if country j 's share of exports of a certain commodity i is greater than the world's share; that is, the RCA is greater than 1. The index allows comparisons between countries at any time (here, the WAEMU members), and allows changes in the structure of comparative advantage to be tracked over time. Thus, RCA indices and their evolution provide broad information about a country's specialization pattern relative to the structure of world trade.

However, the RCA indices are derived from export data only. The conclusion might be incorrect, since product-based RCA might reveal a country's comparative advantage in one product, but in fact it imports parts and does the labour-intensive activities of assembling. In such a case, saying that the country has a comparative advantage in the corresponding good while ignoring its high level of imports might be doubtful. Furthermore, the RCA indices might be biased by the size of the country's market and the influence of changes which are not specific to the country but result from fluctuations of each commodity in world markets.

In order to eliminate such distortions, the CEPII has developed an analytical indicator of comparative advantage based on the trade balance⁵ instead of relative export structures. For product i and country j , the balance is first expressed in thousandths of Purchasing Power Parity (PPP) GDP in current dollars of country j (GDP_j).

$$y_{ij} = 1000 * \frac{X_{ij} - M_{ij}}{GDP_j} \quad \text{where } M_{ij} \text{ denotes imports by country } j \text{ of product } i$$

The contribution of product i to total trade balance (CTB), in relation to GDP, is defined by:

$$CTB_{ij} = y_{ij} - \left(\frac{W_i}{W} \right) * y_j$$

where world trade of product i is $W_i = \sum_j (X_{ij} + M_{ij})$,

world trade of all products is $W = \sum_i \sum_j (X_{ij} + M_{ij})$,

and total trade balance of country j in relation to GDP is $y_j = 1000 * \frac{X_j - M_j}{GDP_j}$

The indicator depends on the spread between the trade balance of product i (relative to GDP) and the global trade balance, weighted by the share of product i in world trade. Defined in this way, the indicator reveals a comparative advantage pattern as any deviation of the specific product to the overall balance corresponds to an advantage (disadvantage) if the contribution to the overall balance is positive (negative). Indeed, this leads to the following index:

$$CTB_{ij} = 1000 * \frac{W_i}{GDP_j} * \left[\frac{(X_{ij} - M_{ij})}{W_i} - \frac{X_j - M_j}{W} \right] \quad (2)$$

Thus, the contribution of product i to the total trade balance of country j corresponds to the spread between the country's position on the international market for product i and its global position. For interpretation of results, two points should be kept in mind:

- First, market position of each country j on product i (POS) measures its international competitiveness. It is defined by its relative trade balance, defined as follows:

$$POS_{ij} = 100 * \frac{(X_{ij} - M_{ij})}{W_i} \quad (3)$$

- Second, country j gets comparative advantage in product i if the CTB is positive: it means that product i is a strong point of country j , as it contributes positively to the overall balance. Either the relative trade balance on i exceeds the overall balance when they are both positive, or conversely when they are both negative. In the latter case, country j may have a comparative advantage on product i ($CTB > 0$) even though he is not competitive on its international market ($POS < 0$).

Finally, in order to assess the degree of export similarity or trade competition among the WAEMU members, we use here the *Cosinus* index⁶ (COS) which, by definition, determines

⁵ The Centre for Prospective Studies and International Information is a French public institution. For further details, see on their website : <http://www.cepii.fr/anglaisgraph/bdd/chelem.htm>

⁶ Some studies used the Finger-Kreinin index to measure the degree of export similarity. It compares the sectoral distribution of two countries' export supply in a reference market. If these two countries have totally identical export structure, the share of each product in one country's total exports should be the same than for the other country. The indicator varies between 100 (if there is total similarity) and 0 (otherwise).

the angular distance between two export vectors. Country *i* and *j* will have the same export structure if their two export vectors are one and the same in world markets: hence, the angle they form will have a cosine equal to 1. Conversely, their exports will be completely different if their two export vectors are perfectly orthogonal (cosine equal to 0): in the latter case, the two countries will have complementary export supply. The Cos index is defined as follows:

$$COS_{ij} = \frac{\sum_k X_{ik} * X_{jk}}{\sqrt{\sum_k X_{ik}^2 * \sum_k X_{jk}^2}} \tag{4}$$

All these trade indicators are computed for the WAEMU members using data from the United Nations statistics division as follows: export and import data are from the Commodity Trade Statistics Database (COMTRADE) following the Standard International Trade Classification (SITC) second revision at a three-digit SITC level. Data on PPP GDP are from the World Development Indicators (WDI) of the World Bank. Due to missing data, we have excluded Guinea-Bissau from our calculations.

3.3. Interpretation of results

As mentioned before, Senegal’s trade balance has constantly worsened along the last ten years, despite the government’s prompt responses towards trade. Among the WAEMU countries, only the Ivory Coast has registered a trade surplus over the period under consideration. Within the WAEMU, Senegal is actually the member registering the highest trade deficit. However, its magnitude is mainly attributable to a very small number of imported products (rice, closely followed by crude oil). That’s why we need to have a deeper look at its trade structure.

Table 4 depicts first the number of comparative advantages by country compared to the WAEMU average. It shows a striking picture of comparative advantage for Senegal, with a number almost always higher than the WAEMU average. However, Senegal has a positive trade balance for only 26 export products under the period 1990-2005. He is ranked at fourth range in the sub-region by number of products with trade surplus: behind the Ivory Coast with 58 products, Togo with 31 products and Niger with 26 products. Taken as whole, the results of calculation for all 239 three-digit SITC indicate that the WAEMU countries register trade surplus for around 10% of products.

Table 4: Number of products with comparative advantage by indicator

Indicators	Countries	1996	2000	2003
RCA	Benin	15	15	14
	Burkina Faso	17	27	17
	Ivory Coast	32	34	32
	Mali	13	12	ND
	Niger	18	28	17
	Senegal	30	32	37
	Togo	33	33	42
	WAEMU average	23	26	27

<i>CTB</i>	Benin	66	76	82
	Burkina Faso	94	113	112
	Ivory Coast	32	34	32
	Mali	75	71	ND
	Niger	24	84	76
	Senegal	112	103	109
	Togo	103	83	68
	WAEMU average	72	81	80
<i>POS</i>	Benin	18	17	17
	Burkina Faso	18	18	15
	Ivory Coast	57	58	58
	Mali	15	17	ND
	Niger	32	34	12
	Senegal	18	27	27
	Togo	36	31	42
	WAEMU average	28	29	29

Source : Authors' calculations

Table 5 reports the strengths and weaknesses of Senegal's trade specialization according to the RCA and CTB indices of comparative advantage. We have also compiled the same indicators for all other WAEMU members and summarized them in *Appendix*. Unsurprisingly, their comparative advantage lies mainly in unprocessed products, either from the sea or sub-soil extraction. However, Senegal often presents comparative advantage on products which, at intermediate levels, correspond to comparative disadvantage of its trading partners in the sub-region. But on the opposite, he has comparative disadvantage in products which are not necessarily exported by the other WAEMU members.

From the perspective of the RCA indices, only few products, such as rice (SITC 042) and armaments (SITC 951)⁷, moved from disadvantage in 1990 to a comparative advantage position in 2005. In fact, the majority of products which were a comparative advantage in 1990 still remained in 2005: this means that Senegal has not improved substantially its competitive strengths during the period under consideration.

Even though, some products which began with a disadvantage in 1994 have seen their disadvantage reduced and in some cases it even turns into a comparative advantage. For instance, the indicator shows that Senegal has now a much more pronounced comparative advantage in fishery products, chemical products and petroleum products. It also has an advantage, but less important, in some agricultural products (rice, cotton and other cereals), and on cement and other construction materials.

The CTB indices show that Senegal's comparative advantage has deteriorated drastically in some animal and vegetables products, petroleum products and basic industry products. Among the 30 products which have the greatest comparative disadvantage in 2005, there were three which had a comparative advantage in the early 1990s (SITC 423, 011 and 333)⁸. There are also 13 products which had an advantage in 1990 and lost it in 2005. For products at the bottom of the range, a few have won in "competitiveness" in 2005: products which experienced a significant reversal position from a negative to a positive one are mainly in SITC 7 category (SITC 773, 749, and 713)⁹. Finally, during the whole period under

⁷ 951 (Armoured fighting vehicles, war firearms, ammunition, parts, nes).

⁸ 011 (Meat and edible meat offal, fresh, chilled or frozen). 333 (Crude petroleum and oils obtained from bituminous minerals). 423 (Fixed vegetable oils, soft, crude, refined or purified).

⁹ 713 (Internal combustion piston engines, and parts thereof, nes). 749 (Non-electric parts and accessories of machinery, nes). 773 (Equipment for distribution of electricity).

consideration, rice (SITC 042) is the weakest point of the Senegalese economy, with a worsening comparative disadvantage.

Table 5: Senegal's comparative advantage in 1996 and 2005.

RCA indices			
TOP RANKING			
<i>Commodity</i>	<i>1996</i>	<i>Commodity</i>	<i>2005</i>
271 Fertilizers, crude	400,45	522 Inorganic chemical elements, oxides and halogen salts	44,45
522 Inorganic chemical elements, oxides and halogen salts	76,43	036 Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	42,38
263 Cotton	32,66	042 Rice	39,02
562 Fertilizers, manufactured	31	034 Fish, fresh, chilled or frozen	29,34
278 Other crude minerals	15,47	951 Armoured fighting vehicles, war firearms, ammunition, p.	26,90
334 Petroleum products, refined	10,78	661 Lime, cement, and fabricated construction materials	20,69
692 Metal containers for storage and transport	9,44	263 Cotton	18,90
211 Hides and skins, excluding furs, raw	7,6	278 Other crude minerals	12,25
423 Fixed vegetable oils, soft, crude refined or purified	5,74	037 Fish, crustaceans and molluscs, prepared or preserved, nes	11,60
282 Waste and scrap metal of iron or steel	5,08	423 Fixed vegetable oils, soft, crude refined or purified	11,16
BOTTOM RANKING			
656 Tulle, lace, embroidery, ribbons, trimmings		724 Textile and leather machinery, and parts thereof, nes	
897 Gold, silver ware, jewelry, articles of precious materials		711 Steam boilers and auxiliary plant; and parts thereof, nes	
881 Photographic apparatus and equipment, nes		871 Optical instruments and apparatus	
277 Natural abrasives, nes		689 Miscellaneous non-ferrous base metals	
842 Mens and boys outerwear, textile fabrics		268 Wool and other animal hair (excluding tops)	
515 Organo-inorganic and heterocyclic compounds		233 Synthetic rubber, latex; waste, scrap of unhardened rubber	
761 Television receivers		676 Rails and railway track construction materials	
664 Glass		072 Cocoa	
662 Clay and refractory construction materials		671 Pig and sponge iron, spiegeleisen, etc, and ferro-alloys	
843 Womens, girls, infants outerwear, textile		091 Margarine and shortening	
CTB indices			
TOP RANKING			
522 Inorganic chemical elements, oxides and halogen salts	6,66	522 Inorganic chemical elements, oxides and halogen salts	8,42
752 Automatic data processing machines and units thereof	3,98	034 Fish, fresh, chilled or frozen	6,40
562 Fertilizers, manufactured	3,58	036 Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	4,92
271 Fertilizers, crude	3,12	784 Motor vehicle parts and accessories, nes	3,25
781 Passenger motor vehicles (excluding buses)	2,69	776 Thermionic, microcircuits, transistors, valves, etc	3,01
784 Motor vehicle parts and accessories, nes	2,44	931 Special transactions, commodity not classified	2,91
764 Telecommunication equipment, nes	2,33	759 Parts, nes of and accessories for machines of 751 or 752	1,78
792 Aircraft and associated equipment, and parts thereof, nes	2,19	752 Automatic data processing machines and units thereof	1,60
263 Cotton	2,13	553 Perfumery, cosmetics, toilet preparations, etc	1,39
778 Electrical machinery and apparatus, nes	1,42	037 Fish, crustaceans and molluscs, prepared or preserved, nes	1,25
BOTTOM RANKING			
782 Lorries and special purposes motor vehicles		248 Wood, simply worked, and railway sleepers of wood	
673 Iron and steel bars, rods, shapes and sections		783 Road motor vehicles, nes	
098 Edible products and preparations, nes		341 Gas, natural and manufactured	
692 Metal containers for storage and transport		334 Petroleum products, refined	
022 Milk and cream		541 Medicinal and pharmaceutical products	
061 Sugar and honey		424 Other fixed vegetable oils, fluid or solid, crude, refined	
423 Fixed vegetable oils, soft, crude refined or purified		673 Iron and steel bars, rods, shapes and sections	
333 Crude petroleum and oils		022 Milk and cream	
042 Rice		333 Crude petroleum and oils obtained from bituminous minls	
334 Petroleum products, refined		042 Rice	

Source : Authors' calculation

The Cos index allows us to assess whether countries tend to compete in export markets or rather complement one with the other. In general, exports of West African countries are rather different. In the case of Senegal, the values of the Cos index are all below 20%, except that with Togo which, for some years, has exceeded 40%, but steadily declining (*Table 6*). The small level of export similarity between the WAEMU countries is in contradiction with what traditional theory predicts. Indeed, one reason which was raised to explain the low economic exchanges between the Southern countries was the similarity of their productive supply. That supply similarity was such that products imported by a country of the union could not be more

efficiently produced by another country of the union. Thus, imports of each country of the union would mostly come from third countries.

Table 6: Indicator of export similarity for Senegal.

COS index ^a		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
ECOWAS	WAEMU	<i>Mali</i>		0,15	0,16	0,12	0,05	0,02	0,01			
		<i>Togo</i>	0,48	0,43	0,34	0,26	0,25	0,11	0,13	0,12	0,12	0,17
		<i>Benin</i>	0,14	0,13	0,13	0,12	0,06	0,04	0,05	0,07	0,12	0,09
		<i>Ivory Coast</i>	0,15	0,20	0,21	0,15	0,19	0,21	0,00	0,14	0,16	
		<i>Burkina Faso</i>	0,20	0,16	0,17	0,15	0,06	0,06	0,05	0,07	0,13	0,11
		<i>Niger</i>	0,01	0,01	0,02	0,02	0,03	0,02	0,01	0,03	0,03	
		<i>Nigeria</i>		0,01	0,01	0,00	0,01	0,08	0,07	0,09	0,14	
		<i>Ghana</i>		0,04	0,03	0,03	0,07	0,05	0,10		0,02	0,05
		<i>Gambia</i>	0,03	0,08	0,06	0,03	0,05	0,26	0,26	0,07	0,27	0,08
		<i>Guinea</i>	0,19	0,13	0,09	0,13	0,18	0,07	0,10	0,22		

Source : Authors' calculation

^a Some ECOWAS countries are excluded from calculation due to missing data.

Following our calculation of Cos indices for the WAEMU area, it should be noted that only Burkina Faso has tended to have very high indices of exports similarity with its WAEMU partners (Table A2 in *Appendix*). We note a very strong resemblance with three other countries in the sub-region: Benin (with an index around up to 1 and very stable over the period), Mali (with an index starting from 0.9 but constantly declining), and Togo (about 0.6). Early calculation of RCA and CTB indices support this high similarity of export structure between the four WAEMU members (Table A1 in *Appendix*). Burkina Faso and its three trading partners have tended to get comparative advantage on the same products. These empirical results suggest therefore potential export rivalry between this sub-group, in contrast to Senegal with its WAEMU partners.

4. Conclusion

Since the beginning of the New Millennium, South-South trade integration has gained growing interest, due notably to a globalization era driven by the successful economies of South-East Asia. The growing number of South-South regional blocs, as well as the composition of intraregional trade, suggest an important potential for trade expansion among developing countries in support of export diversification and industrial development.

Accordingly, our paper has examined the potential for South-South trade in Africa by focusing our analysis on the case of Senegal in the WAEMU. More specifically, does Senegal's participation to the WAEMU improve its external trade and eventually allow expansion of South-South trade in the sub-region? To do this, we have calculated compared indicators of comparative advantage for the WAEMU members: Balassa's Revealed Comparative Advantage (RCA) index, a Contribution to the Trade Balance (CTB) index, and a relative trade balance index describing the international market position (POS) of individual countries by product. Finally, in order to assess the magnitude of competition among WAEMU members in foreign markets, we have looked at the export similarity indices.

Overall, Senegal was one of the fastest growing economies in Africa during the last ten years: even more, it has achieved greater success than its WAEMU partners in terms of GDP per

capita growth. Despite a comprehensive extension of trade arrangements with its neighbours however, Senegal's imports from WAEMU still remain negligible. In particular, global trends on international trade are also supported locally by individual country: *ie*, Senegal has increasingly diverted its import flows from industrialised countries (France were its historical partner) at the benefit of the successful South-East Asian economies. On the opposite, exports have experienced a rather positive trend: Senegal's exports to WAEMU have contributed more than 75% to the overall growth of total exports. This trade reorientation towards regional partners has also occurred at the expense of traditional partners (notably France). This positive trend makes us wonder if the integrating area is going to experience trade creation or diversion.

Calculation of trade indicators has showed that Senegal is one of the countries registering the highest number of comparative advantage in the WAEMU. In addition, it has an export supply very different from its trading partners, suggesting the low potential for competition between them. Moreover, the apparent increase of manufactured products with comparative advantage suggest an overall improvement, as export diversification occurs.

Therefore, contrary to predictions, Senegal's actual experience of regional integration has nothing with trade diversion. Instead, in the newly globalized era driven by the Asian emerging economies, it seems that trade between developing countries have expanded mainly at the expense of the former industrialised partners. In sum, Senegal has taken advantage of a favourable international trade pattern where there is significant scope for improving trade among developing countries themselves.

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Appendix

Table A1 : Indicators of comparative advantage for the other WAEMU members

Niger			
RCA indices			
TOP RANKING			
<i>Commodity</i>	<i>1996</i>	<i>Commodity</i>	<i>2003</i>
286 Ores and concentrates of uranium and thorium	4834,3	286 Ores and concentrates of uranium and thorium	9112,7
941 Animals, live, nes.(including zoo animals,pets, insects,etc)	193,1	941 Animals, live, nes.(including zoo animals, pets, insects,etc)	221,5
269 Old clothing and other old textile articles; rags	77,7	269 Old clothing and other old textile articles; rags	146,1
122 Tobacco, manufactured	49,7	001 Live animals chiefly for food	136,2
001 Live animals chiefly for food	49,2	035 Fish, dried, salted or in brine; smoked fish	46,1
054 Vegetables, fresh or simply preserved; roots and tubers,	17,8	223 Seeds and oleaginous fruit, whole or broken, for oth fxoils	40,6
652 Cotton fabrics, woven (not including narrow or sp fabrics)	8,0	652 Cotton fabrics, woven (not including narrow or sp fabrics)	15,4
022 Milk and cream	5,0	054 Vegetables, fresh or simply preserved; roots and tubers	13,7
653 Fabrics, woven,of man-made fibres(not narrow,sp fabrics)	3,8	122 Tobacco, manufactured	10,7
591 Pesticides, disinfectants	3,1	289 Ores and concentrates of precious metals, waste, scrap	7,2
BOTTOM RANKING			
592 Starches, insulin and wheat gluten; albuminoidal substanc.		872 Medical instruments and appliances, nes	
673 Iron and steel bars, rods, shapes and sections		664 Glass	
533 Pigments, paints, varnishes and related materials		812 Sanitary, plumbing, heating, lighting fixtures and fittings,	
642 Paper and paperboard, precut, and articles of paper or pb		533 Pigments, paints, varnishes and related materials	
678 Tube, pipes and fittings, of iron or steel		699 Manufactures of base metal, nes	
679 Iron, steel casting, forging and stamping, in the rough stat.		736 Metalworking machine-tools, parts and accessories ther of	
684 Aluminium		642 Paper and paperboard, precut, and articles of paper or pb	
882 Photographic and cinematographic supplies		772 Electrical apparatus for making and breaking electricalcirt	
693 Wire products (excluding insulated electrical wire); f. grl.		776 Thermionic, microcircuits, transistors, valves, etc	
871 Optical instruments and apparatus		759 Parts, nes of and accessories for machines of headings	
CTB indices			
TOP RANKING			
286 Ores and concentrates of uranium and thorium	19,4	001 Live animals chiefly for food	3,7
001 Live animals chiefly for food	5,1	054 Vegetables, fresh or simply preserved; roots and tubers	1,3
054 Vegetables, fresh or simply preserved; roots and tubers	4,1	776 Thermionic, microcircuits, transistors, valves, etc	1,2
781 Passenger motor vehicles (excluding buses)	3,2	759 Parts, nes of and accessories for machines of headings	0,7
122 Tobacco, manufactured	2,9	784 Motor vehicle parts and accessories, nes	0,7
653 Fabrics, woven,of man-made fibres(not narrow;sp fabrics)	0,9	752 Automatic data processing machines and units thereof	0,6
941 Animals, live, nes.(including zoo animals, pets,insects,etc)	0,7	792 Aircraft and associated equipment, and parts thereof, nes	0,4
269 Old clothing and other old textile articles; rags	0,7	583 Polymerization and copolymerization products	0,3
971 Gold, non-monetary (excluding gold ores and concentrats)	0,2	641 Paper and paperboard	0,3
652 Cotton fabrics, woven (not including narrow or sp fabrics)	0,1	941 Animals, live, nes, (including zoo animals,pets,insects,etc)	0,3
BOTTOM RANKING			
661 Lime, cement, and fabricated construction materials		764 Telecommunication equipment, nes; parts and accessories,	
046 Meal and flour of wheat and flour of meslin		661 Lime, cement, and fabricated construction materials	
642 Paper and paperboard, precut, and articles of paper or pb.		022 Milk and cream	
523 Other inorganic chemicals; compounds of precious metals		046 Meal and flour of wheat and flour of meslin	
098 Edible products and preparations, nes		269 Old clothing and other old textile articles; rags	
022 Milk and cream		122 Tobacco, manufactured	
541 Medicinal and pharmaceutical products		061 Sugar and honey	
061 Sugar and honey		424 Other fixed vegetable oils, fluid or solid, crude, refined	
042 Rice		042 Rice	
334 Petroleum products, refined		334 Petroleum products, refined	

Burkina Faso

RCA indices

TOP RANKING

Commodity	1996	Commodity	2003
263 Cotton	375,8	263 Cotton	651,9
001 Live animals chiefly for food	65,2	223 Seeds and oleaginous fruit, whole or broken, for other fx o	82,2
223 Seeds and oleaginous fruit, whole or broken, for other fix oil	31,5	122 Tobacco, manufactured	21,2
971 Gold, non-monetary (excluding gold ores and concentrates)	13,4	001 Live animals chiefly for food	14,1
611 Leather	10,9	423 Fixed vegetable oils, soft, crude refined or purified	11,1
222 Seeds and oleaginous fruit, whole or broken, for "soft" fix oil	6,3	222 Seeds and oleaginous fruit, whole or broken, for "soft" f.o.	9,9
785 Cycles, scooters, motorized or not; invalid carriages	4,9	061 Sugar and honey	8,1
045 Cereals, unmilled	2,6	057 Fruit and nuts, fresh, dried	4,7
054 Vegetables, fresh or simply preserved; roots and tubers, nes	2,2	056 Vegetables, roots and tubers, prepared or preserved, nes	3,0
211 Hides and skins, excluding furs, raw	1,6	611 Leather	2,5

BOTTOM RANKING

895 Office and stationary supplies, nes		846 Under-garments, knitted or crocheted	
784 Motor vehicle parts and accessories, nes		628 Articles of rubber, nes	
035 Fish, dried, salted or in brine; smoked fish		514 Nitrogen-function compounds	
653 Fabrics, woven, of man-made fibres (not narrow or spec. fib)		812 Sanitary, plumbing, heating, lighting fixtures and fittings,	
582 Condensation, polycondensation and polyaddition products		582 Condensation, polycondensation and polyaddition product	
672 Ingots and other primary forms, of iron or steel		533 Pigments, paints, varnishes and related materials	
897 Gold, silver ware, jewelry and articles of precious materials,		845 Outerwear knitted or crocheted, not elastic nor rubberized	
951 Armoured fighting vehicles, war firearms, ammunition, parts		073 Chocolate and other preparations containing cocoa, nes	
667 Pearl, precious and semi-precious stones, unworked or wked		696 Cutlery	
664 Glass		736 Metalworking machine-tools, parts and accessories thereof	

CTB indices

TOP RANKING

263 Cotton	13,4	263 Cotton	15,8
001 Live animals chiefly for food	2,8	776 Thermionic, microcircuits, transistors, valves, etc	1,6
971 Gold, non-monetary (excluding gold ores and concentrates)	1,8	784 Motor vehicle parts and accessories, nes	1,0
776 Thermionic, microcircuits, transistors, valves, etc	1,2	759 Parts, nes of and accessories for machines of headings	0,9
611 Leather	0,8	222 Seeds and oleaginous fruit, whole or broken, for "soft" f.o.	0,8
759 Parts, nes of and accessories for machines of headings	0,7	752 Automatic data processing machines and units thereof	0,6
792 Aircraft and associated equipment, and parts thereof, nes	0,5	764 Telecommunication equipment, nes; parts and accessories,	0,6
222 Seeds and oleaginous fruit, whole or broken, for "soft" fixed	0,5	778 Electrical machinery and apparatus, nes	0,6
784 Motor vehicle parts and accessories, nes	0,5	792 Aircraft and associated equipment, and parts thereof, nes	0,5
752 Automatic data processing machines and units thereof	0,5	001 Live animals chiefly for food	0,5

BOTTOM RANKING

674 Universals, plates, and sheets, of iron or steel		673 Iron and steel bars, rods, shapes and sections	
591 Pesticides, disinfectants		098 Edible products and preparations, nes	
048 Cereal, flour or starch preparations of fruits or vegetables		541 Medicinal and pharmaceutical products	
642 Paper and paperboard, precut, and articles of paper or paperb		785 Cycles, scooters, motorized or not; invalid carriages	
785 Cycles, scooters, motorized or not; invalid carriages		661 Lime, cement, and fabricated construction materials	
022 Milk and cream		782 Lorries and special purposes motor vehicles	
041 Wheat and meslin, unmilled		783 Road motor vehicles, nes	
661 Lime, cement, and fabricated construction materials		042 Rice	
541 Medicinal and pharmaceutical products		781 Passenger motor vehicles (excluding buses)	
334 Petroleum products, refined		334 Petroleum products, refined	

Ivory Coast

RCA indices

TOP RANKING

<i>Commodity</i>	<i>1996</i>	<i>Commodity</i>	<i>2003</i>
072 Cocoa	322,0	072 Cocoa	364,4
037 Fish, crustaceans and molluscs, prepared or preserved, nes	28,4	263 Cotton	30,5
071 Coffee and coffee substitutes	27,1	232 Natural rubber latex; rubber and gums	24,4
232 Natural rubber latex; rubber and gums	19,0	071 Coffee and coffee substitutes	19,0
263 Cotton	16,5	951 Armoured fighting vehicles, war firearms, ammunition,..	16,5
424 Other fixed vegetable oils, fluid or solid, crude, refined	12,2	037 Fish, crustaceans and molluscs, prepared or preserved, nes	15,6
248 Wood, simply worked, and railway sleepers of wood	9,6	783 Road motor vehicles, nes	9,0
057 Fruit and nuts, fresh, dried	7,8	248 Wood, simply worked, and railway sleepers of wood	7,8
223 Seeds and oleaginous fruit, whole or broken, for oth fix oils	7,0	223 Seeds and oleaginous fruit, whole or broken, for oth fix oils	7,1
247 Other wood in the rough or roughly squared	6,4	057 Fruit and nuts, fresh, dried	6,8

BOTTOM RANKING

211 Hides and skins, excluding furs, raw		633 Cork manufactures	
671 Pig and sponge iron, spiegeleisen, etc. and ferro-alloys		266 Synthetic fibres suitable for spinning	
679 Iron, steel casting, forging and stamping, in the rough state,		885 Watches and clocks	
246 Pulpwood (including chips and wood waste)		246 Pulpwood (including chips and wood waste)	
681 Silver, platinum and other metals of the platinum group		679 Iron, steel casting, forging and stamping, in the rough stat.	
024 Cheese and curd		672 Ingots and other primary forms, of iron or steel	
269 Old clothing and other old textile articles; rags		524 Radioactive and associated material	
654 Textile fabrics, woven, other than cotton or man-made fibres		654 Textile fabrics, woven, other than cotton or man-made fib	
277 Natural abrasives, nes		024 Cheese and curd	
287 Ores and concentrates of base metals, nes		667 Pearl, precious and semi-precious stones, unworked or w.	

CTB indices

TOP RANKING

072 Cocoa	68,8	072 Cocoa	83,6
334 Petroleum products, refined	13,7	334 Petroleum products, refined	14,4
071 Coffee and coffee substitutes	12,7	263 Cotton	6,6
037 Fish, crustaceans and molluscs, prepared or preserved, nes	9,2	057 Fruit and nuts, fresh, dried	6,3
248 Wood, simply worked, and railway sleepers of wood	8,9	248 Wood, simply worked, and railway sleepers of wood	5,9
057 Fruit and nuts, fresh, dried	7,2	071 Coffee and coffee substitutes	5,1
232 Natural rubber latex; rubber and gums	4,9	037 Fish, crustaceans and molluscs, prepared or preserved, nes	4,9
263 Cotton	4,8	232 Natural rubber latex; rubber and gums	4,5
424 Other fixed vegetable oils, fluid or solid, crude, refined	3,4	783 Road motor vehicles, nes	3,2
634 Veneers, plywood, "improved" wood and oth wood, worked	2,3	081 Feeding stuff for animals (not including unmilled cereals)	3,0

BOTTOM RANKING

784 Motor vehicle parts and accessories, nes		752 Automatic data processing machines and units thereof	
764 Telecommunication equipment, nes; parts and accessories,		784 Motor vehicle parts and accessories, nes	
041 Wheat and meslin, unmilled		776 Thermionic, microcircuits, transistors, valves, etc	
782 Lorries and special purposes motor vehicles		764 Telecommunication equipment, nes; parts and accessories	
752 Automatic data processing machines and units thereof		583 Polymerization and copolymerization products	
034 Fish, fresh, chilled or frozen		042 Rice	
042 Rice		541 Medicinal and pharmaceutical products	
541 Medicinal and pharmaceutical products		034 Fish, fresh, chilled or frozen	
781 Passenger motor vehicles (excluding buses)		951 Armoured fighting vehicles, war firearms, ammunition, ..	
333 Crude petroleum and oils obtained from bituminous minerals		333 Crude petroleum and oils obtained from bituminous minls	

Togo

RCA indices

TOP RANKING

<i>Commodity</i>	<i>1996</i>	<i>Commodity</i>	<i>2005</i>
271 Fertilizers, crude	953,3	271 Fertilizers, crude	359,2
263 Cotton	142,9	661 Lime, cement, and fabricated construction materials	134,4
091 Margarine and shortening	139,1	263 Cotton	132,0
269 Old clothing and other old textile articles; rags	41,1	046 Meal and flour of wheat and flour of meslin	67,8
072 Cocoa	33,1	793 Ships, boats and floating structures	24,4
223 Seeds and oleaginous fruit, whole or broken, for other fix.oil	19,6	072 Cocoa	19,3
971 Gold, non-monetary (excluding gold ores and concentrates)	13,4	223 Seeds and oleaginous fruit, whole or broken, for other f.o.	17,7
071 Coffee and coffee substitutes	9,3	111 Non-alcoholic beverages, nes	14,5
334 Petroleum products, refined	5,1	424 Other fixed vegetable oils, fluid or solid, crude, refined	10,7
042 Rice	4,9	022 Milk and cream	8,8

BOTTOM RANKING

759 Parts, nes of and accessories for machines of headings		671 Pig and sponge iron, spiegeleisen, etc, and ferro-alloys	
712 Steam engines, turbines		335 Residual petroleum products, nes and related materials	
584 Regenerated cellulose; derivatives of cellulose;vulcanized fb		511 Hydrocarbons, nes, and derivatives	
791 Railway vehicles and associated equipment		713 Internal combustion piston engines, and parts thereof, nes	
737 Metalworking machinery (other than machine-tools), and pts		882 Photographic and cinematographic supplies	
251 Pulp and waste paper		736 Metalworking machine-tools, parts and accessories ther.of	
745 Other non-electric machinery, tools and mechanical apparatus		771 Electric power machinery, and parts thereof, nes	
736 Metalworking machine-tools, parts and accessories thereof		897 Gold, silver ware, jewelry and articles of precious materls	
654 Textile fabrics, woven, other than cotton or man-made fibres		776 Thermionic, microcircuits, transistors, valves, etc	
513 Carboxylic acids, and their derivatives		752 Automatic data processing machines and units thereof	

CTB indices

TOP RANKING

263 Cotton	14,8	661 Lime, cement, and fabricated construction materials	9,9
271 Fertilizers, crude	13,6	263 Cotton	8,0
091 Margarine and shortening	3,2	793 Ships, boats and floating structures	5,2
072 Cocoa	2,5	271 Fertilizers, crude	4,0
071 Coffee and coffee substitutes	1,6	072 Cocoa	1,2
057 Fruit and nuts, fresh, dried	0,9	046 Meal and flour of wheat and flour of meslin	1,1
752 Automatic data processing machines and units thereof	0,8	111 Non-alcoholic beverages, nes	0,9
759 Parts, nes of and accessories for machines of headings	0,7	893 Articles, nes of plastic materials	0,7
081 Feeding stuff for animals (not including unmilled cereals)	0,6	022 Milk and cream	0,7
784 Motor vehicle parts and accessories, nes	0,5	792 Aircraft and associated equipment, and parts thereof, nes	0,6

BOTTOM RANKING

061 Sugar and honey		591 Pesticides, disinfectants	
042 Rice		652 Cotton fabrics, woven (not including narrow or sp fabrics)	
674 Universals, plates, and sheets, of iron or steel		781 Passenger motor vehicles (excluding buses)	
122 Tobacco, manufactured		122 Tobacco, manufactured	
541 Medicinal and pharmaceutical products		786 Trailers, and other vehicles, not motorized, nes	
041 Wheat and meslin, unmilled		562 Fertilizers, manufactured	
652 Cotton fabrics, woven (not including narrow or special fab)		673 Iron and steel bars, rods, shapes and sections	
034 Fish, fresh, chilled or frozen		541 Medicinal and pharmaceutical products	
661 Lime, cement, and fabricated construction materials		041 Wheat and meslin, unmilled	
334 Petroleum products, refined		334 Petroleum products, refined	

Benin

RCA indices

TOP RANKING

<i>Commodity</i>	<i>1996</i>	<i>Commodity</i>	<i>2005</i>
263 Cotton	298,2	263 Cotton	639,7
281 Iron ore and concentrates	171,9	223 Seeds and oleaginous fruit, whole or broken, for other f.o	33,2
222 Seeds and oleaginous fruit, whole or broken, for "soft" fix oil	11,1	122 Tobacco, manufactured	16,6
042 Rice	9,8	057 Fruit and nuts, fresh, dried	13,1
122 Tobacco, manufactured	9,3	661 Lime, cement, and fabricated construction materials	10,2
652 Cotton fabrics, woven (not including narrow or special fab	2,9	424 Other fixed vegetable oils, fluid or solid, crude, refined	7,3
057 Fruit and nuts, fresh, dried	2,8	081 Feeding stuff for animals (not including unmilled cereals)	7,0
246 Pulpwood (including chips and wood waste)	1,9	652 Cotton fabrics, woven (not including narrow or special fb	5,6
961 Coin (other than gold coin), not being legal tender	1,9	971 Gold, non-monetary (excluding gold ores and concent)	4,7
269 Old clothing and other old textile articles; rags	1,7	248 Wood, simply worked, and railway sleepers of wood	4,4

BOTTOM RANKING

612 Manufactures of leather or of composition leather, nes; etc		042 Rice	
592 Starches, insulin and wheat gluten; albuminoidal substances		778 Electrical machinery and apparatus, nes	
351 Electric current		784 Motor vehicle parts and accessories, nes	
598 Miscellaneous chemical products, nes		752 Automatic data processing machines and units thereof	
848 Articles of apparel, clothing accessories, non-textile, headg.		771 Electric power machinery, and parts thereof, nes	
678 Tube, pipes and fittings, of iron or steel		874 Measuring, checking, analysis, controlling instruments	
874 Measuring, checking, analysis, controlling instruments,		651 Textile yarn	
044 Maize, unmilled		764 Telecommunication equipment, nes; parts and accessories	
759 Parts, nes of and accessories for machines of headings		776 Thermionic, microcircuits, transistors, valves, etc	
851 Footwear		759 Parts, nes of and accessories for machines of headings	

CTB indices

TOP RANKING

263 Cotton	38,2	263 Cotton	22,1
222 Seeds and oleaginous fruit, whole or broken, for "soft" fix.o.	2,6	776 Thermionic, microcircuits, transistors, valves, etc	2,9
057 Fruit and nuts, fresh, dried	1,3	057 Fruit and nuts, fresh, dried	1,6
752 Automatic data processing machines and units thereof	1,0	784 Motor vehicle parts and accessories, nes	1,6
931 Special transactions, commodity not classified accordg to cl.	0,9	759 Parts, nes of and accessories for machines of headings	1,5
759 Parts, nes of and accessories for machines of headings	0,8	931 Special transactions, commodity not classified/classes	1,3
784 Motor vehicle parts and accessories, nes	0,8	752 Automatic data processing machines and units thereof	1,2
248 Wood, simply worked, and railway sleepers of wood	0,5	081 Feeding stuff for animals (not including unmilled cereals)	1,0
894 Baby carriages, toys, games and sporting goods	0,3	781 Passenger motor vehicles (excluding buses)	0,8
036 Crustaceans and molluscs, fresh, chilled, frozen, salted, etc	0,3	248 Wood, simply worked, and railway sleepers of wood	0,8

BOTTOM RANKING

642 Paper and paperboard, precut, and articles of paper or pb.		642 Paper and paperboard, precut, and articles of paper or pb.	
061 Sugar and honey		673 Iron and steel bars, rods, shapes and sections	
781 Passenger motor vehicles (excluding buses)		424 Other fixed vegetable oils, fluid or solid, crude, refined	
661 Lime, cement, and fabricated construction materials		022 Milk and cream	
591 Pesticides, disinfectants		541 Medicinal and pharmaceutical products	
335 Residual petroleum products, nes and related materials		661 Lime, cement, and fabricated construction materials	
653 Fabrics, woven, of man-made fibres (not narrow or spl. Fab.)		269 Old clothing and other old textile articles; rags	
269 Old clothing and other old textile articles; rags		042 Rice	
652 Cotton fabrics, woven (not including narrow or special fabr.)		652 Cotton fabrics, woven (not including narrow or special f.)	
042 Rice		334 Petroleum products, refined	

Mali

RCA indices

TOP RANKING

Commodity	1996	Commodity	2001
263 Cotton	348,7	971 Gold, non-monetary (excluding gold ores and concentrat)	234,2
001 Live animals chiefly for food	75,1	263 Cotton	36,5
264 Jute, other textile bast fibres, nes, raw, processed but nt spun	58,3	045 Cereals, unmilled	22,3
223 Seeds and oleaginous fruit, whole or broken, for other fx oils	45,0	223 Seeds and oleaginous fruit, whole or broken, for oth fxoils	16,8
971 Gold, non-monetary (excluding gold ores and concentrates)	32,2	264 Jute,other textile bast fibres, nes, raw,processed but not sp	6,5
896 Works of art, collectors pieces and antiques	18,8	723 Civil engineering, contractors plant and equipment and p.	4,7
035 Fish, dried, salted or in brine; smoked fish	16,6	611 Leather	2,2
045 Cereals, unmilled	13,8	783 Road motor vehicles, nes	1,9
941 Animals, live, nes, (including zoo animals, pets, insects, etc)	3,9	591 Pesticides, disinfectants	1,5
292 Crude vegetable materials, nes	3,9	211 Hides and skins, excluding furs, raw	1,4

BOTTOM RANKING

846 Under-garments, knitted or crocheted		662 Clay and refractory construction materials	
843 Womens, girls, infants outerwear, textile, not knitted or croc		741 Heating and cooling equipment and parts thereof, nes	
759 Parts, nes of and accessories for machines of headings		598 Miscellaneous chemical products, nes	
792 Aircraft and associated equipment, and parts thereof, nes		724 Textile and leather machinery, and parts thereof, nes	
897 Gold, silver ware, jewelry and articles of precious materials		677 Iron or steel wire (excluding wire rod), not insulated	
663 Mineral manufactures, nes		654 Textile fabrics, woven, other than cotton or man-made fib	
289 Ores and concentrates of precious metals, waste, scrap		831 Travel goods, handbags etc, of leather, plastics,textile,oth	
667 Pearl, precious and semi-precious stones, unworked or work		846 Under-garments, knitted or crocheted	
592 Starches, insulin and wheat gluten; albuminoid subs; glues		674 Universals, plates, and sheets, of iron or steel	
661 Lime, cement, and fabricated construction materials		628 Articles of rubber, nes	

CTB indices

TOP RANKING

001 Live animals chiefly for food	8,6	776 Thermionic, microcircuits, transistors, valves, etc	1,7
896 Works of art, collectors pieces and antiques	1,4	931 Special transactions, commodity not classified/ class	1,0
931 Special transactions, commodity not classified/ class	1,4	752 Automatic data processing machines and units thereof	0,9
752 Automatic data processing machines and units thereof	1,1	759 Parts, nes of and accessories for machines of headings	0,9
759 Parts, nes of and accessories for machines of headings	0,9	792 Aircraft and associated equipment, and parts thereof, nes	0,8
784 Motor vehicle parts and accessories, nes	0,8	784 Motor vehicle parts and accessories, nes	0,7
292 Crude vegetable materials, nes	0,8	667 Pearl, precious and semi-precious stones, unworked or wd	0,4
792 Aircraft and associated equipment, and parts thereof, nes	0,7	894 Baby carriages, toys, games and sporting goods	0,3
035 Fish, dried, salted or in brine; smoked fish	0,6	778 Electrical machinery and apparatus, nes	0,3
874 Measuring, checking, analysis, controlling instruments, nes	0,5	011 Meat and edible meat offal, fresh, chilled or frozen	0,3

BOTTOM RANKING

591 Pesticides, disinfectants		625 Rubber tires, tire cases,inner and flaps,for wheels of all kd	
782 Lorries and special purposes motor vehicles		691 Structures and parts, nes, of iron, steel or aluminium	
098 Edible products and preparations, nes		716 Rotating electric plant and parts thereof, nes	
541 Medicinal and pharmaceutical products		098 Edible products and preparations, nes	
074 Tea and mate		048 Cereal, flour or starch preparations of fruits or vegetables	
022 Milk and cream		562 Fertilizers, manufactured	
625 Rubber tires,tire cases,inner and flaps,for wheels of all kinds		541 Medicinal and pharmaceutical products	
661 Lime, cement, and fabricated construction materials		061 Sugar and honey	
061 Sugar and honey		661 Lime, cement, and fabricated construction materials	
334 Petroleum products, refined		334 Petroleum products, refined	

Source : Authors' calculation

Table A2: Indicator of export similarity for the other WAEMU members

COS Index		1995	1996	1997	1998	1999	2000	2001	2002	2003
Niger	Ivory Coast	0,01	0,01	0,01	0,01	0,01	0,03		0,01	0,01
	Togo	0,02	0,03	0,03	0,02	0,03	0,03	0,00	0,01	0,00
	Benin	0,02	0,04	0,06	0,51	0,02	0,02	0,00	0,01	0,01
	Burkina Faso	0,03	0,05	0,04	0,03	0,05	0,08	0,06	0,04	0,01
	Mali		0,06	0,01	0,00	0,01	0,01	0,00		
Mali	Togo		0,69	0,68	0,56	0,61	0,30	0,01		
	Benin		0,79	0,75	0,65	0,69	0,54	0,13		
	Ivory Coast		0,07	0,08	0,09	0,08	0,09			
	Burkina Faso		0,98	0,98	0,78	0,69	0,53	0,06		
Benin	Togo	0,46	0,57	0,51	0,52	0,73	0,59	0,27	0,40	0,42
	Ivory Coast	0,08	0,06	0,07	0,09	0,10	0,14		0,07	0,09
	Burkina Faso	0,67	0,82	0,74	0,83	0,98	0,98	0,98	0,86	0,99
Togo	Ivory Coast	0,28	0,25	0,24	0,15	0,20	0,18		0,12	0,13
	Burkina Faso	0,67	0,68	0,67	0,62	0,72	0,58	0,27	0,45	0,41
Ivory Coast	Burkina Faso	0,10	0,08	0,09	0,10	0,10	0,14		0,06	0,08

Source : Authors' calculation