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DYNAMIC PRODUCTS IN WORLD EXPORTS

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Jörg Mayer, Arunas Butkevicius and Ali Kadri

United Nations Conference on Trade and Development

Abstract

The values and market shares of three product categories have grown most rapidly in world exports during the period 1980–1998: electrical and electronic goods (including parts and components for such goods), goods which require high R&D expenditures, and labour-intensive products, particularly clothing. A strong geographical concentration in developing countries at both regional and country levels is discernable regarding the origin of these products. There appears to be a sustained movement in world exports towards the growing significance of a limited number of products and it would seem that there has been a rapid and sustained technological upgrading in the export composition of developing countries. However, since the involvement of developing countries is usually limited to the labour-intensive stages in the production process of technology-intensive goods in the context of international production sharing, simple measures of growth in gross export values are poor guides for an assessment of the nature of participation of developing countries in world trade.

INTRODUCTION

The rate of growth in the value of international trade has been strong and since the mid-1980s has consistently exceeded that of world output. As is well known, this is linked to the increasing integration of national economies into world trade, the deepening of the international division of labour and the concomitant emergence of increasingly internationalized production patterns. These developments have greatly increased the difficulties of monitoring trade performance with a view to providing appropriate trade policy support.

The key objective of this study is to identify options available to policy makers in developing countries in their strategic approaches towards the integration of their countries into the international trading system with a view to promoting development. While trade integration in general can bring about substantial efficiency gains and lead to better communication and trading networks, imports and exports play distinct roles in this process. A number of recent studies have emphasized imports as a carrier of knowledge and shown that developing countries with rapid growth in total factor productivity have imported more from the world's technology leaders. On the export side, emphasis has been on benefits deriving from specialization according to comparative advantage and from the exploitation of increasing returns from larger markets. These contributions have usually looked at exports in general, ignoring the importance of specific products on which the export drive is based. However, to the extent that a developing country can concentrate its exports on what may be called 'dynamic' products, it will be able both to limit the risk that its export markets will become rapidly saturated as a result of more and more countries concentrating their export drives on the same products, and to exploit the potential for long-term productivity growth associated with an export-oriented industrialization strategy.

Satisfying the dual policy goals of limiting the risk of an export product's becoming subject to the 'fallacy of composition' and maximizing the developmental impact of the chosen export strategy requires different definitions of 'dynamic products'. For the first goal, dynamism can be defined on the basis of past average export value growth of a specific product. This is a purely statistical measure that treats all products equally irrespective of differences with regard to the impact of their production and exports on overall development and the potential for long-run productivity growth. The second goal requires defining dynamism in a way that reflects sectoral differences in skill and technology intensity. For this purpose, products can be grouped according to (i) differences in factor intensity regarding technology, capital, and skilled labour, or (ii) long-run rates of sectoral productivity growth which have been observed in large developed countries. Products can also be classified (iii) according to the main factor that affects the competitive process (such as factor intensity, scale of production, product differentiation, etc) in order to assess the main type of economic benefits that can be derived from exporting such products.

It needs to be noted that the results of any analysis of export dynamism are sensitive to the time period chosen. Given that export data at the low level of aggregation used in this paper are available only on an annual basis and that the methodological tools used to analyse these data require long-time series in order to obtain reliable estimates, the analysis has been based on a long-term perspective, namely the period between 1980 and 1998. This period is the longest one for which reliable export data are available. However, this long-run perspective will be supplemented by indicators based on developments during the 1990s as necessary in order to put the results of the long-run analysis into proper perspective. It should also be noted that the data source used for this study (i.e. mainly COMTRADE[1]) reports trade in a comprehensive way only in value terms, with volumes available only for a small number of items (mainly primary commodities). As a consequence, the analysis could be conducted only on the basis of trade values.

The structure of the study is as follows. Section I takes a product-specific perspective and analyses the evolution of the export values (in terms of current US dollar) of 225 products (see Appendix I for discussion on which products are excluded) from 234 developed and developing countries and territories, and economies in transition, i.e. all countries and territories for which data are available in the United Nations' COMTRADE database. The section first looks at trend growth over the 1980–1998 period and relevant composite measures which are also applied to growth during 1996–1998 (to capture developments associated with the East Asian crisis[2], as well as possible dynamics following the beginning of the staged implementation of the Uruguay Round concessions); it then examines the stability of trend growth and product share in global exports and looks at the

[1] United Nations Department of Economic and Social Affairs (UN/DESA), *Commodity Trade Statistics* database.

[2] Duttagupta and Spilimbergo (2000) show that the growth rate of export earnings of East Asian economies (including Hong Kong (China), Indonesia, Republic of Korea, Singapore, and Thailand), i.e. developing economies that are among those whose export earnings have grown most over the past three decades or so, started to decline in 1995, with export earnings basically stagnating during 1996 and 1997 and declining in 1998. They also show that this decline in export earnings was specific to East Asia and cannot be explained by worldwide demand factors.

predictability of export value growth; section I finally analyses the export experience of specific product categories. Section II first takes a country-specific perspective and examines the export experience of regional groups and selected developing countries to delineate the extent to which they have succeeded in keeping pace with changes in world trade. The last part of section II looks at the direction of trade flows in an attempt to explain why certain products have followed a more dynamic export pattern than others and briefly discusses the role of preferential tariff provisions for international production sharing, particularly at the regional level. Section III discusses policy implications of the findings. Discussions of data availability and their limitations as well as the definitions of statistical measures and product categories are in the Appendix.

As such, the study complements existing work on dynamic products in world exports undertaken by UNCTAD (2000, Table 4.3; and 1997] and Lall (1998, 2000), or the estimations included in the TradeMap analysis tool of the International Trade Centre UNCTAD/WTO as discussed in ITC (1999), and in TradeCAN of UNECLAC and the World Bank (1999).

I. IDENTIFICATION OF DYNAMIC PRODUCTS IN WORLD EXPORTS

A. A survey of all products

1. Average annual export value growth during the period 1980–1998

Various measures can be used to define the dynamism of a specific product's evolution in global exports over time, including the rate of growth over alternative periods, the degree of growth stability, and changes of a product's share in total exports. The results based on these measures, however, are not necessarily consistent, as can be seen by comparing table 1a which ranks the products according to the average rate of annual export value growth during the period 1980–1998, and table 1b where ranking is based on growth during the last three years of this period, i.e. 1996–1998.[3] Of the 20 products that are identified as the most dynamic products during the longer period, only four (optical instruments, knitted under garments, telecommunications equipment, and medicinal and pharmaceutical products) appear also on the list of the 20 most dynamic products during 1996–1998.

Most of the fastest growing products listed in tables 1a and 1b broadly fall in four groups, namely (i) electrical and electric goods (Standard International Trade Classification (SITC) 75–77) including parts and components for such goods, (ii) textiles, and labour-intensive manufactures, in particular clothing (SITC 61, 65, and 84), (iii) finished products from industries which require high R&D expenditures and are characterized by high technological complexity and/or a high degree of economies of scale in particular at the firm level (SITC 5; 7 less 75–77; 87), and (iv) primary commodities. As will be shown below, strong growth in the export value of products in the first three groups is most likely a reflection of the deepening of the international division of labour which has given rise to increasingly internationalized production networks, while strong growth in the export value of primary commodities tends to reflect specific developments in one or a small number of exporting countries.

[3] The correlation coefficient between the series on growth during 1980–1998 and that during 1996–1998 is 0.29.

It may be worthwhile addressing briefly the main determinants of international production sharing and of the strong growth in the export value of specific primary commodities. International production sharing can occur at the vertical or horizontal level. Vertical international production sharing[4] has been stimulated by a reduction in communication and transportation costs and has generally been concentrated in labour-intensive activities. Such activities often regard production processes that are at a relatively low level of technology (such as in clothing), but they can also be labour-intensive parts of generally technologically complex production processes (such as in electronics or in parts of the automotive industry). Labour-intensive production processes are spread over production sites located in different countries if doing so allows producers to take advantage of differences in technologies and factor prices among countries and, thereby, to reduce costs. In the textiles and clothing industry, for example, the pre-assembling phases of the production process have become more capital intensive due to growing automation, while the assembling stages have remained relatively labour intensive. As a result, it has become both technically and economically convenient to relocate abroad the assembling segments of production alone and to re-import the final apparel products (see, e.g., Gereffi, 1999). Such outward processing trade in the textiles and clothing industry has benefited from favourable regulations (see section II.C), which were adopted by the United States and the European Union at least partly in order to maintain the competitiveness of their domestic textiles and clothing industries. Whereas items in the textiles and clothing sector represent an important part of vertical international fragmentation of production, there is evidence suggesting that a substantial part of trade in chemicals, the automotive industry and in the electronics industry is also due to vertical production sharing (Hummels, Rapoport and Yi (1998)). The increasing international division of labour in the latter sector is reflected in the vastly growing importance of trade in parts and components for electrical and electronic goods.

Regarding the importance of vertical international production sharing, Hummels, Ishii and Yi (2001) use input-output tables from the OECD and emerging market countries and estimate that trade based on vertical specialization accounts for up to 30 per cent of world exports and that it has grown by as much as 40 per cent in the last twenty-five years. Yeats (2001) and Ng and Yeats (2001) explain that it is very difficult to trace the size of vertical international production sharing at the global level because international trade classifications prior to the second revision of SITC did not allow for making the distinction between trade in final goods and trade in parts and components. In spite of the revision, making this distinction is still not possible to a sufficient degree except for the group 'machinery and transport equipment' (SITC 7) which, however, accounts for approximately half of world trade in manufactures. According to Yeats (2001), trade in parts and components is highly concentrated in parts of motor vehicles (SITC 784), parts of computers and office machines (SITC 759), telecommunications equipment and parts (SITC 764), and electrical apparatus and switches (SITC 772). Ng and Yeats (2001) show that trade in transistors and semiconductors (SITC 776) have played an important role in production sharing in East Asia. The fact that the importance of trade in

[4] The phenomenon has alternatively been referred to as outsourcing, de-localization, fragmentation, intra-product specialization, intra-mediate trade, vertical specialization, and slicing the value chain but generally means the geographic separation of activities involved in producing a good (or service) across two or more countries. For a discussion of various issues associated with vertical international production sharing see, for example, Arndt and Kierzkowski (2001).

parts and components has strongly increased over the past few years and that parts and components from the electronics industry account for an important part of such trade overall, suggests that the rapid development of global production sharing in electrical and electronic goods has been a crucial determinant of the dynamic growth performance of these products, as reflected in table 1a.

Horizontal international production sharing involves the geographical dispersion of production of similar products, which differ mainly in terms of variety. Trade based on horizontal international production sharing occurs mainly between developed countries which have similar resource combinations and which are geographically close but it can also be observed between developing countries which are part of regional trade agreements such as MERCOSUR and ASEAN. Growth in this kind of trade has been driven mainly by attempts to raise economies of scale in particular at the firm level and has resulted in a higher degree of specialization in production and trade. The automotive industry is a standard example of a sector for which horizontal international production sharing has occurred but anecdotal evidence suggests that sectors such as the chemical and pharmaceutical industry, aerospace and other transport equipment, as well as the specialized machinery industry, have also been affected.

A somewhat unexpected result with regard to the growth of total export values during the period 1980–1998 is that three out of the top 20 products are primary commodities (silk, non-alcoholic beverages, and cereals), as can be seen from table 1a. However, these primary products have a low share in world exports (column 3), suggesting that their strong growth is due at least partly to the fact that they started from a low base. The growth rate of silk exports during 1980–1998 also has a very low degree of stability (column 4)[5] and silk ranks close to the bottom with regard to export value growth during 1996–1998 (column 5). Close inspection of the data reveals that the strong growth of silk exports between 1980 and 1998 is largely attributable to the fact that China has been a major exporter of silk and that China's trade data became available on an internationally comparable basis only in the mid-1980s. Table 1b shows that during 1996–1998 seven out of the 20 most dynamic products were primary commodities. However, the above observations as to growth stability and share in world exports also apply to these products. Taken together, the above results suggest that contrary to what has often been argued export values of primary products can experience strong growth rates. It is true, however, that rapid export growth of primary commodities has often been short-lived and relied on particular developments in one or a small number of exporting countries.[6]

2. Composite measures of export dynamism

To overcome the difficulties in identifying export dynamism on the basis of a single measure, a composite measure is constructed which tries to incorporate individual measures in a meaningful way. Table 2 lists the 20 most dynamic products identified on the basis of a combined measure derived

[5] Stability is measured as the inverse of volatility around the trend of growth during 1980–1998; see Appendix II.

[6] For example, the rapid growth of silver and platinum exports during 1996–1998 is entirely due to a massive increase in registered exports from the Russian Federation between 1997 and 1998, while the strong growth rate of tea exports during 1996–1998 reflects almost exclusively strongly increased exports by the two leading exporting countries, Kenya and India.

by using factor analysis (see Appendix II for details) which may be called a comprehensive index; it includes the rate of growth in export value during 1980–1998, the volatility of this growth rate, the rate of growth in export value during 1996–1998, and the average share of a product in total world exports during 1980–1998. The results give support to those based on the single measure of export dynamism referring to the period 1980–1998 (table 1a, column 1): four out of the top five products are electrical and electronic goods (including parts and components for such goods), and five out of the top ten and nine out of the top 20 products are finished goods which require high R&D expenditure. Again similarly to the results on the single measure of export dynamism during the period 1980–1998, several product groups from the textiles and clothing industry are among the most dynamic ones, occupying the ranks 10, 21, 23, 24 and 25. By contrast, on the composite measure no primary commodity ranks among the most dynamic products.

Table 2 also identifies the share of developed and developing countries taken as groups, as well as that of the main individual exporters, in total world exports of these 20 most dynamic products in 1998. As expected developed countries account for some 90 per cent of the total export value in nine products which require high R&D expenditures and are characterized by high technological complexity and/or a high degree of economies of scale particularly at the firm level. Only in optical instruments and apparatus do developing countries account for about 30 per cent of the total export value. In comparison, the share of developing countries in the total export value of part and components for electrical and electronic goods is about 40 per cent, while for telecommunications equipment and parts (SITC 764) and electric apparatus and switches (SITC 772) it is about one fourth of the total value. The only product from the textiles and apparel industry (under garments (SITC 846)) that ranks among the 20 most dynamic products is also the only one for which the share of developing countries in world exports exceeds that of developed countries.

It can be argued that the growth rate of a product's share in world exports is a more appropriate measure of dynamism than the corresponding rate based on export value. This is because a given increase in absolute value translates into a higher growth rate for a product with a lower initial share than for one with a higher initial share. This means that rapid growth in value terms could simply reflect a low base in 1980. Table 3 ranks the product groups according to a measure based on 1980–1998 aggregates that may be called a share index. In each product, it incorporates the linear growth rate of its share in world exports, the volatility of this growth rate, and its period average share in world exports. This measure gives essentially the same results as those based on export values reported in tables 1a, 1b and 2. Accordingly, the most dynamic product groups identified on the basis of average annual export value growth are not those with small shares in world exports in 1980.

3. Predictability of export-value growth

An unforeseen drop in export earnings has adverse impacts on the country's current-account balance and can impair import capacity and jeopardize the attainment of growth targets. For exporters, unforeseen earnings variability increases uncertainty regarding both cash flows, and hence borrowing

costs, and the profitability of investment. It is therefore important to assess the predictability of export value growth (see Appendix II for details on how predictability is measured).

Table 4 shows that products for which export value growth can be best predicted are also among those which rank high in terms of both growth in average export shares and the composite index based on values.[7] By contrast, the vast majority of those products for which export value growth are least predictable also rank low in terms of these two measures. Manufactures, in particular those finished goods that are most likely to have been subject to horizontal international production sharing (and are exported mostly by developed countries), feature prominently in the top ranks of predictability, while most bottom ranks are occupied by primary products. However, it is also interesting to note that among primary commodities, export value growth for fresh fish and fresh meat can be predicted relatively well. Many developing countries have an export potential for these products and – as shown in the last column of table 4 – the share of these product groups in total world non-fuel exports has grown faster than that of most other primary commodities.

Given the apparent close relationship between predicted and actual average export value growth, it may be worthwhile constructing an index that combines predictability, volatility and actual growth of export values during the period 1980–1998. The results of this exercise, shown in table 5, indicate that the majority of the products which share the characteristics of rapid, predictable and stable rates of growth in export values are among the most dynamic products on the composite indices in terms of either export values (table 2) or shares in total world exports (table 3).[8] This suggests that, compared to the other products, the products whose export values have grown most over the past 20 years have experienced a sustained and relatively smooth pattern of growth, rather than experiencing a boom and bust cycle.

4. Market-share concentration in specific product markets

The ease with which exporters from developing countries can enter the world market for a specific product depends on a wide range of factors. One such factor is the degree of market concentration. Where barriers to entry are low competition has a tendency to drive supply up, and prices and profits down. By contrast, where barriers to entry are high – be it because the product is the result of innovation and technological progress so that competition is on quality rather than on price, or because of oligopolistic market structures resulting from stringent requirements regarding design, branding, or marketing – increasing export quantities will not affect prices but instead lead to rising export revenues. Off hand, it would seem that within the manufacturing sector barriers to entry in labour-intensive products may be relatively low because unit-labour costs and price-based competition are more important than in other manufactured products where innovation and hence quality-based competition are of greater relative importance. However, this is not necessarily the case. In the textiles

[7] This result also suggests that there is no product whose export value stagnated throughout the 1980–1998 period because such a product would be predictably best and hence rank at the top.

[8] Nine of the products that are ranked among the top 20 on the composite index on either values or shares are not among the top 20 on this combined measure. However, in each case six out of the nine products are among the top 40 on the combined measure.

and clothing industry, for example, relocation of the labour-intensive assembling stages often takes place only if the final consumer perceives that the firm that originates outward processing still retains control over product quality, for instance, through the persistence of the original national brand.

Market-share concentration during the period 1980–1998 (see Appendix II for the definition of the index) is shown in table 6 for the 20 most dynamic products on the basis of the value-related index of dynamism (table 2). Table 6 shows that export market shares for all the 20 products (except knitted undergarments) have become more equally distributed; this suggests that entering the markets for these most dynamic products have become easier. As an explanation, the fact that the export values of these products have grown most rapidly may have acted as a powerful incentive for other producers to export these products. However, the more likely explanation is that (i) export market shares in technology-intensive products, such as aircraft, have become more equally distributed due to growing intra-industry trade, and that (ii) export market shares in product groups such as transistors and semiconductors, computers, telecommunications equipment and parts, and clothing have become more equally distributed because of the growing importance of vertical international production sharing, which has allowed specific labour-intensive activities to be carried out in countries which had previously not been able to export such products.

Ranking manufactured products according to the index numbers for 1997–1998 (not shown) reveals that – in addition to products from the iron and steel sector (SITC 67) – export market shares are most equally distributed for product groups from the textiles and clothing sector (SITC 65 and 84), eight of which rank among the 20 products with the most equal market distribution. By contrast, product groups from the machinery sector as well as transport equipment (such as aircraft, ships and boats, and passenger motor vehicles) are among those for which market concentration is highest.

5. Summary and conclusions

To summarize, three product groups have been identified as those whose export values and market shares have grown most rapidly and whose growth rates have been least volatile: electrical and electronic goods (including parts and components for such goods), goods that require high R&D expenditures and that are characterized by high technological and managerial complexity, and labour-intensive products in particular clothing. These are also the products found in earlier studies to have been affected most by two phenomena of the world trading system that have rapidly gained in importance over the past few years, namely the horizontal and vertical fragmentation of production processes at the international level. Various primary products have also experienced strong export value growth but their growth performance has been marked by considerable volatility and has often been attributable to specific circumstances in a few exporting countries. Products whose export value development can be best predicted are also those which have experienced the most rapid growth and which have a relatively high average share in world exports. This suggests that there has been a sustained movement in world exports towards the growing significance of a limited number of products.

B. An analysis by product categories

1. Product categories by factor intensity

The effects on development of specific products differ according to the extent of linkages provided by their production and exports especially in terms of industrial upgrading. The latter is a process of improving the ability of a firm or an economy to move to more profitable and/or more skill- and technology-intensive economic activities. It is generally considered that the potential for long-run productivity growth through deepening and diversification in the primary sector are limited. Thus, to the extent that underlying factor combinations offer this possibility, developing countries need to shift the structure of economic activity away from resource-dependent and labour-intensive activities towards technology, scale and skill-intensive activities in order to achieve rapid and sustained economic growth. Clearly, to achieve such a shift developing countries need to overcome a number of constraints, including the scarcity of physical and human capital, lack of specialized technical knowledge and narrow domestic markets. Accordingly, policies that foster the accumulation of physical and human capital and improve access to foreign technology are critical parts of industrial upgrading in developing countries.

A classification of products according to linkages between industrial upgrading and exports can be based on differences in factor intensity regarding skill, technology, and capital (see Appendix III.1 for details on the composition of the product categories). Such a classification results in five product categories, namely non-fuel primary commodities, labour- and resource-intensive manufactures, low skill- and technology-intensive manufactures, medium skill- and technology-intensive manufactures, and high skill- and technology-intensive manufactures. The results of an analysis of variance (see Appendix II for explanation) suggest that export value growth over the period 1980–1998 differs between the five product categories in a statistically significant way at conventional confidence levels, both for world exports and exports from developing countries. This suggests that forming these different categories is meaningful also from a statistical point of view.

With regard to world non-fuel trade, figure 1a shows that export values of all five product categories started to grow rapidly in the mid-1980s. However, export value growth of the high skill- and technology-intensive category was strongest throughout the period 1980–1998, with the growth difference to the other product categories strongly increasing after 1993. The absolute export value of this category grew about fivefold between 1980 and 1998. Export values of the labour- and resource-intensive category, as well as of the medium skill- and technology-intensive product category, have also grown faster than that of total non-fuel exports but the difference has remained fairly small. By contrast, export values of the low skill- and technology-intensive category and, in particular, of non-fuel primary commodities have grown much slower than total non-fuel exports. The impact of these differences in export value growth of the different product categories on their respective shares in world non-fuel exports is shown in figure 1b. Most notable are the strong and sustained drop in the share of non-fuel primary commodities, and the strong and sustained increase in the share of the high skill- and technology-intensive category. The latter now accounts for the highest share in world non-fuel exports among all five product categories.

Regarding non-fuel exports from developing countries, figure 1c shows that export values of all product categories have grown more rapidly than the same category in world exports and that this difference has been higher the more skill- and technology-intensive is the product category: 14-fold for the high, 11-fold for the medium, and about 7-fold for the low skill- and technology-intensive product category. The group of non-fuel primary commodities is the only product category whose export value has grown less than total non-fuel exports from developing countries. Figure 1d shows that this difference in export value growth has led to a steep fall in the share of non-fuel primary commodities in total non-fuel exports from developing countries (from over 50 to under 20 per cent). In addition, the share of the labour- and resource-intensive category, as well as that of the low skill- and technology-intensive category, has over the whole period remained largely unchanged, while the share of the medium and, in particular, of the high skill- and technology-intensive category has strongly increased. Since the mid-1990s, the group of high skill- and technology-intensive manufactures has in fact had the highest share in total developing country non-fuel exports.

The question arises as to whether the rate of growth of a specific product group has been equally based or driven by specific individual product groups within each category. Based on the Standard International Trade Classification (SITC) at the 2-digit level (a few products refer to items at the 3-digit level as shown in Appendices III.1 and 2, forty-six product divisions have been formed. The right-hand side of figures 2a and 2b shows that goods from all product groups have experienced rapid export value growth. By contrast, looking at both sides of the figures together reveals that rapid growth has been combined with large market shares only for products from the high- and the medium-skill and technology categories in figure 2a, and from the scale-intensive (associated with vertical production sharing) and the specialized-supplier (associated with horizontal production sharing) categories in figure 2b.

Not all developing countries have the necessary factor combinations that would allow them to opt for rapid industrial upgrading. As in manufactures, primary products also differ in their developmental potential. For example, a number of unprocessed and processed agricultural products (including (i) meat and meat products, (ii) dairy products, (iii) fish and fishery products, (iv) vegetables, (v) fruits and nuts, (vi) spices, and (vii) vegetable oils; see Appendix III.3 for details on this product classification) are high-unit-value products and/or products with an income elasticity of demand greater than one, and much higher than for traditional agricultural products. Exporting products in this category of agricultural commodities offers opportunities for adding value and for skill- and technology-intensive activities. The quality and logistics requirements of these products are in some respects more typical of modern manufacturing industry than those of traditional agricultural products. This is because standards of product quality, safety and consistency, delivery, packaging, and speed and reliability of supply are much higher than, for example, for basic food commodities. There is at least one item in each of the seven product groups, except dairy products and spices, whose value of exports from developing countries now exceeds that of traditional primary commodities such as cereals, cocoa, tea or natural rubber. Moreover, rapid expansion of exports from these sectors has contributed to growth in agricultural GDP and total food production in a number of developing

countries, such as Brazil, China, and Thailand, as well as to rapid GDP growth, for example, in Chile and Israel (Jaffee and Gordon, 1993; World Bank, 1994, p. 39).

Table 7 shows that this set of products has been more export dynamic than most other agricultural primary commodities. Twelve out of the seventeen products are among the 25 most dynamic agricultural products in world exports, as measured by the index of dynamism based on export values over the period 1980–1998. Moreover, these twelve products cover all of the seven product groups. The table also shows that the share of developing countries in world exports in much higher for most of these 12 products than it is for other agricultural products.

2. Products categories by long-run productivity growth in large developed countries

The above classification based on different skill- and technological intensities reflects common perceptions regarding different skill- and technological intensities in the production of products. Assuming that an increased use of human capital and technology in production favourably influences productivity, this classification gives a rough indication of sectoral differences in terms of the potential for productivity growth. However, it is clear that (i) high productivity – value-added per worker – is not synonymous with high skill and technological intensity in production, and (ii) productivity is influenced by a number of factors in addition to the use of human capital, physical capital and technology in production.

High value-added per worker usually occurs in sectors that are highly capital-intensive or in traditional heavy manufacturing sectors, while it is often lower in sectors that are highly technology-intensive. For example, in 1999, value added per worker in the United States was substantially higher in cigarette manufacturing, petroleum refineries, and automobile manufacturing (1,944,000; 551,000; and 308,000 US dollars, respectively) than in aircraft manufacturing (170,000 US dollars) or in computer and electronic product manufacturing (167,000 US dollars).[9]

Labour productivity is determined by a complex array of factors. In the context of this study, two factors may be of particular interest with respect to the above observation that value-added per worker in production does not always correspond to technology intensity in production. New management and organizational techniques, for example, can lead to very substantial productivity increases in specific industrial sectors. One illustration of this is the lean production system that conferred a substantial advantage to Japanese automobile manufacturers over their competitors that continued to rely on the Fordist system. Another example is linked to the debate on the sources of the growth in labour productivity in the United States during the second half of the 1990s. Some observers concentrate on the contribution of information technology to productivity growth solely stemming from the production of computers and semiconductors, while others emphasize the large benefits that actually accrue from the use of information technology. [10]

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[9] U.S. Census Bureau, 2001. Statistics for Industry Groups and Industries. Annual Survey of Manufacturers. (U.S. Department of Commerce: Washington, DC). http://www.census.gov/prod/2001pubs/m99-as1.pdf.

[10] On these different views see Oliner and Sichel (2000) and Gordon (2000).

Total factor productivity (TFP) is an alternative concept to labour productivity in choosing an indicator for productivity and measuring the link between technology intensity and economic performance. Choudhri and Hakura (2000) have estimated sectoral long-run rates of TFP growth in large developed countries that can be considered technological leaders. According to this study, the sectors with the fastest TFP growth are, in terms of the International Standard Industrial Classification (ISIC): textiles, apparel and leather products; chemicals and chemical products; and fabricated metal products, machinery and equipment (including computers, and transistors and semiconductors). The definition of these ISIC sectors differs from that of SITC product groups that is usually applied in trade analyses. Nonetheless, the majority of the SITC product groups identified above (table 1a) as the most dynamic in world exports fall into the category of ISIC manufacturing sectors with high TPF growth, the exceptions being the three primary commodity groups (silk, non-alcoholic beverages, and cereals), and musical instruments and records.

3. Product categories by main factor affecting the competitive process

The above classification by factor intensity may lead to the conclusion that striving to export the most technology and skill-intensive products is economically desirable in itself to the exclusion of considerations relating to a country's underlying factor combinations. To overcome this weakness, consider an alternative classification based on the primary factors that are believed to affect the competitive process in each activity (see Appendix III.2 for details on the composition of the product groups). Such a classification also provides a link between the way product groups are defined and the main types of economic benefits derived from their exports. For example, exporting scale-intensive goods allows firms to reduce costs by extending plant size and lengthening production runs, while exporting science-based products allows them to spread the high fixed costs associated with research and development over a larger market. The results of an analysis of variance suggest that average annual export value growth over the period 1980–1998 differs between the six product categories in a statistically significant way at conventional confidence levels, both for world exports and exports from developing countries. This suggests that forming these categories is meaningful also from a statistical point of view.

Export value growth performance of the six product categories is shown in figure 3a for non-fuel world exports and in figure 3c for non-fuel exports from developing countries. The science-based category recorded the strongest rate of export value growth between 1980 and 1998 for both world exports and exports from developing countries, followed by the differentiated product category (i.e. products associated with specialized supplier networks). World exports of the science-based category grew about six-fold during this period compared to a 21-fold increase in the value of this category's exports from developing countries. Figure 3d shows that the share of the science-based category in total non-fuel exports from developing countries was very small in 1980, so that the category's rapid growth is partly explained by the fact that it started from a low base. However, given that computers and office equipment (SITC 75) is included in the science-based category and that an important item of this product division refers to parts and components (SITC 759), it is likely that the very rapid export value growth of science-based exports from developing countries reflects the increased

importance of international production sharing. The same conclusion probably holds regarding the high rate of growth recorded for developing country exports of the differentiated product category, given that it includes two other (namely SITC 764 and 776) of the above mentioned main product groups referring to parts and components for electrical and electronic goods.

Using the same product divisions as in figures 2a and 2b, figures 4a and 4b show that the sectors with a high share in total non-fuel exports from developing countries in 1998 tend to be those with rapid average annual export value growth during the period 1980–1998. This suggests that developing country exports tend to be increasingly concentrated in a few products including computers and office equipment, communications equipment and semiconductors, and clothing. All of these products involve labour-intensive production processes, suggesting that this process of concentration is, at least in part, due to the increased importance of global production sharing.

4. Summary and conclusions

The analysis of growth in exports of different product categories suggests that there are dynamic products in all categories, including some primary commodities. However, exports of products from the high skill- and technology-intensive category and from the science-based category have grown most rapidly over the past two decades. Almost all of the most dynamic export products are in the category of products with high TFP growth in large developed countries. Perhaps the most striking finding is that the higher the skill and technology contents of exports, the faster is the growth rate of exports of developing countries compared to growth in world trade.

However, this does not necessarily imply that there has been a rapid and sustained technological upgrading in the exports of developing countries. First, their rapid growth in exports of skill- and technology-intensive products started from a relatively small base in the early 1980s. Secondly – and more importantly – since the involvement of developing countries is usually limited to the labour-intensive stages in the production process of these goods in the context of international production sharing, simple measures of growth in gross export values are poor guides for an assessment of the nature of participation of developing countries in world trade. On the other hand, this result also suggests that changes in the global trading environment in the form of a growing importance of global production sharing offer new opportunities for export-oriented industrialization because there are now production processes in a wider range of industrial sectors where developing countries' integration into global and regional markets can act as a catalyst to industrialization and growth. However, making use of these opportunities requires that developing countries over time succeed in upgrading their involvement in global production sharing beyond mere labour-intensive activities toward more capital, skill and technology-intensive processes.

II. DYNAMIC PRODUCTS IN TRADE OF REGIONAL GROUPS AND SELECTED DEVELOPING COUNTRIES

Whereas the preceding section focused on the global level, this section examines the extent to which the export performance of regional groups and selected developing countries has paralleled that of world exports. It, first, identifies the most dynamic products in the exports of regional groups and compares them with the most dynamic products in world exports (as reported in table 1a) and, second, looks at the export composition of the developing countries with the most rapid growth in total exports over the past 20 years.

A. The most dynamic products in exports of regional groups

Regarding the most dynamic products in exports from regional groups[11], table 8 shows that the 15 fastest growing products of *developed countries* are among the 20 most dynamic products in world exports. Given the importance of developed countries in world exports, this suggests that changes in the export composition of developed countries have been a key determinant of differences in export value growth across individual product groups over the past 20 years. The table also shows, somewhat surprisingly, that items from the clothing sector are among the most dynamic products in the exports of developed countries (while they are not among the most dynamic products in the exports of developing countries, as shown below). However, this is likely to be just another example of the growing importance of production outsourcing from developed to developing countries.

Only eight out of the 20 most dynamic products in the exports of *developing countries* are also among the 20 most dynamic products in world exports, but these eight groups include the four fastest growing product groups in world exports. Pulpwood (SITC 246), occupying rank 21, is the most dynamic primary commodity in developing country exports. Similarly to developed countries, all of the 20 most dynamic products are in the category of high TFP growth in large developed countries. Moreover, 18 of the 20 most dynamic products are either in the medium skill- and technology-intensive category or in the high skill- and technology-intensive category. Combined with the fact that all of the 20 most dynamic products in developing country exports are manufactures, this reflects again the above finding which – taking the data at face value – suggests that there has been a rapid and sustained technological upgrading in the exports of developing countries. However, as mentioned above, this is largely due to the increased participation of developing countries in the labour-intensive segments of production of high-tech electronic goods in the context of international production sharing.

It is likely that the export performance of the entire group of developing countries is strongly influenced by the inclusion of the first-tier Newly Industrialized Economies (first-tier NIEs), i.e. Hong Kong (China), the Republic of Korea, Singapore and Taiwan Province of China. Although the three most dynamic products of the entire group of developing countries are also among the six most

[11] For the composition of the country groups, see UNCTAD, 2000, *Handbook of Statistics*, (United Nations: New York and Geneva).

dynamic products of *developing countries excluding the first-tier NIEs*, the overall result for the latter group gives, indeed, a substantially different picture. Perhaps most striking is the greater importance of telecommunication, audio and video equipment (SITC 76), and the lower importance of chemicals and pharmaceutical products (SITC 5) among the most dynamic products in exports from developing countries excluding the first-tier NIEs. Another remarkable outcome is that transistors and semiconductors (SITC 776), i.e. the product group ranking first in world exports and fourteenth in exports of the entire group of developing countries, occupies as low a rank as number 49 when the first-tier NIEs are excluded from the group of developing countries.

It is perhaps surprising that only three of the 20 most dynamic products in world exports are among the 20 most dynamic products in the exports of the *first-tier NIEs*; these are computers (SITC 752), parts of computers and office machines (SITC 759) and optical instruments (SITC 871). But these three items rank first for the entire group of developing countries and are among the six most dynamic products for the group of developing countries excluding the first-tier NIEs. By contrast, five items from the chemical industry are among the 20 most dynamic products exported by the first-tier NIEs and finished items from the motor vehicle industry also rank comparatively high (SITC 783 occupies rank 3; 781 rank 7; and 782 rank 24). Textiles rank much higher than clothing (the first item from the clothing sector (SITC 84) occupies rank 142), suggesting that within the textiles and clothing sector, the first-tier NIEs have, over the years, succeeded in upgrading their exports from the comparatively labour-intensive clothing to the more capital, skill and technology-intensive textiles part of the sector.

Electrical and electronic goods including parts and components for such goods (with the exception of transistors and semiconductors), and telecommunication, audio and video equipment are the 2 most dynamic groups in the exports of the group of *developing countries in Asia excluding West Asia, Central Asia, the first-tier NIEs and China*. These two groups feature prominently also in the list of the most dynamic products in the exports from the *ASEAN-4*, comprising Indonesia, Malaysia, the Philippines and Thailand. But it is noteworthy that passenger motor vehicles are also among the 20 fastest growing exports from the ASEAN 4. The list of the most dynamic products in the exports from *South Asia* belong to a wide variety of product groups but the relative importance of items from the electronics sector is significantly lower than in the other sub-groups of developing countries in Asia. The absence of any item from the clothing sector is also notable.

As a group, countries in *South America* appear to be largely excluded from dynamic exports in world markets. Only two of the group's fastest growing export products are among the 20 most dynamic products in world trade: non-alcoholic beverages (SITC 111) and knitted textile fabrics (SITC 655). One possible explanation for this is that the region has remained isolated from global production sharing due to, for example, significant geographical distance from the developed countries which have been most active in global production sharing. Products that appear to have been subject to vertical global production indeed occupy comparatively low ranks among dynamic products in the exports from South America (e.g. SITC 845 ranks 13; 655 ranks 20; 764 ranks 23; 844 ranks 39; 846 ranks 52; 776 ranks 85; 752 ranks 129; and 759 ranks 210). Another possible explanation is that,

on average, South America is a comparatively natural-resource-abundant region. Thus, it does not come as a surprise that countries in South America have strongly expanded their primary exports, i.e. the six most dynamic products are primary commodities and three other primary commodities are among the 20 most dynamic products. Regarding countries in *Central America and the Caribbean*, the wide and diverse range of product groups among the 20 most dynamic products makes it difficult to detect a meaningful pattern, due, in part, to the heterogeneity of countries in the region.[12]

To summarize, the above findings suggest that product-specific dynamism in world exports is driven by developed countries and by developing countries in Asia, both the first-tier NIEs and other developing countries in East Asia, while large parts of the other developing regions appear to be excluded from product-specific growth in world exports.

B. Dynamic products and the export composition of selected developing countries

Turning to the experiences of individual countries, table 9 compares the composition of exports averaged over the period 1996–1998 for the 20 developing countries and economies with the most rapid growth in total exports during the period 1980–1998 and with a total export value that exceeded US$ 5 billion in 1998.[13] With respect to the four fastest growing product groups in world exports, four results are noteworthy:

- Electrical and electronic goods including parts and components for such goods, i.e. the most dynamic products in world exports, are the leading export products in all four first-tier NIEs (among the four countries, they are of substantially less importance in the Republic of Korea), as well as in Malaysia, the Philippines and Thailand, and they play an important role also in China, Costa Rica and Mexico. By contrast, they are not among the leading export products either in Chile, Colombia, India, Morocco or Peru and they are of comparatively little importance in Argentina, Brazil, Tunisia and Turkey;
- Textiles, and labour-intensive manufactures, in particular clothing, are important in China, Costa Rica, India, the Republic of Korea, Mexico, Morocco, the Philippines, Thailand, Turkey, Taiwan Province of China and Tunisia. They are of less importance in Colombia, Indonesia, Malaysia and Peru, and they are not among the leading export products in Argentina, Brazil, Chile, and Singapore;
- Transport equipment, in particular passenger motor cars and other motor vehicles, is the only product division among the group of finished products from industries which require high R&D expenditures and are characterized by high technological complexity and/or a high degree of economies of scale in particular at the firm level that features among the leading

[12] The results for *North Africa and sub-Saharan Africa* are not reported because they are strongly influenced by a few countries (Mauritius and Senegal for sub-Saharan Africa) and the fact that those products which have grown fastest are those for which no data were available for 1980, either because data were not recorded or because such products were actually not exported.

[13] If only the first of these two criteria is used, a vastly different set of countries will be selected and include (misleadingly so in our judgment) a large number of very small countries such as Cambodia, Equatorial Guinea, Djibouti, Laos, Benin, Bhutan, Maldives, Lesotho, and the Seychelles.

export products in the selected group of countries, and they play a role only in Argentina, Brazil, the Republic of Korea, and Mexico. It is well-known, however, that these exports reflect nationally grown production activities only for the Republic of Korea;

- Primary commodities and in particular the group of dynamic primary commodities are not among the leading export products in the first-tier NIEs and China; they are of some importance in India, Indonesia, Malaysia, the Philippines, Thailand, Tunisia and Turkey, and they play a very important role in the exports of a number of South American countries and Morocco.

Many country-specific factors, including size and resource endowments have undoubtedly influenced the export composition and dynamics of these countries. There is, however, a striking regional pattern in the different experiences of countries which suggests that geography has played an important role. Products that are involved in global production sharing are important only in the exports of countries which are geographically close to one of the main developed country markets, namely the United States, the European Union and Japan. By contrast, their role is of low significance in countries that are geographically distant from these markets, such as South American countries whose exports continue to be dominated by primary commodities. Moreover, there appears to be a division of labour within East Asia as far as the textiles and clothing sector is concerned, with enterprises in the Republic of Korea and Taiwan Province of China exporting textiles, whose production is comparatively more capital, skill and technology intensive, while enterprises in the other East Asian countries in table 9 concentrate on the more labour-intensive clothing sector.

C. Trade flows of the most dynamic export products

This section focuses on the direction of trade flows, complementing the product-based perspective in section I, and the country-based perspective in sections II.A and B. It briefly addresses the hypothesis that high skill and technology-intensive products are the most dynamic products in the exports of developing countries because of the increased importance of vertical global production sharing. The section first examines whether the most dynamic products in developing country exports are also among the most dynamic products in developing country imports and then examines bilateral trade flows of selected dynamic products between key regions in world trade. Box 1 provides a brief review of preferential tariff provisions for international production sharing.

The analysis of dynamic products in developing country imports covers a shorter period (i.e. 1988–1998) than the above analysis of exports because of the very low degree of reliability of import data prior to 1988. Table 10 lists the 20 most dynamic products in developing country imports during the period 1988–1998 and for each of these products indicates its position in developing country exports (column 5). The table shows that the product groups in the electronics sectors which experienced dynamic export performance are also among the most dynamic imports, lending support to the hypothesis that rapid export growth in these items is largely due to vertical production sharing. It is also interesting that four out of the 20 most dynamic products in developing country imports are in the textile and clothing sectors (SITC 65 and 84) which is most likely due to the spread of global

production networks in the apparel commodity chain over the past 20 years. The same argument probably holds for leather (SITC 612) and footwear (SITC 851).

Box 1

Preferential tariff provisions for international production sharing

Special tariff provision for international production sharing arrangements centres mainly around two major countries or country groups on the import side, namely the United States and the European Union (EU). The United States implemented special tariff provisions already in 1964 to encourage the use of US-origin content in foreign assembly operations. Such products were returned under tariff items 806.30 and 807.00 up to 1988 when this special tariff treatment was continued with some modification under the production-sharing provisions of Chapter 98 of the Harmonized Tariff Schedule of the United States (HTS). These provisions permit a duty exemption for the value of US-made components that are returned to the US as parts of articles assembled abroad (HTS 9802.00.80) and that do not require further processing in the US, or for articles using US-origin metal (except precious metal) that are returned to the United States for further processing (HTS 9802.00.60). In addition, because of NAFTA, HTS 9802.02.90 was created to allow for the duty-free treatment of textile and apparel products assembled in Mexico from US-formed and US-cut fabric (under the latter, value added in Mexico is free of duty in addition to the value of US-cut fabric pieces and US-made fasteners, as under 9902.00.80).[14]

Outward processing trade (OPT) between the European Union and its trading partners[15] has been concentrated in labour-intensive sectors, particularly textiles and clothing. The legislation on OPT goes back to the second extension of the Multi-Fibre Agreement (MFA) in 1982, when quotas for OPT were included for the first time in MFA III (1982-1986). The special treatment of textiles and clothing imports of the EU consists generally in applying customs relief within certain import limits or surveillance arrangements provided for in the bilateral textile agreements concluded by the EU with a number of supplier countries under the MFA. In practice, this usually means a combination of voluntary export restrictions (VERs), applied by the EU against the supplying country, and tariff suspension. This is a kind of preferential tariff quota on OPT re-imports but applied against suppliers on a selective basis. Access to the quota for OPT operators in the EU is subject to their meeting a number of legal and economic conditions. Countries in Central and Eastern Europe and the Mediterranean region have been the main beneficiaries of the EU's OPT-scheme. The importance of this scheme is reflected by the fact that in Germany more than two thirds of total trade in textile and clothing products with countries in Central and Eastern Europe are part of outward-processing operations (WTO, 1998, p. 94).

However, preferential tariff provision included in regional trade agreements among developing countries such as MERCOSUR and the ASEAN Free Trade Agreement have also had a substantial impact on the dynamism of specific products in the countries which are affected by these agreements. This applies, for example, to the creation or consolidation of a regional automobile industry in Latin America and the ASEAN regions, which has given rise to a substantial increase in foreign direct investment in these countries as well as in horizontal production sharing among them.[16]

The remainder of this section reports the main results of an examination of changes in market shares of bilateral trade between key countries and country groups in world trade. Focussing on the most export-dynamic products and the most rapidly growing products within each group of the product classification used in section I.B. (iii), Mayer (2002) examines data on bilateral trade flows and shows that a rapid increase in two-way trade between developed and developing countries was the main driving force behind the majority of products which have shown dynamic growth in both world and developing country exports over the period 1980–1998. This applies in particular to trade in those

[14] For a more detailed account, see USITC (1999).

[15] This paragraph draws on ECE (1995) and WTO (1998).

[16] For a more detailed discussion see Romijn et al (2000).

industrial sectors for which earlier studies (Ernst and Guerrieri (1998), Hummels, Ishii and Yi (1998), Gereffi (1999), Yeats (2001), and Ng and Yeats (2001)) documented the increasing importance of global production sharing. The products in the sectors concerned include parts and components for electrical and electronic goods (SITC 759, 764, 772 and 776), parts and accessories for motor vehicles (SITC 784) and apparel (SITC 84). The bilateral trade flow data suggest that global production sharing has played an increasingly important role also in trade flows of optical instruments (SITC 871) and medicinal instruments (SITC 872). These two products rank very high in terms of both growth of world exports during 1980–1998 and the indices of dynamism based either on world export values or on shares in total world exports. Moreover, these product groups are a driving force of the rapid growth of high skill- and technology-intensive, as well as science-based, manufactured exports from developing countries.

D. Summary and conclusions

The analysis of dynamic products in the exports of country groups and of their importance in the export composition of selected developing countries suggests that there is a strong geographical concentration at both regional and country levels with regard to the origin of these dynamic products. At the country-group level, developed countries and developing countries in Asia (both the first-tier NIEs and other developing countries in East Asia) have been a driving force of product-specific dynamism in world exports. At the country level, dynamic products in world exports represent a relatively high share in the exports of those countries that are geographically close to one of the main developed country markets. The examination of dynamic products in developing countries' imports and of bilateral trade flows in selected dynamic products between key regions in world trade supports the hypothesis that product-specific export dynamism is to a large extent a reflection of the increased importance of global production sharing.

III. CONCLUSIONS AND POLICY IMPLICATIONS

The values and market shares of three product categories have grown most rapidly in world non-fuel exports during the period 1980–1998: electrical and electronic goods including parts and components for such goods, goods that require high R&D expenditures and that are characterized by high technological and managerial complexity, and labour-intensive products (in particular clothing). These are also the products found in earlier studies to have been affected most by two phenomena of the world trading system that have rapidly gained in importance over the past few years, namely the horizontal and vertical fragmentation of production processes at the international level.[17] Export products which have experienced the most rapid growth and which have a relatively high average share in world totals are also those whose export value growth can be best predicted, suggesting a

[17] It is clear that factors other than those associated with the growing importance of international production sharing have also played a crucial role in determining differences in export growth across products over the past 20 years. Such factors include product-specific differences in the income elasticity of demand and in the development of market access conditions. However, an analysis of these factors goes beyond the scope of this study.

sustained movement in world exports towards the growing significance of a limited number of products.

At the country group level, developed countries and developing countries in East Asia – most notably the first-tier NIEs – have been a driving force of product-specific dynamism in world exports. At the country level, dynamic products in world exports represent a relatively higher share in the exports of countries that are geographically close to one of the main developed country markets. The examination of dynamic export products in developing countries' imports and of bilateral trade flows in selected dynamic products between key regions in world trade support the hypothesis that product-specific export dynamism is to a large extent a reflection of the increased importance of global production sharing.

With regard to specific product groupings, exports from the high skill- and technology-intensive category have grown most rapidly. Strikingly, the growth rates of exports from developing countries exceed those of world exports by a higher margin the greater is the skill and technology intensity of the product category. However, this does not necessarily imply that there has been a rapid and sustained technological upgrading in the exports of developing countries. This is because rapid growth in developing country exports of skill- and technology-intensive products started from a relatively low base in the early 1980s and, in particular, because the involvement of developing countries is usually limited to the labour-intensive stages in the production process of these goods in the context of international production sharing. This implies that simple measures of growth in gross export values are poor guides for an assessment of the nature of participation of developing countries in world trade.

The findings also suggest that developing country exports tend to be increasingly concentrated in computers and office equipment, communications equipment and semiconductors, and clothing. All of these products involve labour-intensive production processes. Thus, there is a risk that the simultaneous drive in a great number of developing countries, including in particular those with a large economy, to export such dynamic products may cause the benefits of any increased volume of exports to be more than offset by losses due to lower export prices.

Bearing these caveats in mind, getting involved in global production sharing appears to be a key element of any strategy that takes the growth performance of specific products in world exports as a guide. Whereas the findings suggest that countries situated geographically closer to developed countries have an edge over others in integrating into global production sharing, it needs to be recognized that preferential market access regulation has typically given an impetus towards vertical international production sharing and regional integration. Moreover, there are indications to suggest that the integration in international production networks by developing countries in Asia is much broader than that of countries that are geographically close to the United States or the European Union: enterprises in Asian countries operate regional production networks but also export to the United States and Europe, while enterprises in Central Europe tend to concentrate on production sharing with the European Union and enterprises in countries close to the United States, notably

Mexico, tend to be included in production networks only with the United States. This means that geographic distance to one of the main developed country markets may not be a binding constraint to being included in international production networks.

Becoming part of an international production network can give substantial impetus to a developing country's development and industrialization strategy mainly because it broadens the range of sectors on which developing countries can base their quest for industrialization. Given that product-specific characteristics allow partitioning into various stages the production process of an increasing number of industrial sectors, it is no longer necessary for producers to master entire production chains and to organize them within single firms. Rather, they can focus on mastering just one facet of production and on no more than a limited subset of all the activities involved in making a final product. This is likely to entail large savings in learning costs and can allow small- and medium-sized domestic companies to compete successfully with multinationals. Given relative factor endowments, developing countries may begin by acquiring competence for the more labour-intensive components of complex products and gradually move on to more skill- and technology-intensive activities.

On the other hand, it seems likely that with geographically dispersed production sites, the spillovers from subcontracting or hosting affiliates of multi-national enterprises (MNEs) are reduced because the package of technology and skills required at any one site is narrower and because cross-border backward and forward linkages are strengthened at the expense of domestic ones. When only a small part of the production chain is involved, outcontractors and MNEs have a wider choice of potential sites since these activities take on a more footloose character, thereby strengthening their bargaining position vis-à-vis the host country. This is likely to create a tendency towards increased competition among developing countries, offering more and more substantial concessions on taxation and trade issues to developed-country firms in order to compensate shifting comparative advantage within the group of developing countries or cost-cutting and downsizing pressures of the developed-country firms.

The growing importance of international production networks raises the degree of production complementarities between developed and developing countries. This implies that a greater share of developing-country production and exports come to depend on the decisions and performance of foreign firms and countries. This reduces policy autonomy in developing countries regarding their formulation of a development strategy that emphasizes national capabilities and goals. Moreover, developing countries have usually not been involved in the skill and technology-intensive parts of the production process which carries the risk of developing countries' getting locked in to their current structure of comparative advantage, with its emphasis on labour-intensive activities, while the exploitation of potential comparative advantage in the higher-tech stages of production is delayed. This risk is particularly high where trade flows are based on preferential market access that requires production inputs to be sourced from the developed-country partners. Where this is the case, the geographic dispersals of production activities are likely to lead to less, rather than more technology transfer.

The present study also indicates areas where further research is needed. It would be desirable to disentangle volume and price effects in measuring product-specific export dynamism by concentrating, for example, on a few dynamic export products and a small number of dynamic import markets for which the required data are available. It would also be desirable to examine more closely the impact of product-specific export dynamism on productivity and growth overall and in the respective industrial sectors. It would be interesting to see, for example, whether a given increase in export value has been associated with differences in the rate of income growth in exporting countries depending on the kind of products which generated the increase in export value. Doing so would give some indication also on whether product groups for which differences in long-run sectoral productivity growth have been observed in large developed countries show similar differences also in developing countries.

APPENDICES

Appendix I: Availability and limitations of data

For this study, a data set was created from the repository Economic Time Series database (ETS) that has been maintained by the UNCTAD secretariat. The relevant time series are updated annually by processing a file received from the United Nations Statistics Division (UNSD) in New York. UNSD prepares this file for the publication of Volume II of the International Trade Statistics Yearbook (Commodity Tables, Group (3-digit) level of the SITC, Revision 2). The file includes data from COMTRADE as well as UNSD-estimates. The data series in ETS are further refined on a continuous basis by including the most recent official updates of COMTRADE.

The data used in the study covers the period from 1980 to 1998 for exports and the period from 1988 to 1998 for imports. The data are fully consistent for the period 1988–1998. For the period 1980–1987, export data can be considered to be reasonably accurate, except for products with a very small share in world exports for which incomplete reporting can have a significant impact on the calculations. Data prior to 1980 are considered to be much less reliable. The data are in current US dollar and have two interesting features. First, the data are exhaustive, i.e., there are no missing values within any country-year subset. Second, each subset is based on either official sources or estimates.

The data set includes all products classified in the Standard International Trade Classification (SITC) Revision 2, except SITC 931 (special transactions and commodities not classified according to kind) which is a residual category, and SITC 286 (ores and concentrates of uranium and thorium), SITC 333 (crude petroleum), SITC 351 (electric current), SITC 675 (Hoops and strip or iron and steel), SITC 688 (uranium depleted in U235 and thorium, and their alloys), SITC 911 (postal packages not classified according to kind), SITC 961 (coin other than gold coin), not being legal tender, and SITC 971 (gold, non-monetary) which are excluded because data for these categories "were poorly reported and contain many estimates which are not sufficiently explainable" (United Nations (1999, p.1)). The remaining products in SITC section 3, namely SITC 322 (coal), SITC 323 (coke and briquettes), SITC 334 (refined petroleum products), SITC 335 (residual petroleum products) and SITC 341 (gas) are also excluded, so that the analysis in based on non-fuel merchandise trade, i.e. a category that is frequently used in trade analysis.

One element in the evolution of the world trading system over the past twenty years that can have a significant impact on the calculations of this study is the integration of previously isolated economies into the world trading system. For some of these countries, external trade was not recorded in international statistics because, for example, for certain years the data were not available on an internationally comparable basis. This is the case particularly for the member countries of the former Council For Mutual Economic Assistance (CMEA) and China. Whereas the former continue to have a relatively low share in current world trade, China has become one of the top ten world traders. Given that the time series on Chinese exports start only in the mid-1980s, calculations on export dynamism will be biased for those products which had been exported by China but have only been registered since the mid-1980s. This poses the question as to how to deal with this problem. Excluding China from the study would seriously distort actual trade patterns, while starting the analysis only at the end of the 1980s would eliminate important information on the long-term development of world exports. Given the fact that China entered global markets as an exporter of significance only in the mid-1980s, there is a high probability that the beginning of the data series in the mid-1980s actually marks China's entry into the world trading system in an accurate manner with respect to most of its manufactured exports, i.e. the products for which the value of China's exports has grown most, and that therefore only the calculations concerning a few primary products are affected by the data problem in a considerable way, the best possible solution appears to be not to make any, necessarily arbitrary, corrections to the data. In interpreting the statistical results, however, it will be important to bear this issue in mind.

Appendix II: Description of statistical and econometric methods

Degree of market concentration: The Herfindahl-Hirschman Index (HHI) is a measure of the degree of market concentration. For the purposes of this study, the HHI can be calculated for each product by taking the sum of the squared values of the market shares of all countries that export a particular product, i.e. $HHI_j = \sum (S_{ij})^2$ where S_i is the share of country i expressed as a percentage of total world exports of products j. This means that the HHI ranges between 43, indicating that all 234 countries in the sample have equal shares (i.e. 0.43 per cent) in a product's total exports, and 10,000, indicating that the product is exported by only one country.

Composite measures of dynamism

As a measure of dynamism, the time-dependent path of growth represents a one sided characteristic of what constitutes a dynamic product. Issues like volatility, predictability, growth in shares, and growth in the last period are not usually considered when dynamism is measured. Moreover, time dependence may not in itself explain why a product should be dynamic. A product's path of growth may be complex and its relationship with time may not necessarily be linear. Therefore, the question to which an answer shall be provided is: can a comprehensive measure of what constitutes a dynamic product be developed and, if so, what elements should be included in assessing the performance of an export product over time. In attempting to answer this question, the following arguments were deemed relevant to the analysis of dynamic behaviour over time:

- Time-path dependence assigns equal weights to every period in time. The distant past may not affect the future as the very recent past. In fact, recent developments in theory indicate that composite measures that assign higher weights to growth in the last periods tend to capture more of the true behaviour of a product over time. Evidently, price dependent export series exhibit a relatively high-volatility and, therefore, an emphasis on growth in the last period does introduce a needed momentum into the analysis of dynamism;

- Growth in shares represents another missing component in trend growth over time. Incorporating the consistency of share growth over time into the analysis of dynamism offsets the impact of absolute variations on an export series. A product whose share experienced consistent growth on a trend represents a highly dynamic product;

- A high growth rate over time can conceal within it elements of volatility and unpredictability that negatively contribute to dynamism. Generally speaking, a predictable high-growth/low-volatility product represents the surest product on the export market. Introducing the negative impacts of low predictability/high volatility into composite measures of dynamism is relevant for the definition of a dynamic product.

Given the numerous possibilities by which a composite index of dynamism can be formed on the basis of the above categories, the following three indices of dynamism may be sufficient for a relatively comprehensive definition:

- A comprehensive index (I_c) that includes long-term growth (1980–1998), short-term growth (1996–1998), volatility around the trend of long-term growth, and growth in the share of a specific product in total world exports (1980–1998), i.e.

$$I_c = a_1 * \textit{long-term growth} + a_2 * \textit{short-term growth} + a_3 * \textit{volatility} + a_4 * \textit{growth in share}$$

Volatility: dispersion around the trend is generally meant to represent the extent of volatility in time series. Thus, where the coefficient of determination measures the closeness of fit or the ratio of explained to total variations in an export series, its opposite, the poorness of fit or the ratio of unexplained to total variations should capture the extent of volatility around a trend, i.e.

Volatility = 1-R^2, where R-square is the coefficient of determination.

The drawback to such an approach lies in the specification that an export series has a linear relationship with time. However, it is not possible to study and implement the different specifications of the many export series with time and still arrive at a unique general benchmark that may serve the purpose of comparison. For comparative reasons, the fact that the same measure can be applied as a rule to all the export series seemed to be a reasonable starting point.

- A share-based index (I_s) that accounts for the linear trend in the share of a specific product in total world exports (1980–1998), the volatility around the trend in the share (1980–1998), and the rate of growth in the share over the period 1996–1998, i.e.

  $I_c = a_1 * trend\ share + a_2 * short\text{-}term\ growth\ in\ share + a_3 * volatility$

- A predictability/volatility index (I_{pv}) that encompasses predictability of long-term growth, volatility of long-term growth, and long-term growth (1980–1998), i.e.

  $I_{pv} = a_1 * predictability + a_2 * volatility + a_3 * long\text{-}term\ growth$

Predictability: a simple and widely used estimation procedure known as AR1 was used for assessing the predictability of SITC 3digit level export series. The principal meaning behind this approach is that present behaviour can be predicted on the basis of past performance, i.e.

$y_t = E_t (y_t \mid y_{t-1})$

Hence the following regression was fitted: $y_t = b_0 + b_1 y_{t-1} + \varepsilon_t$

where the autoregressive order is one and the differencing order is also one.

The coefficient of determination arising from the regression determines the level of fit and, hence, predictability. Where the autoregressive order was higher than one, i.e. when prediction can be made on the basis of the behaviour of many past periods, the regression was restricted to a first order autoregression because this allowed comparability across all the export series with a single benchmark, i.e. the coefficient of determination arising from a single lag in the series.

The weights assigned for each variable in the index are generated from the data through the method of factor analysis. The use of this method allows the values assigned to each weight (a) to be derived on the basis of correlations between the variables included in the index.[18]

[18] Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. For further details of this method see D. Child, *The Essentials of Factor analysis, 1970.*

Analysis of variance

Analysis of variance, or ANOVA, is a method of testing the null hypothesis that several group means are equal in the population, by comparing the sample variance estimated from the group means to that estimated within the groups. In the context of this study, the effect of the technological profile on the growth in the share of the product group is tested. This is a standard procedure which attempts an answer to the question of whether the technological profile of a product contributes to the growth of its share in world exports.

The null hypothesis being tested that the classification according to production profile of different product groups are equal vis-à-vis the alternative hypothesis that the means of the growth in the shares are unequal.

The applied F test is $F^* = \sum (y^2/(K-1)) / \sum (e^2/(n-K))$.

All F and t tests confirmed a significant difference in the means of the groupings on the basis of either the classification given in Appendix 1 3.I or that given in Appendix 1 3.II. The orderings for such groupings was given in the text under the appropriate heading.

Appendix III: Definition of product categories

1. Product categories by factor intensity[19]

	SITC Rev. 2 Codes
Non-fuel primary commodities	0, 1, 2 (less, 233, 244, 266, 267), 4, 68
Labour-intensive and resource-intensive manufactures	
Leather, textiles, apparel, and footwear	61, 65, 83, 84, 85
Toys and sports equipment	894
Wood and paper products	63, 64, 82
Non-metallic mineral products	66
Low skill-, technology-, capital- and scale-intensive manufactures	
Iron and steel	67
Fabricated metal products	69
Simple transport equipment	78 (less 781–784) + 79 (less 792–793)
Sanitary and plumbing equipment	81
Ships and boats	793
Medium skill-, technology-, capital- and scale-intensive manufactures	
Rubber and plastic products	62, 893
Non-electrical machinery	71–74
Electrical machinery other than semiconductors	77 (less 776)
Road motor vehicles	781–784
High skill-, technology-, capital- and scale-intensive manufactures	
Chemical and pharmaceutical products	5
Computers and office equipment	75
Communications equipment and semiconductors	76, 776
Aircraft	792
Scientific instruments, watches and photographic equipment	87, 88

[19] This classification is based on UNCTAD, 1996, *Trade and Development Report 1996*, (United Nations: New York and Geneva)

2. Product categories by main factor affecting the competitive process[20]

	SITC Rev. 2 Codes
Non-fuel primary commodities	0, 1, 2 (less, 233, 244, 266, 267), 4, 68
Resource-intensive manufactures	
Woods products	63, 82
Non-metallic mineral products	66
Labour intensive manufactures	
Leather, textiles, apparel, footwear	61, 65, 83, 84, 85
Fabricated metal products	69
Other manufactures, excluding plastics	89 less 893
Differentiated products requiring specialized suppliers	
Non-electrical machinery	71, 72, 73, 74
Electrical machinery	77
Communications equipment	76
Scale-intensive manufactures	
Paper	64
Chemicals excluding pharmaceuticals	5 less 54
Rubber and plastic products	62, 893
Iron and steel	67
Road motor vehicles	781–784
Ships and other transport equipment other than aerospace	79 less 792
Science-based manufactures	
Aircraft	792
Computers and office equipment	75
Pharmaceuticals	54
Scientific instruments	87, 88

[20] This classification is based on OECD, 1994, *Industrial Policies in OECD Countries, Annual Review 1994*, (OECD: Paris).

3. Agricultural goods which are high-value products and/or items with an income elasticity of demand greater than one[21]

	SITC Rev. 2 Codes
Meat and meat products	011, 012, 014
Dairy products	022, 023, 024
Fish, fish products and sea food	034, 035, 036, 037
Vegetables	054, 056
Fruit, nuts and fruit preparations	057, 058
Spices	075
Fixed vegetable oils and fats	423, 424

4. By long-run growth of total factor productivity in large developed countries[22]

	ISIC Code
Non-manufacturing sectors	
Low TFP-growth manufacturing sectors	
Food, beverages, and tobacco	31
Paper, paper products, printing and publishing	34
Other manufacturing industries	39
Medium TFP-growth manufacturing sectors	
Wood and wood products	33
Non-metallic mineral products, except fuel	36
Basic metal industries	37
High TFP-growth manufacturing sectors	
Textiles, clothing and leather	32
Chemicals and chemical products	35
Fabricated metal products, machinery and equipment	38

[21] This classification is based on Jaffee and Gordon (1993) and World Bank (1994, p. 39).
[22] This classification is based on Choudhri and Hakura (2000, p.15).

FIGURES AND TABLES

Figure

Table

Figure 1a
Growth of world non-fuel exports of different product categories, by factor intensity
(Index numbers, 1980 = 100)

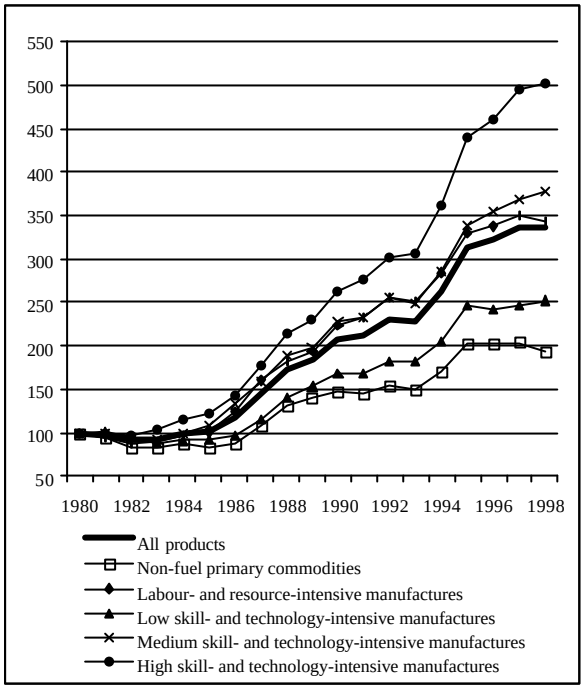


Figure 1c
Growth of developing country non-fuel exports of different product categories, by factor intensity
(Index numbers, 1980 = 100)

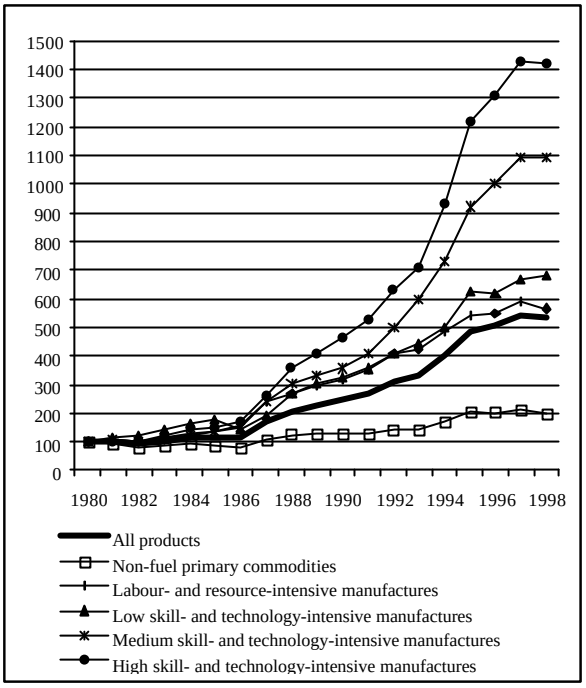


Figure 1b
Structure of world non-fuel exports by product category according to factor intensity, 1980–1998
(Percentage share)

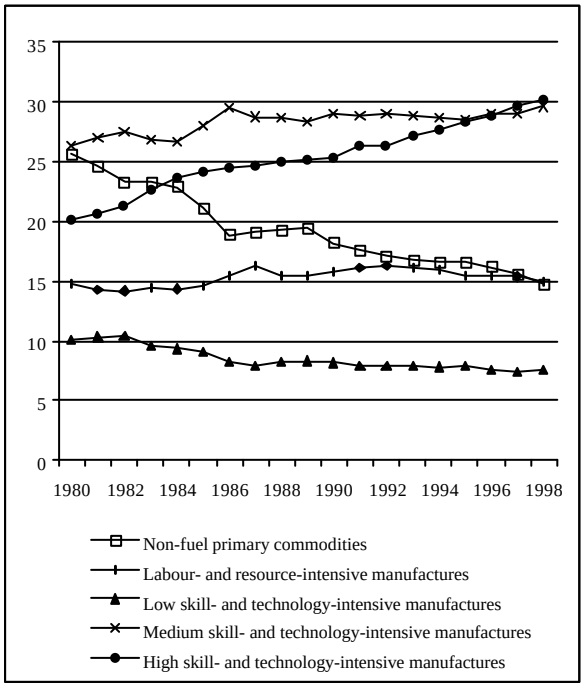
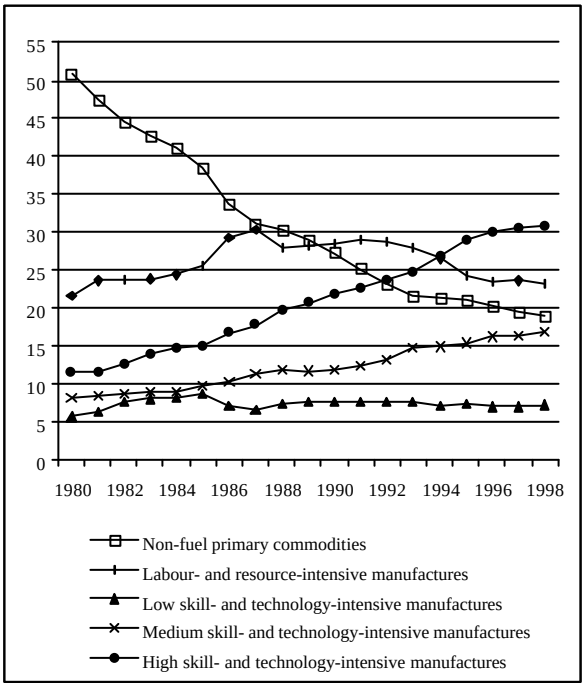


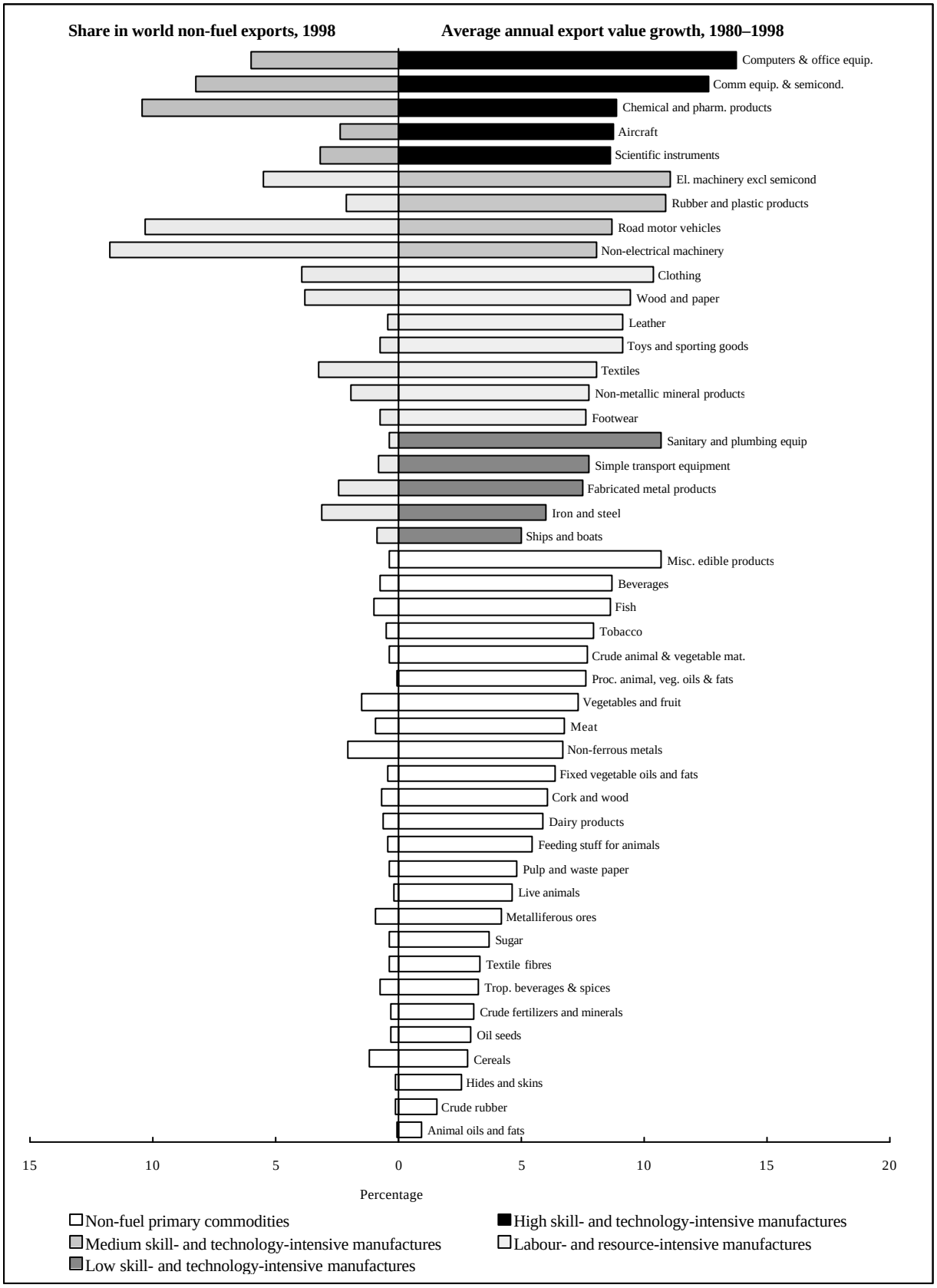
Figure 1d
Structure of developing country non-fuel exports by product category according to factor intensity, 1980–1998
(Percentage share)



Source: See table 1a.
Note: For the product classification see Appendix III.(i).

Figure 2a

Export dynamism of internationally traded non-fuel products, by factor intensity

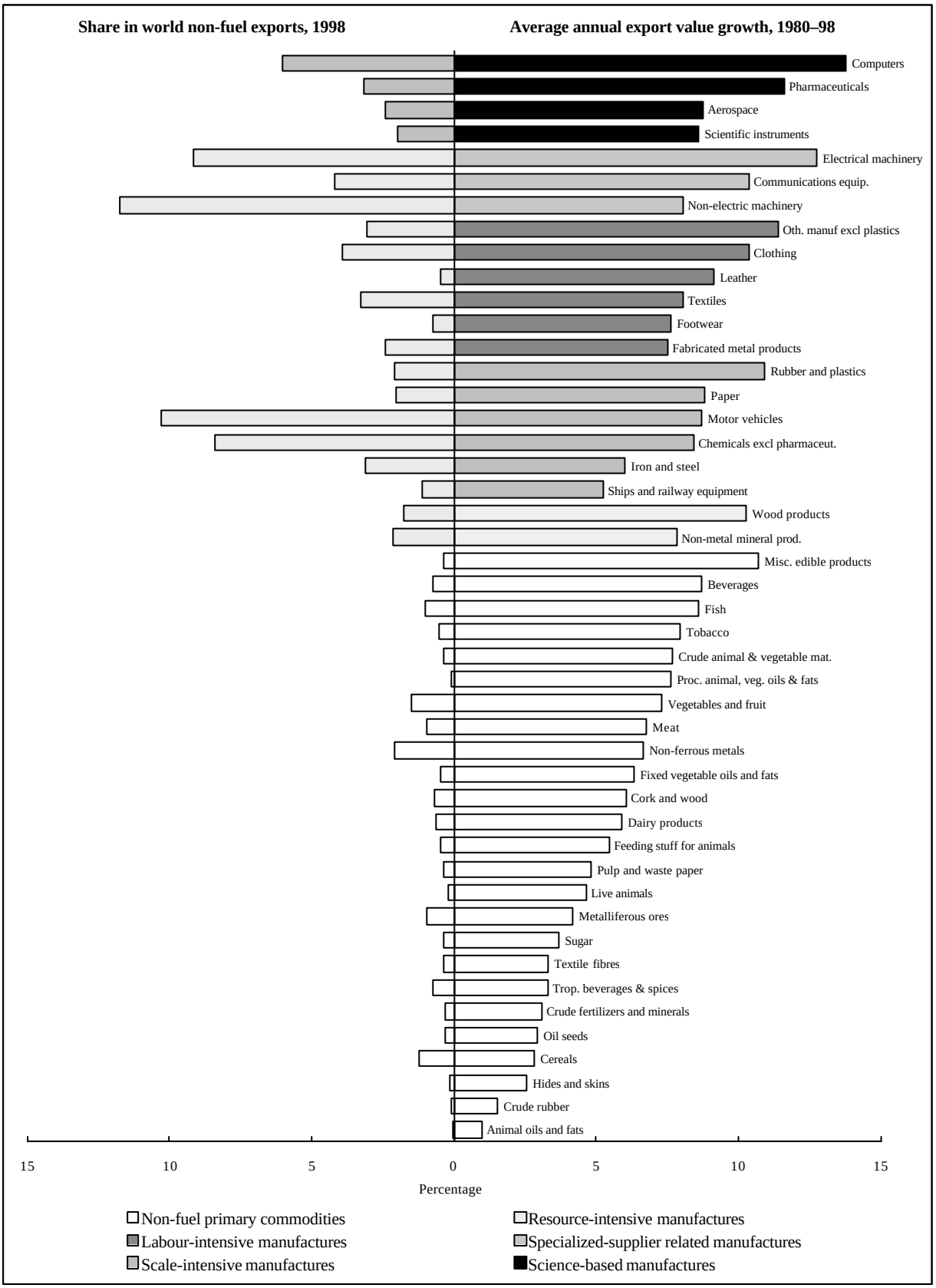


Source: See table 1a.

Note: For the product classification see Appendix III.(i). Both product groups and sub-groups are ranked in decreasing order by their average rate of growth during the period 1980–1998.

Figure 2b

Export dynamism of internationally traded non-fuel products, by main factor affecting the competitive process



Source: See table 1a.

Note: For the product classification see Appendix III.(ii). Both product groups and sub-groups are ranked in decreasing order by their average rate of growth during the period 1980–1998.

Figure 3a
Growth of world non-fuel exports of different product categories, by main factor affecting the competitive process
(Index numbers, 1980 = 100)

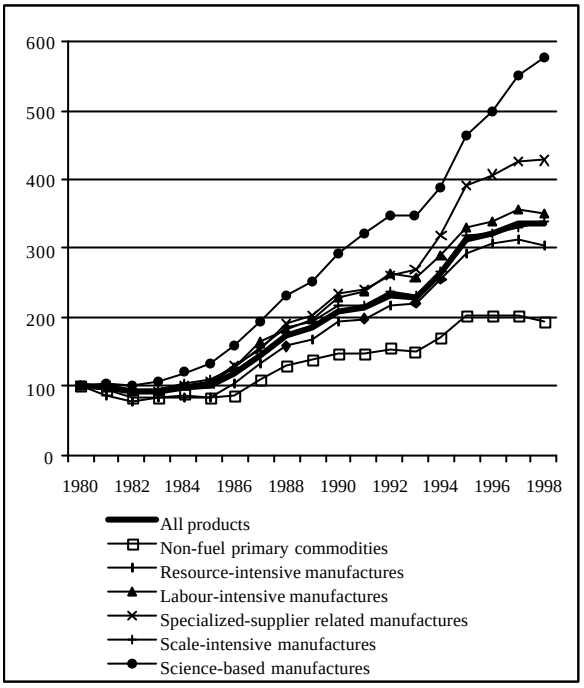


Figure 3c
Growth of developing country non-fuel exports of different product categories, by main factor affecting the competitive process
(Index numbers, 1980 = 100)

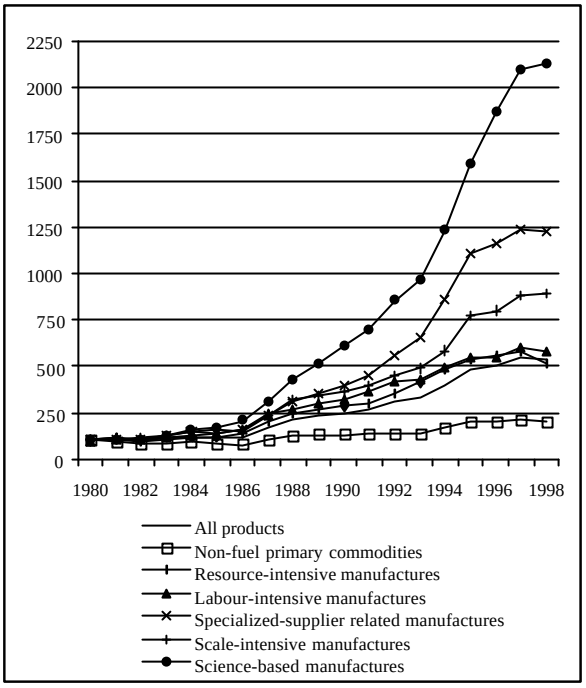


Figure 3b
Structure of world non-fuel exports by product category according to main factor influencing the competitive process, 1980–1998
(Percentage share)

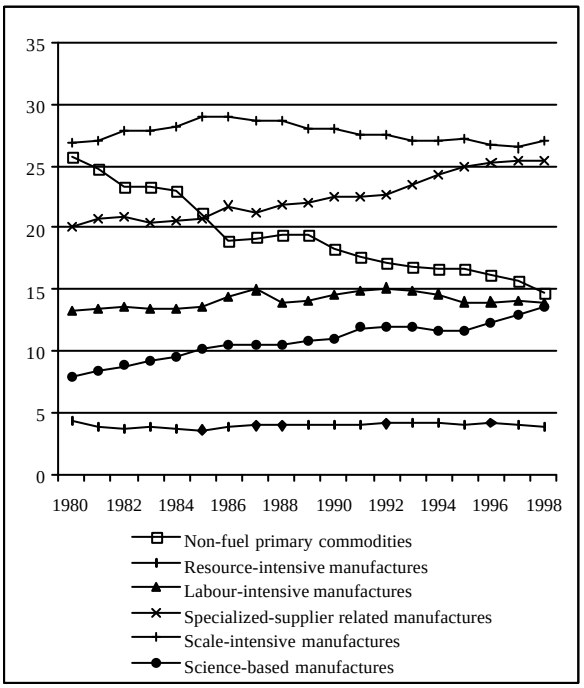
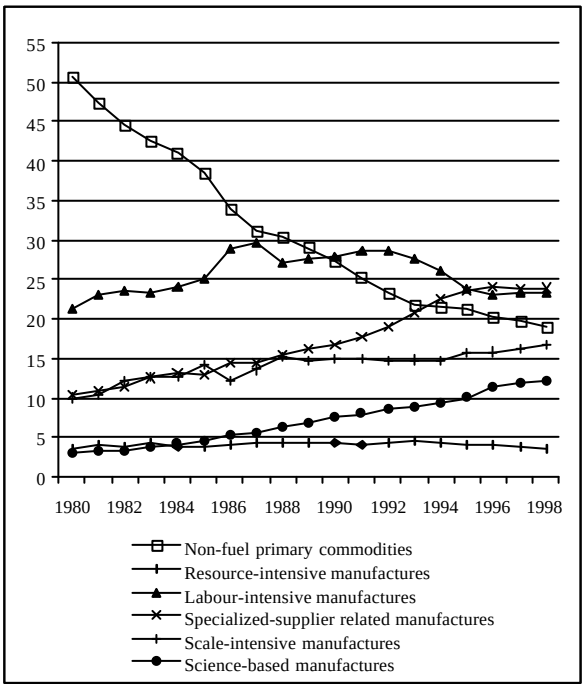


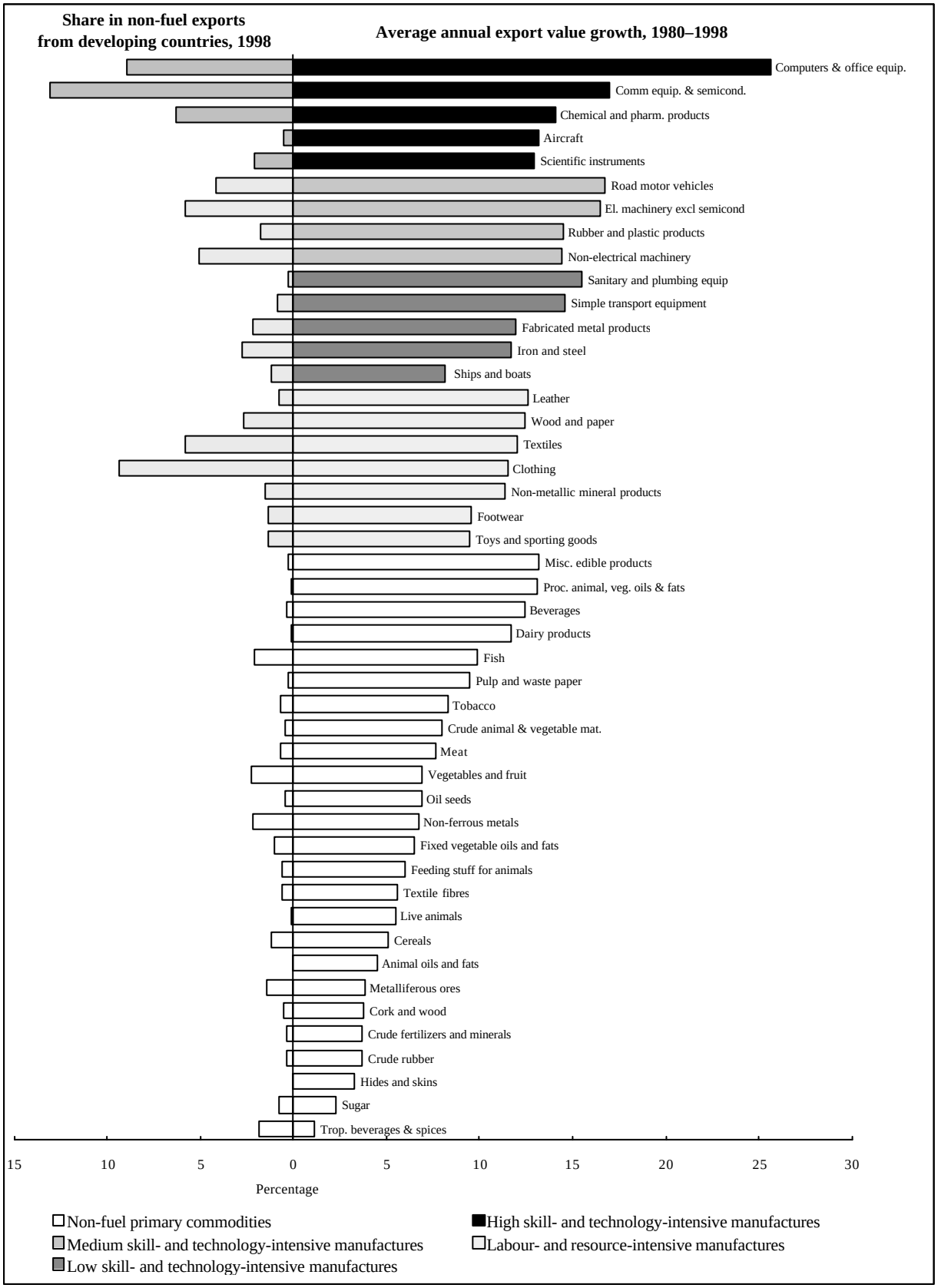
Figure 3d
Structure of developing country non-fuel exports by product category according to main factor influencing the competitive process, 1980–1998
(Percentage share)



Source: See table 1a.
Note: For the product classification see Appendix III.(ii).

Figure 4a

Dynamism of developing country non-fuel exports, by factor intensity

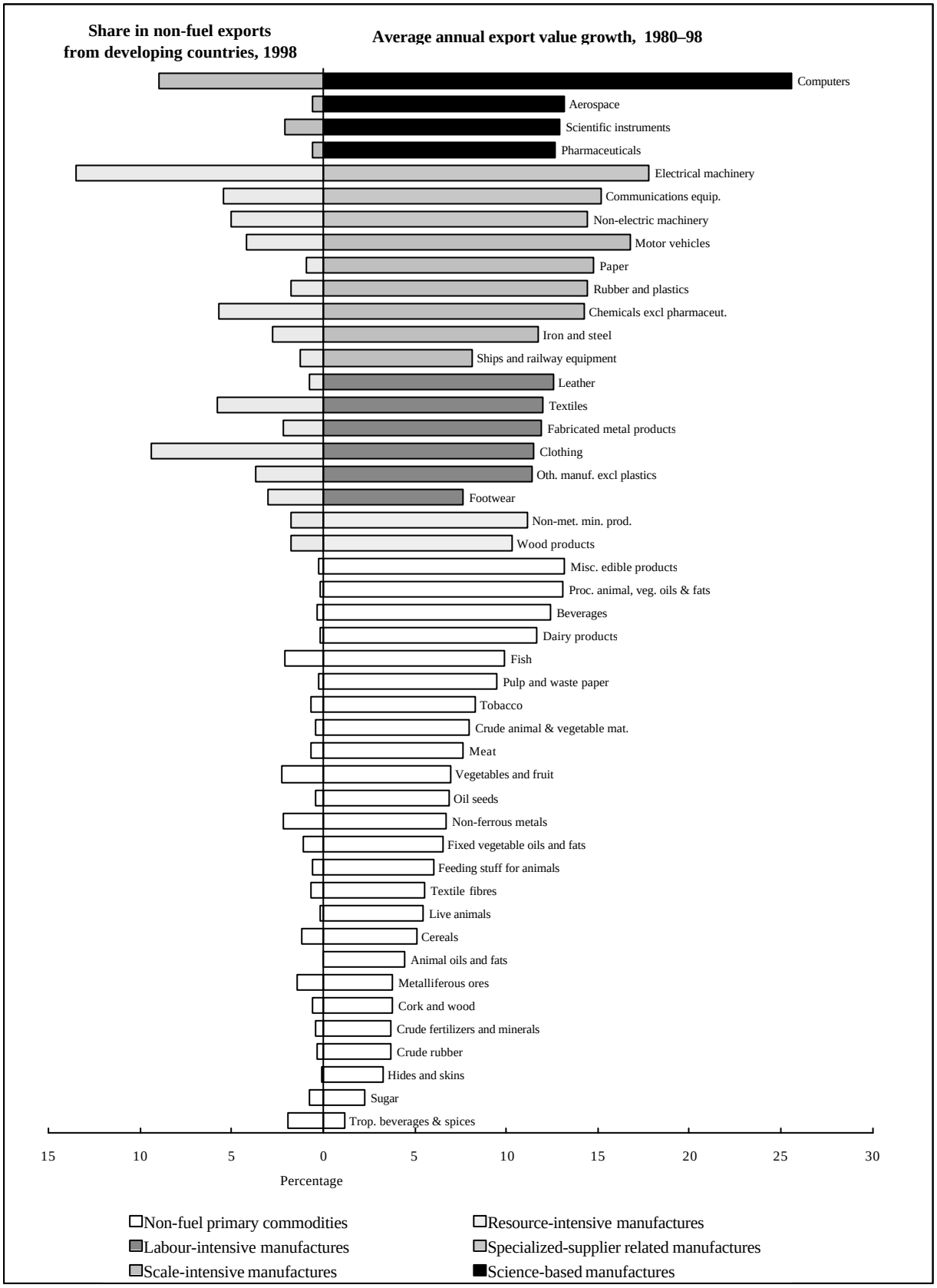


Source: See table 1a.

Note: For the product classification see Appendix III.(i). Both product groups and sub-groups are ranked in decreasing order by their average rate of growth during the period 1980–1998.

Figure 4b

Dynamism of developing country non-fuel exports, by main factor affecting the competitive process



Source: See table 1a.

Note: For the product classification see Appendix III.(ii). Both product categories and individual groups ***w***ithin product categories are ranked in decreasing order by average rate of growth during 1980–1998.

Table 1a

The 20 most dynamic products in world non-fuel exports, ranked by average annual export value growth, 1980–1998

SITC code	Product group	1980–98 Rank (1)	1980–98 Average annual export value growth (Per cent) (2)	1980–98 Average share in world non-fuel exports (Per cent) (3)	1980–98 Stability indicator (4)	1996–98 Rank (5)	1996–98 Average annual export value growth (Per cent) (6)	1996–98 Average annual growth of share in world non-fuel exports (Per cent) (7)
776	Transistors and semiconductors	1	16.3	2.2	0.98	72	0.9	2.8
752	Computers	2	15.0	2.1	0.98	38	5.3	6.9
759	Parts of computers and office machines	3	14.6	1.5	0.98	32	6.7	8.1
871	Optical instruments	4	14.1	0.1	0.99	4	37.6	28.8
553	Perfumery and cosmetics	5	13.3	0.3	0.97	58	2.5	4.4
261	Silk	6	13.2	0.0	0.59	204	-18.3	-20.0
846	Knitted undergarments	7	13.1	0.4	0.96	16	11.2	11.8
893	Plastic articles	8	13.1	0.8	0.96	51	3.3	5.1
771	Electric power machinery	9	12.9	0.3	0.98	46	4.2	5.9
898	Musical instruments and records	10	12.6	0.5	0.97	127	-6.1	-4.5
612	Leather manufactures	11	12.4	0.1	0.94	100	-2.6	-0.7
111	Non-alcoholic beverages	12	12.2	0.1	0.92	124	-5.8	-4.1
872	Medical instruments and appliances	13	12.1	0.3	0.98	30	6.9	8.3
773	Electricity distributing equipment	14	12.0	0.4	0.96	67	1.7	3.6
764	Telecom equipment, and parts	15	11.9	1.9	0.98	13	12.0	12.4
844	Non-knitted undergarments	16	11.9	0.2	0.96	48	3.9	5.7
048	Cereal preparations	17	11.9	0.3	0.95	116	-4.7	-2.9
655	Knitted fabrics	18	11.7	0.2	0.93	45	4.3	6.0
541	Medicinal and pharmaceutical products	19	11.6	1.2	0.98	7	15.8	15.3
778	Electrical machinery and apparatus	20	11.5	1.2	0.97	102	-2.7	-0.8

Source: Authors' calculations based on sources given in Appendix I.
Note: For the calculation of the measures, see text and Appendix II. SITC code numbers refer to *Standard International Trade Classification*, Revision 2.

Table 1b

The 20 most dynamic products in world non-fuel exports, ranked by average annual export value growth, 1996–1998

		1996–98			*1980–98*			
SITC code	*Product group*	*Rank*	*Average annual export value growth (Per cent)*	*Average annual growth of share in world non-fuel export (Per cent)*	*Rank*	*Average annual export value growth (Per cent)*	*Average annual growth of share in world non-fuel exports (Per cent)*	*Stability indicator*
681	Silver and platinum	1	55.3	36.9	206	1.9	0.2	0.14
714	Non-electric engines and motors	2	39.1	29.5	52	9.7	0.6	0.96
792	Aircraft and associated equipment	3	38.4	29.2	78	8.7	1.7	0.90
871	Optical instruments	4	37.6	28.8	4	14.1	0.1	0.99
791	Railway vehicles	5	24.4	21.2	142	6.6	0.2	0.88
075	Spices	6	18.2	17.1	171	4.8	0.0	0.85
541	Medicinal and pharmaceutical prod.	7	15.8	15.3	19	11.6	1.2	0.98
515	Organo-inorganic compouds	8	15.3	14.9	61	9.4	0.4	0.98
289	Precious metal ores, waste and scrap	9	13.5	13.6	218	-0.6	0.0	0.02
244	Cork, natural, raw and waste	10	13.5	13.6	156	5.7	0.0	0.60
514	Nitrogen-function compounds	11	13.0	13.3	22	11.2	0.5	0.97
074	Tea and mate	12	12.5	12.9	205	2.8	0.1	0.64
764	Telecom equipment, and parts	13	12.0	12.4	15	11.9	1.9	0.98
042	Rice	14	11.9	12.4	179	4.4	0.2	0.57
845	Knitted outergarments	15	11.7	12.3	45	9.9	0.7	0.92
846	Knitted undergarments	16	11.2	11.8	7	13.1	0.4	0.96
633	Cork manufactures	17	10.9	11.6	87	9.7	0.0	0.90
091	Margarine and shortening	18	10.8	11.5	102	8.1	0.0	0.81
551	Essential oils and perfume	19	10.1	10.9	54	9.7	0.1	0.96
723	Civil engineering equipment	20	9.9	10.8	192	3.5	0.6	0.68

Source: See table 1a.
Note: For the calculation of the measures, see text and Appendix II.

Table 2

Shares of main exporters, developed and developing countries in world non-fuel export of the 20 most dynamic products (ranked by index of dynamism based on export values, 1980–1998), 1998

(Per cent)

SITC code	*Product group*	*Share of developed countries*	*Share of developing countries*	*Main exporting countries (shares)*
776	Transistors and semiconductors	53	46	United States (17), Japan (15), Singapore (10), Malaysia (7)
752	Computers	63	36	United States (13), Singapore (13), Japan (10), Netherlands (9)
871	Optical instruments	69	30	Japan (22), United States (17), Rep. of Korea (12), Germany (10), China (5), Hong Kong SAE (5)
759	Parts of computers and office machines	61	38	United States (17), Japan (14), Singapore (9), Taiwan Prov. (7), Malaysia (6)
764	Telecom equipment, and parts	75	24	United States (15), United Kingdom (9), Japan (9), Sweden (7)
714	Non-electric engines and motors	94	4	United States (30), United Kingdom (23), France (11), Germany (9), Canada (5)
541	Medicinal and pharmaceutical products	91	8	Germany (15), Switzerland (11), United Kingdom (10), United States (10)
781	Passenger motor cars	89	9	Germany (22), Japan (18), Canada (11), France (7)
792	Aircraft and associated equipment	93	6	United States (46), France (14), Germany (12), United Kingdom (8)
846	Knitted undergarments	40	57	China (16), United States (8), Turkey (6), Italy (6), Mexico (5)
893	Plastic materials	75	23	United States (14), Germany (13), China (7), Italy (7)
514	Nitrogen-function compounds	88	11	Ireland (18), Germany (13), United States (11), Switzerland (8)
771	Electric power machinery	61	37	United States (11), Germany (10), China (9), Japan (9)
553	Perfumery and cosmetics	88	10	France (28), United States (12), United Kingdom (12), Germany (11)
772	Electrical apparatus, switches etc	73	24	Germany (15), United States (14), Japan (13), France (7), United Kingdom (5), Mexico (4)
872	Medical instruments and appliances	87	12	United States (27), Germany (12), United Kingdom (7), Japan (6), Ireland (6)
778	Electrical machinery and apparatus	74	23	Japan (17), United States (13), Germany (13), United Kingdom (7), Mexico (6)
515	Organo-inorganic & heterocyclic compounds	89	9	Ireland (20), United States (12), United Kingdom (9), Germany (8), Japan (8)
821	Furniture and parts thereof	72	21	Italy (16), United States (9), Germany (9), Canada (8), China (5)
773	Electricity distributing equipment	59	34	Mexico (16), United States (14), Germany (9), Japan (6), France (4)

Source: See table 1a.

Note: See UNCTAD, Handbook of Statistics, table 4.4 for the main exporters of these products within the group of developing countries.

Table 3

The 20 most dynamic products in world non-fuel exports, ranked by index of dynamism based on shares in total exports, 1980–1998

Rank	*SITC code*	*Product group*
1	776	Transistors and semiconductors
2	752	Computers
3	764	Telecommunications equipment and parts
4	759	Parts of computers and office machines
5	541	Medicinal and pharmaceutical products
6	871	Optical instruments and apparatus
7	781	Passenger motor cars
8	772	Electrical apparatus, switches etc
9	714	Non-electric engines and motors
10	893	Plastic materials
11	846	Knitted undergarments
12	514	Nitrogen-function compounds
13	778	Electrical machinery and apparatus
14	681	Silver and platinum
15	821	Furniture and parts thereof
16	792	Aircraft and associated equipment
17	771	Electric power machinery
18	553	Perfumery and cosmetics
19	872	Medical instruments and appliances
20	773	Electricity distributing equipment

Source: See table 1a.
Note: For the calculation of the measure, see text and Appendix II.

Table 4

Predictability of annual export value growth, selected products, 1980–1998

Rank by predict-ability	*SITC code*	***Product group***	*Rank by index on dynamism based on export values*	*Rank by average annual growth of share in world non-fuel exports*
1	792	Aircraft and associated equipment	8	6
2	714	Non-electric engines and motors	6	30
3	554	Soap, cleansing and polishing preparations	63	129
4	725	Paper and pulp mill machinery	142	152
5	728	Specialized machinery and equipment	79	14
6	881	Photographic apparatus and equipment	112	115
7	847	Clothing accessories of textile fabrics	31	163
8	633	Cork manufactures	34	216
9	273	Stone, sand and gravel	115	185
10	742	Pumps for liquids, liquid elevators, and parts	78	82
11	679	Iron and steel castings, forgings and stampings	53	186
12	011	Meat and edible meat offals, fresh, chilled or frozen	146	21
13	737	Metalworking machinery, and parts	129	135
14	034	Fish, fresh (live or dead), chilled or frozen	77	70
15	749	Non-electric accessories of machinery	51	18
16	812	Sanitary, plumbing, heating and lighting fixtures	35	102
17	743	Pumps, compressors, fans and blowers	61	42
18	667	Pearls, precious and semi-precious stones	156	25
19	621	Materials of rubber (pastes, plates, sheets)	41	169
20	741	Heating and cooling equipment, and parts	86	30
206	001	Live animals for food	177	111
207	056	Preserved and prepared vegetables	153	158
208	289	Ores and concentrates of precious metals	210	201
209	628	Rubber articles	28	153
210	711	Steam and other vapour generating boilers, and parts	170	182
211	042	Rice	162	147
212	271	Crude certilizers	218	184
213	282	Waste and scrap metal of iron or steel	135	156
214	263	Cotton	200	98
215	047	Other cereal meals and flours	203	219
216	071	Coffee and coffee substitutes	208	66
217	211	Raw hides and skins (except fur skins)	193	157
218	233	Synthetic rubber	198	151
219	266	Synthetic fibres suitable for spinning	171	162
220	524	Radioactive and associated materials	206	148
221	037	prepared or preserved fish, crustaceans and molluscs	85	142
222	045	Unmilled cereals (other than wheat, rice, barley, maize)	224	196
223	251	Pulp and waste paper	186	56
224	274	Sulphur and unroasted iron pyrites	213	202
225	681	Silver and platinum	169	132

Source: See table 1a.
Note: For the calculation of the measures, see text and Appendix II.

Table 5

The 20 most dynamic products in world non-fuel exports ranked by composite index on predictability, volatility and growth, 1980–1998

Rank	*SITC code*	***Product group***	*Rank by index on dynamism based on export values*	*Rank by index on dynamism based on shares in total exports*
1	846	Knitted undergarments	10	11
2	714	Non-electric engines and motors	6	9
3	752	Computers	2	2
4	553	Perfumery and cosmetics	14	18
5	048	Cereal preparations	33	42
6	893	Plastic articles	11	10
7	111	Non-alcoholic beverages	45	65
8	847	Textile clothing accessoris	31	52
9	773	Electricity distributing equipment	20	20
10	612	Leather manufactures	29	70
11	728	Specialized machinery and equipment	79	88
12	778	Electrical machinery and apparatus	17	13
13	655	Knitted fabrics	24	23
14	872	Medical instruments and appliances	16	19
15	821	Furniture and parts thereof	19	15
16	759	Parts of computers and office machines	4	4
17	592	Starch, inulin, gluten, albuminoidal substances	44	46
18	062	Non-chocolate sugar preparations	72	86
19	776	Transistors and semiconductors	1	1
20	679	Iron and steel castings	53	54

Source: See table 1a.
Note: For the calculation of the measures, see text and Appendix II.

Table 6

Market-share concentration of dynamic products in world non-fuel exports identified on the basis of index of dynamism, based on export values, 1980–1998

Rank by index of dynamism	*SITC code*	***Product group***	*Index of market-share concentration*				
			1980-1981	*1984-1985*	*1990-1991*	*1994-1995*	*1997-1998*
1	776	Transistors and semiconductors	1285	1259	1163	1171	945
2	752	Computers	1735	1350	1121	977	797
3	871	Optical instruments and apparatus	1655	1629	1451	1362	1132
4	759	Parts of computers and office machines	2055	1824	1028	986	858
5	764	Telecommunications equipment, and parts	971	1219	1153	819	676
6	714	Non-electric engines and motors	2306	2136	1919	1650	1733
7	541	Medicinal and pharmaceutical products	891	886	827	767	771
8	781	Passenger motor cars	1713	1818	1474	1214	1122
9	931	Special transactions and commodities	2341	1540	954	724	709
10	792	Aircraft and associated equipment	2994	2684	2524	2146	2463
11	846	Knitted under garments	523	558	411	438	567
12	893	Plastic materials	826	814	767	632	647
13	514	Nitrogen-function compounds	1217	1190	1014	909	850
14	771	Electric power machinery	931	849	748	609	566
15	553	Perfumery and cosmetics	1601	1654	1481	1395	1249
16	772	Electrical apparatus	1053	1033	1088	934	794
17	872	Medical instruments and appliances	1115	1113	1224	1081	1123
18	778	Electrical machinery and apparatus	1035	1140	1066	899	826
19	515	Organo-inorganic & heterocyclic compounds	1038	896	848	802	915
20	821	Furniture and parts thereof	954	862	821	678	649

Source: See table 1a.

Note: For the calculation of the measure, see text and Appendix II. The index of market-share concentration ranges between 43, indicating that all countries in the sample have an equal share (0.43 per cent) in a product's total exports, and 10000, indicating that the product is exported by only one country.

Table 7

Shares of main exporters, developed and developing countries in world exports of the most agricultural commodities (ranked by index of dynamism based on export values, 1980–1998), 1998

(Per cent)

Rank	*SITC code*	*Rank among all products*	*Product group*	*Share of developed countries*	*Share of developing countries*	*Main exporting countries (shares)*
1	048	32	Cereal preparations	84	14	Italy (11), Germany (10), France (10), United Kingdom (8)
2	111	43	Non-Alcoholic beverages	75	22	France (19), Canada (7), United States (7), Belgium/Luxembourg (7)
3	098	49	Edible products and preparations	80	17	United States (16), France (12), Germany (8),China (5), Netherlands (6)
4	062	67	Non-chocolate sugar preparations	69	25	United Kingdom (10, Germany (9), Spain (9), United States (7), Belgium/Luxembourg (6)
5	122	69	Manufactured tobacco	74	24	United States (29), Netherlands (16), United Kingdom (10)
6	034	75	***Fish, fresh, chilled frozen***	61	37	Norway (13), United States (7), Denmark (5), China (5), Taiwan Province of China (5), Chile (5)
7	037	80	***Fish, prepared, preserved***	40	58	Thailand (20), China (10), Denmark (5), Spain (4), Germany (4)
8	036	84	***Shell fish, fresh, frozen***	15	70	Thailand (12), Indonesia (7), Canada (6), India (6), Ecuador (6)
9	112	86	Alcoholic beverages	87	10	France (28), United Kingdom (16), Italy (10), Spain (6)
10	073	88	Chocolate	88	7	Germany (16), Belgium/Luxembourg (13) , France (11), United Kingdom (8)
11	269	93	Waste of textile fabrics	82	16	United States (22), Germany (15), United Kingdom (8), Netherlands (8)
12	054	95	**Vegetables, fresh, simply pres.**	67	31	Netherlands (15), Spain (12), United States (9), Mexico (9), Italy (7)
13	091	96	Margarine and shortening	71	25	Germany (16), Netherlands (11), Belgium/Luxembourg (11), United States (7)
14	245	97	Fuel wood and charcoal	24	41	Latvia (15), Indonesia (10), China (10), France (6), Poland (5)
15	058	104	**Fruit, preserved, prepared**	57	37	Brazil (11), United States (9), Germany (7), Belgium/Luxembourg (6), Italy (6)
16	292	111	Crude vegetable materials	74	25	Netherlands (31), United States (7), Germany (5), Italy (5), Denmark (5)
17	423	115	**Soft fixed vegetable oils**	59	38	Argentina (21), United States (11), Spain (10), Germany (7), Brazil (7)
18	057	116	**Fruits, nuts, fresh, dried**	58	41	Spain (13), United States (12), Italy (7), Belgium/Luxembourg (6), France (5)
19	014	121	**Meat, prepared, preserved**	68	23	Denmark (10), Belgium/Luxembourg (10), United States (9), France (9)
20	431	122	Processed animal and vegetable oil	51	48	Malaysia (25), Netherlands (12), Germany (10), Indonesia (10)
21	024	123	**Cheese and curd**	95	2	France (19), Netherlands (18), Germany (15), Denmark (9), Italy (7)
22	291	126	Crude animal materials	56	40	China (18), Germany (10), United States (10), Taiwan Province of China. (6), Netherlands (5)
23	022	133	**Milk and cream**	89	7	Germany (22), France (14), Netherlands (10), Belgium/Luxembourg (9)
24	011	145	**Meat, fresh, chilled or frozen**	79	17	United States (16), Netherlands (10), France (9), Denmark (7), Australia (7)
25	075	148	**Spices**	22	77	Singapore (13), Indonesia (12), India (11), China (6), Netherlands (5)

Source: See table 1a.

Note: See UNCTAD, Handbook of Statistics, table 4.4 for the main exporters of these products within the group of developing countries. Bold characters indicate high-value products and/or items with an income elasticity of demand greater than one (see Appendix III.(iii)).

Table 8

Leading dynamic products by exporting region, ranked by average annual export value growth, 1980–1998

Rank	SITC code	Product group	SITC code	Product group	SITC code	Product group
		Developed countries		**Developing countries**		**Developing countries excl. 1st-tier NIEs**
1	776	**Transistors and semiconductors**	752	**Computers**	763	Sound recorders
2	844	**Textile undergarments**	871	**Optical instruments**	871	**Optical instruments**
3	553	**Perfumery and cosmetics**	759	**Parts of computers & office machines**	759	**Parts of computers & office machines**
4	871	**Optical instruments**	582	Condensation products	761	Television receivers
5	752	**Computers**	741	Heating and cooling equipment	881	Photogr apparatus and equipment
6	893	**Plastic articles**	655	**Knitted fabrics**	752	**Computers**
7	759	**Parts of computers & office machines**	531	Synthetic organic dyestuffs	655	**Knitted fabrics**
8	898	**Musical instruments and records**	773	**Electricity distributing equipment**	894	Toys and sporting goods
9	541	**Medicinal & pharmaceutical products**	712	Steam engines and turbines	762	Radio receivers
10	846	**Knitted undergarments**	781	Passenger motor vehicles, excl buses	898	**Musical instruments and records**
11	872	**Medical instruments**	872	**Medical instruments**	885	Watches and clocks
12	048	**Cereal preparations**	763	Sound recorders	893	Plastic articles
13	111	**Non-alcoholic beverages**	583	Polymerization products	666	Pottery
14	764	**Telecom equipment, and parts**	776	**Transistors and semiconductors**	895	Office supplies nes
15	771	**Electric power machinery**	771	**Electric power machinery**	679	Iron and steel castings
16	783	Road motor vehicles nes	679	Iron and steel castings	773	**Electricity distributing equipment**
17	098	Edible products and preparations	774	Medical apparatus	785	Cycles, motorized or not
18	514	Nitrogen-function compounds	592	Starch, inulin, gluten, albuminoidal sub.	741	Heating and cooling equipment
19	873	Meters and counters	516	Other organic chemicals	831	Travel goods and handbags
20	073	Chocolate	761	Television receivers	531	Synthetic organic dyestuffs
		First-tier NIEs		**Developing Asia excluding West Asia, Central Asia, 1st-tier NIEs and China**		**ASEAN-4 (Indonesia, Malaysia, Philippines, Thailand)**
1	752	**Computers**	752	Computers	752	**Computers**
2	277	Natural abrasives	759	Parts of computers and office machines	759	**Parts of computers & office machines**
3	783	Road motor vehicles nes	763	Sound recorders	871	**Optical instruments**
4	951	War firearms and ammunition	672	Iron or steel ingots and forms	763	Sound recorders
5	871	**Optical instruments**	761	Television receivers	672	Iron or steel ingots and forms
6	592	Starch, inulin, gluten, albuminoidal sub.	751	Office machines	751	Office machines
7	781	Passenger motor vehicles, excl buses	674	Iron or steel universals, plates and sheets	716	Rotating electric plant
8	611	Leather	871	Optical instruments	511	Hydrocarbons
9	212	Raw furskins	716	Rotating electric plant, and parts	277	Natural abrasives
10	582	Condensation products	511	Hydrocarbons	761	Television receivers
11	882	Photographic & cinematographic supplies	277	Natural abrasives	785	Cycles, motorized or not
12	682	Copper	582	Condensation products	773	**Electricity distributing equipment**
13	759	**Parts of computers & office machines**	267	Other man-made fibres	267	Other man-made fibres
14	686	Zinc	764	Telecom equipment, and parts	786	Trailers and other non-motor vehicles
15	513	Carboxylic acids	592	Starch, inulin, gluten, albuminoidal sub.	775	Household equipment
16	524	Radioactive materials	641	Paper and paperboard	641	Paper and paperboard
17	122	Manufactured tobacco	781	Passenger motor vehicles, excl buses	592	Starch, inulin, gluten, albuminoidal sub.
18	712	Steam engines and turbines	773	Electricity distributing equipment	677	Iron or steel wire
19	774	Medical apparatus	881	Photographic apparatus & equipment nes	781	Passenger motor vehicles, excl buses
20	515	Organo-inorganic compounds	677	Iron or steel wire	268	Wool and animal hair
		South Asia		**Central America and the Caribbean**		**South America**
1	761	Television receivers	851	Footwear	245	Fuel wood and charcoal
2	752	**Computers**	265	Vegetable fibres, excl cotton & jute	682	Copper
3	582	Condensation products	778	**Electrical machinery & apparatus**	292	Crude vegetable materials
4	674	Iron or steel universals, plates and sheets	266	Synthetic fibres for spinning	098	Edible products preparations
5	515	Organo-inorganic compounds	268	Wool and animal hair	014	Meat prepared or preserved
6	655	**Knitted fabrics**	411	Animal oils and fats	121	Unmanufactured tobacco
7	266	Synthetic fibres for spinning	678	Iron or steel tubes and pipes	524	Radioactive materials
8	672	Iron or steel ingots and forms	751	Office machines	716	Rotating electric plant
9	871	**Optical instruments**	759	**Parts of computers & office machines**	678	Iron or steel tubes, pipes and fittings
10	759	**Parts of computers & office machines**	772	Electrical apparatus, switches etc	812	Plumbing, heating & lighting equipment
11	673	Iron or steel bars and rods	874	Measuring & controlling instruments	523	Other inorganic chemicals
12	513	Carboxylic acids	671	Pig iron	111	**Non-alcoholic beverages**
13	661	Lime, cement and building products	785	Cycles, motorized or not	845	Knitted outergarments
14	583	Polymerization products	245	Fuel wood and charcoal	951	War firearms and ammunition
15	514	Nitrogen-function compounds	871	**Optical instruments**	713	Internal combustion piston engines & parts
16	277	Natural abrasives	582	Condensation products	045	Unmilled cereals
17	511	Hydrocarbons	872	**Medical instruments**	671	Pig iron
18	683	Nickel	742	Pumps for liquids	046	Wheat meal or flour
19	898	Musical instruments and records	737	Metal working machinery	551	Essential oils and perfume
20	781	Passenger motor vehicles, excl buses	724	Textile and leather machinery	655	**Knitted fabrics**

Source: See table 1a.

Note: For the calculation of the measures, see text and Appendix II. The product groups highlighted are among the 20 most dynamic ones on a world scale, as listed in table 1a.

Table 9

Composition of non-fuel exports, selected developing countries, 1996–1998 averages

(Per cent)

SITC Code	Product group	Share
Philippines		
776	Transistors & semiconductors	36.89
759	Parts of computers and office machines	7.86
752	Computers	7.51
764	Telecom equip, and parts	4.08
843	Non-knit women'soutergarm	3.10
424	Other fixed vegetable oils	2.67
772	Electrical app, switches etc	2.37
773	Electricity distributing equip	2.22
845	Knitted outergarments	2.08
846	Knitted undergarments	1.67
057	Fruit, nuts, fresh, dried	1.59
842	Non-knitted men'soutergarm	1.55
Costa Rica		
057	Fruit, nuts, fresh, dried	21.53
071	Coffee and substitutes	10.88
292	Crude vegetable materials	3.92
759	Parts of computers and office machines	3.45
776	Transistors & semiconductors	3.07
058	Fruit preserved, prepared	2.78
846	Knited undergarments	2.26
054	Vegetables fresh, simply pres	2.14
034	Fish, fresh, chilled, frozen	2.09
036	Shell fish fresh, frozen	1.88
843	Non-knit women'soutergarm	1.87
842	Non-knitted men'soutergarm	1.85
541	Medicinal, pharmaceutical prdts	1.77
764	Telecom equip, and parts	1.67
Mexico		
781	Passengr motor vehicl, exc bus	10.44
773	Electricity distributing equip	5.03
764	Telecom equip, and parts	4.44
778	Electrical machinery, apparatus	4.16
761	Television receivers	4.11
782	Lorries, other spec motor veh	3.80
752	Computers	3.68
784	Parts of motor vehicles	3.61
713	Intern combust piston engines	2.99
772	Electrical apparatus, switches	2.82
776	Transistors & semiconductors	2.00
759	Parts of computers and office machines	1.92
054	Vegetables fresh, simply pres	1.87
821	Furniture and parts thereof	1.70
771	Electric power machinerynes	1.66
843	Non-knit women'soutergarm	1.51
China		
851	Footwear	4.59
894	Toys and sporting goods	4.58
843	Non-knit women'soutergarm	3.93
842	Non-knitted men'soutergarm	3.51
845	Knitted outergarments	3.49
764	Telecom equip, and parts	3.31
752	Computers	3.19
846	Knited undergarments	2.61
893	Plastic articles	2.07
831	Travel goods, handbags, etc	1.87
848	Headgear, non-textile clothing	1.84
778	Electrical machinery, apparatus	1.80
652	Woven cotton fabrics	1.77
899	Other manufactured goods	1.67
775	Household equipment	1.66
762	Radio receivers	1.58
658	Other textile articles	1.57
759	Parts of computers and office machines	1.57
Malaysia		
776	Transistors & semiconductors	
759	Parts of computers and office machines	
752	Computers	
764	Telecom equip, and parts	
424	Other fixed vegetable oils	
762	Radio receivers	
763	Sound recorders	
772	Electrical apparatus, switches	
634	Veneers and plywood	
761	Television receivers	
248	Wood, shaped, rail sleepers	
821	Furniture and parts thereof	
848	Headgear, non-textile clothing	
232	Natural rubber and gums	
Singapore		
752	Computers	20.66
776	Transistors & semiconductors	18.56
759	Parts of computers and office machines	9.21
764	Telecom equip, and parts	5.20
778	Electrical machinery, apparatus	2.38
772	Electrical apparatus, switches	2.28
Thailand		
759	Parts of computers and office machines	8.39
776	Transistors & semiconductors	6.10
752	Computers	5.05
042	Rice	3.88
036	Shell fish fresh, frozen	3.57
232	Natural rubber and gums	3.54
037	Fish prepared, preserved	3.36
764	Telecom equip, and parts	2.81
772	Electrical apparatus, switches	2.03
851	Footwear	1.95
061	Sugar and honey	1.93
761	Television receivers	1.86
741	Heating, cooling equipment	1.82
845	Knitted outergarments	1.76
897	Gold, silver ware, jewellery	1.73
667	Pearl, prec, semi-prec stones	1.56
583	Polymerization products	1.53
Argentina		
081	Feeding stuff for animals	10.08
423	Soft fixed vegetable oils	9.76
044	Unmilled maize	5.82
781	Passengr motor vehicl, exc bus	5.77
041	Unmilled wheat	5.49
611	Leather	3.76
222	Seeds for soft fixed oils	3.46
011	Meat, fresh, chilled, frozen	3.20
782	Lorries, other spec motor veh	2.41
057	Fruit, nuts, fresh, dried	2.32
034	Fish, fresh, chilled, frozen	2.23
678	Iron or steel tubes, pipes, fittings	2.23
784	Parts of motor vehicles	1.96
036	Shell fish fresh, frozen	1.79
054	Vegetables fresh, simply prsrvd	1.71
263	Cotton	1.61
Korea, Republic of		
776	Transistors & semiconductors	15.42
781	Passengr motor vehicl, exc bus	7.37
793	Ships and boats	5.93
653	Woven man-made fibre fabrics	4.60
752	Computers	3.98
764	Telecom equip, and parts	3.70
583	Polymerization products	2.83
674	Iron or steeluniv, plates, sheets	2.41
778	Electrical machinery, apparatus	1.90
775	Household equipment	1.52
India		
667	Pearl, prec, semi-prec stones	
651	Textile yarn	
843	Non-knit women'soutergarm	
042	Rice	
652	Woven cotton fabrics	
541	Medicinal, pharmaceutical prdts	
036	Shell fish fresh, frozen	
844	Non-knitted undergarments	
081	Feeding stuff for animals	
658	Other textile articles	
897	Gold, silver ware, jewellery	
846	Knitted undergarments	
659	Floor coverings	

Source: See table 1a.

Notes: Share refers to a product's average share in an economy's total merchandise exports during the period 1996–1998. For each of the countries, all products with a share of at least 1.5 per cent are included. The economies are ordered according to their aver üñž !AP value growth during the period 1990–1998.

Table 9 (concluded)

Composition of non-fuel exports, selected developing countries, 1996–1998 averages

(Per cent)

SITC Code	Product group	Share
Morocco		
522	Inorganic chemical elements	11.99
036	Shell fish fresh, frozen	9.39
271	Crude fertilizers	8.47
562	Manufactured fertilizers	7.92
057	Fruit, nuts, fresh, dried	6.51
845	Knitted outergarments	5.64
842	Non-knitted men's outergarm	5.23
054	Vegetables fresh, simply prsrvd	3.89
037	Fish prepared, preserved	3.80
056	Vegetables preserved, prep	2.69
287	Base metals ores, conc nes	2.33
846	Knited undergarments	2.10
034	Fish, fresh, chilled, frozen	2.06
843	Non-knit women's outergarm	1.78
773	Electricity distributing equip	1.71
851	Footwear	1.62
292	Crude vegetable materials	1.52
Peru		
682	Copper	18.06
081	Feeding stuff for animals	15.16
287	Base metals ores, conc nes	14.12
071	Coffee and substitutes	6.01
686	Zinc	4.06
846	Knited undergarments	3.71
681	Silver and platinum	3.04
897	Gold, silver ware, jewellery	2.70
036	Shell fish fresh, frozen	2.19
056	Vegetables preserved, prep	2.01
845	Knitted outergarments	1.89
281	Iron ore and concentrates	1.75
651	Textile yarn	1.71
054	Vegetables fresh, simply prsrvd	1.51
Turkey		
845	Knitted outergarments	8.48
846	Knited undergarments	6.54
843	Non-knit women's outergarm	5.34
057	Fruit, nuts, fresh, dried	4.85
673	Iron or steel bars and rodes	4.78
658	Textile articles nes	3.05
651	Textile yarn	2.49
054	Vegetables fresh, simply prsrvd	2.37
842	Non-knitted men's outergarm	2.31
653	Woven man-made fibre fabrics	2.22
121	Unmanufactured tobacco	2.18
761	Television receivers	1.75
652	Woven cotton fabrics	1.71
773	Electricity distributing equip	1.53
848	Headgear, non-textile clothing	1.52
China, Hong Kong SAR		
845	Knitted outergarments	12.62
843	Non-knit women's outergarm	10.04
776	Transistors & semiconductors	9.20
842	Non-knitted men's outergarm	5.14
885	Watches and clocks	4.67
759	Parts of computers and office machines	4.08
764	Telecom equip, and parts	3.94
844	Non-knitted undergarments	3.52
846	Knited undergarments	3.38
897	Gold, silver ware, jewellery	3.25
652	Woven cotton fabrics	3.08
892	Printed matter	2.30
772	Electrical apparatus, switches	2.25
583	Polymerization products	2.11
871	Optical instruments	1.87
Chile		
682	Copper	30.50
287	Base metals ores, conc nes	13.07
057	Fruit, nuts, fresh, dried	7.06
034	Fish, fresh, chilled, frozen	5.61
251	Pulp and waste paper	4.81
081	Feeding stuff for animals	3.54
112	Alcoholic beverages	2.87
248	Wood, shaped, rail sleepers	2.50
Indonesia		
634	Veneers and plywood	9.65
287	Base metals ores, conc nes	5.07
851	Footwear	4.63
424	Other fixed vegetable oils	4.59
232	Natural rubber and gums	4.40
036	Shell fish fresh, frozen	3.10
641	Paper and paperboard	2.97
897	Gold, silver ware, jewellery	2.94
653	Woven man-made fibre fabrics	2.85
651	Textile yarn	2.53
843	Non-knit women's outergarm	2.46
842	Non-knitted men's outergarm	2.09
763	Sound recorders	2.07
635	Wood manufactures	2.02
821	Furniture and parts thereof	1.99
764	Telecom equip, and parts	1.93
071	Coffee and substitutes	1.73
759	Parts of computers and office machines	1.65
251	Pulp and waste paper	1.61
845	Knitted outergarments	1.52
Colombia		
071	Coffee and substitutes	27.97
292	Crude vegetable materials	7.43
057	Fruit, nuts, fresh, dried	6.71
061	Sugar and honey	3.52
583	Polymerization products	3.17
591	Pesticides and disinfectants	2.44
541	Medicinal, pharmaceutical prdts	2.23
671	Pig iron	2.08
846	Knited undergarments	1.92
667	Pearl, prec, semi-prec stones	1.85
842	Non-knitted men's outergarm	1.84
892	Printed matter	1.50
Taiwan, Province of China		
752	Computers	10.11
776	Transistors & semiconductors	9.21
759	Parts of computers and office machines	8.01
764	Telecom equip, and parts	3.41
772	Electrical apparatus, switches	2.78
653	Woven man-made fibre fabrics	2.65
785	Cycles, motorized or not	2.49
893	Plastic articles	2.49
655	Knitted fabrics	2.44
778	Electrical machinery, apparatus	2.38
699	Base metal manufactures	2.34
657	Spec textile fabrics & products	2.16
583	Polymerization products	2.14
894	Toys and sporting goods	2.14
651	Textile yarn	1.87
771	Electric power machinery	1.61
728	Oth machy for spec industries	1.53
674	Iron or steel univ, plates, sheets	1.50
Tunisia		
842	Non-knitted men's outergarm	21.55
843	Non-knit women's outergarm	12.19
562	Manufactured fertilizers	5.94
846	Knited undergarments	5.07
522	Inorganic chemical elements	4.74
845	Knitted outergarments	4.31
773	Electricity distributing equip	4.25
423	Soft fixed vegetable oils	3.74
844	Non-knitted undergarments	2.80
612	Leather manufactures	2.48
851	Footwear	2.17
772	Electrical apparatus, switches	2.08
523	Other inorganic chemicals	1.59
036	Shell fish fresh, frozen	1.51
Brazil		
281	Iron ore and concentrates	6.19
071	Coffee and substitutes	5.52
081	Feeding stuff for animals	5.36
222	Seeds for soft fixed oils	3.92
061	Sugar and honey	3.77
784	Parts of motor vehicles	3.61
672	Iron or steel ingots and forms	3.50
851	Footwear	3.12
058	Fruit preserved, prepared	2.80
011	Meat, fresh, chilled, frozen	2.65
684	Aluminium	2.62
781	Passengr motor vehicl, exc bus	2.57
713	Intern combust piston engines	2.33
251	Pulp and waste paper	2.17
121	Unmanufactured tobacco	2.16
641	Paper and paperboard	1.92
671	Pig iron	1.86
792	Aircraft	1.79
782	Lorries, other spec motor veh	1.73
674	Iron or steel univ, plates, sheets	1.73
423	Soft fixed vegetable oils	1.53

Table 10

Dynamic products in non-fuel imports of developing countries, by average annual import value growth, 1988–1998

SITC code	Product group	Average annual import value growth, 1988–1998 (Per cent)	Share in total imports			Rank by average annual export value growth 1988–1998
			1990	1995	1998	
			(Index numbers, 1988 = 100)			
		(1)	(2)	(3)	(4)	(5)
871	Optical instruments	25.3	146	670	940	1
941	Zoo animals and pets	21.0	127	451	612	125
776	Transistors and semiconductors	19.5	121	437	518	6
759	Parts of computers and office machines	19.1	139	412	546	2
893	Plastic articles	18.6	158	485	559	78
846	Knitted undergarments	17.6	187	499	582	69
851	Footwear	17.4	192	559	479	194
771	Electric power machinery nes	17.1	133	370	449	16
752	Computers	17.0	141	354	453	14
612	Leather manufactures	16.8	209	508	523	164
844	Non-knitted undergarments	16.1	165	417	490	137
764	Telecom equipment and parts	16.0	140	385	407	28
845	Knitted outergarments	15.6	144	344	467	171
773	Electricity distributing equipment	15.4	141	346	396	7
681	Silver and platinum	15.4	194	372	453	70
699	Base metal manufactures	15.4	130	324	399	55
289	Precious metal ores & waste	15.3	167	267	463	217
772	Electrical apparatus, switches etc	15.0	121	306	366	9
778	Electrical machinery & apparatus	15.0	131	340	365	10
951	War firearms and ammunition	15.0	162	298	448	11

Source: See table 1a.

Note: For the calculation of the measures, see text and Appendix II.

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