Trade Potential among Morocco and his African partners

Evaluation using an EXTENDED Gravity Model

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**Abstract -** *In this work, we are interested in the trade potential between Morocco and his African partners. To do this, in the first part, we analyzed the structure of foreign trade of Morocco and that of its main partner in West Africa (Senegal), and the nature of their bilateral trade. It appears that, as in most African countries, trade flows of Morocco and Senegal are largely oriented to their Western partners and Senegal is the first partner of Morocco in West Africa with a very small share in its total trade (less than 5% of Moroccan flows are heading to Africa).*

*In the second part and to estimate the trade potential, the natural framework with which to attack this question is the gravity model of bilateral trade. We adopted a random effects model using generalized least squares. This model focuses on a sample of 25 countries (16 African and 9 outside Africa) and spans 1998-2006. The estimation was performed to evaluate the potential of trade with Senegal and the rest of the countries in the sample.*

*The results reveal that the trade potential of Morocco to Senegal as for a number of African countries is very low or nonexistent. For the rest of the countries and in this case the traditional partners (Germany, France, Italy, the Netherlands), Morocco has a high potential for trade. The same result was reached in the case of Algeria and Egypt with a potential trade that exceeds 4 times the observed exports.*

***Key words -*** AUGMENTED GRAVITY MODEL, BILATERAL TRADE, PANEL DATA, TRADE POTENTIAL, AFRICAN COUNTRIES, MOROCCO.

***Classification JEL –*** F12, F14, C23, C53

1. introduction

Since the Second World War, foreign trade grew strongly. In fifty years, international trade in goods has increased by thirty times while global production has increased by 10. This reflects a greater openness of national economies and increased interdependence among countries. Despite the current global crisis and slowing economic growth in many areas, the value of world exports of goods increased by 20% in 2011 and 11% of services in the same year according to statistics from The WTO (2012), while world GDP increased by 2.4%.

This dynamism of international trade is mainly due to the willingness of countries to integrate into the global economy and benefit from the opportunities offered by trade and WTO efforts to unite countries around one crucial goal, which is to reduce tariff and non-tariff barriers. The proliferation of preferential trade agreements in the form of creation of free trade areas (FTA), customs unions have increased trade flows between countries. Intra-regional trade in goods increase more than interregional trade, particularly in North America, Europe and Asia showing the extent of preferential trade agreements, bilateral or regional.

The share of Africa in international trade remains very modest. This is due, among other things, a lack of competitiveness and a polarization of trade with those African countries with which they have historical ties (former colonial powers). Morocco is no exception to this rule (almost 60% of its trade is done with EU countries), but in recent years, the country's new commercial strategy gives more priority to African countries.

In this sense, we are trying through this paper to evaluate the potential trade between Morocco and a number of African countries, including Senegal. In a comparative perspective, we used the model to estimate the Moroccan potential trade in all sample countries including Western partners.

To do this, we will discuss, at first, the stylized facts in terms of trade in both countries. We will focus on the nature of the foreign trade and its structure in both countries. Secondly, we use an econometric approach to estimate an augmented gravity model in order to assess the Moroccan potential trade. The model used is a model of random effects panel. It is estimated on a sample of 25 countries including 16 African countries and 9 countries outside Africa, which are Morocco's main partners. The variables used are those that exist in the literature base of the gravity model by adding dummy variables to capture the influence of regional agreements, proximity, common language, common currency or the colonial link on flows exports between pairs of countries. Trade in services and remoteness "multilateral resistance" are not retained in the gravity equation. This is justified in the presentation of the model. All variables are observed over the period 1998-2006.

2. THE STRUCTURE OF FOREIGN TRADE

The volume of world goods trade increased by 5% in 2011 (growth of 19% in value due to rising commodity prices) with Asia on top of all regions with an increase of 6.6%. Africa marked a contraction of 8.3%. This decrease is largely explained by the socio-political upheavals in the North Africa region, including Libya (reduction of approximately 75% of oil supplies) and Egypt. Africa's imports registered an increase of 5%; a lower performance compared to other exporting regions resources.

In value, Africa's exports increased by 17% to $ 597 billion (or 3.4% of world total) in 2011, while imports grew 18 percent to $ 555 billion (3.1% of world total). For services, Africa is the region that recorded the lowest growth in exports of services (0%). Africa's imports of services increased by 9%, slightly less than the global average of 10%.

Being the second most dynamic geographic area for growth after Asia, and having a market whose growth is estimated at more than $ 300 billion by 2020, Africa is more than ever the object of lusts. FDI has never been more important in recent years. Despite this growing interest in this geographical area, African countries have been unable to optimally exploit this potential for growth and trade. For Morocco as for Senegal, a South-South and win-win partnership is a means to stimulate growth, to find alternative markets and avoid the barriers imposed by the developed countries.

**2.1. Foreign trade trends in both countries**

Between 1998 and 2011, Moroccan exports and imports experienced a sharp increase compared to those of Senegal. They have recorded a growth of nearly 250%, from $ 10 billion in 1998 to $ 25 billion in 2011 and imports $ 8.6 billion to $ 19 billion in exports for the same period. For Senegal, trade flows have believed almost 200%, rising for exports from 1.2 to 1.9 billion dollars and imports of 1.5 to 3.1 billion between 1998 and 2011.

**Graph 1. Total trade in Morocco and Senegal in goods and services (constant 2000 US $)**

Source: World Bank

**2.2. The main products traded**

In terms of structure of trade, the main products imported by Morocco in 2010 focus on energy products 25%, equipment 19% for finished products and consumption for 17%. The semi-products have an important share in import (21%) and export (31%). This is due to the industrial strategy adopted by Morocco in recent years and is moving towards industrial trades and industrial components.

Morocco remains a major wheat importer relating to its production. The agricultural sector is highly dependent on weather conditions do not actually enjoys a rationalization strategy allowing him some independence from rainfall variability. Recently exports are more diversified. Morocco exports foods, usually vegetables and citrus for 16%, finished products for 22%, equipment for 15% and 31% for finished products and semi-finished products.

Despite this diversification, coverage rate did not exceed 50% over the last decade. A foreign dependence on energy, an agricultural sector that cannot takes off and domestic demand oriented "foreign product" and stimulated by government subsidies, account for much of the trade deficit.

**Graph 2. The structure of trade in Morocco (2010)**

Source : Office des changes, Morocco

For Senegal, the trade structure is similar to that of Morocco on the import side, with an important part of oil products (24%), equipment commodities (23%), food (20%) and intermediate goods 20%. Exports focus on oil products for 21%, seafood for 15% and 10% for cement. The trade balance is characterized, as in Morocco, with a structural deficit and a coverage rate not exceeding 50%.

**Graph 3. The structure of trade in Senegal (2010)**

Source: Ministry of Trade, Senegal

**2.3. Development of trade between the two countries**

For Morocco, trade with African Sub-Saharan countries have tripled between 2000 and 2010, due to an voluntary economic strategy of exiting Morocco of its African isolation since its withdrawal from the Organization of African Unity (OAU) in 1984. This was achieved, for example, with the signing in 2004 with several African countries (Benin, Cameroon, Gabon, Niger and Senegal) agreements concerning the "non-double taxation" in order to encourage investment.

As with all African countries, commercial flows of Morocco and Senegal are largely done with their Western partners, namely France, Spain, Italy, the United States for Morocco, we add India and Britain for Senegal. Africa represents only a small part in their trade.

**Table 1. Geographic structure of Morocco's trade (2011)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Continent | Total of Trade | Part % | Imports MDH | Part % | Exports MDH | Part % | Coverage rate % |
| Europe | 317570,4 | 60 | 206242,3 | 57,7 | 111328,1 | 63,6 | 54 |
| EU | 272894,1 | 51 | 170183,8 | 47,6 | 102710,3 | 58,7 | 60,4 |
| Asia | 11628,2 | 21 | 83291 | 23,3 | 28337,2 | 16,2 | 34 |
| America | 68119,6 | 13 | 48227,2 | 13,5 | 19892,4 | 11,4 | 41,2 |
| Africa | 30487,7 | 5,7 | 19042,4 | 5,3 | 11445,3 | 6,5 | 60,1 |
| Oceania | 2151,2 | 0,4 | 847,6 | 0,2 | 1303,6 | 0,8 | - |
| Other | 2807 | 0,5 | 119,1 |  | 2687,9 | 1,5 | - |
| Total | 532764,1 | 100 | 357769,6 | 100 | 174994,5 | 100 | 48,9 |

Source: Office des changes

Senegal remains the first partner of Morocco in West Africa. Trade between the two countries rose from 9.7 billion CFA francs to 30.5 billion between 2000 and 2010, an increase of nearly 214%. This relationship has been strengthened by a number of agreements signed in 2013 in the areas of transport, mining and energy.

The Senegalese imports from Morocco were estimated in 2010 at 27.7 billion CFA francs, against 8.8 billion in 2000. These imports covered different products: milk and cheese, cereals, vegetable oils and medicines while products exported to Morocco mainly concern cotton, salt, and lately calcium phosphates and chalk for 1.5 billion CFA francs.

**Graph 4. Trade flows of Senegal with Morocco (CFA Francs**

Source: Foreign Trade Ministry, Senegal

1. ESTIMATE OF TRADE POTENTIAL

**3.1. The gravity model: a literature review**

The basic gravity model applied to international trade is due to Tinbergen (1962) and postulates that trade flows depend on the size of the economies as measured by gross domestic product (GDP) and transportation costs approximated by the distance between countries parties to an exchange. Size of economies thus acts as a trade attraction force while transport costs are a resistance force in international trade.

The augmented version of the model takes into account other factors that can affect trade: the level of economic development measured by income per capita; cultural factors (common language, common colonizer); the common border; trade agreements; etc. The augmented gravity model can be specified as follows [Fontagné et *ali*, (2001)]:

 With:

: Exports of country i to country j;

y : Income per capita;

Y : Gross Domestic Product (GDP);

D : Distance between the partner countries;

P : Dummy measuring trade preferences;

u : Error.

Gravity equations that combine macroeconomic variables such as GDP and population, with geographical distance, have become one of the most popular tools for analysis of international trade. The estimate of trade potentials is the most common application. A vast literature exists and justify this methodology from a theoretical point of view [Tinbergen (1962), Feenstra (2003), Anderson (1979), Anderson et al (2003)].

It has become the workhorse or toolkit in international trade (Head and Mayer, 2013), in which the proven popularity are primarily due to its exceptional success in predicting bilateral trade flows and the theoretical foundations given to it by both the old, new and “new” new trade theories.

The monopolistic competition model is probably the most solid theoretical foundation of the gravity equation. It is among the most robust empirical regularities in economics (Chenery, 2014).

Broadly, the conditions for that bilateral trade flows correspond to a gravity-type equation are:

1) Countries are specialized and preferences are homogeneous across countries. This condition refers to the size of the country.

2) There are transaction costs related to the distance between the countries.

The gravity model has been used in many applications that can be separated into two major categories:

1. The applications related to issues of economic integration and the impact of regional trade agreements.
2. Applications concerning trade potential. In this case, the gravity model defines a trade standard; we can look to deviations from this standard.

The trade potential is increasing or declining trade volume expected due to a deviation from the standard gravity. The methodology used to assess this potential requires three steps:

The first step is to estimate a gravity equation on a reference sample of countries. We then obtain the coefficients of different variables such as GDP, GDP per capita, and Distance, membership in a free trade zone, language or the common border.

The second step is to use these coefficients by taking the corresponding variables for countries outside the sample [Mucchielli and Mayer 2005] or for countries in the sample and / or for swapping out sample countries with the countries of the sample [Fontagné 2001]. This step provides bilateral trade flows predicted for these countries.

The last step is to compare these predictions to the actual flow. The difference between the two (positive or negative) is the trade potential. In this context and in order to evaluate and analyze Morocco's trade potential, we estimate a panel gravity model based on exports of a group of African countries to the world using the approach of Fontagné et al ( 2001). We use the parameters of the equation gravity to simulate bilateral trade and compare it with the observed flux. The trade potential is the difference between the two values.

**3.2. Presentation of the model**

Our model is in line with the work of Linnemann (1966) including the population as a factor of the size of the partner countries and adding other binary variables that may influence trade flows between countries (contiguity, membership a free trade area, common currency, common language, colonial link ...). This is a full panel model (cubic capacity) which covers a sample of 25 countries and the observations are spread over the period 1998-2006.

In this work, we have not introduced multilateral resistance in the gravity equation. This is justified by several reasons:

1. It should be noted that African economies are poorly integrated. In the case of the countries of West Africa, interregional trade represents on average 7-8% of the total trade of various West African countries, the rest is done with Western partners. This is not due to the existence of trade barriers, but lies in the fact that these African economies generally export a very limited number of products and complementarities are weak.
2. Concerning Morocco, it maintains preferential relations with African countries and signed several free trade agreements with other countries in the sample. Trade barriers are rather gravity order and does not necessarily depend on multilateral resistance. Indeed, Gravity variables used in the equation accounts for over 70% of bilateral trade flows.
3. The price indexes, which are considered multilateral resistance indicators, depend more on the economic situation in these countries rather than their degree of openness. These are economies based on export of raw materials with low diversification. These can be responsible for differences in prices between these countries. Moreover, at the statistical level, there is no data on price indices for all countries and for a long period.

For bilateral flows, we were interested to trade in goods. Trade in services were excluded for two reasons. The first depends on the data outage for the entire country pairs. The second reason relates to the fact that services trade with European countries are very important. However, Morocco's relations with the countries of West Africa, regarding services, take more the form of foreign direct investment (FDI) than trade flows, especially in the banking and telecoms.

**3.1.1. The sample of countries**

For an appropriate specification to the heterogeneity of countries, we estimate a gravity model based on panel data on exports flows of 16 countries belonging to the African continent toward their main partners in the world. The elasticities obtained can be used to calculate the potential export in short-term.

The sample of importing countries consists of 16 exporting countries and 9 countries outside Africa. We selected countries presented in the table *infra*.

**Table 2. Sample of countries**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Exporters** | **Country code : iso3\_o** | **Exporters** | **Country code : iso3\_o** | **Importers = Exporters +** | **Coutry code : iso3\_d** |
| Burkina | BFA | Algeria | DZA | Germany | DEU |
| Cape Verde | CPV | Egypt | EGY | Spain | ESP |
| Côte d’ivoire | CIV | Libya | LBY | France | FRA |
| Gambia | GMB | Morocco | MAR | Italy | ITA |
| Ghana | GHA | Tunisia | TUN | Netherlands | NLD |
| Guinea | GIN | Gabon | GAB | China | CHN |
| Guinea Bissau | GNB | Senegal | SEN | India | IND |
| Mali | MLI |  |  | Pakistan | PAK |
| Niger | NER |  |  | USA | USA |

Reliable and timely data are available for these countries. We retain a period from 1998 to 2006, in order not to take into account the impact of the "Arab Spring" in some countries of North Africa on the volume and value of trade.

**3.1.2. Sources of Data**

The data on geographical variables and dummy variables in this case: GDP, GDP / Capita, distance, common language, colonial past, contiguity, opening to the sea (or isolation), the free trade agreements trade, are taken from the database Gravdata CEPII. For bilateral trade data, we used the UNCTAD database (Comtrade). A harmonization work in terms of coding of countries was made to exploit the two databases.

**3.3. Basic Equation and Estimation Method**

Using panel data can exploit two sources of variation of statistical information: time where intra-individual variability (Within) and individual or inter-individual variability (Between). The increased number of observations ensures accurate estimators; reduce the risk of multicollinearity; and especially to improve the scope of investigation.

In its logarithmic form, the basic equation for the total merchandise trade (in thousands of US dollars) is as follows:

With

yi : GDP per capita of exporter country

yj : GDP per capita of importer country

Yi : GDP of exporter country

Yj : GDP of importer country

Dij : Relative geographical distance between the exporting and importing countries in the database "gravdata" CEPII.

One of the biggest challenges gravity models remains approximation of trade costs. For our study, we retain the logarithm of the weighted distance Dij from the database "Gravdata" CEPII as a "proxy" of trade costs. It is a measure of the distance between the two main cities of the partner countries weighted by the relative weight of each city in the total population of each country.

Z is a dummy variable capturing the preferential trade agreements (preferential access to unilateral, free trade agreements, common market) and L a binary variable that captures the sharing of a common language or historical ties (colonial past). The variables of GDP are in current prices.

We started our regression using the fixed effects model, which sets the individual effects and then performs a regression on the individual average in order to obtain greater accuracy in the estimation. This model is not retained in this case because the inter-individual variability is not used to estimate the structural parameters of the model. Another inherent limit to the fixed effects model is the fact that the impact of invariant factors over time cannot be identified. This is a limit to the level of economic analysis, since it amounts to restricting the field of economic analysis of the study[[3]](#footnote-3).

We hold therefore the random effects model. This model assumes that the individual specificity has a random form. The constant term specific to individual i is random. It is divided, into a fixed term and a random term, in goal to control individual heterogeneity. By grouping the random terms of the model, we obtain a composed errors structure. In this random effects model we decompose residuals. It is in which interact the omitted variables.

Therefore, we do the regression with random effects estimator that uses generalized least squares to compensate for the lack of fixed effects method. Thus, we proceed to the various statistical tests to ensure the relevance of the results including collinearity tests.

We retained after several estimates using the approach "stepwise" variables that are statistically significant. Consequently; contiguity; colonial relationship; and membership in a free trade zone prove insignificant and were withdrawn. All variables are in log-linear except dummies. The chosen model is written as follows:

Where:

**:** Goods exports; country i (iso3\_O) to country j (iso3\_d) in thousands $US.

**:** Income per capita of exporter in current $US.

**:** Income per capita of exporter in current $US.

**:** The area of the exporting country inKm2.

**:** The area of the importing country inKm2.

**:** The population of the exporting country in million

**:** The population of the importing country in million

**:** The relative distance between the two countries.

**:** Binary variable takes 1 for the existence of a common currency or 0 otherwise.

**:** 1 if the exporting country is a member of GATT / WTO, 0 otherwise.

**:** 1 if the importing country is a member of GATT / WTO, 0 otherwise.

**:** 1 for the existence of a common official language between the two countries, 0 if not.

**:** Individuals effects related to country couples.

**:** Residuals.

We expect positive signs for the variables: Income per capita; of population size; membership in the GATT / WTO; common language and common currency, and negative signs for the distance and area of the importing country.

**3.4. The results of the estimate**

The results of estimating the random effects model are presented in Table 3 below with the regression equation. The signs of the coefficients are consistent with the literature and the results of empirical work. For comparison purposes, we estimated the same equation using the between estimator. The results of this latest estimate is given in Annex 1.

This model offers us the best results, with R2= 0.66 and R2between= 0.72. We obtained significant coefficients at the 1% level and satisfactory evidence from the perspective of the expected signs. Income per capita helps increase the volume of trade. An increase of 1% of this variable in the exporting country leads *ceteris paribus* an increase in exports of 0.92% and a 1% increase from that of the importing country increases 0.85%. The population representing the market size helps in the growth of trade between the two countries with the elasticities of around 1.09% for the exporting countries and 1.51 to the importing country.

The existence of a common currency, membership of the WTO and the common language are correlated positively and significantly with exports. They contribute to improving exchanges.  
The distance sharply reduced export flows. A 1% increase in the distance leads ceteris paribus a fall in exports of more than proportionally to -1.87%. The other variable that plays in the same direction as the distance is the area of the importing country. An increase of 1% of the area of the partner country reduced 0.57% the export flows.

Between effects model, presented in Annex 1, provides almost similar results with differences in terms of magnitude of the elasticities without changing the signs of the coefficients of the variables.

**Table 3. The results of estimate by the random effects model**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ln\_Export | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
| comcur | 0.7537775 | 0.4229944 | 1.78 | 0.075 | -0.0752763 | 1.582831 |
| gatt\_o | 1.536526 | 0.3305274 | 4.65 | 0.000 | 0.8887047 | 2.184348 |
| gatt\_d | 0.6677706 | 0.1962826 | 3.4 | 0.001 | 0.2830637 | 1.052477 |
| ln\_area\_d | -0.5732153 | 0.1085401 | -5.28 | 0.000 | -0.78595 | -0.3604806 |
| ln\_area\_o | 0.2491384 | 0.1096167 | 2.27 | 0.023 | 0.0342935 | 0.4639832 |
| comlang\_off | 1.208427 | 0.2699056 | 4.48 | 0.000 | 0.6794222 | 1.737433 |
| ln\_gdpcap\_d | 0.8504691 | 0.0596897 | 14.25 | 0.000 | 0.7334795 | 0.9674587 |
| ln\_gdpcap\_o | 0.9244506 | 0.0890363 | 10.38 | 0.000 | 0.7499427 | 1.098958 |
| ln\_distw | -1.872013 | 0.1746081 | -10.72 | 0.000 | -2.214239 | -1.529787 |
| ln\_pop\_o | 1.09482 | 0.137199 | 7.98 | 0.000 | 0.8259146 | 1.363725 |
| ln\_pop\_d | 1.515884 | 0.1115084 | 13.59 | 0.000 | 1.297332 | 1.734437 |
| \_cons | 4.573631 | 2.140648 | 2.14 | 0.033 | 0.3780389 | 8.769223 |
| sigma\_u | 1.9968323 |  |  |  |  |  |
| sigma\_e | 1.1661738 |  |  |  |  |  |

Random-effects GLS regression Number of obs = 3240

R-sq: within = 0.1065 Wald chi2(11) = 1215.93

between = 0.7263 Prob > chi2 = 0.0000

overall = 0.6627 corr(u\_i, X) = 0 (assumed)

**3.5. Analysis of trade potential**

We use the equation of the above regression, given by the random effects model, to determine the norm and in order to estimate Morocco's exports to Senegal and to the rest of the countries for the year 2006. Based on this estimate, we calculate the trade potential. The latter is calculated in percentage by the following formula:



A ratio above 100% means that there is an untapped trade potential. With a ratio below 100%, we can say that the country surpasses its trade potential or that there is no positive trade potential. The results of this calculation are given in Table 4.

The estimate of potential in Morocco's export highlights three categories of partners:

1. A first category concerns countries for which there is a strong trade potential for Morocco. Without surprisingly, we find its traditional partners in terms of international trade. These include Germany with a potential of 4.7 times the level of observed exports, France with a ratio of 2.12 times, Italy with a ratio of 3 times and the Netherlands with a low ratio of 2.6 times that observed.

In this group of countries, we find some Maghreb countries. In this case, Algeria with a potential of 4.5 times[[4]](#footnote-4). This situation can be explained by factors of proximity (different natures) and their membership in the Arab Maghreb Union (UMA), but trade between the two countries remain very modest. The same result was found in the case of Egypt with a ratio of 4.4 times, a situation that perfectly resembles that of Algeria.

1. A second category concerns countries for which there is a positive trade potential. This is the case of Spain with a ratio of 1.3 times more than observed exports, Tunisia with a potential of 1.7 times and some African countries such as Burkina Faso with a ratio of 2.2 times and Guinea-Bissau with a ratio of 1.3 times the observed situation.
2. A Third category of countries for which Morocco has no commercial potential. Senegal is one of the group with a potential of 62% below the actual situation. In the same situation, we find the United States and China. Other African countries with no trade potential. This situation can be explained by the low share of Morocco's trade with these countries (less than 6% of total exports) and transportation costs related to distance and lack of infrastructure linking the countries in this region. We can also note the weak implementation of agreements and dynamic and operational partnerships between Morocco and the African countries before 2006.

For Comparison and based on the Between model given in Annex 1; Results of the estimate of trade potential of Morocco (Annex 2) show some differences from the first model. These differences are reflected by the fact that some African countries moving from category 3 to category 2. We find the Côte-D’Ivoire, Cape Verde, Libya and Niger.

In General, the results of the second assessment report a slightly higher potential than that of the first model. This difference is due to a small increase of elasticities in the second model. The passage of the estimated value in logarithm to the absolute value using the exponential increases in a faster way the estimated exports.

**Table 4. Morocco’s Trade Potential**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **iso3\_o** | **iso3\_d** | **Observed Exports : A** | **Estimated Exports : C** | **Trade Potential : C/A %** |
| MAR | BFA | 5725,212 | 12593,66262 | 219,968 |
| MAR | CHN | 220252,745 | 119010,8566 | 54,034 |
| MAR | CIV | 29279,16 | 22000,95191 | 75,142 |
| MAR | CPV | 1021,64 | 505,3155067 | 49,461 |
| MAR | DEU | 433924,533 | 2053281,904 | 473,189 |
| MAR | DZA | 49211,419 | 224564,893 | 456,327 |
| MAR | EGY | 23072,909 | 102650,9831 | 444,898 |
| MAR | ESP | 2621159,52 | 3415450,636 | 130,303 |
| MAR | FRA | 3146485,524 | 6699007,908 | 212,904 |
| MAR | GAB | 15340,068 | 1509,245295 | 9,839 |
| MAR | GHA | 18823,045 | 6797,19292 | 36,111 |
| MAR | GIN | 19478,004 | 4929,693033 | 25,309 |
| MAR | GMB | 8606,777 | 656,9776502 | 7,633 |
| MAR | GNB | 152,802 | 204,2506671 | 133,67 |
| MAR | IND | 488725,165 | 122615,6567 | 25,089 |
| MAR | ITA | 612248,613 | 1807598,994 | 295,239 |
| MAR | LBY | 22016,312 | 9762,287237 | 44,341 |
| MAR | MLI | 15968,136 | 5846,304318 | 36,612 |
| MAR | NER | 3644,168 | 3234,071019 | 88,746 |
| MAR | NLD | 285908,087 | 748802,0935 | 261,903 |
| MAR | PAK | 128782,327 | 17123,31048 | 13,296 |
| **MAR** | **SEN** | **53612,748** | **20404,77049** | **38,06** |
| MAR | TUN | 69756,136 | 119196,6584 | 170,876 |
| MAR | USA | 375306,813 | 316994,5943 | 84,463 |

Source: Authors' calculations using estimates and UNCTAD data

1. conclusion

As part of this work, we are interested in Morocco's trade potential to a number of African countries. In this framework, we strayed at the beginning to analyze the structure and nature of trade between Morocco and Senegal. Senegal is the main partner of Morocco in West Africa. The overall analysis of the structure of foreign trade of the two countries showed us a clear statement. Trade flows of Morocco and Senegal are done more with countries outside Africa than intra Africa (more than 80% of trade flows).

In the second part and using a gravity model based on panel data (a sample of 25 countries over a period from 1998 to 2006), we estimated the potential of exports from Morocco to Senegal and to all sample countries. The model used for the estimate is the random effects model. For comparison purposes, we also performed a gravity equation using the Between-effects model. The results of this work show that Morocco's trade potential to Senegal as to a number of African countries is very low or nonexistent. For the rest of the countries and in this case the traditional partners (Germany, France, Italy, the Netherlands), Morocco has strong trade potential. The same result was reached in trade with Algeria and Egypt with a trade potential that exceeds 4 times the observed exports.

Morocco became the second African investor in the continent after South Africa. Only 5% of Moroccan exports are destined for Africa. The Morocco exudes a trade surplus with Senegal, but in value and volume, trade between the two countries represent only a very small part of their foreign trade. The limited market size (GDP); high transport-related costs and non-optimization of economic cooperation agreements between the two countries could explain the low estimated market potential.

In recent years, both countries recorded growth with an improvement in per capita income; factors that can boost their trade. In addition, all agreements between the two countries, including the latest on the transport and logistics (2013) argue for increased trade and reducing shortfalls in terms of bilateral trade. Diversification of exportable supply coupled with the tangible reduction of tariff and non-tariff barriers between Morocco and African countries is essential to boost trade.

In continuation of this work, and to test the robustness of our model, the estimated trade potential in several recent years must be done to ensure the stability of elasticities. In addition, an estimate by sector will provide more accuracy in the economic analysis.

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annexe 1.

**Between regression** (regression on group means)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ln\_Export | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
| comcur | 1.218176 | 0.4175748 | 2.92 | 0.004 | 0.3968297 | 2.039523 |
| gatt\_o | 2.176285 | 0.3437239 | 6.33 | 0.000 | 1.5002 | 2.852371 |
| ln\_area\_d | -0.5932938 | 0.1069696 | -5.55 | 0.000 | -0.8036971 | -0.3828906 |
| comlang\_off | 1.098257 | 0.2683188 | 4.09 | 0.000 | 0.570489 | 1.626026 |
| ln\_gdpcap\_d | 0.955105 | 0.0665068 | 14.36 | 0.000 | 0.8242898 | 1.08592 |
| ln\_gdpcap\_o | 1.577217 | 0.1292292 | 12.2 | 0.000 | 1.32303 | 1.831403 |
| ln\_distw | -2.045849 | 0.1759438 | -11.63 | 0.000 | -2.391921 | -1.699777 |
| ln\_pop\_o | 1.321654 | 0.0856216 | 15.44 | 0.000 | 1.153241 | 1.490067 |
| ln\_pop\_d | 1.57844 | 0.109607 | 14.4 | 0.000 | 1.362849 | 1.794031 |
| \_cons | 3.478312 | 1.897112 | 1.83 | 0.068 | -0.2532031 | 7.209827 |

R-sq: within = 0.0973 Number of obs = 3240

between = 0.7417 F(9,341) = 108.79

overall = 0.6726 Prob > F = 0.0000

sd(u\_i + avg(e\_i.))= 2.049035

**ANNEXE 2.**

**Morocco’s Trade Potential using Between-effects Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Between regression | | | | |
| iso3\_o | iso3\_d | Observed Exports : A | Estimated Exports : B | Trade Potentiel : B/A % |
|
| MAR | BFA | 5725,212 | 17044,62187 | 297,712 |
| MAR | CHN | 220252,745 | 202650,8852 | 92,008 |
| MAR | CIV | 29279,16 | 31362,24312 | 107,115 |
| MAR | CPV | 1021,64 | 1536,680731 | 150,413 |
| MAR | DEU | 433924,533 | 5456619,408 | 1257,504 |
| MAR | DZA | 49211,419 | 869018,7669 | 1765,888 |
| MAR | EGY | 23072,909 | 158685,5738 | 687,757 |
| MAR | ESP | 2621159,52 | 10059821,71 | 383,793 |
| MAR | FRA | 3146485,524 | 16531694,91 | 525,402 |
| MAR | GAB | 15340,068 | 2144,966042 | 13,983 |
| MAR | GHA | 18823,045 | 10442,62222 | 55,478 |
| MAR | GIN | 19478,004 | 6244,135611 | 32,057 |
| MAR | GMB | 8606,777 | 892,4004796 | 10,369 |
| MAR | GNB | 152,802 | 253,9577717 | 166,201 |
| MAR | IND | 488725,165 | 200003,4709 | 40,924 |
| MAR | ITA | 612248,613 | 4834121,624 | 789,568 |
| MAR | LBY | 22016,312 | 32724,84977 | 148,639 |
| MAR | MLI | 15968,136 | 7718,35857 | 48,336 |
| MAR | NER | 3644,168 | 3976,288001 | 109,114 |
| MAR | NLD | 285908,087 | 1921467,932 | 672,058 |
| MAR | PAK | 128782,327 | 25921,81056 | 20,128 |
| **MAR** | **SEN** | **53612,748** | **29227,05207** | **54,515** |
| MAR | TUN | 69756,136 | 209827,281 | 300,801 |
| MAR | USA | 375306,813 | 718097,0457 | 191,336 |

Source: Authors' calculations using estimates and UNCTAD data

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3. See Goaied .M, et Sassi .S, 2012, Econométrie des données de panel sous STATA ; 1ère édition, IHEC, Université de Carthage, Mai 2012 [↑](#footnote-ref-3)
4. In the case of Algeria, the Work of Millogo, A. (2011) estimates that the trade potential of Morocco represents 11 times the level of observed exports. [↑](#footnote-ref-4)