The Trade Specialization of SANE:Evidence from Manufacturing Industries

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Abstract

This paper studies the evolution of the foreign trade specialization in manufacturing sectors of South Africa, Algeria, Nigeria and Egypt. These four countries, the so-called SANE, are recently viewed as Africa's best chance of producing an economic bloc comparable to the BRIC economies of Brazil, Russia, India and China. Using data on trade flows since mid-1970s, the results show that the SANE group has experienced few changes in its trade structure, which is still based on low-technology and slow-growth world demand sectors. The degree of persistence in the specialization model is higher in the case of Algeria and Nigeria, where the dependence on products based on natural resources is stronger.

Keywords: SANE; Trade specialization; Manufacturing; Lafay index

JEL classification: F14, N67, O24, O55

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1. Introduction

Africa is a continent of 53 countries, with a vast area of nearly 30 millions square kilometres and is the second most populated region in the world with about 930 million inhabitants. Within this region, the four biggest economies, South Africa, Algeria, Nigeria and Egypt, the so-called SANE, could become an engine of the economic growth in the continent in the same way that the emerging market giant economies of BRIC (Brazil, Russia, India and China)[1] are for the rest of developing world. According to Oshikoya (2007) and Kasekende, Oshikoya, Ondiege and Danash (2007), SANE economies account for almost a fifth and a third of Africa's land mass and population respectively, more than half of its total GDP in both nominal and purchasing power parity terms and more than half of its export, total trade, foreign direct investment and foreign reserves (see Table 1).

The SANE area benefits by different comparative advantage factors such as geographical location, resource endowment, market size and large participation of the private sector in the economy, which makes these economies a growth pole for the regional economic prosperity and integration into the international market. If one considers geographical location, all of the SANE economies are situated in strategic positions within Africa. They are all coastal states and therefore enjoy a comparative advantage with respect to landlocked African countries, which facilitates the access to international market and reduces the trade costs. Moreover, their economies are blessed with huge natural resources: Nigeria, Algeria and Egypt are among the greatest producers of petroleum products and natural gas, while South Africa is one of the world leading exporters of minerals. Finally, the market size in these economies is relatively developed due to their higher GDP per capita and higher population with respect to the rest of the continent, which can stimulate the internal market. Furthermore, the higher active participation of the private sector into the economy, such as the greater amount of FDI, makes the structure of SANE better diversified relative to the rest of the continent.

These countries have also experienced a changing policy towards an open-market economy and a number of attempts of privatization and trade liberalization reforms have been implemented since early 1990s, after decades in which industrialization, viewed as the engine of long run growth (Kaldor, 1967), was thought to be attainable through import substitution strategies (Prebisch, 1950). However, the failure of the domestic market oriented development policy in Africa, as well as in other developing countries, opened a debate with many authors such as Bhagwati (1978), Krueger (1974 and 1978) and Balassa (1978, 1981 and 1982) pointing out that the development policies that protected the domestic market from foreign competition could not support sustainable growth.

[1] According to The Africa Competitiveness Report (2007), the average per capita income in 2005 was higher in the SANE economies ($ 1841) than in the BRIC economies ($ 1669).

Furthermore, the new growth theory, since the contributions by Romer (1986), Krugman (1987) and Lucas (1988), stresses the importance of R&D, learning-by doing and human capital as critical factors in sustaining high growth rates in the long run: therefore, it follows that specialization plays a key role in the growth process of a country. These factors become crucial when an economy decides to open to the international market, in order to benefit from the gains of foreign trade: the scale and the reallocation effects of the international integration can be better achieved and exploited when a country is specialized in increasing returns to scale sectors (see, for example, Rivera-Batiz and Romer, 1991, Grossman and Helpman, 1991 and Young 1991). Moreover, foreign trade specialization is important not only for triggering the growth rate but also for the distribution of the advantages generated by the growth process: for example, Buccellato and Mickiewicz (2007) demonstrate that the regional oil and gas abundance in Russia is associated with high within-region inequality.

The aim of this research is to study the pattern of foreign trade specialization in the countries of SANE, in order to understand whether the four economies will be able to act as the future engine of African trade, growth and development. To capture the effects of the policies that have been implemented in these countries from the import substitution to the liberalization strategies, we concentrate our attention on the three digits industries in the manufacturing sectors covering the period from 1975 to 2005.

Our main findings reveal that Algeria, Egypt, Nigeria and South Africa, although with some differences, have experienced few changes in their trade patterns and they are still far from a specialization model characterized by a comparative advantage in the most dynamic products. The persistence of natural resource based items among the most specialized sectors, and the absence of a significant shift towards categories with the highest technological content and the fastest growth in the world demand, reduce the potential gains derived from the economic integration of the SANE area with the rest of the world, with negative consequences not only for the four countries themselves but also for the rest of the continent.

The structure of the paper is as follows. We start with section 2 by describing the process of economic growth and policy reforms implemented in the last decades in Africa and in the SANE economies. Section 3 examines the pattern of trade specialization of the countries by using the Lafay index (Lafay, 1992) with particular attention to the technological content of the products. Section 4 explores the specialization dynamics with different econometric instruments, in order to assess whether some changes have occurred in the pattern during the last three decades. Section 5 studies the evolution of the comparative advantages of the four economies in relation with the world demand. Finally, we summarize the main conclusions in Section 6.

2. Growth and economic reforms in Africa and SANE

Most African countries, after gaining their independence during the 1960s, used import substitution policy as a strategy for the economic development and in order to maintain their political, economic, and social autonomy from the former colonial powers. This strategy was implemented using restrictive external trade policy and considerable protection for the new growing internal market in order to stimulate industries to move up from agriculture towards intermediate and capital goods. The main result of the reforms is evident by the improvement of the African manufacturing sector and the development of final goods industries. During the 1960s, the industrial sector grew significantly, with about a 8% annual growth in the added value (WTO 2005) and by 1965 the sector contributed about 15% or more of GDP in 15 countries[2] in the continent. As a consequence, the positive performance of the manufacturing sector enabled African countries to achieve an average annual growth of the GDP of about 5.5% during the period.

However, at the beginning of the 1970s, the import substitution strategy started to show its failure in Africa as elsewhere in the developing world. The annual GDP per capita growth in Africa recorded a negative rate of about -0.2% between the second half of the 1970s and the first half of the 1990s (Table 2). The reasons of this collapse are several. First of all, Elbadawi (1996) noted that the role of the state was too much emphasized and the bad management of the governments belittled the role of the private sector and reduced the market discipline in the development process. Second, most African countries were involved in continuous wars, ethnic divisions and political instability (Easterly and Levine, 1997), which reverted the growth process and slowed down the economic development[3]. Third, the failure of the import substitution policies was driven by the weakness of the internal market and by the uneven distribution of income, with the wealthiest population concentrated in urban areas and with the rural areas, the most populated zones, characterised by a very low level of income, low agricultural productivity, and exclusion from modern consumption patterns (Nel, 2003). Finally, their difficulties were exacerbated by the debt crisis in the mid 1980s due to the aggravation of the terms of trade, which reduced the prices of African raw material exports, decreased the availability of financing resource and worsened trade balances (Kirkpatrick and Weiss, 1995).

[2] These countries are Algeria, Botswana, Cameroon, Chad, Ivory Coast, Ghana, Kenya, Madagascar, Egypt, South Africa, Mauritius, Senegal, Togo, Zaire and Zimbabwe.

[3] African emergencies in recent years include Algeria, Angola, Burundi, Chad, Congo-Brazzaville, Congo-Kinshasa, Guinea-Bissau, Eritrea, Ethiopia, Liberia, Mozambique, Nigeria, Rwanda, Sierra Leone, Somalia, South Africa, Sudan, and Uganda.

As result of these failures, African countries sought help from international institutions that in exchange required the implementation of economic reforms towards privatization and liberalization. Between late 1980s and early 1990s, they started to implement structural adjustment programs in order to reduce the short-term imbalance between the supply and demand, and promote external market orientation policy through trade liberalization (see Engberg-Pedersen, Gibbon, Raikes and Udsholt, 1996, Ebrill, Stotsky, and Gropp, 1999 and Ackah and Morrissey, 2005). As a result of the new growth strategy, Africa recovered from the long-run recession with an annual GDP per capita growth rate of 1.7% in the second half of the 1990s, which jumped to 2.3% between 2000 and 2004. Furthermore, the contribution of manufacturing on GDP increased to 26% in the 1990s and the import-export average growth rate increased from -1.2% per year in the 1980s to 2.8% during the 1990s (UNCTAD 2005). However, although there is some evidence that growth has been higher in more open African economies (Onafowora and Owoye, 1998)[4], the change in the development model fell below expectations. First, the new growth pattern was sharply below the seven percent annual rate expected in order to halve poverty by the year 2015 (UN, 2007). Furthermore, the improvement in industry seems to have affected just a few countries such as Tunisia, South Africa, Egypt, and Morocco (UNECA, 2004a,b), that have succeeded also in diversifying their economies and that have benefited from the services liberalization especially in the telecommunication sector (ITU, 2007). Finally, the continued fall in the world prices of raw materials and agriculture products reduced by about 20% the terms of trade of African countries, and the unchanged composition of their trade produced a gap between the volume and the value of exports. As a consequence, African share on the world merchandise trade in terms of value has been decreasing from 6% in 1980s to around 2% in 2002 (Morrissey, 2005).

The growth performance and the pattern of reforms in SANE area reflect the evolution of Africa over the last three decades. All the economies of the group experienced a significant shift from the import-substitution policy to the pro-market reforms. During the 1960s, apart from South Africa[5], the SANE economies opted for reducing their dependence on imports from developed countries and for diversifying their productive structure by establishing highly restrictive trade policies. The import substitution strategy had ensured a positive GDP per capita growth rate till the 1970s, even if at the end of the decade only Algeria and Egypt continued to show high and sustained rates of growth (Table 2). However, the situation worsened at the beginning of the 1980s and persisted till mid-1990s: on average, the GDP per capita growth rate in the SANE group was practically stagnant around zero between 1980 and 1995. The possible explanations of the long run

[4] See also Sachs and Warner (1997), Khandelwal (2004) and Clarke (2005).
[5] Egypt declared independence in 1952, Nigeria in 1960 and Algeria 1962. South Africa became independent in 1931, but in 1948 the National Party constituted the apartheid regime; the first free and democratic elections only took place in 1994.

stagnation are numerous (see Licari, 1997, Arora and Vamvakidis 2005, and Okonjo-Iweala and Osafo-Kwaako, 2007). Political instability played a key role in the case of South Africa with the Apartheid regime, in Algeria with the resurrection of radical Islamite groups and in Nigeria with continuous civil wars and military administrations. Furthermore, the depreciation of the world crude oil prices during the 1980s aggravated the situation especially in Algeria and Nigeria. Finally, the deceleration of the Egyptian rate of growth since mid-1980s was mainly driven by the increasing current account deficit and the galloping external debt together with a high rate of inflation.

The crisis has therefore induced the governments to change their policy strategies in favour of privatization and trade liberalization reforms. Since the mid-1990s, under the pressure of the International Monetary Fund, the four countries developed structural adjustment programs with particular emphasis on public expenditure reduction, privatization of state owned companies, liberalization of domestic markets, reconstruction of public administration and deregulation of labour market. Furthermore, the new growth strategy focused on the role of foreign trade and reforms were implemented to cut tariffs and barriers to trade in order to integrate the area with the process of economic globalization. The fact that in just a few years the SANE bloc has become one of the most attractive poles for foreign investment in the world is an accurate example of the new pro-market policy: in 2006, the group attracted $ 16.2 billions worth of FDI, which accounted to two and half times the FDI to India and also higher than the amount to Brazil or Russia. The wave of reforms during the 1990s has therefore positively affected the GDP per capita growth rate of the area, which increased to 1.4% in the second half of the 1990s and to 2.3% between 2000 and 2004.

However, despite its successful result in terms of growth recovery, the SANE group still presents serious structural problems that can reduce the gains from foreign trade and limit the ability of these economies to drive the continent into the challenges and the opportunities of the international integration process. For example, reforms that regarded the labour market deregulation were very slow in South Africa, which still suffers one of the highest unemployment rates in the world (Edward and Lawrence, 2006 and Rodrik, 2006). In Algeria, the private sector, especially in the small and medium-size enterprises, was not taken into consideration by the reforms due to the public administration outdated and endless bureaucratic procedures. Furthermore, the source of finance from the state banking system was very unbalanced and more that 80% of companies faced difficulties in the credit market (Lazare, Callier, Koranchelian and Florkemeier, 2003, IBRD, 2004 and CGAP, 2006). The aim of diversification of the economy to allow the country not to depend exclusively on oil was a total failure in Nigeria. After the adjustment program, Nigeria still relies on hydrocarbon for about 97 percent of its export revenue and its manufacturing sector is strongly dependent on importation of raw materials, intermediate and capital goods for the production (Okonjo-Iweala and Osafo-Kwaako, 2007). Finally, Egypt has not completely recovered from the

debt difficulties inherited from the past decade (Licari, 1997) and in 2006 it was the only one economy among the four facing a negative trade balance.

The following sections will seek to explore the evolution of SANE foreign trade specialization. Our emphasis will be on manufacturing sectors since mid-1970s in order to capture the effects of the shift in the policy strategy on the specialization model and to understand whether the group will be the driving force of the African trade.

3. Trade specialization

The foreign trade structure in the SANE manufacturing exports is mainly dominated by natural resource based products (Table 3), given by Fuels in Algeria, Egypt and Nigeria and by Ores and metals in South Africa. In the case of Algeria and Nigeria the weight of petroleum products reaches respectively 97.7% and 96% of total exports in 2004-05 and 2002-03 respectively, while Egypt experiences a rapid growth of fuels items between the second half of the 1970s and the first half of the 1980s, reaching more than half of total exports in 2004-05. Among the four economies, South Africa exhibits the highest percentage in Manufacturing goods exports. This increased over time from 36.2% to 57.1%, making up for the wide reduction in primary goods categories. On the import side, all countries display high dependence on Manufacturing goods imports, which still exceed the value of 70% in Algeria, Nigeria and South Africa and represent more than 54% of Egyptian imports. More interesting, with the exception of South Africa, all the others show a high share of Food items that account, on average, for more than one fifth of total imports. In the case of Nigeria, the situation has worsened since late 1970s, with a growing dependence on foreign food over time.

We use the Lafay index (Lafay, 1992) in order to measure the comparative advantage of Algeria, Egypt, Nigeria and South Africa. Differently form Balassa's Revealed Comparative Advantage (Balassa, 1965) that compares the national export structure with that of the world by focusing only on export data, this indicator also includes imports and it is therefore able to capture intra-industry trade flows and to control for distortions due to the business cycle.

We calculate the Lafay index (*LFI*) for each of the four countries of SANE by using the following formula:

$$LFI_j = 100\left(\frac{x_j - m_j}{x_j + m_j} - \frac{\sum_{j=1}^{N}(x_j - m_j)}{\sum_{j=1}^{N}(x_j + m_j)}\right)\frac{x_j + m_j}{\sum_{j=1}^{N}(x_j + m_j)} \qquad (1)$$

where x and m represent imports and exports of product j and N is the number of the traded goods. The above formula indicates that the comparative advantage for a country in product j is the deviation of the product normalized trade balance form the overall normalized balanced trade. Thus, the sum of *LFI* across j for any year must by construction be equal to zero. Positive values of the *LFI* imply specialization, while negative values imply reliance on imports; higher degree of specialization (de-specialization) is therefore associated with higher (lower) value of the index.

The source of our data is the Comtrade Database by UN over the period 1975-2005 for 180 items at 3-digit SITC-1 classification. We use the 2-year average of the *LFI* in order to reduce the impact of outliers and the impact of wide variation in exchange rates or prices. The data series is not complete in the case of Nigeria (availability from 1975-76 to 1978-79, from 1983-84 to 1986-87 and from 1996-97 to 2002-03) and South Africa (missing data form 1984-85 to 1991-92), but the incomplete availability does not affect our analysis.

Tables 4a - 7b report the top 15 and the bottom 15 product categories of countries of SANE according to their *LFI* for years 1975-76, 1985-86, 1995-96 and 2004-05. The tables also report an indicator of the technological content of the sectors according to OECD (2001, Annex A) and Khonddaker (2005, Appendix 1)[6] in order to understand if the specialization has been evolving towards product categories with the highest technological intensity.

Some important characteristics of the four countries trade specialization emerge form the top-bottom tables. First, Algeria, Egypt and Nigeria are extremely specialized in "Petroleum, crude and partly refined" and "Petroleum products". The dependence on petroleum-related items, due to their high weight on total exports, is particular evident in the case of Nigeria, whose *LFI* reaches and exceeds the value of 42 in 2002-03. Algeria also takes advantage of "Gas, natural and manufactured" starting from the 1980s, while in the case of South Africa we find natural resources-based products at the top position till middle-1990s with "Pearls and precious and semi-precious stones" and "Coal, coke & briquettes" among the most-specialized sectors; these two products are then replaced by "Silver and platinum group metals" and "Pig iron, spiegeleisen, sponge iron" in 2004-05. Second, the analysis of Manufacturing goods (categories from 5 to 8) confirms South

[6] The taxonomy of technological content for sectors follows the OECD classification presented in 'OECD Science, Technology and Industry Scoreboard 2001—Towards a Knowledge-based Economy, Annex A. Classification of Manufacturing Industries Based on Technology'. The methodology uses two indicators of technology intensity: (i) R&D expenditures divided by production, and (ii) R&D expenditures divided by value added. The classification of the sectors is based on the analysis of R&D expenditure and output in 12 OECD countries for the period 1991–1999. Manufacturing industries are classified as Low technology, Medium-low technology, Medium-high technology, and High technology groups. Sectors included in higher categories have a higher intensity for both indicators than sectors included in lower categories. Some sectors belonging to mining, fuels or agricultural industries present no expenditure in R&D and are classified as N/A. OECD makes use of the International Standard Industrial Classification (ISIC-3). In order to convert the figures from ISIC to SITC code, we have made use of the conversion table in Khondaker (2005, Appendix 1).

Africa and Egypt as the most specialized in industrial items, even if with opposite dynamics: while South Africa increases the number of manufacturing products from three out of the top fifteen in 1975-76 to eight in 2004-05, Egypt remains stable with six items of categories from 6 to 8, but with category 5, which generally incorporates medium-high and high tech sub-sectors, dropping to zero from two in 1975-76; in addition, its category 0 increases to four the number of products among the top fifteen. Moreover, Algeria appears to be the most specialized in products of chemicals category (5) in 2004-05 with "Crude chemicals from coal and petroleum" and "Inorganic chemicals elements" at the fourth and fifth position. It is interesting also to add that till early 1990s none of chemicals products appears in the most specialized Algerian items. Contrarily, Nigeria reveals no signal of industrial specialization due to total dependence on petroleum products, which monopolize its trade activities. Furthermore it seems that Nigeria has lost some form of specialization reached in middle-1970s especially in Agricultural raw materials (2) and in 2002-03 eleven out of the top fifteen products show the *LFI* stagnant at around 0 (they were four in 1975-76). Finally, the technological content reveals that SANE area is over-represented among the most import dependent sectors by medium-high and high tech items and such situation has not changed over time. In addition none of the four countries displays sectors with high tech content in the top fifteen rating. The country with the highest number of medium-high tech products at the end of the period is Algeria (those of category 5 and "Fertilizers, crude"), while Egypt and South Africa, which do not present any sector of medium-high technological content, display a remarkable improvement in the number of medium-low tech items from one and two in 1975-76 to six and eight in 2004-05 respectively.

A more precise picture of the evolution of the *LFI* can be offered by Tables 8a-8d, which collect the average *LFI* by product category and technological content for each country of SANE. The five main categories of product are displayed according to the classification provided by UNCTAD (2005). Algeria, Egypt and Nigeria exhibit negative values of the indicator in Food items category, and, in the case of Nigeria, the dependence on food import has worsened since middle-1990s falling to -0.19 in 2002-03[7]. Moreover, Algeria and Nigeria show a similar pattern also in Agricultural raw materials, while Egypt, that had a positive average *LFI* in this group in the 1970s, experiences a sharp decrease over time[8]. Only South Africa exhibits a certain degree of specialization in both Food items and Agricultural raw materials, even if the comparative advantage in these categories has been eroded since middle-1970s. However, the decline in South African

[7] The negative and worsening situation of Nigeria in agriculture products can be easily synthesized by the case of Cocoa (072), that was the second most specialized sector till 1996-97; just a few years later Nigeria becomes a net importer of this product reaching a *LFI* of -0.016 in 2002-03.

[8] This result can be explained by the negative pattern of Cotton (263), sector where Egypt displayed high degree of specialization until mid-1970s but lost most of its comparative advantage over time.

agricultural items is replaced by the growth of Ores and metals group that reaches 0.51 in 2004-05 and by an overall betterment in Manufactured goods. More interesting, this last category is driven by the sustained growth of Machinery and transport equipment that, even if still remains negative in recent years, jumps from the value of -1.27 in 1975-76 to -0.62 in 2004-05. The dynamism occurring in South Africa, which indicates some signals of transformation towards industrialization, seems not to have affected the other three countries of SANE. Indeed, although they generally experience an improvement in the average *LFI* of Manufactured goods between 1985-86 and 1995-96, Algeria, Egypt and, more strongly, Nigeria, suffer a new negative pattern of industrial products in the last decade.

In line with the last implication, other revealing aspects emerge by the analysis of average *LFI* by technological content as shown by the bottom part of Tables 8a-8d. The situation of high tech items appears to negatively persist in all the four countries. Only South Africa displays a sharp growth in the value of medium-high tech group, whose average *LFI* increases from -0.73 in 1975-76 to -0.18 in 2004-05. In addition, a similar pattern can be found in medium-low tech that is quadrupled in its positive value in three decades. Egypt shows some improvements in medium-high tech group, even if medium-low tech products, especially between 1995-96 and 2004-05, display a better performance. By contrast, Algeria experiences a negative pattern of average *LFI* in both medium tech categories, more emphasized in the lower one which falls from 0.53 in 1985-86 to 0.30 in 2004-05. Finally, Nigeria confirms its negative performance due to the fact that it is the only economy with no positive average *LFI* in anyone sub-period and, furthermore, all its four groups by technological content worsen in the last years of the time sample.

The study of the top-bottom distribution reveals that only South Africa shows some remarkable and positive improvements in the degree of specialization although its trade is still driven by resource-based categories. Furthermore, it appears that the performance of Algeria and Egypt is not very brilliant, even if their dependence on petroleum-related products does not seem to be so negative as in the case of Nigeria.

The next section will investigate on the specialization dynamics in order to assess if and which of the countries of SANE has become more or less specialized for the period under study.

4. Specialization dynamics

A first simple measure for testing whether a changing specialization has occurred in the countries of SANE can be offered by the Finger-Kreinin export similarity index (*F&K*). The indicator developed by Finger and Kreinin in 1979 is defined as the sum of smaller values of the two countries' shares

of all products in their total exports to the world; it lies between 0 (maximum dissimilarity) and 1 (maximum similarity). The *F&K* index can be used in order to study export structure of different economies (see, for instance, Bonassi, Borin and Mastinu, 2007), but it can be easily computed to compare also the export structure of a country in two different years. The *F&K* index we use is expressed by the following formula:

$$F\ \&\ K_{t-l,t} = \sum_{j=1}^{N} \min(s_{j,t-l}, s_{j,t}) \qquad (2)$$

where s_j is the share of export of product *j* computed at time *t-l* and *t*. The $F\&K_{t-l,t}$ index adds up the minimum value of s_j between time *t-1* and *t* across products and hence allows us to compare export structure of economies of SANE in terms of similarity over the period.

Table 9 suggests that Egypt displays the lowest degree of similarity among the four countries between 1975-76 and 2004-05. It has therefore experienced more changes in its export structure than the other economies of the group in particular in the first and in the third decade. South Africa follows with nearly half of its exports distribution changed, while more similarity is found in Algeria, although this exhibits a certain degree of dynamism in the first decade. The stationary situation of Nigeria shows again in the high value of the $F\&K_{t-l,t}$ index displaying that its exports structure in 2002-03 is practically identical to that of 1975-76. This implies that, even if their share of petroleum-related products on total exports is high, Algeria and Egypt, although at a different speed, have been able to modify their export composition.

However, the *F&K* index just focuses on exports dynamics. In order to understand if the specialization pattern has changed over time, we therefore run the following simple OLS regression in which the *LFI* in the final and in the initial period are respectively the dependent and the independent variable.

$$LFI_j^{2004-05} = \alpha + \beta LFI_j^{1975-76} + \varepsilon \qquad (3)$$

We use the expression described by *(3)* for each country of our sample; for Nigeria, we consider he *LFI* in 2002-03 against the *LFI* in 1975-96. Since variables on both sides of the equation have a zero mean, the estimate of α should also have a zero value, whereas the value of β would capture the changes over time in the pattern of specialization. For a β greater than one, the degree to which a country of SANE has specialised or not specialised in certain industries has increased, whereas if β is less than one the existing pattern of specialisation in particular industries

has lessened; for a β equal to 1 no changes have occurred in the specialization pattern, while for a β equal to 0 then there is no relation between the pattern of specialisation in the two periods.

Table 10 reports the regressions results while Figure 1 presents the scatter diagrams with the fitted regression lines. As can be seen from the table, the estimated coefficients for the all countries are highly significantly positive and below the unity: we obtain 0.59, 0.37, 0.90 and 0.31 for Algeria, Egypt, Nigeria and South Africa respectively. These findings suggest that although the *LFI* has shown some improvements for items with initial low values and showed some retreat for those with initial high values, on average the specialization pattern for the SANE area remained the same. However, such movements seem to be more evident in the case of Egypt and South Africa indicating a stronger degree of dynamism with respect to Nigeria and Algeria. In order to check the robustness of results, we re-estimate the regressions by dropping the outliers: these are identified in "Petroleum, crude and partly refined" and "Gas, natural and manufactured" for Algeria; "Petroleum products" for Egypt; "Petroleum, crude and partly refined" for Nigeria. Also in this case, the estimated coefficients are positive and lie below the 45-degree line, but the changes in the values are not the same in the economies: while in the case of Egypt there is a modest decline from 0.37 to 0.25, the exclusion of the outliers for Algeria and Nigeria generates a more emphasized change in the value of the parameter. Figure 2 evidences the new situation for the two countries. In Algeria the estimated coefficient increases from 0.59 to 0.82, a value close to the unity, indicating that once we exclude the two natural resource based products, the Algerian specialization for the remaining sectors in 2004-05 is almost the same of that of the past three decades. Indeed, β in Nigeria declines from 0.90 to 0.48 and such decrease is mainly driven by the de-specialization in those sectors in which the economy was previously specialized (even if in Nigeria very few sectors had a positive *LFI* at the initial year).

A more detailed analysis of the dynamics of the *LFI* distribution can be obtained by using the transition probabilities, suggested in a series of papers by Quah (1993, 1996 and 1997) in order to describe the evolution of income distribution and the probabilities that a country can become more or less rich with respect to its initial income conditions. This method can be applied on specialization distribution to measure the probabilities that individual sectors become more or less specialized over time as a function of their initial degree of specialization (see Redding, 2002). The law of motion is described by the following formula:

$$F_{t+l} = P^{l} * F_{t} \qquad (4)$$

where F_t and F_{t+l} denote the distribution of sectors with respect to their degree of specialization at time t and $t+l$ respectively, and P encodes information on whether the sectors transit subsequently to widely different specialization levels. Each row of P is a probability mass function describing the distribution across sectors after one transition given that the system is currently in the state corresponding to that row.

We calculate the transition probabilities for each country of SANE and Table 11 summarizes the results. Due to the missing data and to the proprieties of transition matrices that require the completeness of the time series, we cannot compute the calculations for Nigeria and South Africa for the entire period. However, in order to have a clearest picture of the dynamics and a more efficient comparison among the four countries, we add two measures of mobility, M^1 and M^2, to each transition table (see Shorrocks, 1978): higher values of the two indicators imply a larger degree of mobility across specialization quartiles. The indicator M^1 captures the relative magnitude of the diagonal and off-diagonal elements by using the trace of the transition matrix whereas M^2 is based on its determinant[9].

Three very revealing aspects emerge from the transition matrix analysis. Firstly, all four countries show the indicators of mobility under 0.20 and 0.50 respectively in all the periods considered. The only exception is Algeria, that between 1986-87 and 1995-96 displays 0.21 for M^1 and 0.52 for M^2. These results indicate a very low degree of mobility and high values in the main diagonal elements, especially if we compare such results with those obtained in similar analysis for other developing countries. For example, Zaghini (2005), computing the two indices for a group of new EU members for the period 1993-2001, finds the values of 0.28 and 0.64 as the lowest in his sample, while Alessandrini, Fattouh and Scaramozzino (2007) obtain 0.50 and 0.90 for the Indian economy in the period 1985-2002. This means that the countries of SANE show a degree of mobility that is, on average, less than half of that of other developing countries such as India. Second, even if we are not able to compute the transition matrix for Nigeria and South Africa for the entire period, we can argue from the available results that their degree of mobility is not far from that of the other two countries, which are 0.16 and 0.42 for Egypt and 0.17 and 0.43 for Algeria. Furthermore, these two last economies seem to have increase their degree of persistence over time, as witnessed by the lower values of the indicators obtained in the last decade. Third, all the four countries in each sub-period considered display higher persistence in the first quartile than in the fourth one, indicating that the probability that an import-dependent sector becomes more specialized over time is less than the probability that a highly specialized sector keeps the position. In other words, countries of SANE, on average, have faced difficult in maintaining the achieved

[9] See the note of Table 11 for the formula.

specialization in some sectors and have not been able to lowering the import-dependence in other ones. The most evident example comes again from Nigeria, that shows the lowest value for the fourth quartile: in the last years, around 14% of the most specialized sectors loose the position.

5. Specialization of SANE and world demand

The previous sections indicate that few changes have occurred in the pattern of manufacturing trade specialization in the SANE area during the last three decades. However, even if the findings suggest that the trade of the four countries is still dependent on natural resource items and very far from high-tech content products, we need to check if their specialization model can be defined as "efficient" or "inefficient", in the sense that it is based on products groups for which global demand growth has grown the fastest or the slowest (Zaghini, 2005). A way to answer to such question can be derived by examining the cumulative distribution of the Lafay index for each country ranked according to the average growth rates of world imports for the period under study.

Figures 3a-3d display the cumulative distribution of the Lafay index of Algeria, Egypt, Nigeria and South Africa for the years 1975-76 and 2004-05 against the 180 items. The graphs start with the slowest growth product and end at zero by construction. Therefore, the beginning of the distribution would show positive values for a country specialized in items that display slow growth on a world scale. By looking at the shape of the two curves for each country, we can easily find that only Egypt and South Africa have experienced some changes. The specialization model of Algeria and Nigeria against world demand is practically unchanged over time, with decreasing functions, and so systematically de-specialization, in almost all the products (the 77th item in both figures is represented by "Petroleum, crude and partly refined"). The jump of Algeria in 2004-05 in product in position 171st corresponds to "Gas, natural and manufactured", whose exports have been sharply increasing since early 1980s (see also Table 4a). Instead, the pattern of the other two countries of SANE, in particular in the case of South Africa, reveals that they have lost their degree of specialization in the slowest items, improving the trade specialization in the faster ones, although neither displays an increasing function in the highest growth products.

These results are summarized by Table 12, in which items are grouped into four categories, from the slowest growth to the fastest growth group (see the note of the table for details). Egypt and South Africa record a de-specialization pattern in the slowest growth products, replaced in particular by a positive increase in the average *LFI* of medium-high growth category, reaching 0.187 and 0.096 respectively from the beginning values of -0.110 and -0.075. Moreover, South Africa displays an improvement also in the fastest growth items, form -0.238 in 1975-76 to -0.054

in 2004-05. The jump in the fastest growth group registered by Algeria can be explained again by the increasing weight of "Gas, natural and manufactured products", which show a *LFI* of 15.87 in the last year. Furthermore, the heavy impact of "Petroleum, crude and partly refined" items in Algeria and especially in Nigeria emerges by the high and positive values of the average *LFI* in the medium growth category.

This section confirms that countries of SANE have, on average, maintained over time a similar specialization pattern also against world demand, failing in achieving the gains from the most rapid growth categories. However, Egypt and in particular South Africa have displayed a more degree of dynamism, indicating an effort to leave behind a model of trade specialization based on the slowest items towards the products which have grown the fastest in the last three decades.

6. Conclusions

The foreign trade specialization model of manufacturing industries in Algeria, Egypt, Nigeria and South Africa seems to limit the capability of the group to benefit from international integration and to trigger a lung run growth process. The SANE aim of becoming the potential engine of economic development for Africa could not be achieved if the area still depends on products groups characterized by low-technological content and slow-growth world demand. Thus far, the import-substitution and the following pro-market policies have failed in shifting the economies towards the most dynamics items.

We find that the four countries have experienced very few changes in their specialization model during the last three decades. Where the weight of natural resources is higher, as is the case for petroleum products in Nigeria and Algeria, the degree of persistence in the trade structure seems to be more emphasized. It follows that just South Africa and, in few cases, Egypt have been able to afford some transformations to the economy. South Africa, in particular, is the only one that has modified its pattern towards products with the fastest world demand growth.

In conclusion, a number of policy interventions have to be invoked to improve the trade performance of SANE on the world market. A greater and more efficient expenditure on education such as the consolidation of the democratic institutions, as recently pointed out by Anyanwu and Erhijahpor (2007), could be a reasonable way of starting. These goals, if reached, could not only redirect the economies towards the most dynamic activities for sustaining economic growth in the long run, but could also ensure a better income distribution of the natural resources revenues for spurring the development process.

Table 1. The relative impact of SANE economies, 2006

	SANE ECONOMIES					REST OF AFRICA		
Indicators	**South Africa**	**Algeria**	**Nigeria**	**Egypt**	**SANE**	**Landlocked**	**Coastal**	**Total**
Surface Area (thousand Km. sq.)	1.221	2.381	924	1001	5528	10.324	14.455	30.307
as share of Africa, (%)	*5.8*	*11*	*4.4*	*4.7*	*26.3*	*34*	*46.7*	*100*
Total population, 2004 (million)	45.5	34.6	128.8	72.6	279.2	284	349	924
as share of Africa, (%)	*6.7*	*4.8*	*19.1*	*6.7*	*37.3*	*31*	*38*	*100*
Nominal GDP (US$ billions)	262	128	120	104	613	95	385	1.093
as share of Africa, (%)	*24*	*12*	*11*	*10*	*56*	*9*	*35*	*100*
GDP (US$ billions PPP)	605	246	186	327	1.373	326	905	2.605
as share of Africa, (%)	*23*	*10*	*7*	*13*	*53*	*13*	*35*	*100*
Investment ratio (gross capital formation, % of GDP)	19	31	20	18	21	21	20	21
Gross National Saving (% of GDP)	13	56	36	20	28	17	26	23
Foreign reserves (US$ billions)	23	82	49	23	176	15	122	314
as share of Africa, (%)	*7*	*26*	*16*	*7*	*56*	*5*	*39*	*100*
Trade balance (US$ Billion)	4	40	33	-11	57	2	17	72
Current account balance (US$ Billion)	14	31	19	2	38	3	24	35
Share of Africa exports, (%)	16	16	16	5	52	6	42	100
Share of Africa imports, (%)	23	8	10	10	51	10	41	100
Export growth 1997-2006 (%)	4	5	3	10	4	5	6	5
Import growth 1997-2006 (%)	7	12	6	7	6	5	7	9
FDI (US$ millions)	6.379	1.081	3.403	5.376	16.239	3.4459	10.971	30.669
as share of Africa, (%)	*21*	*4*	*11*	*18*	*53*	*11*	*36*	*100*

Source: Oshikoya (2007)

Table 2. Annual GDP per capita growth, 1975-2004 (in percentage)

	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004
Africa	1.3	-0.3	0.4	-2.1	1.7	2.3
Sane	2.5	-0.1	0.6	-0.5	1.4	2.3
Algeria	3.7	0.9	-1.4	-2.6	1.8	2.6
Nigeria	-0.8	-6.4	2.7	0.7	-0.1	2.7
South Africa	0.0	0.4	-0.9	-1.8	0.3	2.2
Egypt	7.2	4.8	1.9	1.5	3.5	1.9

Source: World Development Indicators (2006)

Table 3. Trade structure (in percentage)

	ALGERIA				EGYPT				NIGERIA				SOUTH AFRICA			
	75-76	**85-86**	**95-96**	**04-05**	**75-76**	**85-86**	**95-96**	**04-05**	**75-76**	**85-86**	**96-97**	**02-03**	**75-76**	**83-84**	**95-96**	**04-05**
Export																
All food items (0, 1, 22, 4)	3.6	0.4	1.2	0.2	18.6	6.2	10.1	10.1	4.8	3.7	0.9	0.3	31.7	12.9	11.5	8.7
Agricultural raw materials (2 excl. 22, 27, 28)	0.1	0.0	0.1	0.0	33.6	14.1	5.2	5.0	0.5	0.2	0.9	0.1	8.9	8.3	4.7	2.1
Fuels (3)	93.0	97.5	93.3	97.7	17.2	59.4	41.0	50.6	94.1	96.0	96.0	96.0	2.3	14.2	12.0	9.7
Ores and metals (27, 28, 68)	1.8	0.6	0.6	0.5	1.1	4.9	6.2	3.5	0.4	0.0	0.0	0.0	20.9	17.4	11.8	22.3
Manufactured goods (5, 6, 7, 8 excl. 68)	1.5	1.4	4.8	1.7	29.5	15.1	36.0	29.5	0.3	0.0	2.2	3.5	36.2	39.7	59.9	57.1
Chemicals products (5)	*0.2*	*0.9*	*2.7*	*1.2*	*3.7*	*1.1*	*5.5*	*5.9*	*0.0*	*0.0*	*0.1*	*0.1*	*4.4*	*5.7*	*9.9*	*8.2*
Manufactured goods classified chiefly (6 excl. 68)	*0.9*	*0.3*	*1.2*	*0.3*	*17.1*	*12.1*	*20.6*	*18.3*	*0.2*	*0.0*	*0.3*	*0.6*	*24.7*	*28.4*	*33.1*	*24.9*
Machinery and transport equipment (7)	*0.4*	*0.1*	*0.4*	*0.1*	*0.9*	*0.1*	*0.5*	*1.4*	*0.1*	*0.0*	*1.7*	*2.5*	*5.9*	*4.3*	*12.2*	*20.2*
Miscellaneous manufactured goods (8)	*0.0*	*0.0*	*0.6*	*0.0*	*7.8*	*1.7*	*9.4*	*3.9*	*0.0*	*0.0*	*0.1*	*0.4*	*1.3*	*1.3*	*4.7*	*3.8*
Import																
All food items (0, 1, 22, 4)	19.7	23.7	30.4	20.6	32.1	28.6	27.9	24.0	9.8	17.0	18.1	17.5	4.9	8.8	6.9	5.1
Agricultural raw materials (2 excl. 22, 27, 28)	2.0	3.5	3.1	1.8	5.2	5.9	6.0	5.2	0.7	1.6	1.1	0.8	3.4	3.1	2.3	1.3
Fuels (3)	1.6	2.4	1.2	1.0	4.3	2.7	0.8	11.6	3.1	0.7	1.2	8.7	0.3	0.5	9.5	15.7
Ores and metals (27, 28, 68)	1.4	2.1	1.5	1.4	1.7	1.2	3.0	3.9	1.8	3.1	2.8	1.9	2.9	2.2	1.8	2.1
Manufactured goods (5, 6, 7, 8 excl. 68)	75.2	68.3	63.9	75.2	54.6	60.8	61.4	54.5	84.5	77.6	76.8	71.1	88.4	85.4	79.5	75.7
Chemicals products (5)	*6.1*	*9.2*	*9.9*	*11.9*	*11.4*	*9.3*	*12.9*	*13.3*	*8.4*	*16.6*	*19.8*	*13.6*	*10.1*	*11.7*	*13.5*	*11.7*
Manufactured goods classified chiefly (6 excl. 68)	*23.0*	*21.5*	*18.6*	*15.8*	*15.5*	*22.7*	*18.5*	*16.0*	*23.8*	*20.9*	*16.6*	*15.9*	*16.3*	*13.6*	*12.9*	*11.3*
Machinery and transport equipment (7)	*43.1*	*33.5*	*31.3*	*42.8*	*25.4*	*25.2*	*26.0*	*21.2*	*44.9*	*36.3*	*35.3*	*37.7*	*54.5*	*50.6*	*43.2*	*42.4*
Miscellaneous manufactured goods (8)	*3.0*	*4.0*	*4.1*	*4.7*	*2.2*	*3.6*	*4.0*	*4.1*	*7.4*	*3.7*	*5.0*	*3.8*	*7.6*	*9.4*	*9.8*	*10.3*

Source: authors' calculation based on COMTRADE. Sectors are classified according to UNCTAD (2005)

Table 4a. Top 15 products groups based on Lafay Index, Algeria

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
331-Petroleum, crude and partly refined	na	42.27	341-Gas, natural and manufactured	**	17.02
332-Petroleum products	**	1.65	331-Petroleum, crude and partly refined	na	16.15
341-Gas,natural and manufactured	**	1.33	332-Petroleum products	**	14.55
112-Alcoholic beverages	*	1.18	112-Alcoholic beverages	*	0.17
271-Fertilizers, crude	***	0.38	271-Fertilizers, crude	***	0.12
051-Fruit, fresh, and nuts – excl. oil	na	0.25	686-Zinc	**	0.08
671-Pig iron, spiegeleisen, sponge iron	**	0.17	282-Iron and steel scrap	*	0.05
281-Iron ore & concentrates	na	0.14	284-Non-ferrous metal scrap	**	0.02
283-Ores & concentrates of non-ferrous	na	0.13	052-Dried fruit including artificially	*	0.01
282-Iron and steel scrap	*	0.11	633-Cork manufactures	*	0.01
611-Leather	*	0.05	244-Cork, raw and waste	*	0.00
031-Fish,fresh & simply preserved	*	0.03	281-Iron ore & concentrates	na	0.00
633-Cork manufactures	*	0.03	012-Meat, dried, salted or smoked	*	0.00
686-Zinc	**	0.03	212-Fur skins, undressed	na	0.00
284-Non-ferrous metal scrap	**	0.03	285-Silver & platinum ores	na	0.00
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
331-Petroleum, crude and partly refined	na	23.32	331-Petroleum, crude and partly refined	na	24.00
341-Gas,natural and manufactured	**	15.54	341-Gas, natural and manufactured	**	15.87
332-Petroleum products	**	7.02	332-Petroleum products	**	3.28
551-Essential oils, perfume and flavour	***	0.38	521-Crude chemicals from coal, petroleum	***	0.25
521-Crude chemicals from coal,petroleum	***	0.38	513-Inorg.chemicals-elems.oxides,halogen salts	***	0.11
052-Dried fruit including artificially	*	0.34	282-Iron and steel scrap	*	0.09
671-Pig iron, spiegeleisen, sponge iron	**	0.11	284-Non-ferrous metal scrap	**	0.04
271-Fertilizers, crude	***	0.09	686-Zinc	**	0.03
686-Zinc	**	0.09	271-Fertilizers, crude	***	0.02
351-Electric energy	na	0.06	633-Cork manufactures	*	0.01
284-Non-ferrous metal scrap	**	0.06	611-Leather	*	0.01
513-Inorg.chemicals-elems.oxides, halogen salts	***	0.05	052-Dried fruit including artificially	*	0.00
611-Leather	*	0.05	111-Non-alcoholic beverages,nes	*	0.00
282-Iron and steel scrap	*	0.04	211-Hides & skins,-exc.fur skins- undressed	*	0.00
633-Cork manufactures	*	0.02	244-Cork, raw and waste	*	0.00

Note: * Low tech, ** Medium-low tech, *** Medium-high tech, **** High tech. N/A: it is not possible to assign a technological content.

Table 4b. Bottom 15 products groups based on Lafay Index, Algeria

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
651-Textile yarn and thread	*	-0.76	421-Fixed vegetable oils, soft	*	-0.79
729-Other electrical machinery and apparatus	***/****	-0.78	691-Finished structural parts and structures, nes	**	-0.92
661-Lime,cement & fabr.bldg.mat.-ex glass	**	-0.79	651-Textile yarn and thread	*	-0.95
541-Medicinal & pharmaceutical products	****	-0.94	581-Plastic materials,regenerd.cellulose	**/***	-1.02
673-Iron and steel bars,rods,angles, shapes	**	-1.07	663-Mineral manufactures, nes	**	-1.02
691-Finished structural parts and structure	**	-1.11	729-Other electrical machinery and apparatus	***/****	-1.13
722-Electric power machinery and switch	***	-1.24	718-Machines for special industries	***	-1.14
724-Telecommunications apparatus	****	-1.27	673-Iron and steel bars,rods,angles,shapes	**	-1.28
711-Power generating machinery, other t	***	-1.46	022-Milk and cream	*	-1.33
678-Tubes,pipes and fittings of iron or	**	-2.24	722-Electric power machinery and switch	***	-1.36
061-Sugar and honey	*	-2.51	541-Medicinal & pharmaceutical products	****	-1.43
041-Wheat - including spelt - and mesliin, unmilled	na	-2.52	711-Power generating machinery, other than electric	***	-1.53
718-Machines for special industries	***	-2.81	041-Wheat - including spelt - and meslin, unmilled	na	-2.41
732-Road motor vehicles	***	-3.86	732-Road motor vehicles	***	-3.10
719-Machinery and appliances-non electrical parts	***	-5.42	719-Machinery and appliances-non electrical parts	***	-4.58
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
729-Other electrical machinery and apparatus	***/****	-0.96	714-Office machines	****	-0.74
724-Telecommunications apparatus	****	-1.16	044-Maize - corn - unmilled	na	-0.75
718-Machines for special industries	***	-1.22	678-Tubes,pipes and fittings of iron	**	-0.93
673-Iron and steel bars,rods,angles,shapes	**	-1.23	734-Aircraft	****	-0.95
722-Electric power machinery and switch	***	-1.26	581-Plastic materials,regenerd.cellulose	**/***	-1.09
421-Fixed vegetable oils, soft	*	-1.26	711-Power generating machinery, other than electric	***	-1.11
711-Power generating machinery, other than electric	***	-1.29	722-Electric power machinery and switch	***	-1.50
061-Sugar and honey	*	-1.46	673-Iron and steel bars,rods,angles,shapes	**	-1.56
678-Tubes,pipes and fittings of iron or steel	**	-1.60	022-Milk and cream	*	-1.64
022-Milk and cream	*	-1.86	718-Machines for special industries	***	-1.93
046-Meal and flour of wheat or of meslin	*	-1.91	724-Telecommunications apparatus	****	-2.16
541-Medicinal & pharmaceutical products	****	-2.15	041-Wheat - including spelt - and meslin	na	-2.37
732-Road motor vehicles	***	-2.40	541-Medicinal & pharmaceutical products	****	-2.42
041-Wheat - including spelt - and meslin	na	-3.02	719-Machinery and appliances-non electrical parts	***	-3.93
719-Machinery and appliancesv-non electrical parts	***	-4.92	732-Road motor vehicles	***	-4.52

Notes: see table 4a

Table 5a. Top 15 products groups based on Lafay Index, Egypt

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
263-Cotton	*	12.65	331-Petroleum, crude and partly refined	na	16.42
631-Textile yarn and thread	*	4.08	263-Cotton	*	4.51
331-Petroleum, crude and partly refined	na	3.08	332-Petroleum products	**	3.82
332-Petroleum products	**	2.20	651-Textile yarn and thread	*	2.71
042-Rice	*	1.92	684-Aluminium	**	1.61
841-Clothing except fur clothing	*	1.54	652-Cotton fabrics,woven ex.narrow or spec. fabrics	*	0.82
051-Fruit, fresh, and nuts - excl. oil	na	1.48	051-Fruit, fresh, and nuts - excl. oil	na	0.81
652-Cotton fabrics,woven ex.narrow or spec. fabrics	*	1.12	054-Vegetables, roots & tubers, fresh o	*	0.34
054-Vegetables, roots & tubers, fresh or dried	*	0.99	841-Clothing except fur clothing	*	0.26
851-Footwear	*	0.64	042-Rice	*	0.12
553-Perfumery, cosmetics, dentifrices,	***	0.63	292-Crude vegetable materials,nes	na	0.11
112-Alcoholic beverages	*	0.53	551-Essential oils, perfume and flavour	***	0.10
551-Essential oils, perfume and flavour	***	0.49	892-Printed matter	*	0.07
821-Furniture	*	0.25	697-Household equipment of base metals	**	0.04
656-Made-up articles,wholly or chiefly of text.mat.	*	0.22	656-Made-up articles,wholly or chiefly of text.mat.	*	0.04
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
331-Petroleum, crude and partly refined	na	7.54	332-Petroleum products	**	14.28
332-Petroleum products	**	6.35	341-Gas,natural and manufactured	**	2.37
841-Clothing except fur clothing	*	2.42	661-Lime,cement & fabr.bldg.mat.-ex glass	**	1.94
651-Textile yarn and thread	*	2.10	263-Cotton	*	1.71
684-Aluminium	**	1.80	042-Rice	*	1.48
263-Cotton	*	1.13	331-Petroleum, crude and partly refined	na	1.47
054Vegetables, roots & tubers, fresh or dried	*	1.00	841-Clothing except fur clothing	*	1.17
652-Cotton fabrics,woven ex.narrow or spec.fabrics	*	0.88	673-Iron and steel bars,rods,angles,shapes	**	1.03
656-Made-up articles,wholly or chiefly of text.mat.	*	0.86	656-Made-up articles,wholly or chiefly of text.mat.	*	0.73
042-Rice	*	0.85	684-Aluminium	**	0.61
561-Fertilizers manufactured	***	0.35	273-Stone, sand and gravel	na	0.52
657-Floor coverings, tapestries, etc.	*	0.31	051-Fruit, fresh, and nuts - excl. oil	na	0.46
677-Iron and steel wire, excluding wire	**	0.28	054-Vegetables, roots & tubers, fresh	*	0.38
292-Crude vegetable materials,nes	na	0.26	055-Vegetables, roots & tubers pres	*	0.21
055-Vegetables, roots & tubers pres or	*	0.21	665-Glassware	**	0.19

Notes: see table 4a

Table 5b. Bottom 15 products groups based on Lafay Index, Egypt

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
411-Animal oils and fats	*	-0.67	599-Chemical materials and products,nes	***	-0.60
044-Maize - corn - unmilled	na	-0.75	044-Maize - corn - unmilled	na	-0.66
673-Iron and steel bars,rods,angles,shapes	**	-0.77	641-Paper and paperboard	*	-0.68
321-Coal,coke & briquettes	na	-0.79	421-Fixed vegetable oils, soft	*	-0.72
512-Organic chemicals	***/****	-0.84	581-Plastic materials,regenerd.cellulose	**/***	-0.77
599-Chemical materials and products,nes	***	-0.84	722-Electric power machinery and switch	***	-0.83
243-Wood,shaped or simply worked	*	-0.87	011-Meat, fresh, chilled or frozen	*	-0.92
717-Textile and leather machinery	***	-0.88	046-Meal and flour of wheat or of meslin	*	-0.95
641-Paper and paperboard	*	-1.03	718-Machines for special industries	***	-0.99
718-Machines for special industries	***	-1.06	243-Wood,shaped or simply worked	*	-1.45
046-Meal and flour of wheat or of meslin	*	-1.07	661-Lime,cement & fabr.bldg.mat.-ex glass	**	-1.58
421-Fixed vegetable oils, soft	*	-1.51	732-Road motor vehicles	***	-1.71
719-Machinery and appliances-non electrical parts	***	-1.62	041-Wheat - including spelt - and meslin	na	-1.84
732-Road motor vehicles	***	-2.94	673-Iron and steel bars,rods,angles,shapes	**	-1.85
041-Wheat - including spelt - and meslin	na	-4.74	719-Machinery and appliances-non electrical parts	***	-2.32
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
718-Machines for special industries	***	-0.58	714-Office machines	****	-0.65
724-Telecommunications apparatus	****	-0.59	861-Scientific,medical,optical,meas	****	-0.69
061-Sugar and honey	*	-0.60	722-Electric power machinery and switch	***	-0.73
421-Fixed vegetable oils, soft	*	-0.61	011-Meat, fresh, chilled or frozen	*	-0.81
674-Universals,plates and sheets of iron or steel	**	-0.66	422-Other fixed vegetable oils	*	-0.81
422-Other fixed vegetable oils	*	-0.67	641-Paper and paperboard	*	-0.92
512-Organic chemicals	***/****	-0.68	081-Feed.-stuff for animals excl.unmilled	*	-0.94
722-Electric power machinery and switch	***	-0.71	541-Medicinal & pharmaceutical products	****	-0.96
044-Maize - corn - unmilled	na	-1.08	512-Organic chemicals	***/****	-1.08
641-Paper and paperboard	*	-1.20	724-Telecommunications apparatus	****	-1.13
243-Wood,shaped or simply worked	*	-1.36	243-Wood,shaped or simply worked	*	-1.47
581-Plastic materials,regenerd.cellulose	**/***	-1.40	732-Road motor vehicles	***	-1.56
732-Road motor vehicles	***	-1.61	044-Maize - corn - unmilled	na	-1.65
719-Machinery and appliances-non electrical parts	***	-2.67	041-Wheat - including spelt - and meslin	na	-2.68
041-Wheat - including spelt - and mesli	na	-2.90	719-Machinery and appliances-non electrical parts	***	-2.94

Notes: see table 4a

Table 6a. Top 15 products groups based on Lafay Index, Nigeria

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
331-Petroleum, crude and partly refined	na	45.89	331-Petroleum, crude and partly refined	na	43.72
072-Cocoa	*	1.92	072-Cocoa	*	1.60
221-Oil-seeds, oil nuts and oil kernels	na	0.24	332-Petroleum products	**	0.07
687-Tin	**	0.15	231-Crude rubber-incl.synthetic & reclaimed	na	0.06
231-Crude rubber-incl.synthetic & reclaimed	na	0.12	211-Hides & skins,-exc.fur skins- undressed	*	0.00
081-Feed.-stuff for animals excl.unmilled	*	0.07	282-Iron and steel scrap	*	0.00
611-Leather	*	0.06	241-Fuel wood & charcoal	*	0.00
211-Hides & skins,-exc.fur skins- undressed	*	0.06	283-Ores & concentrates of non-ferrous	na	0.00
422-Other fixed vegetable oils	*	0.03	052-Dried fruit including artificially	*	0.00
282-Ores & concentrates of non-ferrous	na	0.02	212-Fur skins, undressed	na	0.00
242-Wood in the rough or roughly square	na	0.02	285-Silver & platinum ores	na	0.00
243-Wood,shaped or simply worked	*	0.00	286-Ores & concentrates of uranium & thorium	na	0.00
282-Iron and steel scrap	*	0.00	411-Animal oils and fats	*	0.00
241-Fuel wood & charcoal	*	0.00	613-Fur skins, tanned or dressed, included dyed	*	0.00
212-Fur skins, undressed	na	0.00	688-Uranium and thorium and their alloy	**	0.00
Sector	**Tech content**	**LFI 1996-97**	**Sector**	**Tech content**	**LFI 2002-03**
331-Petroleum, crude and partly refined	na	42.56	331-Petroleum, crude and partly refined	na	42.17
072-Cocoa	*	0.23	341-Gas,natural and manufactured	**	0.23
231-Crude rubber-incl.synthetic & reclaimed	na	0.23	651-Textile yarn and thread	*	0.08
221-Oil-seeds, oil nuts and oil kernels	na	0.03	812-Sanitary,plumbing,heating & lighting fixtures	*	0.02
652-Cotton fabrics,woven ex.narrow or spec.fabrics	*	0.03	611-Leather	*	0.00
211-Hides & skins,-exc.fur skins- undressed	*	0.01	043-Barley, unmilled	na	0.00
051-Fruit, fresh, and nuts - excl. oil	na	0.01	285-Silver & platinum ores	na	0.00
241-Fuel wood & charcoal	*	0.00	286-Ores & concentrates of uranium & thorium	na	0.00
651-Textile yarn and thread	*	0.00	675-Hoop and strip of iron or steel	**	0.00
611-Leather	*	0.00	941-Animals, nes-incl.zoo animals,dogs	na	0.00
265-Vegetable fibres,except cotton and jute	*	0.00	961-Coin-other than gold-,not being leg	**	0.00
212-Fur skins, undressed	na	0.00	351-Electric energy	na	0.00
243-Wood,shaped or simply worked	*	0.00	842-Fur clothing and articles of artificial fur	*	0.00
012-Meat, dried, salted or smoked	*	0.00	613-Fur skins, tanned or dressed, including dyed	*	0.00
043-Barley, unmilled	na	0.00	896-Works of art,collectors pieces and antiques	*	0.00

Notes: see table 4a

Table 6b. Bottom 15 products groups based on Lafay Index, Nigeria

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1985-86
041-Wheat - including spelt - and meslin	na	-0.83	711-Power generating machinery, other	***	-0.84
061-Sugar and honey	*	-0.86	599-Chemical materials and products,nes	***	-0.92
641-Paper and paperboard	*	-0.93	061-Sugar and honey	*	-0.92
661-Lime,cement & fabr.bldg.mat.-ex glass	**	-0.98	712-Agricultural machinery and implements	***	-0.94
541-Medicinal & pharmaceutical products	****	-1.08	674-Universals,plates and sheets of iron	**	-1.00
722-Electric power machinery and switch	***	-1.12	729-Other electrical machinery and apparatus	***/****	-1.04
674-Universals,plates and sheets of iron or steel	**	-1.12	691-Finished structural parts and structures, nes	**	-1.28
651-Textile yarn and thread	*	-1.18	641-Paper and paperboard	*	-1.32
673-Iron and steel bars,rods,angles,shapes	**	-1.18	718-Machines for special industries	***	-1.50
332-Petroleum products	**	-1.18	581-Plastic materials,regenerd.cellulose	**/***	-1.51
678-Tubes,pipes and fittings of iron or	**	-1.47	541-Medicinal & pharmaceutical products	****	-1.53
724-Telecommunications apparatus	****	-1.49	722-Electric power machinery and switch	***	-1.68
718-Machines for special industries	***	-2.75	041-Wheat - including spelt - and meslin	na	-2.41
719-Machinery and appliances-non electrical parts	***	-3.61	719-Machinery and appliances-non electrical parts	***	-4.03
732-Road motor vehicles	***	-8.19	732-Road motor vehicles	***	-4.18
Sector	**Tech content**	**LFI 1996-97**	**Sector**	**Tech content**	**LFI 2002-03**
678-Tubes,pipes and fittings of iron or steel	**	-0.92	674-Universals,plates and sheets of iron or steel	**	-0.91
641-Paper and paperboard	*	-1.14	061-Sugar and honey	*	-0.95
674-Universals,plates and sheets of iron or steel	**	-1.15	042-Rice	*	-0.95
722-Electric power machinery and switchgear	***	-1.22	512-Organic chemicals	***/****	-0.96
042-Rice	*	-1.27	661-Lime,cement & fabr.bldg.mat.-ex glass	**	-1.21
512-Organic chemicals	***/****	-1.37	718-Machines for special industries	***	-1.34
724-Telecommunications apparatus	****	-1.41	041-Wheat - including spelt - and meslin	na	-1.50
061-Sugar and honey	*	-1.52	724-Telecommunications apparatus	****	-1.51
031-Fish,fresh & simply preserved	*	-1.71	031-Fish,fresh & simply preserved	*	-1.56
718-Machines for special industries	***	-1.87	735-Ships and boats	**	-1.77
581-Plastic materials,regenerd.cellulose	**/***	-2.04	722-Electric power machinery and switch	***	-1.91
599-Chemical materials and products,nes	***	-2.16	581-Plastic materials,regenerd.cellulose	**/***	-1.98
041-Wheat - including spelt - and meslin	na	-2.27	732-Road motor vehicles	***	-2.42
732-Road motor vehicles	***	-2.73	332-Petroleum products	**	-2.90
719-Machinery and appliances-non electrical parts	***	-3.30	719-Machinery and appliances-non electrical parts	***	-4.26

Notes: see table 4a

Table 7a. Top 15 products groups based on Lafay Index, South Africa

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1983-84
667-Pearls and precious and semi-precious stones	*	5.54	321-Coal,coke & briquettes	na	6.63
044-Maize - corn - unmilled	na	3.64	667-Pearls and precious and semi-precious stones	*	5.89
061-Sugar and honey	*	3.31	961-Coin-other than gold-,not being leg	**	3.69
283-Ores & concentrates of non-ferrous	na	2.88	671-Pig iron, spiegeleisen, sponge iron	**	2.54
671-Pig iron, spiegeleisen, sponge iron	**	2.41	262-Wool and other animal hair	*	2.18
262-Wool and other animal hair	*	2.23	051-Fruit, fresh, and nuts - excl. oil	na	1.79
051-Fruit, fresh, and nuts - excl. oil	na	2.16	283-Ores & concentrates of non-ferrous	na	1.70
276-Other crude minerals	na	2.01	674-Universals,plates and sheets of iron or steel	**	1.61
682-Copper	**	1.78	682-Copper	**	1.37
053-Fruit,preserved and fruit preparatiions	*	1.56	276-Other crude minerals	na	1.29
321-Coal,coke & briquettes	na	0.93	281-Iron ore & concentrates	na	1.14
081-Feed.-stuff for animals excl.unmilled	*	0.85	053-Fruit,preserved and fruit preparations	*	0.78
251-Pulp & waste paper	*	0.63	684-Aluminium	**	0.72
281-Iron ore & concentrates	na	0.58	061-Sugar and honey	*	0.69
211-Hides & skins,-exc.fur skins- undressed	*	0.45	251-Pulp & waste paper	*	0.64
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
667-Pearls and precious and semi-precious stones	*	5.56	681-Silver and platinum group metals	**	5.75
321-Coal,coke & briquettes	na	3.59	671-Pig iron, spiegeleisen, sponge iron	**	3.13
671-Pig iron, spiegeleisen, sponge iron	**	2.63	321-Coal,coke & briquettes	na	3.03
283-Ores & concentrates of non-ferrous	na	1.88	667-Pearls and precious and semi-precious stoned	*	1.77
332-Petroleum products	**	1.55	684-Aluminium	**	1.62
672-Ingots & other primary forms of iron	**	1.16	051-Fruit, fresh, and nuts - excl. oil	na	1.31
051-Fruit, fresh, and nuts - excl. oil	na	1.15	672-Ingots & other primary forms of iron or steel	**	1.24
251-Pulp & waste paper	*	1.03	674-Universals,plates and sheets of iron or steel	**	1.03
684-Aluminium	**	0.90	281-Iron ore & concentrates	na	0.86
513-Inorg.chemicals-elems.,oxides,halogen salts	***	0.89	283-Ores & concentrates of non-ferrous	na	0.78
674-Universals,plates and sheets of iron or steel	**	0.87	332-Petroleum products	**	0.56
821-Furniture	*	0.80	112-Alcoholic beverages	*	0.53
281-Iron ore & concentrates	na	0.77	251-Pulp & waste paper	*	0.42
673-Iron and steel bars,rods,angles,shapes	**	0.61	683-Nickel	**	0.41
053-Fruit,preserved and fruit preparations	*	0.58	673-Iron and steel bars,rods,angles,shapes	**	0.41

Notes: see table 4a

Table 7b. Bottom 15 products groups based on Lafay Index, South Africa

Sector	Tech content	LFI 1975-76	Sector	Tech content	LFI 1983-84
861-Scientific,medical,optical,meas.	****	-0.78	891-Musical instruments,sound recorders	*	-0.64
512-Organic chemicals	***/****	-0.80	734-Aircraft	****	-0.67
714-Office machines	****	-0.82	653-Text fabrics woven ex narrow, spec, not cotton	*	-0.70
715-Metalworking machinery	***	-0.85	599-Chemical materials and products,nes	***	-0.73
653-Text fabrics woven ex narrow, spec,	*	-0.87	861-Scientific,medical,optical,meas.	****	-0.92
581-Plastic materials,regenerd.cellulose	**/***	-1.01	581-Plastic materials,regenerd.cellulose	**/***	-1.00
711-Power generating machinery, other than electric	***	-1.04	724-Telecommunications apparatus	****	-1.06
712-Agricultural machinery and implements	***	-1.26	512-Organic chemicals	***/****	-1.07
724-Telecommunications apparatus	****	-1.26	722-Electric power machinery and switch	***	-1.38
729-Other electrical machinery and apparatus	***/****	-1.36	729-Other electrical machinery and apparatus	***/****	-1.45
734-Aircraft	****	-1.47	718-Machines for special industries	***	-1.55
722-Electric power machinery and switch	***	-1.64	711-Power generating machinery, other than electric	***	-1.67
718-Machines for special industries	***	-1.83	714-Office machines	****	-2.14
719-Machinery and appliances-non electrical parts	***	-3.93	719-Machinery and appliances-non electrical parts	***	-4.53
732-Road motor vehicles	***	-5.85	732-Road motor vehicles	***	-5.19
Sector	**Tech content**	**LFI 1995-96**	**Sector**	**Tech content**	**LFI 2004-05**
717-Textile and leather machinery	***	-0.51	851-Footwear	*	-0.44
891-Musical instruments,sound recorders	*	-0.63	841-Clothing except fur clothing	*	-0.51
711-Power generating machinery, other than electric	***	-0.67	891-Musical instruments,sound recorders	*	-0.54
512-Organic chemicals	***/****	-0.79	732-Road motor vehicles	***	-0.54
722-Electric power machinery and switch	***	-0.85	719-Machinery and appliances-non electrical parts	***	-0.56
581-Plastic materials,regenerd.cellulos	**/***	-0.90	722-Electric power machinery and switch	***	-0.57
541-Medicinal & pharmaceutical products	****	-0.97	581-Plastic materials,regenerd.cellulos	**/***	-0.67
718-Machines for special industries	***	-1.29	729-Other electrical machinery and apparatus	***/****	-0.70
861-Scientific,medical,optical,meas	****	-1.34	718-Machines for special industries	***	-1.02
729-Other electrical machinery and apparatus	***/****	-1.37	541-Medicinal & pharmaceutical products	****	-1.05
724-Telecommunications apparatus	****	-1.79	861-Scientific,medical,optical,meas.	****	-1.15
714-Office machines	****	-2.13	734-Aircraft	****	-1.31
732-Road motor vehicles	***	-2.32	714-Office machines	****	-2.26
719-Machinery and appliances-non electrical parts	***	-3.03	724-Telecommunications apparatus	****	-2.48
331-Petroleum, crude and partly refined	na	-3.91	331-Petroleum, crude and partly refined	na	-6.61

Notes: see table 4a

Table 8a. Average Lafay Index by product category and technological content, Algeria

By product	1975-76	1985-86	1995-96	2004-05
All food items (0, 1, 22, 4)	-0.19	-0.28	-0.34	-0.22
Agricultural raw materials (2 excl. 22, 27, 28)	-0.06	-0.10	-0.09	-0.05
Fuels (3)	9.01	9.48	9.15	8.59
Ores and metals (27, 28, 68)	0.01	-0.04	-0.02	-0.02
Manufactured goods (5, 6 ,7, 8 excl. 68)	-0.39	-0.36	-0.32	-0.35
5-Chemicals and related products, n.e..s.	*-0.18*	*-0.26*	*-0.22*	*-0.30*
6-Manufactured goods classified chiefly (excl.68)	*-0.26*	*-0.26*	*-0.21*	*-0.17*
7-Machinery and transport equipment	*-1.17*	*-0.92*	*-0.85*	*-1.05*
8-Miscellaneous manufactured articles	*-0.08*	*-0.11*	*-0.10*	*-0.12*
By technological content	**1975-76**	**1985-86**	**1995-96**	**2004-05**
*	-0.11	-0.17	-0.19	-0.12
**	-0.16	0.53	0.36	0.30
***	-0.71	-0.61	-0.49	-0.58
****	-0.40	-0.43	-0.57	-0.74
na	1.56	0.46	0.74	0.79

Note: see Table 3 and Table 4a

Table 8b. Average Lafay Index by product category and technological content, Egypt

By product	1975-76	1985-86	1995-96	2004-05
All food items (0, 1, 22, 4)	-0.13	-0.19	-0.15	-0.15
Agricultural raw materials (2 excl. 22, 27, 28)	0.66	0.17	-0.03	0.00
Fuels (3)	0.88	3.97	2.81	3.66
Ores and metals (27, 28, 68)	-0.01	0.06	0.06	-0.01
Manufactured goods (5, 6 ,7, 8 excl. 68)	-0.11	-0.17	-0.09	-0.12
5-Chemicals and related products, n.e..s.	*-0.19*	*-0.18*	*-0.16*	*-0.22*
6-Manufactured goods classified chiefly (excl.68)	*0.01*	*-0.09*	*0.02*	*0.03*
7-Machinery and transport equipment	*-0.54*	*-0.49*	*-0.47*	*-0.51*
8-Miscellaneous manufactured articles	*0.12*	*-0.04*	*0.11*	*0.00*
By technological content	**1975-76**	**1985-86**	**1995-96**	**2004-05**
*	0.23	0.00	0.04	-0.02
**	-0.04	-0.04	0.13	0.43
***	-0.37	-0.35	-0.32	-0.31
****	-0.25	-0.22	-0.27	-0.47
na	-0.10	0.53	0.11	-0.12

Note: see Table 3 and Table 4a

Table 8c. Average Lafay Index by product category and technological content, Nigeria

By product	1975-76	1985-86	1996-97	2002-03
All food items (0, 1, 22, 4)	-0.06	-0.14	-0.08	-0.19
Agricultural raw materials (2 excl. 22, 27, 28)	-0.01	-0.04	0.01	-0.02
Fuels (3)	8.94	8.76	4.09	7.90
Ores and metals (27, 28, 68)	-0.04	-0.07	-0.03	-0.04
Manufactured goods (5, 6 ,7, 8 excl. 68)	-0.44	-0.38	-0.18	-0.33
5-Chemicals and related products, n.e..s.	*-0.26*	*-0.48*	*-0.25*	*-0.38*
6-Manufactured goods classified chiefly (excl.68)	*-0.28*	*-0.23*	*-0.09*	*-0.17*
7-Machinery and transport equipment	*-1.22*	*-0.93*	*-0.42*	*-0.89*
8-Miscellaneous manufactured articles	*-0.20*	*-0.09*	*-0.07*	*-0.09*
By technological content	**1975-76**	**1985-86**	**1996-97**	**2002-03**
*	-0.11	-0.10	-0.05	-0.12
**	-0.24	-0.19	-0.09	-0.26
***	-0.81	-0.74	-0.33	-0.60
****	-0.42	-0.44	-0.26	-0.40
na	1.80	1.62	0.78	1.61

Note: see Table 3 and Table 4a

Table 8d. Average Lafay Index by product category and technological content, South Africa

By product	1975-76	1983-84	1995-96	2004-05
All food items (0, 1, 22, 4)	0.30	0.05	0.05	0.04
Agricultural raw materials (2 excl. 22, 27, 28)	0.15	0.14	0.07	0.02
Fuels (3)	0.19	1.32	0.25	-0.60
Ores and metals (27, 28, 68)	0.43	0.36	0.25	0.51
Manufactured goods (5, 6 ,7, 8 excl. 68)	-0.26	-0.24	-0.10	-0.10
5-Chemicals and related products, n.e..s.	*-0.17*	*-0.18*	*-0.11*	*-0.11*
6-Manufactured goods classified chiefly (excl.68)	*0.10*	*0.17*	*0.24*	*0.17*
7-Machinery and transport equipment	*-1.27*	*-1.24*	*-0.85*	*-0.62*
8-Miscellaneous manufactured articles	*-0.17*	*-0.22*	*-0.14*	*-0.18*
By technological content	**1975-76**	**1983-84**	**1995-96**	**2004-05**
*	0.14	0.07	0.10	0.01
**	0.08	0.23	0.19	0.32
***	-0.73	-0.68	-0.36	-0.18
****	-0.67	-0.75	-0.85	-0.83
na	0.51	0.46	0.16	-0.02

Note: see Table 3 and Table 4a

Table 9. Finger-Kreinin Index

	1975-76/2004-05	1975-76/1985-86	1985-86/1995-96	1995-96/2004-05
ALGERIA	0.62	0.40	0.79	0.88
EGYPT	0.34	0.53	0.62	0.54
NIGERIA[1]	0.94	0.97	0.97	0.96
SOUTH AFRICA[2]	0.45	0.69	0.68	0.73

Note:
1 1975-76/2002-03 and 1996-97/2002-03 are considered instead of 1975-76/2004-05 and 1995-96/2004-05
2 1975-76/1983-84 and 1983-84/1995-96 are considered instead of 1975-75/1985-86 and 1985-86/1995-96

Table 10. OLS regressions of LFI in 2004-05 against LFI in 1975-76 (standard errors in brackets)

	FULL SAMPLE	WITHOUT THE OUTLIERS
	ALGERIA	
α	0.000 (0.089)	-0.022 (0.028)
β	0.591 (0.028)	0.821 (0.039)
No of obs.	180	178
	EGYPT	
α	0.000 (0.084)	-0.077 (0.035)
β	0.370 (0.071)	0.249 (0.030)
No of obs.	180	179
	NIGERIA	
α	0.000 (0.390)	-0.111 (0.032)
β	0.899 (0.011)	0.485 (0.040)
No of obs.	180	179
	SOUTH AFRICA	
α	0.000 (0.060)	- -
β	0.307 (0.063)	- -
No of obs.	180	-

Note: LFI in 2002-03 is considered for Nigeria. We can reject both the null hypothesis that the slope is equal to zero (at the 1% level) as well as the null hypothesis that the slope is equal to unity (also at the 1% level)

Table 11. Transition probabilities

Algeria	**1975-76 to 2004-05**				**1975-76 to 1985-86**				**1986-87 to 1995-96**				**1996-97 to 2004-05**			
	0.93	0.07	0.00	0.00	0.93	0.07	0.00	0.00	0.92	0.07	0.01	0.00	0.93	0.06	0.01	0.00
	0.07	0.83	0.09	0.01	0.07	0.86	0.07	0.00	0.07	0.79	0.13	0.01	0.07	0.86	0.07	0.00
	0.00	0.09	0.83	0.07	0.00	0.07	0.86	0.07	0.01	0.13	0.77	0.09	0.00	0.08	0.85	0.07
	0.00	0.00	0.08	0.91	0.00	0.00	0.07	0.93	0.00	0.01	0.10	0.89	0.00	0.00	0.07	0.93
	M^1=0.17		**M^2**=0.43		**M^1**=0.14		**M^2**=0.38		**M^1**=0.21		**M^2**=0.52		**M^1**=0.14		**M^2**=0.38	
Egypt	**1975-76 to 2004-05**				**1975-76 to 1985-86**				**1986-87 to 1995-96**				**1996-97 to 2004-05**			
	0.94	0.06	0.00	0.00	0.93	0.07	0.00	0.00	0.94	0.06	0.00	0.00	0.94	0.04	0.01	0.01
	0.06	0.85	0.07	0.02	0.08	0.83	0.08	0.01	0.05	0.86	0.07	0.02	0.04	0.85	0.08	0.03
	0.00	0.08	0.83	0.08	0.00	0.09	0.81	0.10	0.00	0.08	0.82	0.10	0.00	0.08	0.87	0.05
	0.00	0.01	0.09	0.89	0.00	0.01	0.11	0.88	0.00	0.01	0.11	0.88	0.01	0.03	0.05	0.91
	M^1=0.16		**M^2**=0.42		**M^1**=0.18		**M^2**=0.47		**M^1**=0.16		**M^2**=0.43		**M^1**=0.14		**M^2**=0.37	
Nigeria					**1975-76 to 1978-79**				**1983-84 to 1986-87**				**1996-97 to 2002-2003**			
	-	-	-	-	0.93	0.07	0.00	0.00	0.92	0.07	0.00	0.01	0.94	0.06	0.00	0.00
	-	-	-	-	0.07	0.83	0.09	0.01	0.08	0.84	0.08	0.00	0.05	0.84	0.10	0.01
	-	-	-	-	0.00	0.09	0.82	0.09	0.00	0.10	0.80	0.10	0.01	0.08	0.78	0.13
	-	-	-	-	0.00	0.00	0.09	0.91	0.00	0.00	0.12	0.88	0.00	0.01	0.13	0.86
	-		-		**M^1**=0.17		**M^2**=0.44		**M^1**=0.19		**M^2**=0.48		**M^1**=0.19		**M^2**=0.49	
South Africa					**1975-76 to 1983-84**								**1996-97 to 2004-05**			
	-	-	-	-	0.94	0.04	0.01	0.01	-	-	-	-	0.94	0.05	0.00	0.01
	-	-	-	-	0.04	0.85	0.10	0.01	-	-	-	-	0.05	0.84	0.09	0.02
	-	-	-	-	0.01	0.09	0.84	0.06	-	-	-	-	0.00	0.10	0.82	0.08
	-	-	-	-	0.01	0.02	0.05	0.92	-	-	-	-	0.01	0.01	0.08	0.90
	-		-		**M^1**=0.15		**M^2**=0.39		-		-		**M^1**=0.16		**M^2**=0.43	

Note:
M^1 = (K – trace (transition matrix)) / (K – 1)
M^2 = 1 – det (transition matrix)

Table 12. Average Lafay index by world demand, 1975-76 and 2004-05 (number of top and bottom sectors according to Tables 1a-4b in brackets)

GROUPS	LFI 1975-76		LFI 2004-05	
	ALGERIA			
Slowest growth	-0.216	(1; 3)	-0.121	(4; 2)
Medium growth	0.693	(5; 4)	0.299	(3; 4)
Medium-high growth	-0.322	(7; 4)	-0.238	(4; 3)
Fastest growth	-0.154	(2; 4)	0.060	(4; 6)
	EGYPT			
Slowest growth	0.204	(3; 5)	-0.066	(2; 2)
Medium growth	-0.059	(4; 5)	-0.037	(6; 3)
Medium-high growth	-0.110	(4; 4)	0.187	(4; 4)
Fastest growth	-0.035	(4; 1)	-0.084	(3; 6)
	NIGERIA			
Slowest growth	-0.116	(5; 3)	-0.152	(5; 4)
Medium growth	0.850	(6; 3)	0.815	(2; 1)
Medium-high growth	-0.490	(3; 6)	-0.402	(2; 6)
Fastest growth	-0.243	(1; 3)	-0.260	(6; 4)
	SOUTH AFRICA			
Slowest growth	0.203	(5; 1)	-0.009	(0; 0)
Medium growth	0.110	(7; 3)	-0.033	(6; 2)
Medium-high growth	-0.075	(3; 3)	0.096	(5; 3)
Fastest growth	-0.238	(0; 8)	-0.054	(4; 10)

Note: 2002-03 is considered for Nigeria instead of 2004-05. Mean growth rates of the groups: Slowest growth, 4.02%; Medium growth, 7.18%; Medium-high growth, 8.97%; Fastest growth, 14.60%.

Figure 1. LFI, 2004-05 against 1975-76, Algeria, Egypt, Nigeria and South Africa

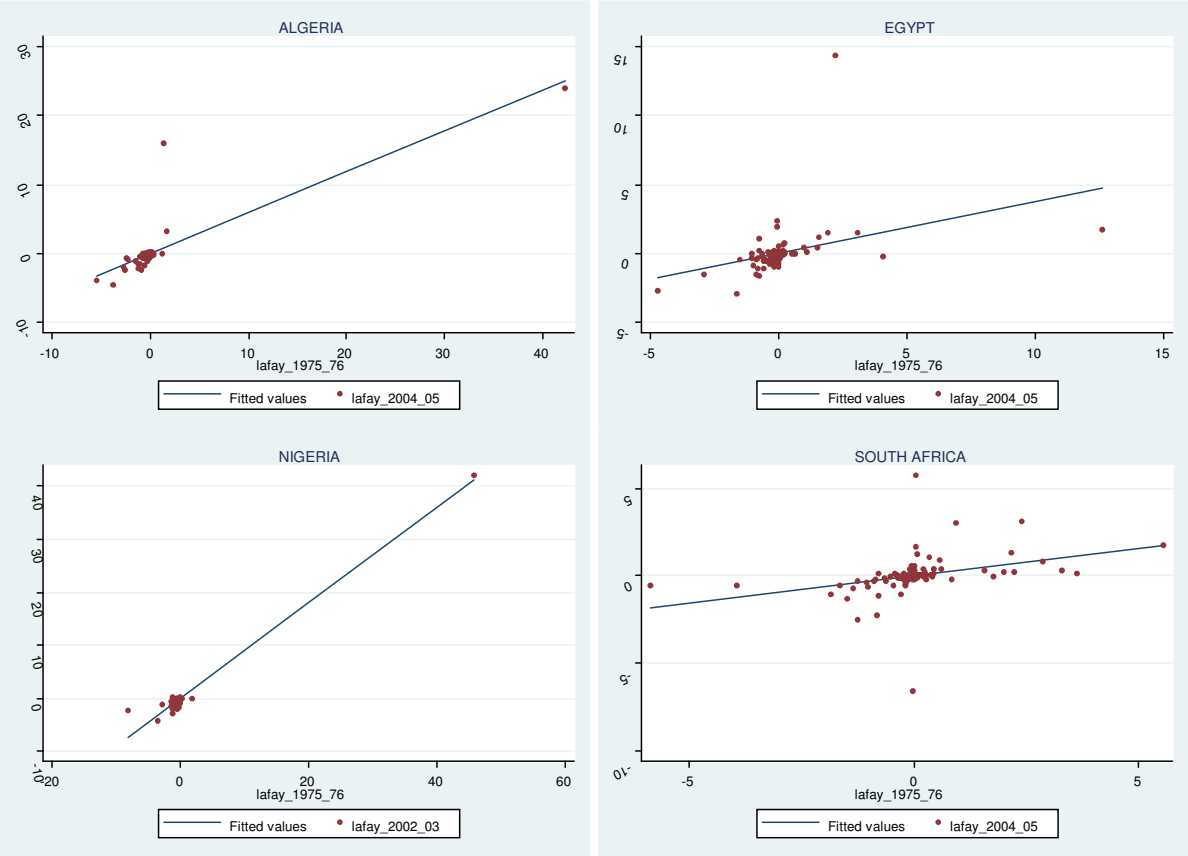


Figure 2. LFI, 2004-05 against 1975-76 without the outliers, Algeria and Nigeria

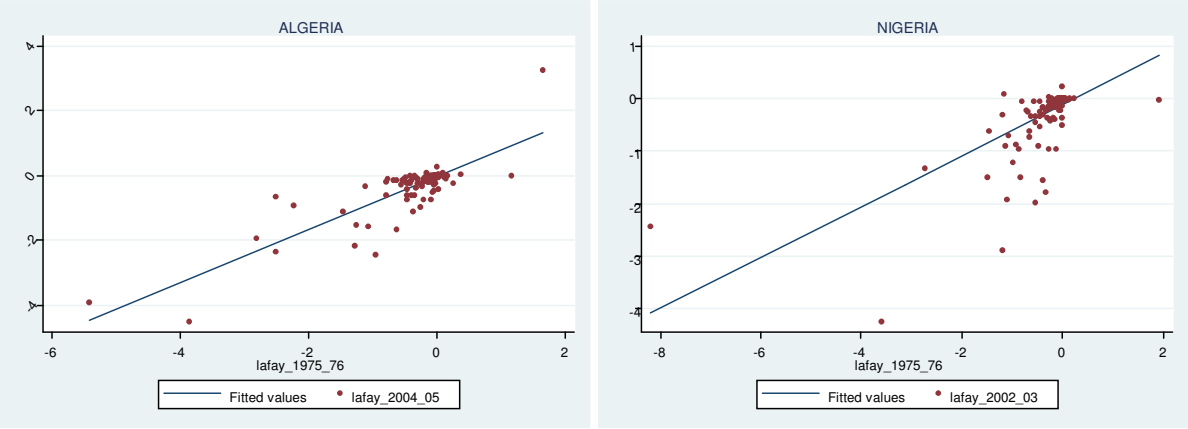


Figure 3a. The cumulated Lafay index: items ordered by world import growth over the period 1975-76 to 2004-05

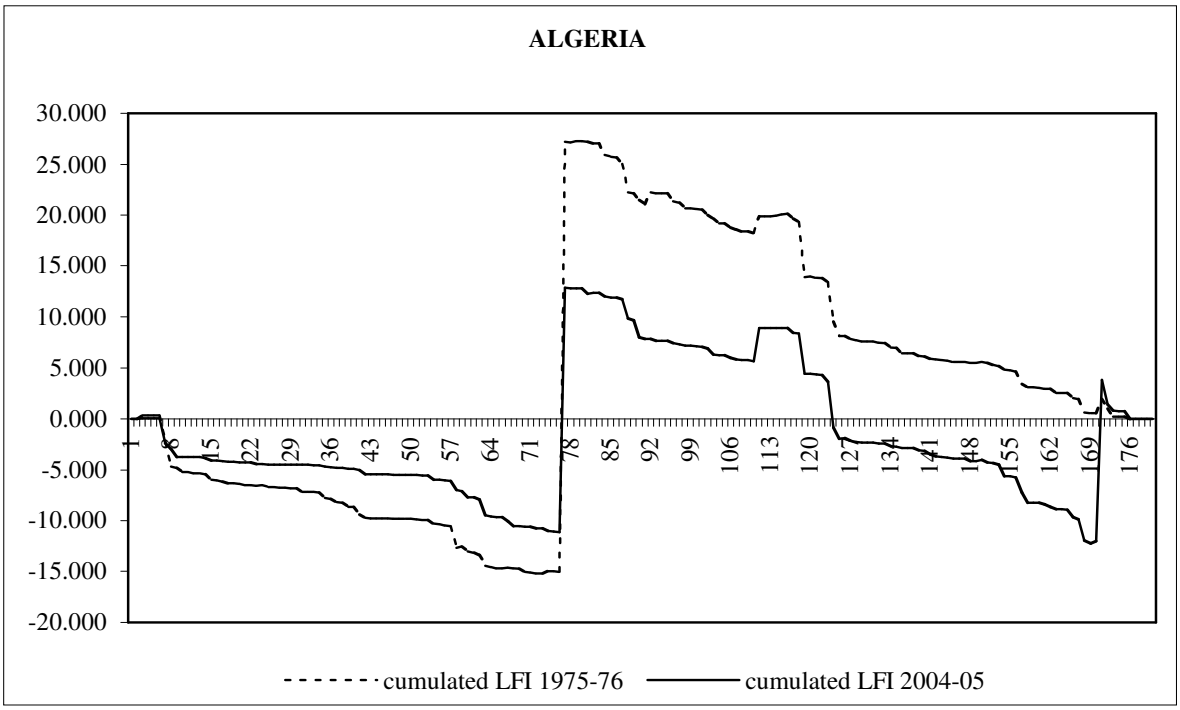


Figure 3b. The cumulated Lafay index: items ordered by world import growth over the period 1975-76 to 2004-05

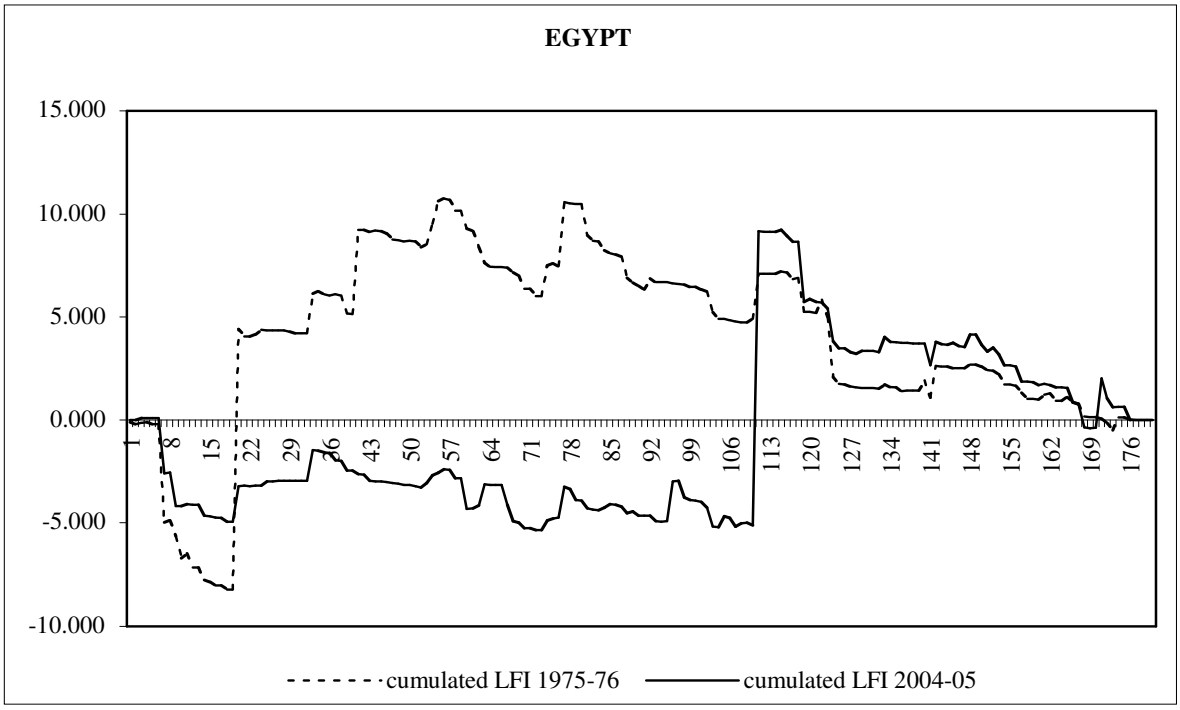


Figure 3c. The cumulated Lafay index: items ordered by world import growth over the period 1975-76 to 2002-03

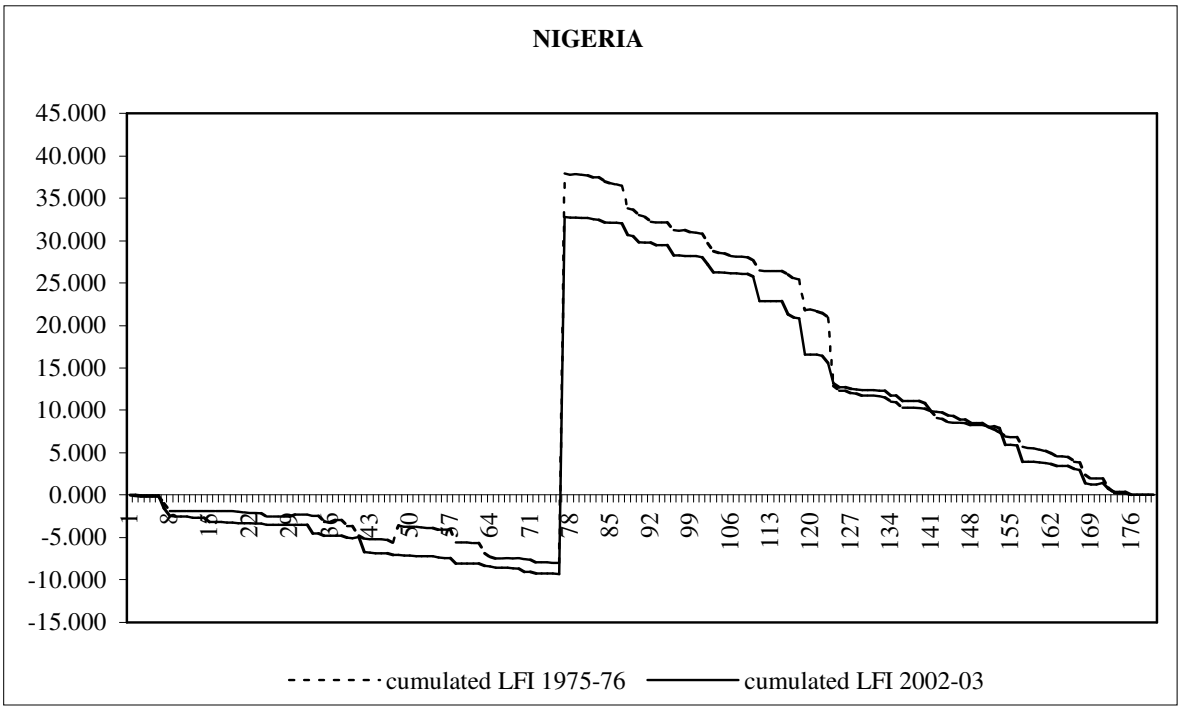
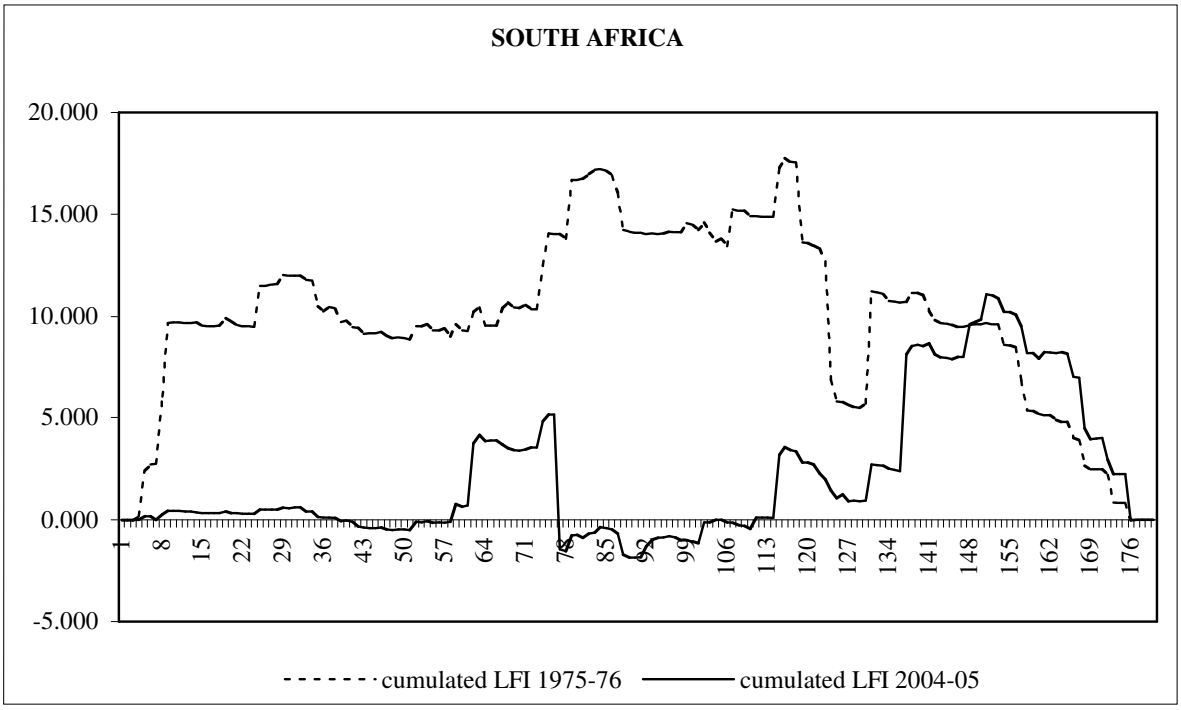


Figure 3d. The cumulated Lafay index: items ordered by world import growth over the period 1975-76 to 2004-05



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