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# Trade Performance of the Less Developed African Countries

Short title: Trade Performance of the LDAC

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**Abstract:** Adopting a long term perspective, we evaluate the trade performance of less developed African countries. Besides some general trade indicators, we apply a constant market share analysis in order to decompose export performance into several components with specific economic interpretation. Our main conclusions are: (i) the sectoral specialization structure of exports has remained heavy in commodities but the composition of the basket of goods exported has changed considerably with a very strong concentration in crude oil (mainly in the last two decades), (ii) the geographical structure of exports has also changed, with an important increase of the relative importance of China and USA, (iii) the countries under analysis not only show a negative competitiveness effect, but are also penalized by their sectoral and geographical specialization, and (iv) the most favorable evolution is observed in the most recent sub-period (2000-2007), but it is insufficient to reverse the previous negative trend.

**JEL Codes:** F14, O55

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# Trade Performance of the Less Developed African Countries

## 1. Introduction

We analyze the export performance of the Less Developed African Countries (LDAC)<sup>1</sup> over four decades, from 1967 to 2007. The period starts after most of these countries gained independence from colonial powers and covers the profound change in their economic strategies that occurred between the 1980s and the 1990s. In addition, the analysis extends to the commodity boom of the last decade.

Trade policy of the LDAC can be characterized by three major stages (UNCTAD, 2008). Before 1960, African countries' trade was mainly based on exports of primary products and imports of manufactures in a bidirectional relationship with the colonial powers. Subsequent to political independence, most of these countries adopted an import-substitution industrialization strategy, envisaged as a way to promote national production and reduce dependency on primary products. Nevertheless, faced with the poor results of this strategy and the ensuing loss of competitiveness, aggravated by the oil crisis of 1973 and 1979, which reduced demand for most primary products and resulted in decreasing prices, by the mid-1980s most of these countries began to adopt an export-oriented strategy based on market-oriented reforms, as advocated by the International Monetary Fund and the World Bank. By the mid-1990s, most African countries had gone through a structural adjustment programme designed by these institutions. With regard to the reform of the external sector, the guidance was to depreciate overvalued currencies, eliminate foreign exchange rationing, streamline import licensing and replace quantitative restrictions by tariffs (to reduce tariff dispersion and the overall level of tariffs), and to reduce or eliminate export taxes and de-monopolize trade. Many countries also adopted measures to promote non-traditional exports such as duty drawbacks, the creation of export-processing zones, and the promotion of foreign investment (UNCTAD, 2008).

Taking into account the heterogeneity of the period under review, the expectation is for significant changes in the pattern of trade and export performance of LDAC. The

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<sup>1</sup> This is a group of countries so designated in the Chelem database (which is used in this study), consisting of Angola, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Ivory Coast, Democratic Republic of Congo (formerly Zaire), Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Uganda, and Zambia.

export-oriented strategy was designed to benefit the tradable sector, diversifying the productive structure and increasing exports.

Nevertheless, LDAC's trade structure did not change substantially during the period analyzed, as it is made up basically of primary products, leaving those countries dependent on volatile global commodity prices. Indeed, the trend is an increasing concentration in some primary commodities, especially oil. Also, these countries decreased their market share in global trade during the period analyzed, as shown in this study. The strategy for promoting exports therefore did not produce the expected results with regard to improved export performance and diversified production, as amply illustrated in UNCTAD (2008).

While the above-mentioned empirical evidence on Africa's role in the international arena is uncontested, less agreement exists about its determinant factors. Some studies have sought to evaluate the role of protectionism in OECD markets. Indeed, Africa's major trading partners have very high non-tariff measures, such as sanitary and phytosanitary measures, social and environmental measures, or strict rules of origin (Mutume, 2006). However, evidence on whether Africa's protectionist policies has caused its marginalization in world trade is not clear-cut, as OECD trade preferences made market access for Africa more favorable than for many other exporters (Ng and Yeats, 1997). In turn, development economists and international organizations argue that inappropriate domestic policies are largely responsible for unfavorable trade and economic trends. In fact, many African countries have implemented the trade strategy reform in a very limited way. Tariffs remain high, trade monopolies continue to exist, export crops are still taxed, and trade procedures continue to be characterized by red tape and corruption.

Despite strong pressure from donor governments and multilateral agencies, the African leaders in general have been reluctant to open their economies and reduce the role of the state. For that reason, the reforms have progressed very little, with shy advances and setbacks (Rodrik, 1998). Overvalued exchange rates and high transaction costs (in part due to geography as these countries are far from destination markets (Redding and Venables, 2004), but also largely derived from very poor infrastructures and internal barriers to trade) have given Africa a comparative disadvantage in 'transaction-intensive' activities, as is the case of manufacturing. With transport unreliable, firms typically need to carry very large stocks of inputs in order to maintain continuity and this problem is aggravated particularly in the case of manufacturing, since it tends to

have a high share of intermediate inputs production (Collier and Gunning, 1999). Weakness in institutions, namely at the level of property right protection and functioning of the courts, making the firms reluctant to invest, and insufficient human capital, are still other weaknesses commonly stressed. But it is also possible that LDAC are more specialized in export products and destination markets where demand is weak in comparison to other products and markets. If this is the case, their aggregate export share will tend to decline.

This paper helps to understand the export performance of LDAC throughout the period analyzed by differentiating between competitiveness and structural factors, geographical and sectoral specialization patterns that drove the export market share growth of these countries in the period analyzed. For this purpose, we use the constant market share (CMS) accounting method in the version proposed by Cabral and Esteves (2006). This method allows decomposing the export performance at the level of the product/country of destination and for each individual market of destination (i.e., by product and country of destination).

The remainder of the paper is organized as follows. Section 2 characterises the LDAC export performance over the period analyzed through the use of some simple international trade indicators. Section 3 presents the methodology of constant market share, which is applied to LDAC in Section 4. Section 5 presents some final remarks.

## **2. The LDAC Export Performance: Some Preliminary Evidence**

The empirical analysis performed in this paper is based on data drawn from the Chelem database. Specifically, we use a predefined group of countries – the Less Developed African Countries – and consider their exports over the period 1967-2007 to their 36 largest destination markets, covering almost all the exports of LDAC by the end of the period under analysis. The main contribution of our study is the application of a constant market share analysis to these data in order to provide an in-depth understanding of the factors behind the evolution of trade performance of this group of countries.

We begin our empirical exercise by considering some simple international trade indicators, aiming to provide an overview of the integration of LDAC in the international trade arena. Table 1 shows the evolution of the world market share of the LDAC over the period under scrutiny. LDAC's global export market share (MS)

decreased from 1.82% in 1967 to 0.71% in 2007. This evolution represents a market share loss of 61.10% since 1967, a decreasing trend reversed only in the sub-period 2000-2007. Nevertheless, despite the recuperation in this last sub-period (with an increase of 92.03%), the year 2007 recovers only the 0.70% market share level of 1980.

[Insert Table 1 here]

The main thing this table shows us, therefore, is that the relative importance of LDAC in world trade has been falling substantially over the period considered, even after trade liberalization, implemented in the 1980s, with the replacement of the import-substitution industrialization strategy widely accepted in the 1960s and 1970s. However, in the period 2000-2007 there was strong growth in the LDAC's world market share. As shown below, it is explained principally by the commodity demand boom of fuels, minerals, and other primary products that began in 2002.

Export diversification of the LDAC is very low, as shown in Table 2. These countries remain essentially primary commodity exporters and depend on a small number of products whose demand increased throughout the period analyzed. The weight of the top ten sectors in each year ranges from 86.09% in 1980 to about 94.23% in 2007, being very high since the beginning of the period studied. The export concentration reached the highest level at the end of the period analyzed, showing that these countries became increasingly dependent on a limited number of products.<sup>2</sup>

[Insert Table 2 here]

At the bottom of Table 2 we show the weight of the ten largest sectors in every year as well as the weight of the same sectors in the remaining years. From that, we see important changes in the composition of the exports. For example, while the top 10 sectors in 1967 represent 93.11% of total exports in that year, the exports of these sectors in 2007 have a value as low as 18.36%. The greatest changes relative to the beginning of the period analyzed occurred after 1990 and became more pronounced as we approach the end of the period. Noteworthy is the case of crude oil, which is not on

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<sup>2</sup> Sub-Saharan Africa is the region of the developing world with the highest dependence on primary exports, especially fuel since 1990 (UNCTAD, 2008, p. 19).

the list of the ten most exported products in 1967. It occupies third place in 1980 and thereafter passes to the first position in the ranking.

To evaluate the degree of transformation of the sectoral export structure of the LDAC, we use the Lawrence index ( $L_s$ ), which compares this structure at two different moments in time (which we define as 0 and 1):

$$L_s = \frac{1}{2} \sum_j |v_j(1) - v_j(0)|, \quad j = 1, \dots, J. \quad (1)$$

$j$  represents the product. This index ranges between 0 and 1, increasing with structural transformation. The results are reported in the first line of Table 3. This evidence shows that the decade with the least change in the sectoral structure was the last one, followed by the post-independence period. The biggest changes occurred in the 1980s and 1990s. This may be a result of an economic strategy inflection, more favorable to exports, but it should be noted that the change is not very large relative to the previous period.

[Insert Table 3 here]

The geographical pattern of destination countries of LDAC exports has changed considerably over the four decades analysed, as shown in Table 4 (which presents the destination countries ranked by their importance in 1967).

[Insert Table 4 here]

The main conclusion emerging from this evidence is the decreasing share of the European countries and the importance of North America and Asia as destination markets. This trend reflects the gradual loosening of the economic ties of African countries with previous colonizers, in spite of the Preferential Agreements established by Europe with African countries (African, Caribbean, and Pacific Group of States). In turn, LDAC gradually reinforced their commercial relations with the USA, representing almost 24% of total LDAC exports in 2007. The growth of this market is a result of increased sourcing of oil and the implementation of the African Growth and Opportunity Act of 2000, the flagship of USA commercial and development policy with Sub-Saharan Africa, mainly based on trade preferences (Brenton and Hoppe, 2006).

Still more significant was the increased importance of Asian markets, mainly China, as these countries became importers of raw materials, amounting to 27.22% of total LDAC exports in 2007, followed by India, South Korea, Malaysia, Indonesia, Taiwan, and Thailand, with weights much smaller but still important.

Finally, it appears that intra-African trade remains marginal. Two reasons are usually advanced for this: (i) African countries tend to export products similar in nature, and (ii) high transaction costs due to geography and poor infrastructures, limited regional integration, and high barriers to trade.

To evaluate the degree of transformation of the geographical export structure of the LDAC over the period analyzed, we once more turn to the Lawrence index, but now considering its spatial version ( $L_G$ ). We apply the measure presented in equation (1) but instead of  $j$  for the product we consider the index  $i$  for destination markets ( $i = 1, \dots, I$ ). The results obtained from the application of this measure are in the second line of Table 3.

Comparing this evidence with that obtained through the Lawrence index applied to the sectoral structure, we see a greater stability in the present case. We also see that the LDAC underwent the most profound change in their geographical export pattern in the decade 1990-2000, followed by the last sub-period analyzed (2000-2007). The 1980s is the period showing the most stable geographical pattern. This is in line with the increasing importance, in more recent sub-periods, of non-traditional African trade partners, like the USA and Asian countries.

In order to obtain a more complete understanding of the transformations in the exports from LDAC, we conclude this section by focusing our attention on the exports to each market individually, i.e., each combination country-sector (Table 5).

[Insert Table 5 here]

The evidence in Table 5 confirms the strong increase in the concentration of exports over the period analyzed, particularly crude oil. This trend is so strong that by 2007 the ten largest individual markets are related to the export of this product, a remarkable fact considering that oil accounted for only 0.18% of exports of LDAC in 1967. We should also note the entry of Asian customers from 2000 on, especially China, but also Korea and Taiwan in 2000 and India in 2007.



The bottom of Table 5, which records the weight of the top individual markets of each year in the remaining years, puts into evidence the strong concentration of exports in the ten most important markets from 1980 to 2007, reaching 68.26% at the end of this period. The composition of the most important exports, however, varied substantially over the period. For instance, while the top individual markets represented 45.32% of total exports in 1967, this same basket represents only 3.81% of total exports at the end of the period. For their part, the ten most important individual markets in 2007 have a weight of 0% of total exports in 1967. A final observation concerns the strong concentration of oil exports in some target markets: in 2007, the two main destination countries of this product (China and the USA) represent around 46% of total exports of LDAC, suggesting a dangerous dependence upon these specific markets.

The Lawrence index displaying the degree of transformation of the LDAC's export structure by individual markets ( $L_M$ ) can once again be obtained using equation (1) considering the index  $m$  ( $m = 1, \dots, J \times I$ ) for individual markets instead of  $j$ . The last line of Table 3 presents the results for this index. It points to a similar structural change in all decades studied, with a slight decrease, revealing more stability, in the most recent sub-period.

The trend of concentration of exports identified above over the period under consideration is reflected in Table 6, which indicates the degree of concentration of exports, evaluated through the well-known Herfindahl index (for the three levels analyzed: destination countries, sectors, and individual markets).

[Insert Table 6 here]

In all cases concentration increased, and is especially evident for sectors (0.55 at the end of the period), which corroborates the analysis above.

### **3. Constant Market Share Analysis**

The CMS is a statistical decomposition of market share changes with a long tradition in applied international economics since the pioneering study of Tyszynski (1951).<sup>3</sup>

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<sup>3</sup> See Richardson (1971) for reservations regarding this approach, primarily the fact that in the traditional CMS formulation, the product and the market effect are calculated in an asymmetric way. Depending on the calculation sequence of these two effects, one of them will include the interaction term. Therefore, results depend on the ordering of the structure effects.

Recent applications of CMS include, for example, ECB (2005), Amador and Cabral (2008), Finicelli *et al.* (2008), Cafiso (2009), Skriner (2010), and Crespo and Fontoura (2011).

This methodology disaggregates the trade data of a given country (or group of countries as in the present case) and compares it with the trade flows of the rest of the world (Skriner, 2010). A spirited methodological debate during recent decades has produced a variety of versions of CMS analysis (Ahmadi-Esfahani, 2006). In order to decompose the export market share performance of LDAC, we follow the CMS analysis proposed by Cabral and Esteves (2006). This is a slightly adapted version of the formulation developed by Milana (1988). The formulation adopted here decomposes the variation registered in the export market share of a country (in our case, the LDAC) into several terms.

In terms of notation, we define  $X_{ji}$  as the exports of LDAC of product  $j$  to country  $i$  and  $M_{ji}$  as the imports of product  $j$  by country  $i$ . Therefore, the market share of LDAC in country  $i$  concerning product  $j$  –  $MS_{ji}$  – is defined as:

$$MS_{ji} = \frac{X_{ji}}{M_{ji}}. \quad (2)$$

Total market share is expressed as:

$$MS = \frac{\sum_j \sum_i X_{ji}}{\sum_j \sum_i M_{ji}}. \quad (3)$$

The next step involves calculating the percentage variation in the total market share as well as its decomposition into three main effects: the market share effect ( $MSE$ ), the combined structure effect ( $CSE$ ), and the residual effect ( $RE$ ).

The  $MSE$  captures the evolution of the share in each specific market (i.e., a country/product pair) weighted by the relative importance of that market in the total exports of LDAC. By capturing the effective variations registered in each individual market, this component can be interpreted as an indicator of the economy's

competitiveness. For this reason, this is also called the ‘competitiveness effect’, expressed as follows:

$$MSE = \sum_j \sum_i \frac{\Delta MS_{ji}}{MS_{ji}} \frac{X_{ji}}{\sum_j \sum_i X_{ji}}. \quad (4)$$

The combined structure effect (*CSE*) captures the relative evolution of each destination market – translated into the variation in the relative weight of that market in the total imports – weighted by the relative importance of that market in the total market share of the country under analysis (in our case, LDAC). Thus, the *CSE* measures the impact of the sectoral and geographical specializations on the variation of the LDAC’s market share, being expressed in the following way:

$$CSE = \sum_j \sum_i \Delta \frac{M_{ji}}{\sum_j \sum_i M_{ji}} \frac{MS_{ji}}{MS}. \quad (5)$$

Finally, the residual effect (*RE*) retains the cross-variations, which permits the full decomposition of the market share variation. It is expressed as:

$$RE = \sum_j \sum_i \frac{\Delta MS_{ji}}{MS} \Delta \frac{M_{ji}}{\sum_j \sum_i M_{ji}}. \quad (6)$$

Thus, the total variation of the market share can be represented as follows:

$$\frac{\Delta MS}{MS} = MSE + CSE + RE. \quad (7)$$

In order to deepen our understanding of the international trade dynamics of LDAC, we may improve the method applied until now through a more refined decomposition of the *CSE*. This will allow us to distinguish between the effect generated by the sectoral structure and that which arises from the geographical specialization. Consequently, the *CSE* can itself be broken down into three components: the sectoral structure effect

(*SSE*), the geographical structure effect (*GSE*), and a residual term – the mixed structure effect (*MixSE*).

The sectoral structure effect (*SSE*) captures the part of the total variation of the market share that results from the specialization by products of the exports. This is expressed as:

$$SSE = \sum_j \Delta \frac{M_j}{\sum_j M_j} \frac{MS_j}{MS}, \quad (8)$$

in which:

$$M_j = \sum_i M_{ji} \quad (9)$$

and

$$MS_j = \frac{\sum_i X_{ji}}{M_j}. \quad (10)$$

In an analogous manner, the geographical structure effect (*GSE*) captures the total variation of the market share that is due to the geographical specialization of the exports. It is defined as follows:

$$GSE = \sum_i \Delta \frac{M_i}{\sum_i M_i} \frac{MS_i}{MS}, \quad (11)$$

in which:

$$M_i = \sum_j M_{ji} \quad (12)$$

and

$$MS_i = \frac{\sum_j X_{ji}}{M_i}. \quad (13)$$

Since the two previous effects are not independent, we need to introduce the mixed structure effect (*MixSE*), allowing a total decomposition of the *CSE*. Therefore, we have:

$$CSE = SSE + GSE + MixSE. \quad (14)$$

#### 4. Decomposing the LDAC Export Performance - Evidence

Using the methodology presented in the previous section, we now evaluate the main factors that explain the evolution of LDAC export performance over the four decades considered. The method is applied at the most disaggregated sectoral level available using the CHELEM database (i.e., 72 sectors).

Table 7 presents the CMS results obtained for the total period considered as well as for the four sub-periods, in order to obtain a clearer understanding of the evolution of the trade performance of these countries.

[Insert Table 7 here]

As shown in Table 7, the LDAC's global export market shrank over the period 1967-2007, mainly the result of the negative contribution of the competitiveness effect (-0.710) followed by a negative contribution of the *SSE* (-0.525). This evidence allows us to conclude that during the period under review, the sectoral orientation of the LDAC's exports was mainly toward products with a lower growth rate relative to world trade growth, i.e., the sectoral specialization of these countries penalized their export performance.

Disaggregating this analysis by decades, we observe a positive *MSE* in the 1980s and after 2000. While in the first sub-period the reason may be related to the reorientation of the strategy toward export promotion, the positive competitiveness effect in the more

recent sub-period appears to be mainly explained by the price effect of the commodity boom.

Regarding *SSE*, it is negative except for the last decade. Once more, this positive effect is directly related to the increased demand of commodities during this sub-period. Finally, *GSE*, which is related with the growth of the destination markets, is positive only in the first and last sub-periods. While in the case of the first sub-period a positive effect can be explained by the still important trade with the former colonizer, the most developed countries at this time, during the most recent sub-period it is basically due to the new Asian trade partners and, to a lesser extent, to increased trade with the USA, as described above (Section 2).

It should be noted that the last sub-period (2000-2007) not only has positive geographical (0.140) and sectoral (0.201) effects, but also a positive (and larger) competitiveness effect (0.360). These positive developments in the last decade are the result of higher export concentration in oil for some dynamic markets. This, however, is an obvious and important fragility of a productive structure based almost exclusively on one natural resource. Moreover, it is a natural resource for which there are other important markets worldwide (some emerging, as is the case of Brazil) and that may be substituted by other energy sources.

Let us now consider, to conclude, the geographical and sectoral effects disaggregated by destination country and sector. This evidence is presented in Tables 8 and 9, respectively. For the sake of simplicity, we show the result of this disaggregation for only the five main positive and negative contributions for the global values of each effect.

[Insert Table 8 here]

From the results shown in Table 8 it can be seen that there is considerable change in the relative importance of the main destination countries over the period chosen for the analysis. The trend we see makes clear the loss of importance of European countries (France and Italy stand out but only in the first sub-period, while France, the UK, Germany, the Netherlands, and Belgium-Luxembourg are part of the list of countries with the largest negative contributions during this period) and the increased importance of the USA, which is the country with the largest positive contribution between 1980 and 2000, and especially China, which will occupy a prominent place, increasing from

1980 to reach the top position in the last decade. We should also note the recent loss of importance of the USA, as in the last decade this country ranks first with respect to the largest negative contributions.

In terms of the geographical effect, it is also worth highlighting the loss of importance of the former colonizer. Thus, the UK, which was the first destination of exports in 1967 (Table 4), fell from 15.82% of LDAC's total exports in that year to 1.09% in 2007. From Table 8 it is clear that this country is the largest contributor to the negative geographical effect throughout the whole period analyzed, with most of this effect occurring in the first sub-period, i.e., 1967-1980. France also falls in relative terms, from a weight of 12.81% of total exports in 1967 to 3.93% in 2007. This is the country with the second largest negative contribution throughout the period studied, with emphasis on the 1990s.

Finally, disaggregating the contributions for the sectoral structure (Table 9), we see, as expected, the crucial importance of crude oil to the growth of LDAC's market share, mainly in the last two decades, in which it occupies the first place among the products with the largest positive contribution.

[Insert Table 9 here]

## **5. Final Remarks**

Decomposing LDAC exports reveals that the declining importance in global trade of this group of countries since the beginning of the period under observation is in part due to the inability to remain competitive in international markets. With the turn of the century, a positive competitiveness effect is evident, but there are reasons to believe that this is the result of the commodity price boom in this period. Another reason for the poor export performance in the 1980s and 1990s is the weak demand of the destination markets: the geographical effect has a positive impact only during the first sub-period, in which the European partners, especially the former colonial powers, still had importance as trade partners, and in the 2000s, which is related to the commodity boom led by the dynamic Asian markets.

The specialization pattern gives a positive contribution to export performance only in the 2000s, i.e., precisely the period of the commodity demand boom. Indeed, the

increased export performance in the last decade, in contrast to previously analyzed sub-periods, is mainly the result of higher export concentration in oil and for some (few) dynamic markets. This, however, is the fragility of a productive structure based almost exclusively on just a single natural resource.

As mentioned in the Introduction, the weakness of the manufacturing sector and the poor export capacity of the LDAC appear to be the result of a low productivity trap, which only coherent programs to stimulate the supply response can solve. The commodity price boom of the oil and other primary products that drove LDAC exports has had the undesirable effect of increasing the concentration of exports of traditional products in terms of both products and target markets. But it is also possible to envisage the current trend with optimism, as it opens to these countries a window of opportunity to finally transform their export pattern. The trick is to properly use the increased financial resources in order to broaden the export basket by sowing the seeds of a diversified industrial structure.

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**Table 1: LDAC World Market Share (%), 1967-2007**

<b>Years</b>	<b>Market Share</b>
1967	1.82
1980	0.70
1990	0.52
2000	0.37
2007	0.71

  

<b>Periods</b>	<b>Market Share Growth Rate</b>
1967-1980	- 61.49
1980-1990	- 25.99
1990-2000	- 28.92
2000-2007	92.03
<b>1967-2007</b>	<b>- 61.10</b>

**Table 2: Sectoral Export Structure (%) – Top 10 (1967-2007)**

	1967	1980	1990	2000	2007
1	Non ferrous metals 29.97	Non ferrous metals 21.72	Crude oil 27.64	Crude oil 53.56	Crude oil 73.61
2	Other edible agricultural prod. 25.87	Other edible agricultural prod. 21.71	Non ferrous metals 15.26	Jewellery, works of art 9.69	Non ferrous metals 5.55
3	Non-edible agricultural prod. 11.33	Crude oil 9.13	Other edible agricultural prod. 10.38	Other edible agricultural prod. 8.66	Other edible agricultural prod. 3.82
4	Iron ores 7.00	N.e.s. prod.* 7.79	Jewellery, works of art 8.45	Non-edible agricultural prod. 4.87	Non ferrous ores 2.87
5	Jewellery, works of art 6.71	Non-edible agricultural prod. 7.54	Ships 7.43	Meat 4.44	Non-edible agricultural prod. 2.05
6	Fats 3.68	Non ferrous ores 5.23	Non-edible agricultural prod. 6.66	Non ferrous ores 3.84	Meat 1.64
7	N.e.s. prod.* 3.27	Iron ores 4.26	Non ferrous ores 5.05	Non ferrous metals 2.51	Jewellery, works of art 1.39
8	Non ferrous ores 2.10	Basic inorganic chemicals 3.95	Meat 4.20	Ships 1.98	N.e.s. prod.* 1.36
9	Cereals 1.67	Unprocessed minerals 2.52	Iron ores 2.44	Refined petroleum prod. 1.35	Iron ores 1.02
10	Animal food 1.51	Refined petroleum prod. 2.24	Basic inorganic chemicals 1.80	Iron ores 1.11	Natural gas 0.92
Weight of the largest sectors in each year and in the remaining years					
1967	<b>93.11</b>	82.02	85.11	84.38	86.88
1980	73.48	<b>86.09</b>	78.64	76.93	80.57
1990	50.79	72.47	<b>89.31</b>	88.43	81.20
2000	31.61	77.14	91.26	<b>91.99</b>	89.23
2007	18.36	91.81	93.37	93.64	<b>94.23</b>

Note: N.e.s. prod. – Not elsewhere specified products

**Table 3:** Lawrence Index (1967-2007)

Lawrence index	1967-1980	1980-1990	1990-2000	2000-2007	1967-2007
For sectoral export structure ( $L_S$ )	0.280	0.353	0.306	0.253	<b>0.790</b>
For geographical structure ( $L_G$ )	0.216	0.175	0.314	0.223	<b>0.545</b>
For individual market structure ( $L_M$ )	0.452	0.481	0.485	0.373	<b>0.875</b>

**Table 4:** LDAC Exports by Country of Destination (%) (1967-2007)

Country	1967	1980	1990	2000	2007
United Kingdom	15.82	5.63	2.13	1.11	1.09
United States	13.49	18.33	21.10	25.03	23.91
France	12.81	14.08	11.68	6.58	5.93
Belgium-Luxembourg	10.50	13.32	13.67	10.74	2.57
Germany	9.97	8.45	6.97	3.88	2.08
Japan	7.67	9.91	6.12	3.85	5.17
Italy	7.09	6.67	5.62	2.52	2.30
Netherlands	6.24	3.02	2.49	1.41	1.86
Portugal	4.94	0.90	1.62	1.24	1.70
India	1.90	1.21	1.78	1.50	3.50
Saudi Arabia	1.33	2.99	1.20	1.47	1.00
Spain	1.31	2.60	3.09	6.29	3.62
Canada	0.89	0.57	1.06	0.50	2.04
Switzerland	0.84	0.54	0.43	0.16	0.33
Egypt	0.79	0.18	0.39	0.28	0.24
China	0.60	0.82	1.15	15.79	27.22
Norway	0.52	0.27	5.63	0.97	0.24
Former URSS	0.47	0.84	0.18	1.14	0.72
Greece	0.41	0.46	0.46	0.70	0.10
Kenya	0.38	0.68	0.73	0.20	0.35
Cote d'Ivoire	0.33	0.77	0.45	0.27	0.35
Brazil	0.28	1.68	1.13	0.71	1.89
Finland	0.24	0.35	0.15	0.61	0.30
South Korea	0.23	0.89	1.60	6.04	1.86
Cameroon	0.21	0.59	0.51	0.44	0.28
Former Yugoslavia	0.18	1.57	4.77	0.18	0.04
Ireland	0.14	0.16	0.67	0.51	0.16
Malaysia	0.11	0.17	0.56	0.24	0.51
Poland	0.10	0.20	0.03	0.29	0.55
Nigeria	0.07	0.37	0.14	0.53	0.53
Indonesia	0.05	0.92	0.30	0.55	0.52
Taiwan	0.05	0.31	0.61	2.66	4.23
Thailand	0.02	0.26	1.06	0.83	0.60
Turkey	0.01	0.29	0.32	0.23	0.27
Chile	0.00	0.00	0.22	0.53	1.23
Peru	0.00	0.01	0.00	0.03	0.73

**Table 5: Sectoral Structure by Destination Countries (%) – The Top 10 (1967-2007)**

	1967	1980	1990	2000	2007
1	Non ferrous metals Bel.-Lux. 7.95	Crude oil United States 5.89	Crude oil United States 15.77	Crude oil United States 20.73	Crude oil China 24.72
2	Other edible agricultural prod. United States 7.38	Non ferrous metals Bel.-Lux. 5.18	Jewellery, works of art Bel.-Lux. 7.19	Crude oil China 14.89	Crude oil United States 21.33
3	Non ferrous metals United Kingdom 6.12	N.e.s. prod.* Bel.-Lux. 5.05	Ships Norway 5.40	Jewellery, works of art Bel.-Lux. 9.11	Crude oil Japan 4.41
4	Non ferrous metals Japan 4.91	Other edible agricultural prod. United States 4.75	Non ferrous metals Bel.-Lux 4.27	Crude oil South Korea 5.74	Crude oil France 4.06
5	Other edible agricultural prod. France 4.25	Non ferrous metals Japan 3.17	Crude oil France 3.59	Crude oil Spain 4.22	Crude oil Taiwan 3.91
6	Jewellery, works of art United Kingdom 3.60	Basic inorganic chemicals France 3.15	Non ferrous metals Japan 3.18	Crude oil Taiwan 2.25	Crude oil India 2.52
7	Non ferrous metals Italy 2.85	Non ferrous metals United States 3.11	Other edible agricultural prod. Germany 1.90	Crude oil France 2.10	Crude oil Spain 2.41
8	Other edible agricultural prod. United Kingdom 2.82	Other edible agricultural prod. France 2.95	Crude oil Germany 1.73	Crude oil Japan 1.44	Crude oil Canada 1.82
9	Non ferrous metals France 2.74	Non ferrous metals France 2.47	Crude oil Former Yugoslavia 1.60	Other edible agricultural prod. Germany 1.30	Crude oil Brazil 1.66
10	N.e.s. prod.* Netherlands 2.71	Other edible agricultural prod. Germany 2.43	Non ferrous metals France 1.45	Refined petroleum prod. United States 1.16	Crude oil Portugal 1.43
Weight of the 10 top individual markets in each year in the remaining years					
1967	<b>45.32</b>	29.71	17.34	1.75	0.00
1980	24.27	<b>38.16</b>	19.96	11.06	8.36
1990	12.92	30.94	<b>46.09</b>	29.62	22.04
2000	2.80	24.95	35.50	<b>62.94</b>	46.06
2007	3.81	23.84	28.36	63.99	<b>68.26</b>

Note: N.e.s. prod. – Not elsewhere specified products

**Table 6:** Degree of Export Concentration (1967-2007)

<b>Herfindahl index</b>	<b>1967</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2007</b>
By countries	0.0989	0.0996	0.0979	0.1169	0.1458
By sectors	0.1828	0.1233	0.1335	0.3112	0.5487
By individual markets	0.0290	0.0210	0.0413	0.0814	0.1151



**Table 7: Results of Constant Market Share Analysis (1967-2007)**

<b>Effects</b>	<b>1967-1980</b>	<b>1980-1990</b>	<b>1990-2000</b>	<b>2000-2007</b>	<b>1967-2007</b>
<i>MSE</i>	-0.323	0.204	-0.304	0.360	<b>-0.710</b>
<i>CSE</i>	-0.080	-0.267	-0.149	0.338	<b>-0.266</b>
<i>SSE</i>	-0.347	-0.266	-0.161	0.201	<b>-0.525</b>
<i>GSE</i>	0.038	-0.010	-0.039	0.140	<b>-0.083</b>
<i>MixSE</i>	0.229	0.009	0.050	-0.003	<b>0.343</b>
<i>RE</i>	-0.212	-0.197	0.165	0.222	<b>0.365</b>
<b><math>\Delta MS/MS</math></b>	<b>-0.615</b>	<b>-0.260</b>	<b>-0.289</b>	<b>0.920</b>	<b>-0.611</b>

**Table 8:** Breakdown of the Geographical Structure Effect: Largest Positive and Negative Contributions (1967-2007)

1967-1980	1980-1990	1990-2000	2000-2007	1967-2007
<b>Largest positive contributions</b>				
Saudi Arabia 0.0521	United States 0.0249	United States 0.0666	China 0.1401	China 0.0424
Japan 0.0304	Spain 0.0112	China 0.0154	Bel.-Lux 0.0155	United States 0.0143
France 0.0168	South Korea 0.0063	Brazil 0.0048	India 0.0140	Saudi Arabia 0.0143
Italy 0.0059	Portugal 0.0043	South Korea 0.0047	Spain 0.0135	Spain 0.0110
South Korea 0.0034	China 0.0038	Malaysia 0.0040	Former USSR 0.0119	South Korea 0.0108
<b>Largest negative contributions</b>				
United Kingdom -0.0398	Saudi Arabia -0.0165	France -0.0306	United States -0.0598	United Kingdom -0.0669
Netherlands -0.0154	Japan -0.0093	Bel.-Lux. -0.0291	Japan -0.0084	France -0.0272
India -0.0074	Brazil -0.0085	Norway -0.0167	Taiwan -0.0065	Netherlands -0.0247
Bel.-Lux. -0.0063	Bel.-Lux. -0.0056	Germany -0.0159	France -0.0030	Bel.-Lux. -0.0198
United States -0.0037	Cote d'Ivoire -0.0051	Former Yugoslavia -0.0147	United Kingdom -0.0014	Germany -0.0188

**Table 9:** Breakdown of the Sectoral Effect: Largest Positive and Negative Contributions (1967-2007)

1967-1980	1980-1990	1990-2000	2000-2007	1967-2007
<b>Largest positive contributions</b>				
Jewellery, works of art 0.0269	Meat 0.0031	Crude oil 0.0142	Crude oil 0.1614	Pharmaceuticals 0.0031
Crude oil 0.0045	Aeronautics 0.0012	N.e.s. prod.* 0.0030	Non ferrous ores 0.0432	Toiletries 0.0022
Basic inorganic chemicals 0.0020	Yarns fabrics 0.0010	Natural gas 0.0012	Iron ores 0.0162	Crude oil 0.0013
Refined petroleum prod. 0.0017	Leather 0.0009	Pharmaceuticals 0.0004	Non ferrous metals 0.0076	Refined petroleum prod. 0.0009
Non ferrous ores 0.0006	Toiletries 0.0005	Telecommunications equipment 0.0003	Refined petroleum prod. 0.0058	Telecommunications equipment 0.0007
<b>Largest negative contributions</b>				
Other edible agricultural prod. -0.1292	Crude oil -0.0586	Other edible agricultural prod. -0.0337	Jewellery, works of art -0.0118	Other edible agricultural prod. -0.1957
Non ferrous metals -0.0946	Other edible agricultural prod. -0.0544	Ships -0.0279	Non-edible agricultural prod. -0.0093	Non ferrous metals -0.1139
Non-edible agricultural prod. -0.0588	Non ferrous metals -0.0481	Non-edible agricultural prod. -0.0269	Meat -0.0089	Non-edible agricultural prod. -0.0934
Iron ores -0.0382	Non ferrous ores -0.0212	Jewellery, works of art -0.0200	Other edible agricultural prod. -0.0033	Iron ores -0.0253
N.e.s. prod.* -0.0212	N.e.s. prod.* -0.0186	Non ferrous metals -0.0166	Clothing -0.0019	Fats -0.0199

Note: N.e.s. prod. – Not elsewhere specified products