

Exports Similarity and IntraTrade Expansion: The Case of the West African Economic and Monetary Union

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Abstract

The low level of intra-WAEMU trade is often justified by the narrowness of the sub-regional market and the similarity of products intended for trade. This paper analyses the effect of exports similarity on trade within the West African Economic and Monetary Union (WAEMU) member countries. To do so, a gravity model in panel data over the period 1996 to 2013 has been estimated. The results reveal that intra WAEMU exports are weakly similar and exports within member countries lower with the degree of exports similarity. But the effect is very low. All member countries don't benefit from the trade creation effect generated by WAEMU in presence of exports similarity. Only Mali increases its exports towards WAEMU member states. Burkina Faso, Guinea Bissau and Niger see their exports shrink with the degree of similarity of their exports with their partners.

Key words: Economic Integration, exports similarity, Intra Trade.

JEL Classifications: F02, F15, O40

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I. Introduction

According to economic theory (Viner, 1951), the expansion of intra-Community trade (trade creation effect) is one of the catalysts for growth and welfare improvement in each member country in a Regional Economic Community (REC). Moreover, relatively successful experiences of economic integration in the world confirm this idea. For example, within the European Union (EU), intra-community trade is on average over 60% of total EU trade over the last two decades (UNCTAD, 2015). This is also the case with the North American Free Trade Agreement (NAFTA) whose intra-community trade is estimated on average at 49% of total trade (UNCTAD, 2015). The expansion of trade between the members of these Regional Economic Communities (RECs) indeed gives possibilities for endogenous economic growth and social development which contributes to strengthening regional integration.

Regional economic integration is a key strategy for intensifying intra-regional trade and it is expected to produce considerable economic gains for member countries. Although it is widely recognized that intra-regional trade can play a significant role in accelerating economic growth, reducing poverty, improving food and energy security, internal trade in WAEMU remains very low. In fact, intra-regional trade is still marginal to create positive externalities that can support economic growth and social development (Egger & Pfaffermayr, 2013). Indeed, since its creation in 1994, the effects in terms of well-being gains are still slow to be felt in space. Intra-WAEMU exports stagnate between 14% and 15% of total exports (UNCTAD, 2015). This situation suggests that there are factors limiting intra-regional trade expansion and the strengthening of frank integration into WAEMU. One could mention the colonial specialization of the member countries and the weak complementarity of the production systems within WAEMU. Several studies question the high transaction costs explained by the lack of infrastructure quality, the poor quality of institutions, the mismanagement of trade policy and the existence of non-tariff barriers. Very few studies, to our knowledge, question quantitatively the effects of the similarity of exports on intra trade in the case of WAEMU.

So the low level of intra-WAEMU trade is often justified by the narrowness of the sub-regional market and the similarity of products intended for trade. The contribution of this analysis is to examine the quantitative effect of the similarity of the structure of exports on intra WAEMU trade expansion. We assume that, in a regional economic communities gathering developed countries, the similarity of the export seems to accompany the intensification of trade between the members. What is the situation in WAEMU? How similar is WAEMU members' countries

exported products? Is the similarity of the export an obstacle to the intensification of intra WAEMU trade?

This analysis proposes an empirical evaluation of the effects of this similarity on the expansion of intra WAEMU trade. To our knowledge this is a study that seems to be one of the first empirical investigations on the question applying the transformed gravity model. The results show, on the one hand, that the intra exports of the member countries are not as similar as thought and, on the other hand, the low similarity is an obstacle to the expansion of intra-WAEMU trade. Thus, the resulting heterogeneity of countries, in terms of production structure, shows that not all countries are in the same boat. Countries are taking advantage of this situation while others are losing out. Such is the originality of this work.

The rest of the paper is organized in four sections. The first takes us back to the theoretical debate on the conditions for success of international trade knowing the conditions of production and demand in the trading partner countries. The second section revisits the empirical literature review. The third section presents the methodology approach. The fourth section presents and discusses the results of the study before concluding and making recommendations to strengthen economic integration within WAEMU.

II. Theoretical and conceptual framework

Exports similarity of two countries can be defined as the correspondence of their export structure. In other words, the export structure of country A will be considered similar to that of country B, if goods constituting the exports of both countries refer to identical product categories. In the analysis of the possibilities of expansion of international trade, two theoretical conceptions oppose the effect of the resemblance of traded goods on trade expansion between two countries: traditional and new theories.

According to traditional theories, the difference in technology (Ricardian theory) and the factorial abundance difference (Heckscher Ohlin Samuelson theory) are fundamental in international trade. Countries benefit from trade openness if they are specialized in the production of goods for which they have a comparative advantage. One of the conditions of the mutually beneficial from trade is that the good sold by each country is different. The specialization is total in David Ricardo's standard model: the country produces only one good and exports it to its partner. In the factor abundance model, the country specializes in producing

a good based on the principle of comparative advantage. It produces and exports this good, but it preserves the production of the other good which serves to cover part of the domestic consumption. The Ricardian theory (and its extension Heckscher Ohlin Samuelson) has been the basis of international trade theory. It is however not able to account for the reality of trade. In particular, his hypotheses lead him to exclude from the field of analysis the multinationalization of firms and the existence of intra-industry trade. Thus, according to these traditional theories, one of the central hypotheses is the non-similarity of traded goods.

Regarding the new theories of international trade, it is possible and profitable to partners despite the similarity of production structures and traded goods. What explains the trade flows in this case? The new theories of trade highlight two approaches: the representative demand approach and the product differentiation approach.

With respect to the representative demand approach, according to Linder, the conditions of production within a country depend on the conditions of demand. Indeed, at first, sales prospects are primarily national. Producers will therefore produce goods corresponding to those sought by the local population. The foreign market is then only an extension of the domestic market. More countries are similar, more the range of exportable goods is identical to the range of importable. Trade is therefore between like-minded countries and involves close-knit products seeking new outlets in foreign markets where demand for this type of product already exists. Competition between companies will therefore push them to seek to establish themselves simultaneously on the area of competitors, which will lead to the emergence of intra-industry trade. Linder's theory improved the Heckscher-Ohlin theory because it specified that trade would occur between countries even if the proportions of the factors were identical, provided that their demand preferences were similar.

In Linder's logic, a country will largely export its products towards countries with similar demand patterns and income levels. He calls this the "similarity of preference". Due to the similarity of preferences, the country will have overlapping demands.

As for the approach by differentiating products, the idea developed here is that products of the same branch are not identical. They are heterogeneous in their characteristics, even if their utility is the same. They will differ in their colour, their packaging, their advertising, their marketing, their image, the proposed after-sales service. According to Lassudrie-Duchêne, consumer demand is a demand for a difference in similarity: economic agents actually demand a set of characteristics. However, the products of the same branch differ in the characteristics

offered. Therefore, a French consumer who wants to buy a car may very well be attracted by a German car, because the characteristics of this car will better meet his needs than those of French cars. In the opposite direction, German consumers will be attracted by French cars. The expansion of intra-industry trade would then come from the heterogeneity of products within the same branch of activity. The existence of an international trade cannot be explained so much by differences of prices, and therefore of production costs, but by the differentiation of the products, and thus by strategic policies of research, quality, marketing and advertising. Structural competitiveness then supplants Price competitiveness.

The demand-side approach shows that while goods are similar, trade between partners is possible and viable. This approach aims, in fact, to explain the existence of intra-industry trade (similar products). These new theories emphasize the impact of demand as a source of international trade. Trade is therefore between like-minded countries and involves close-knit products seeking new outlets in external markets where demand for this type of product already exists. Competition between companies will therefore push them to seek to establish themselves simultaneously on the territory of competitors, which will lead to the emergence of intra-industry trade.

Finally, from a theoretical point of view, the similarity of the exports structure is not fundamentally a brake on the development of trade. Better similarity of exports can lead to growth in intra-industry trade and increased trade between partner countries.

III. Literature review

As an extension of the theories of international trade, empirical works have examined the effects of the similarity of exported goods on the dynamics of trade between trading partners. Analysing the effects of export structure similarity on intra-trade is a question of knowing if the similarity of the content of external trade structure is creative of trade within a regional economic area. In this regard, the literature presents two opinions. The first argues that the similarity of exports is trade-creating in a regional economic area. As for the second, it leads to a contrary result and shows that this trade creation could be done under certain conditions.

The traditional analysis of the effects of regional integration argues that the creation of a regional economic area produces two effects: a trade creation effect and a trade diversion effect.

It is the trade creation effect that contributes most to strengthening trade integration. Venables (1999) shows that generally the similarity of supply factors and weak intra-regional demand favour more trade diversion effects rather than trade creation effects within RECs gathering developing countries. However, relatively more developed countries in this RECs benefit from integration to the detriment of the least developed countries: hence the divergence within the RECs of developing countries. In the case of WAEMU, Senegal has earlier benefited from regional integration to increase its trade with other member countries (Diaw & Tran, 2009). This would mean that the similarity of products traded by Senegal within WAEMU is not a handicap to increasing its intra-community trade. Such a result was also highlighted by Dinka and Kennes (2007) cited by (NOUWOUE, 2013). Taking into account the similarity of the productive structure or exports, they conclude that similarity could have a positive impact on intra-Community trade within the member countries of the Association of South-East Asian Nations.

But, Yeats (1999) or Cadot, De Melo and Olarreaga, (2000) in the framework of RTAs between African countries, as well as Schiff, (1997) on South-South agreements in general, show that developing countries are not willing to trade with each other. In addition, these authors argue that if there is an increase in trade between developing countries, of course this would be to the detriment of more efficient and competitive third countries outside the integration area. This result is in line with Venables (1999).

More generally, empirical studies based on comparative advantages suggest that the overall effect of South-South agreements depends among other things on the characteristics of the partners, their degree of mutual dependence on the exchange, the initial costs of their trade (particularly MFN tariff level) and their degree of complementarity in terms of supply structure (UNCTAD, 2007). Going in the same direction, Bye (1997) and Bounou (2004) cited by NOUWOUE, (2013) affirmed that productive complementarity favours specialization and trade between member states of the same REC. Therefore, one might think that the decomposition of value chains at the sub-regional level implying a complementarity of production structures is a source of growth in trade between countries belonging to the same regional economic community. This is not the similarity of products, but the effects of specialization on the basis of the comparative advantages of each country which would be the driving force of the trade flows.

Following the assumptions of Linder's model (1961)², Viciu et al (2016) identify, in Romania, other factors that could affect developing countries trade performance. This study assesses the effectiveness of a trading system widely accepted by stakeholders. The results show that there are other creative forces of trade flows apart from the similarity of incomes and markets. These are the political and economic restrictions and opportunities generated by foreign relations in the region. In fact, it is true that exports structure similarity is a source of growth in expanding trade in an area. More importantly, the intensification of intra-Community trade is dependent on trade policies and the political and economic environment prevailing in this area.

For the positive effects of export structure similarity to be felt in strengthening regional economic integration, preconditions have to be fulfilled. Authors like Mayda and Steinberg (2009) point out that one of the conditions for trade creation in a regional economic community is that the supply of some would have to meet the expectations of others as Linder (1961). Indeed, they show that the integration of Uganda into the Common Market for Eastern and Southern Africa (COMESA) has not resulted in an increase in trade with other partner countries as members are not (sufficient) natural trade and economic partners: what would seem to be a general rule for most of developing countries. Thus, whatever the policy implemented to stimulate trade between them, the result is always likely to be weak. This result seems to contradict that of Diaw and Tran, (2009). But it should be noted that such a result could depend also on the relative economic importance of Uganda in COMESA compared to that of Senegal in WAEMU.

Other factors limit the importance of intra-community trade. The institutional environment (Francoisa & Manchin, 2007), the quality of economic infrastructures and the mismanagement of economic policies (Coe, Helpman, & Hoffmaister, 1997, Longo & Sekkat, 2004, Francoisa & Manchin, 2007), changes (Bangake & Eggoh, 2008), political instability (Longo & Sekkat, 2004) and unadapted trade policy as well as low GDP (Rodrik, 1997) are all factors that have been identified in the literature.

However, Geda & Seid, (2015) examining intra-African trade and prospects for promoting regional economic integration through this trade, show that there is significant potential for intra-African trade as a catalyst for regional integration. However, in his view, the realization

² (i) The potential trade of a country is confined to these goods that have domestic demand.

(ii) Two trading countries are engaged in the trade of such goods the demand for which exists within their domestic markets.

(iii) The domestic demand for goods is determined by the level of per head income.

(iv) Broadly, similar levels of income influence the potential trade between two countries.

of this potential and therefore the effort to advance regional integration through intra-African trade is hampered by the lack of complementarity of exports and imports as well as the relative competitive position of potential suppliers. African exports. In the case of WAEMU, among other factors, the empirical literature denotes the importance of cross-border trade (Agbodji, 2007), the intra-regional disparity in the levels of rail, road and telephone infrastructure (GEOURJON et al, 2013). We can highlight also the case of CEMAC another REC in sub-Saharan Africa. In CEMAC, the increase in intra-trade would have been greater if the rationalization process were effective and if countries had implemented the necessary reforms to promote market integration, through the strengthening of infrastructure and better quality of institutions (Avom & Mignamissi, 2017). NOUWOUE, (2013) shows that the similarity of exports has a negative and significant influence on bilateral trade within CEMAC. So the similarity of exports is a brake on the expansion of trade between the members of this regional economic community.

The creation of a free trade area, according to the literature, leads to an increase in trade between members (Baier & Bergstrand, 2007). These authors note in a study that on average, a free trade agreement induces a multiplication of exchanges between member countries after at least ten years. In another study they show that the creation of a free trade area has a positive impact on trade between members. (Baier & Bergstrand, 2009).

Analyzing the effects of preferential trade agreements on signatory countries' net FDI inflows, Medvedev (2012) shows that the accession of countries to an agreement is associated with a positive change in the net inflows of foreign direct investment (FDI). Kumar, Sen, & Srivastava, (2014) analyze how some major regional economic integration initiatives in Africa, such as SACU (Customs Union of South Africa), WAEMU (West African Monetary Union and Economic), COMESA (Common Market of Eastern and Southern Africa) and ECOWAS (Economic Community of West African States) have affected the mobility of capital in their member countries. They reveal that international capital mobility has (only) increased slightly in African member countries of these RECs because of these agreements. Given that FDI flows are complementary to trade flows, then this study by Kumar, Sen, & Srivastava, (2014) shows that there are inhibiting economic factors to strengthening regional integration in these studied RECs.

In the end, the expansion of trade between members of a REC in Africa in general and in WAEMU particularly is limited by several factors. Previous papers did not address this issue including the degree of similarity of the products traded. However, trade facilitation can be

beneficial in a number of member countries, those who are primarily involved in value chains as suppliers (Hoekmana & Shepherd, 2015) or those more economically advanced in RECs grouping low incomes like UEMOA with Côte d'Ivoire and Senegal (Venables, 1999). This analysis draws on all of this literature and attempts to assess the effect of the similarity of exports structure on intra-WAEMU trade.

IV. Methodology

This analysis is based on a transformed gravity model estimated with a panel data. The pairs of WAEMU member countries are the individuals from 1996 to 2013. This section is articulated around two points. The first point looks at the specification of the transformed gravity model. The second point focuses on the data used and the expected signs of estimated coefficients.

A. Econometric specification

The original specification of the gravity model based on the physical relationship relates partner country GDP, distance, and a set of control variables. It is given by equation (1):

$$Export_{ij,t} = A \frac{GDP_{it}^{\theta} GDP_{jt}^{\theta}}{D_{ij}^{\mu}} e^{\gamma X_{ijt}} \quad 1$$

where i stands for the exporting country, j the partner country, and t the time. A is a scale parameter. $Export_{ij,t}$ is the bilateral exports value from country (i) to country (j) at time t . GDP_{it} et GDP_{jt} , D_{ij} et X_{ijt} represent respectively the Gross Domestic Product of country (i) and country (j), the distance between country (i) and (j) and a set of control variables (see Table 1 for more details about the variables).

Following Wang, Wei, & Liu, (2010), A is a function not a constant. This function specifies a relationship between exports similarity index $EIS_{ij,t}$, and intra WAEMU trade. It varies over time with $EIS_{ij,t}$ as followed:

$$A_{ij,t} = e^{\alpha + \beta_1 EIS_{ij,t}} \quad 2$$

with α a constant. This specification assumes that a greater similarity index would be favourable to intra-WAEMU trade in connection with the assumptions of Linder's theory and figures on

RECs gathering developed countries. This index $EIS_{ij,t}$ is based on Finger and Kreinin (1979) and It compares the distribution of the countries' export offers on the WAEMU market. The following formula is adopted for the calculation:

$$EIS_{ij} = 100 * \sum_k \min \left\{ \frac{Exports_{ik}}{\sum_k Exports_{ik}}; \frac{Exports_{jk}}{\sum_k Exports_{jk}} \right\} \quad 3$$

The factor $\frac{Exports_{ik}}{\sum_k Exports_{ik}}$ is the share of the exports of product k in the total exports of country (i). The indicator, making the sum multiplied by 100 of the minima between the shares of sectors taken in the foreign trade by both countries, must approach the value 100 if the similarity is total, and 0 otherwise. In other words, when $EIS_{ij} = 0$, that means there is no similarity between the exports structure of countries i and j on the reference market. On the other hand, when $EIS_{ij} = 100$, there is a perfect similarity between the export supply structures of countries i and j on the reference market. The reference market is WAEMU market. We use (three digits) data by product of member countries from the UNCTAD³ database according to the Standard International Trade Classification Revision 3⁴.

The final specification is:

$$Export_{ijt} = \alpha + \beta_1 EIS_{ij,t} + \theta \ln GDP_{it} + \vartheta \ln GDP_{jt} + \mu \ln D_{ij} + \gamma X_{ijt} + \varepsilon_{ijt} \quad 4$$

where $\varepsilon_{ijt} = \mu_{ij} + \mu_t + \mu_{ijt}$, with μ_{ij} the error term due to the country pairs, μ_t the error term du to time and μ_{ijt} the error term du to both country pairs and time.

B. Data and excepted signs for the coefficients

We use annual data from 1996 to 2013 for the eight WAEMU members' countries. See Table 1 for a quick description of each the data.

³ <http://unctadstat.unctad.org/FR/Classifications.html>

⁴ CTCl révision 3

Table 1: Data description

Variables	Sources	Units
Bilateral Exports within WAEMU members states (value)	International Monetary Fund, <i>Direction Of Trade Statistics</i>	USD (units)
Gross Domestic product (i) (value)	UNCTAD	Millions of USD, current price, current exchange rate
Gross Domestic product (j) (value)	UNCTAD	Millions of USD, current price, current exchange rate
Distances	CEPII	km
Exports Similarity index (EIS)	Author calculation EIS	

Source: Author

The coefficients associated with GDP and distance should have respectively positive and negative signs. In fact, whether it is the importing country or the exporting country, the coefficient of the GDP variable is positive to reflect the increase in intra-regional trade following the increase in income. For the GDP of the exporting country, an increase in GDP means an increase in domestic production. This rise in domestic production should lead to an increase in exports. On the importing country side, higher GDP reflects an increase in potential external demand to exporting countries. So this increase in foreign demand should translate into an increase in domestic sales abroad.

Distance is treated as a proxy for transaction costs. As a result, higher transaction costs discourage trade. Then the sign of the coefficient associated would be negative.

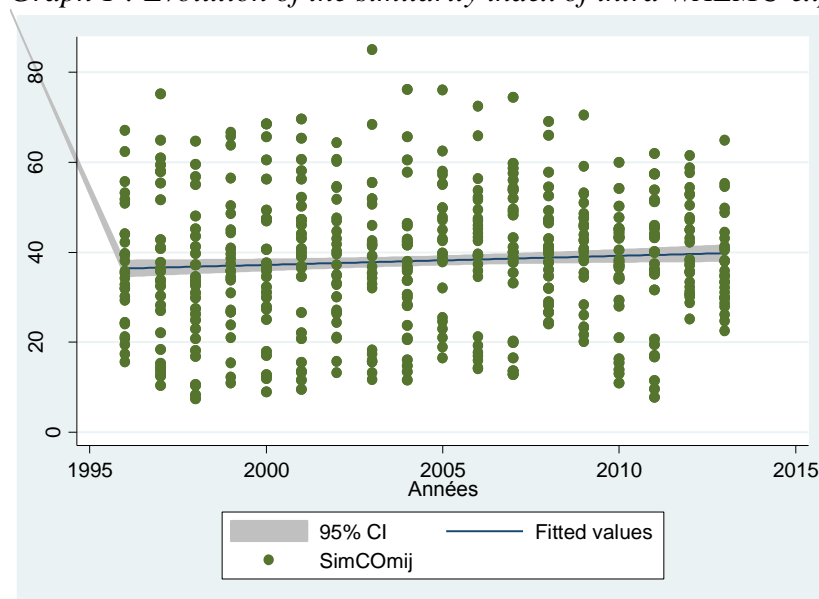
With regard to the export similarity indicator, the sign associated with this variable is expected to be negative in order to corroborate the results of the empirical work on the weakness of intra-African trade. This would translate well that the similarity of the exports is an obstacle for the expansion of intra WAEMU trade thus of the reinforcement of the commercial integration.

V. Results

A. Some descriptive statistics

Analysing changes in the average value, the export similarity index shows an upward trend over the period (Cf. Graph 1). This upward trend shows that on average between 1996 and 2013, the range of products exported on the WAEMU market by member countries is becoming more and more similar.

Graph 1 : Evolution of the similarity index of intra WAEMU exports



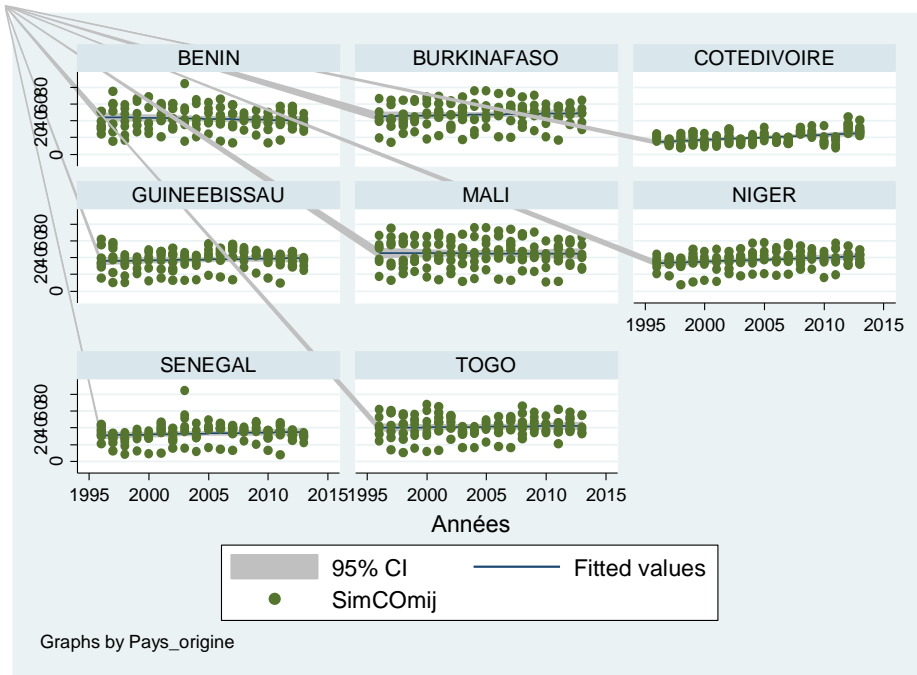
Source: The author

The value of the index varies on average between 35 and 45. The degree of similarity is relatively low. Given the slope of the trend, we can say that the dynamics are low on average. In the light of the foregoing, it can be said that, according to Linder's analysis, the sub-regional market is far from being an extension of the domestic markets of the member countries.

However, a country level analysis shows that only Côte d'Ivoire, Senegal and Niger seem to have the WAEMU market as an extension of their domestic market (cf. Graph 2). Indeed, as we can see on the the trend of the similarity indicator seems bullish over the period for these three countries.

Graph 2 the trend of the similarity indicator seems bullish over the period for these three countries.

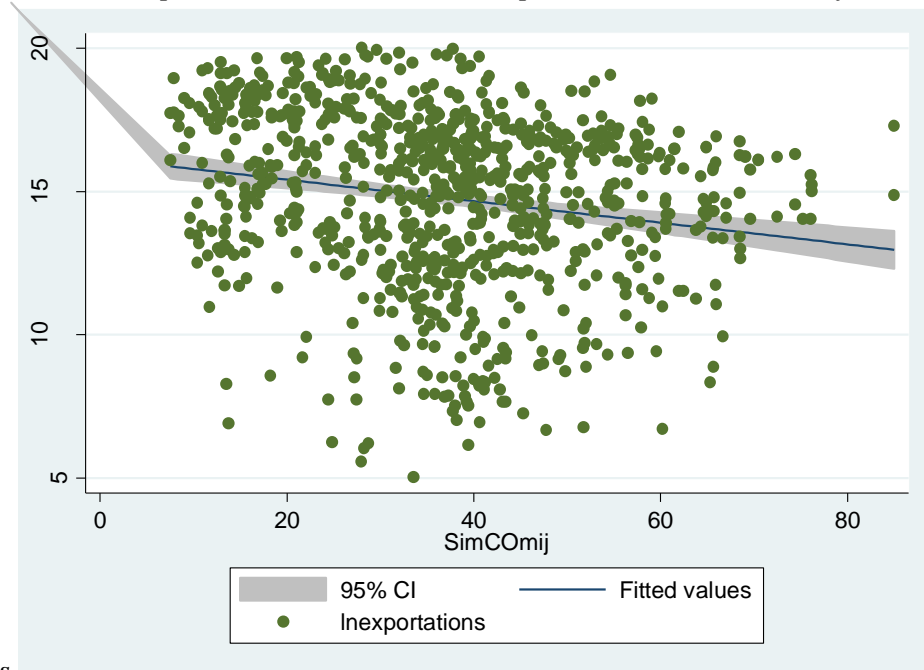
Graph 2 : Evolution of the index of similarity of intra-UEMOA exports of the countries



Source: The author

In analysis, the similarity of these countries' exports could be a source of intra-WAEMU trade opportunities. An analysis of the relationship between the indicator of similarity of exports and intra WAEMU exports shows a downward trend. Graph 3 assumes that the level of products exported similarity seems to be an obstacle to expanding intra-Community trade.

Graph 3 : Relationship between intra WAEMU exports and the indicator of similarity

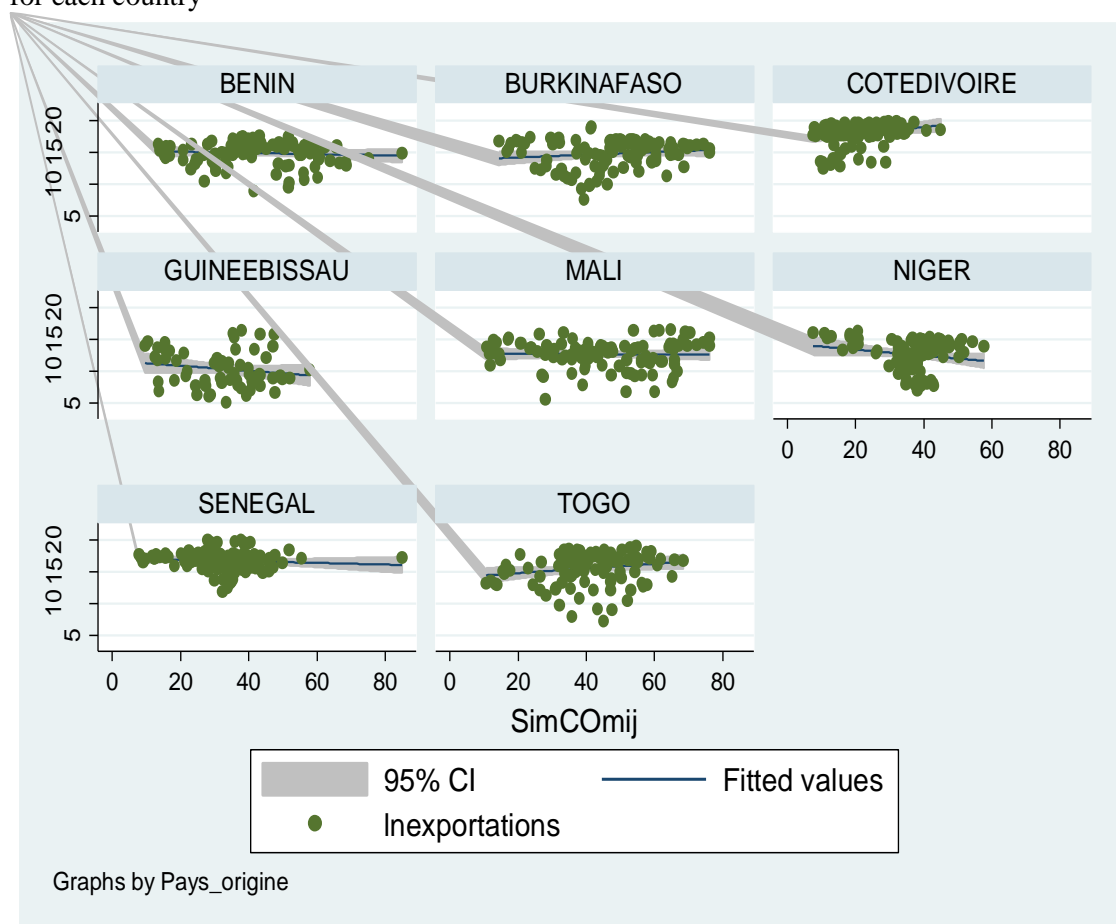


of exports

Source: The author

But analysing the performance of each member country, it appears that Burkina Faso, Côte d'Ivoire, Mali and Togo derive a positive relationship between intra-WAEMU exports and the exports similarity index over the period. (see Graph 4). It could be said that in these countries the degree of similarity of exported goods has made it possible to intensify and increase their intra-Community exports. This is not the case in the other four countries which present a downward trend. This would mean that exports structure similarity of these countries is not conducive to the trade expansion on the regional market.

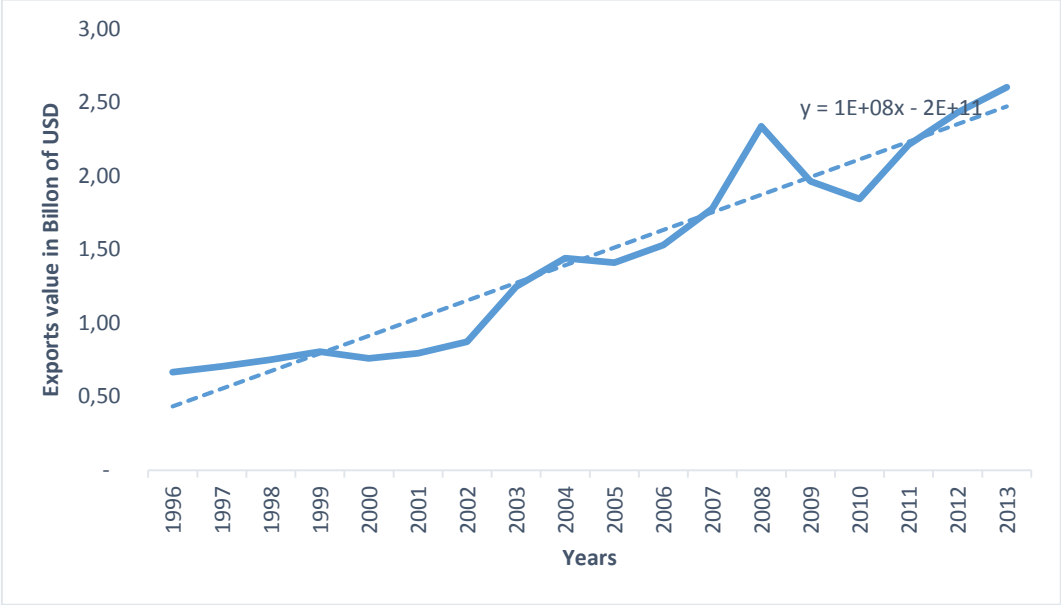
Graph 4 : Relationship between intra WAEMU exports and the indicator of similarity of exports for each country



Source: The author

Over the period of analysis intra-UEMOA exports in value increased (see Graph 5), from 0.6 billion CFA francs in 1996 to just over 2.6 billion CFA francs in 2013. This trend represents a rise annual average of about 8.5% per annum over the period. Trade between member countries has increased since the creation of WAEMU in 1994. Efforts to strengthen the Free Trade Area and the Customs Union seem to be having the desired results. Several decisions and actions demonstrate the will to strengthen economic integration within WAEMU: (i) the completion of the customs union in 2000 with the entry into force of the Common External Tariff (CET); (ii) the continued implementation of the Pact of Convergence, Stability, Growth and Solidarity between the Member States since 1999; (iii) the adoption of policies to facilitate trade, the free movement of persons, services and capital in the union; (iv) the establishment of a Regional Integration Assistance Fund (FAIR).

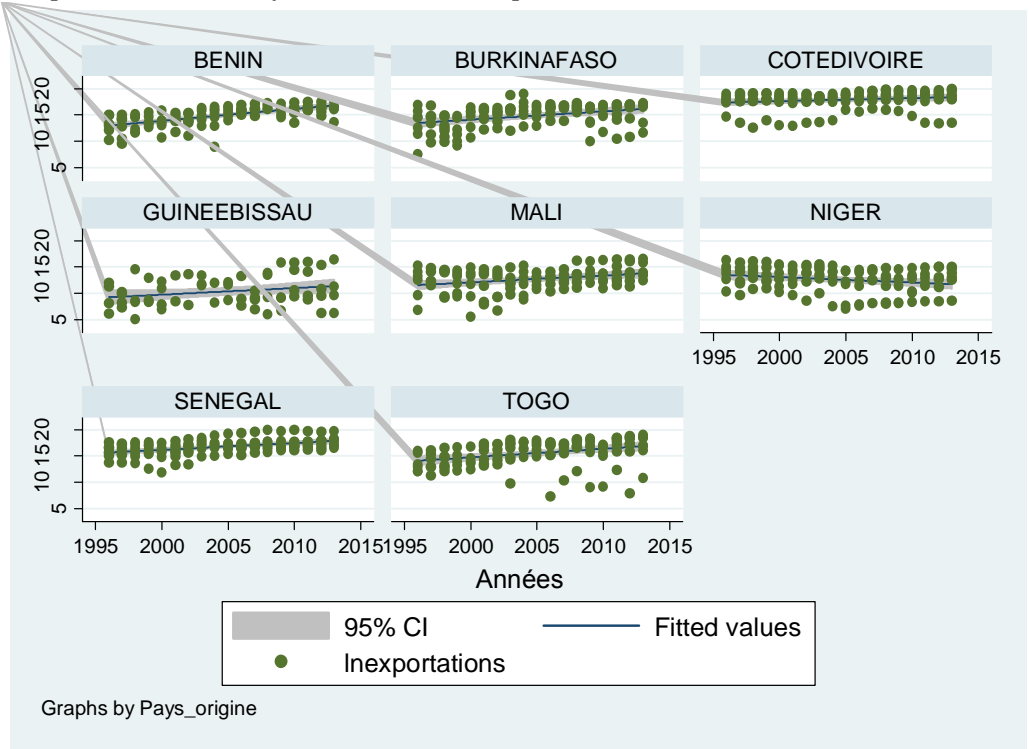
Graph 5: Evolution of intra-UEMOA exports between 1996 and 2013



Source: The author

With the exception of Niger, intra-Community exports from all member countries increased over the period (see Graph 6).

Graph 7: Evolution of intra-UEMOA exports between 1996 and 2013



Source: The author

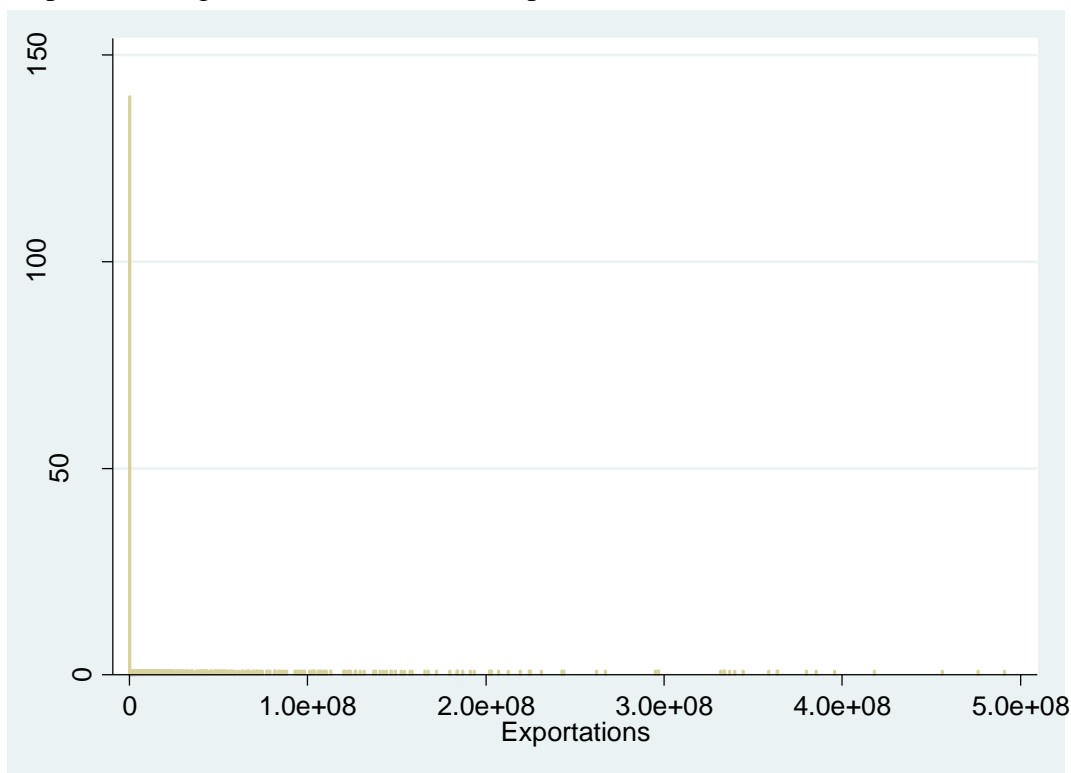
B. Estimation method, robustness check, results and discussions

1. Estimation method and robustness check

Analysis of exported values (cf. shows a high proportion of zero values. This high proportion of zero values shows that intra-WAEMU trade is relatively low over the analysis period. Given this high proportion of zero values, we equation (4) will be estimated by a pseudo-maximum likelihood Poisson model (PPML) (Santos-Silva & Tenreyro, 2006). This estimator has two advantages: it corrects the truncation of the zero-valued data and the potential bias generated by the log-linearization of the gravity model.

Graph 8) shows a high proportion of zero values. This high proportion of zero values shows that intra-WAEMU trade is relatively low over the analysis period. Given this high proportion of zero values, we equation (4) will be estimated by a pseudo-maximum likelihood Poisson model (PPML) (Santos-Silva & Tenreyro, 2006). This estimator has two advantages: it corrects the truncation of the zero-valued data and the potential bias generated by the log-linearization of the gravity model.

Graph 8 : Histogram of intra UEMOA exports from 1995 to 2013



Source: The author

We will assume that the process that generates this high proportion of zero values is different from the process that generates the positive values of exports. Indeed, one could argue that for economic reasons, the zero export flows can be explained by the low income or the lack of suitable conditions to generate intra WAEMU exports. It is, for example, the mismatch between the exportable supply and the demand of the UEMOA member partner or the substitution effects between a partner outside WAEMU that offers the same products at more competitive costs.

As a result, the countries exporting within WAEMU are relatively more competitive than partners outside the union and there is a match between their exportable supply and the demand of partner member countries. To control the robustness of the estimates, equation (4) is also estimated by two-rate counting models called Zero-Inflated Poisson and Zero-Negative Binomial. We assume that the export GDP is discriminating because, indeed, it is obvious that the level of GDP conditions the behaviour of each country.

2. Results and discussion

The results are in Table 2. We focus on the results of the estimation by the PPML method. It appears that the GDP of the exporting country and the importing country have a positive impact on intra-Community exports as we have expected. The coefficients associated with these two variables in the regression are positive and significant. An increase in GDP in the exporting country of 1% leads to a 1.064% increase in intra WAEMU exports. A 1% increase in the GDP of the WAEMU importing member country leads to a 0.37% increase in intra WAEMU exports.

Countries sharing a common border export a lot within WAEMU. Results show that when countries have a common border, they export 3.79⁵ times more than those who have no common border. This shows the importance of trade between neighboring countries. The geographical proximity of two trading partners has a significant impact on trade in WAEMU. Indeed, the existence of a common border between two countries participating in trade increases the importance of trade between them. This means that countries that have a common border trade more than those that do not. This geographic proximity facilitates access to countries' domestic markets and reduces transportation costs. At the same time, considering Agbodji, (2007), the importance of these cross-border mismatches limits intra WAEMU trade.

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Countries with a seaboard export more than those that do not. Countries with openness to the sea, export 10.12 times more to the WAEMU market compared to other countries.

Table 2: Estimations results

Estimation Methods	Zero inflated Poisson	Zero-inflated Binomial Poisson	Poisson Pseudo-Maximum de Vraisemblance
Variables dependants	Exportations	Exportations	Exportations
ln(GDP exporting country)	1.038*** (0.042)	1.065*** (0.061)	1.064*** (0.042)
ln(GDP importing country)	0.353*** (0.044)	0.362*** (0.065)	0.369*** (0.043)
ln(Distance between mains cities)	-1.054*** (0.103)	-0.656*** (0.130)	-0.075 (0.103)
Contiguity	1.324*** (0.117)	1.222*** (0.149)	1.333*** (0.118)
Sea	2.277*** (0.192)	2.072*** (0.119)	2.315*** (0.192)
Exports similarity index (ij)	-0.008*** (0.003)	-0.014*** (0.003)	-0.009*** (0.003)
Constant	3.030*** (0.944)	7.249*** (1.129)	2.756*** (0.951)
<i>inflate</i>			
GDP exporting country	-0.971*** (0.101)	-0.975*** (0.098)	
Constant	5.884*** (0.776)	5.906*** (0.757)	
/lnalpha		0.711*** (0.040)	
Wald (Chi2)	2213.90		
Pr > Chi2	0.0000		
LR (Chi2)		733.90	
Pr > Chi2		0.0000	
Log likelihood		-14961.19	
Pseudo log-likelihood:			-8.387e+09
Observations	1,008	1,008	1,008
R-squared			0.740
Robust standard errors in parentheses pour le PPML			
*** p<0.01, ** p<0.05, * p<0.1			
Vuong test of zinb vs. standard negative binomial: z = 21.21 Pr>z = 0.0000			

Source: L'auteur

The likelihood of similarity has a negative and significant impact on intra-Community exports. A 1% increase in the similarity index of exports led to a decline in exports of 0.009%. Indeed,

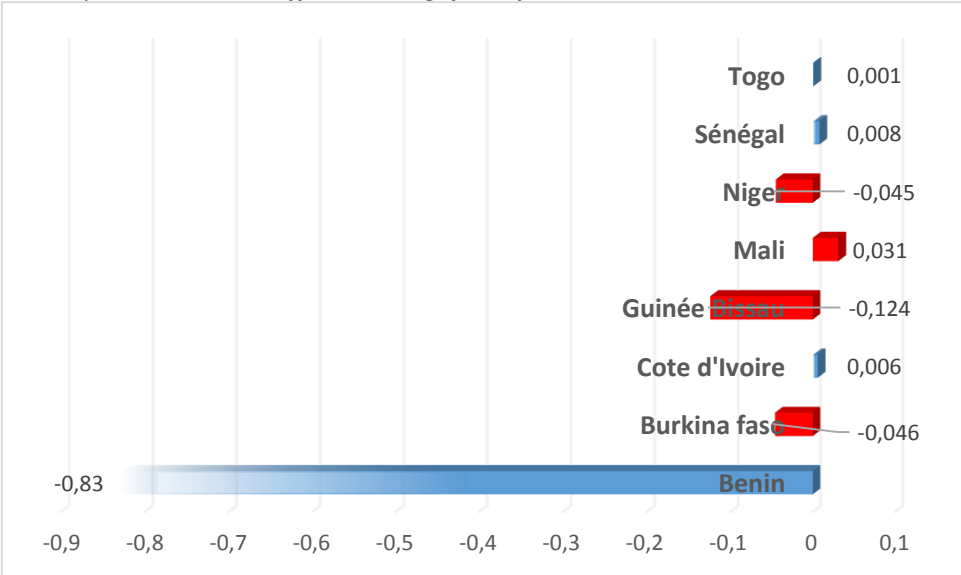
if the similarity index doubles, intra-WAEMU exports drop by 0.9%. The effect is certainly small but significant. So the similarity of exported products within WAEMU is an obstacle to expanding intra trade. In the case of CEMAC, NOUWOUE, (2013) obtained a similar result even though the coefficient is relatively low.

The estimates (see Table 2) show that the similarity of intra WAEMU exports structure negatively influences bilateral trade flows within this area. This would mean that two trading partner countries that offer goods of a similar nature outside their margins will tend to reduce the volume of their trade over time, all other things being equal, thereby creating a diversion of traffic to countries that have expressed demand for these goods.

Although the effect of product similarity is significant, the value of the coefficient is relatively small (-0.009). Thus, this analysis does not support the assumptions that the sub-region's lag is related to the similar nature of the goods involved in the trade. It is important to note, however, that this factor is not the biggest obstacle to the development of intra-community trade.

Graph 9 presents the value of the coefficients associated with the exports structure similarity index in the regressions of each country. The red bars indicate the significant coefficients.

Graph 10 : Values of coefficients associated with the index of similarity of exports in each country (in red the coefficients significatifs)



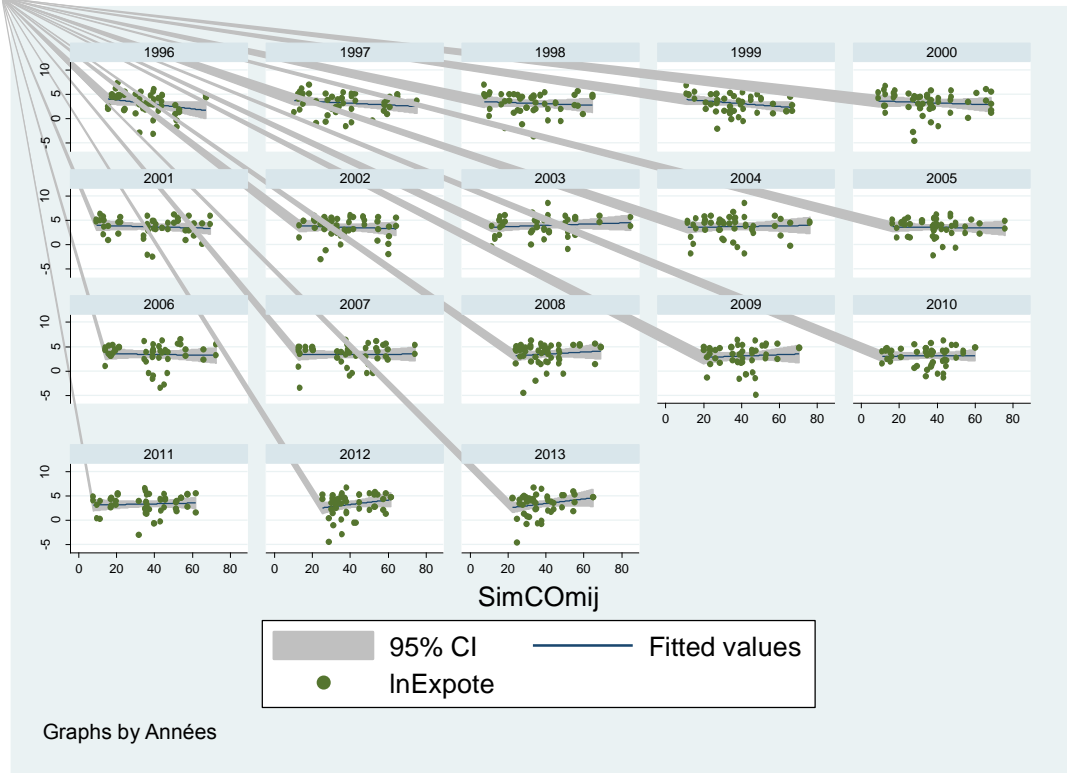
Source : The author

According to country estimates (see Appendix 1), only Mali has benefited from the similarity of its exports with those of the WAEMU countries. The coefficient associated with the similarity index for Mali has a positive and significant sign (+0.031). But for Burkina Faso,

Guinea Bissau and Niger, the associated coefficient is significant and negative, respectively (-0,046), (-0,124) and (-0,045).

We then evaluate the effect of the degree of similarity on the intra-WAEMU export potential. To calculate this potential, the approach used is articulated in two stages: (i) the calculation of exports from the estimated gravity model and (ii) given the value of the exports observed, the ratio Exports observed in percentage of estimated exports. Graph 9 shows the evolution of the potential of intra WAEMU exports between 1996 and 2013 according to the index of similarity of exports.

Graph 11 : Evolution of the potential of intra-WAEMU exports between 1996 and 2013 according to the similarity index



Source : The author

From 1996 to 2002, the potential for intra-WAEMU exports fell with the degree of similarity of exports. From 2003 to 2013 the export potential increases with the similarity index. While the effect is relatively small, it can be said that the degree of similarity of exports has an influence on the intra-WAEMU export potential. Since 2003, this potential for intra-Community exports has increased.

VI. Conclusions et recommandations

This paper analyses the effect of exports similarity on trade within the West African Economic and Monetary Union (WAEMU) member countries. To do so, a gravity model in panel data over the period 1996 to 2013 has been estimated.

The results reveal that intra WAEMU exports are weakly similar. On average, the similarity index increases over the analysis period but intra-WAEMU exports fall with this degree of similarity. Exports within WAEMU member countries decrease with the degree of similarity of exported products. Must recognize that the effect is weak. Indeed, when the index doubles, intra-WAEMU exports fall by 0.9%. Of course, the similarity of exported products within WAEMU is an obstacle to expanding intra trade. But the level of influence suggests that the strong obstacles to fostering intra WAEMU trade are elsewhere.

The results are differentiated by country. Not all countries benefit from the trade creation effect generated by WAEMU. Only Mali increases its exports with the degree of similarity of its exports with its partners in the zone. Countries such as Burkina Faso, Guinea Bissau and Niger are seeing their exports shrink with the degree of similarity of their exports with their union partner. In other words, the sub-regional market is not an extension of the domestic market of these countries.

The results of this analysis call for all reflections on the problem of strengthening regional integration in WAEMU. Thus, for this economic similarity to be a force for economic integration as in developing area (e.g. as in EU or in NAFTA), the following recommendations are made:

Creating the necessary conditions for the internationalization of production systems in WAEMU: the internationalization of production systems, which rely more and more on vertical structures of exchange encompassing several countries, each of which specializes in a particular stage production, participate in the development of world trade and could strengthen regional integration. Countries will thus specialize in process segments earlier than final goods.

Adapting intra-Community offers to the needs of member countries: the increase of wealth in space will lead to the creation of new needs. The maintenance of the exportable potential in WAEMU will require an adjustment of the offer of economic operators originating from the

union. This will go through the definition and updating of an industrial policy oriented towards exploiting opportunities.

Strengthening the Pact of Convergence, Stability, Growth and Solidarity: Economic growth, increased GDP is conducive to the expansion of intra-EU trade. Strengthening the Convergence, Growth Stability and Solidarity Pact can be achieved through continued multilateral surveillance and the effective implementation of Member States' stimulus or stabilization measures; the continuation of the implementation of the regional economic program and the monitoring of regional sectoral policies.

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Appendix

Appendix 1 : Estimation results for each country.

Estimation Method	Poisson Pseudo-Maximum de Vraisemblance (PPML)							
Pays	Benin	Burkina Faso	Cote d'Ivoire	Guinea Bissau	Mali	Niger	Senegal	Togo
Variables dependants	Exportations							
ln(GDP exporter)	1.380*** (0.183)	1.205*** (0.383)	-0.886*** (0.173)	6.730*** (1.254)	0.718** (0.347)	-1.598*** (0.390)	0.613*** (0.136)	1.702*** (0.274)
ln(GDP Importers)	0.399*** (0.099)	-0.792 (0.496)	1.126*** (0.083)	-2.438*** (0.533)	0.709*** (0.246)	1.276*** (0.306)	0.839*** (0.073)	0.274** (0.112)
ln(Distance)	0.162 (0.130)	0.510 (0.460)	-1.476*** (0.188)	-0.027 (0.788)	-2.575*** (0.498)	-0.253 (0.269)	-0.027 (0.178)	-0.173 (0.114)
Contiguity	1.442*** (0.288)	5.597*** (1.488)	0.215** (0.103)	-0.475 (1.177)	1.279*** (0.398)	1.677*** (0.430)	2.386*** (0.154)	1.191*** (0.253)
Exports similarity index (ij)	-0.830 (1.758)	-0.046** (0.022)	0.006 (0.005)	-0.124*** (0.031)	0.031*** (0.007)	-0.045*** (0.013)	0.008 (0.006)	0.001 (0.006)
Constant		6.056** (2.888)	27.569*** (1.984)	-5.657 (7.521)	16.455*** (3.798)	18.154*** (3.020)	3.767** (1.707)	1.789 (1.688)
Observations	126	126	126	126	126	126	126	126
R-squared	0.547	0.205	0.861	0.625	0.746	0.629	0.935	0.682
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Source : L'auteur

