"Latin American Export Specialization and Growth: an inquiry into the nature of product competition between different exporters"

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1. Introduction

The main objectives of this paper are to examine the patterns of export specialization of Latin American countries and try to see if they are related to the export performance of these countries. It is assumed that better export performance will foster economic growth. Given Latin America general specialization in resource-based products, the paper focus on the question as to whether or not it is possible for a country specialized in resource-based products to have high rates of export and growth.

There are many ways of classifying products and hence defining patterns of specialization. The conventional practice has been to apply some measure of technology intensity to define countries' patterns of specialization. However, very few resource-based products are actually classified as high-tech products. In this paper an attempt is made to classify resource-based products, according to the role played by prices in the mechanism through which countries compete in specific international product markets and, eventually, gain or loose market shares in these markets.

The remainder of this paper is organized as follows. Section two reviews some possible theoretical effects of trade integration on specialization, technological progress and economic growth. It reviews OECD's classification of high-tech products and describes the methodology for a new taxonomy of traded goods based on their degree of differentiation. It also discusses some policy implications. Section three analyses the development of world trade by groups of products, classified according to their degree of manufacturing and technology intensity. The distribution of these groups of products by countries is also analysed and related to the countries' export performance. The performance of Latin American countries' exports to the US is examined at the end of section three, using a constant market share analysis. Section four applies the new taxonomy to a group of fifty-one resource-based products, excluding energy-related goods, and to twelve machines used in the production of resource-based goods. The dynamics of each group of product is then used to analyse the performance of some Latin American countries' exports to the US. The fifth section sums up the conclusions of the paper.

2. Specialisation, technological progress and growth

Theoretical framework

The principal theoretical reference of this paper is to be found in the literature that attempts to integrate trade and growth theories. A large number of dynamic models have been developed in this literature. Grossman and Helpman (1991) sum up some of these models and work out the effects of integration on innovation and growth in a two-country general equilibrium framework. I review some of their results here.

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Economic growth in the long run is the result of technological progress. In traditional neoclassical growth models, technological progress is assumed to be exogenous. This would be an adequate assumption "if advances in industrial know-how followed automatically from fundamental discoveries and if basic research was guided mostly by nonmarket forces"[2].

One way of making technological progress endogenous is by assuming that market forces can allocate resources to R&D, generating innovation and growth. In Grossman and Helpman's (G&H) models, new technologies are endogenous and result from the intentional actions of economic agents that perceive profit opportunities. Firms allocate resources to R&D when they expect a return. These returns come most often in the form of economic rents in product markets operating in imperfect competition. Therefore, monopoly profits provide the basis for economic growth in these models.

Innovation successes materialize into two types of new products or inputs: those that are imperfect substitutes of the existing ones; and those that are perfect substitutes of the existing ones. With the first type of new product or input, the economy expands horizontally, as new products are added to the existing ones. With the second type, the economy expands vertically, as new and better quality products or inputs make the existing ones obsolete. The model of expanding variety captures the first type of innovation, while the rising product quality model (quality ladders) captures the second type. In the real world, of course, economies can expand horizontally and vertically at the same time as both types of products coexist.

G&H build on these models by adding three sectors: the traditional sector (where no innovation takes place), the high-tech industry (where innovation is applied), and the R&D sector (where innovation is created). The R&D sector is assumed to be the most intense in human capital, whereas the traditional sector is the least intense. Given this set up and assuming that technological spillovers are global, the country's size, human capital endowment, and stock of accumulated knowledge all contribute to the country's competitiveness in research.

Research successes create export opportunities to the extent that innovators learn how to produce goods that are better, different or cheaper than those of their competitors abroad. In the long run, the country's pattern of specialization and economic growth are both the result of this competitiveness in research. When technological spillovers are national, the initial conditions, historically determined, become crucial for the countries' pattern of specialization and growth in the long term.

Therefore, one possible outcome is that countries that are small and/or poorly endowed with human capital and have a relatively small stock of country-specific knowledge would tend to specialize in traditional and non-innovative sectors, export low-tech products, and grow more slowly. On the other hand, large economies, well endowed with human capital and with relatively large stocks of country-specific knowledge would tend to specialize in innovative sectors, export high-tech products and experience high rates of innovation and growth.

Empirical Questions

A large number of empirical questions can possibly be derived from the above theoretical framework. If indeed countries that are more competitive in research are expected to grow faster and export high-tech products, one should empirically find a positive relationship between rates of economic growth and specialization in high-tech sectors and goods across countries. However, in order to address this empirical question, it is necessary to be able to define, measure, and identify high-tech sectors and products in a meaningful and practical way.

[2] Grossman and Helpman (1991), p.334.

A theoretical and conceptual discussion on how to define and measure technology could take us well beyond the scope of this work. It here suffices to say that a high-technology industry is the one producing technology (better, different or cheaper products or inputs) or using it intensively. They are also expected to be "those expanding most strongly in international trade and their dynamism helps to improve performance in other sectors (spillover)"[3].

A number of factors may be used to measure the technological level of a sector. Hatzichronoglou (1997) lists the following: R&D intensity, scientific and technical personnel, technology embodied in patents, licenses and know-how, strategic technical co-operation between companies, the rapid obsolescence of the knowledge available, quick turnover of equipment, etc[4].

However, one should bear in mind that researchers are restricted by the data that are available for the existing international classifications of sectors and products. To the best of my knowledge, the main systematic effort to classify sectors and products according to their technological content has been pursued by OECD[5]. It is largely recognized that there is no perfect way to identify the technology content of an industry or product, measure it and determine the cut-off points between different categories.

OECD's classification of sectors by technology content applies the concept of R&D direct and indirect intensity. The former is measured by the ratio of R&D expenditure to output or value added by industry and tries to capture the industry effort for producing technology. The latter measures R&D expenditure embodied in intermediates and capital goods purchased by the industry, through the use of input-output matrices, and it is an attempt to capture technology diffusion or how intensively technology is used in a particular industry. The sum of direct and indirect R&D intensity is then calculated to rank manufacturing industries into four groups: high-technology, medium-high-technology, medium-low-technology and low technology.

In order to identify high-tech products, OECD calculates R&D expenditure over total sales by product at the 5-digit level of the Standard International Trade Classification (SITC), Revision 3. Indirect R&D intensity is not applied at this level of disaggregation to define high-tech products. In principle, high-tech products do not have to belong to a high-tech industry. Hence, a true proportion of high technology of an industry could then be calculated, excluding all non-high-tech products from it. However, at this level of aggregation, many products manufactured by medium-and-low-technology sectors, but with high R&D expenditure over total sales, could not justifiably be considered high-tech and were excluded from the OECD list on the basis of expert opinion. As a result, OECD only publishes a list of high-tech products, which are largely consistent with the industries classified as high-tech[6], though it includes some products manufactured by medium-high technology industries.

It is worth noting that sectors can be more technology intensive in one country, but less so in another. That is why OECD classifies the technology content of each manufacturing industry on the basis of a weighted average of a large number of their member countries. On the other hand, the technology content of products is regarded as independent of the country where they are manufactured.

Hatzichronoglou (1997) recognizes some of the main limitations of the method applied by OECD to classify sectors and list the group of high-tech products by their technology content. First, R&D intensity is a very important characteristic of high technology, but it is not the only one. Second,

[3] Hatzichronoglou (1997), p. 4.
[4] Ibid, p.8.
[5] See Mani (2000) and Hatzichronoglou (1997) for a brief history of OECD's and others' efforts.
[6] The concordance between SITC Rev.3 (product classification) and ISIC Rev.2 (sectoral classification) gives the list of products by sectors classified by their R&D intensity.

R&D intensity measurements are biased against the sectors and periods in which turnover or production increase more rapidly than R&D expenditure on account of strong demand in growth or exceptionally vigorous marketing. They are also biased because all research in each sector is attributed to the principal activity of the firms making up the sector. High-tech products cannot be selected exclusively by quantitative methods unless a relatively high level of aggregation is adopted. Resorting to expert opinion helps to mitigate this problem, but the results cannot readily be reproduced in their entirety by other panel of experts. Since the choice is not based exclusively on quantitative measurements, it is difficult to classify products in increasing or decreasing order. Finally, the data are not comparable with other industrial data, as information published by other agencies on, for example, value added, employment and gross fixed capital formation are not available at product level.

The lack of sufficiently disaggregated data is another limitation, forcing the method to be applied to industries and products defined at still high levels of aggregation. A firm that has a high level of R&D expenditure to sales may produce a product, whose final assembly may consist of simple operations that can be located in any cheap labour country. In this case, although the product is very likely classified as high-tech according to OECD's classification, it should not have been considered a high-tech product[7]. Therefore, "countries with low technological capabilities can appear technologically advanced, giving a misleading picture of industrial performance. This problem is not possible to solve by refining available data on MVA and exports"[8].

A new taxonomy for traded goods

Given the limitations discussed above of OECD's methodology to classify high-tech products and the fact that OECD applies it only to manufactured goods, a new taxonomy is here proposed to supplement OECD's list of high-tech products. The idea is to classify traded goods, especially resource-based products, be manufactures or non-manufactures, as homogeneous, differentiated, and highly differentiated products.

Products that follow the law of one price (LOP) are regarded as homogeneous products. This law states that homogeneous products must be traded at the same price, regardless of where they are sold, as long as prices are expressed in the same currency and taking due account of transfer costs[9]. Any price difference should be rapidly eliminated by commodity arbitrage. Countries would, therefore, specialise either as exporters or importers of these products and would not discriminate between domestic and exporting markets.

Formally, a strict version of LOP may be expressed as[10]:

$$P_i^*/ P_j^* = 1, \quad (1)$$

where P_i^* and P_j^* are the domestic prices paid in a given market for the same good (or perfect substitute goods) imported from countries i and j, respectively. These are cif (cost, insurance and freight) prices plus import duties, so they may be written as:

$$P_i^* = (P_i/E_i)\,(1+t_i), \quad (2)$$

where P_i is the cif export price expressed in country i's currency, E_i is the exchange rate relating the value of country i's currency to one unit of the market currency and t_i is the *ad valorem* import tariff (plus any non-tariff *ad valorem* equivalent) for country i.

[7] This is one reason why indirect R&D intensity ought not to be applied to define a high-tech product, as opposed to a high-tech industry, even if it could be measured at this high level of disaggregation.

[8] UNIDO (2002), box 2.1, p.30.

[9] That includes transportation costs, tariff and non-tariff barriers.

[10] See Chami Batista and Silveira (2003).

A weaker version of LOP would allow a price difference (premium), but no variations in relative prices:

$d(P_i^*/ P_j^*)/dt = 0$ (3).

The presumption behind the law of one price is that suppliers are price takers in perfect competitive markets. The intersection between global demand and supply curves determines the world equilibrium price, which should vary according to the location of delivery, but relative prices from different exporting countries must remain constant at each location.

On the other hand, differentiated good (DG) models assume that a commodity produced by one country is an imperfect substitute in demand for the "same" commodity produced by another country. Following Armington's (1969) convention we here refer to these commodities as goods and to the good produced by a particular country as a product. It is assumed that changes in the price of a product will change both relative prices and relative quantities demanded by the market.

Formally, DG models often assume that[11]:

$Q_i^*/ Q_j^*= F (P_i^*/ P_j^*)$, where $F'<0$, or(4)

$d(Q_i^*/ Q_j^*)/(Q_i^*/ Q_j^*)= f [d(P_i^*/ P_j^*)/(P_i^*/ P_j^*)]$, where $f'<0$. (5).

Assuming that the long-run price elasticity of substitution is constant, it follows that:

$d(Q_i^*/ Q_j^*)/(Q_i^*/ Q_j^*)= \sigma\, d(P_i^*/ P_j^*)/(P_i^*/ P_j^*)$, where σ is Armington's long-run elasticity of substitution between two products.

Thus, in order to classify resource-based products as homogeneous (LOP), differentiated (DIF) and highly differentiated (HIGH-DIF) products, time series of monthly US import prices from 1996 to 2003 by products and country of origin will be tested econometrically. When the time series of relative import price from a pair of countries, exporting a particular product to the US, is found by ADF test (Augmented Dickey-Fuler test) to be stationary, the product is classified as a homogeneous product, since it follows the law of one price (LOP).

If the test finds the series of relative import price to be non-stationary, the product is considered differentiated (DIF). In this case, the time series of relative quantities of the same product and pair of countries is also investigated. If it happens to be non-stationary, a number of Johansen cointegration tests are run, in order to look for a cointegration equation between the two non-stationary series. If a cointegration equation is found and the long run elasticity of relative quantities with respect to relative prices is negative, the product is simply classified as differentiated (DIF). This means that countries expand their export volume relatively to competitors by cutting their relative prices.

If the long run price elasticity of substitution is found to be positive or if no long run relationship is found between relative prices and quantities, the product is classified as highly differentiated (HIGH-DIF). This means that international competition in these products is not predominantly based on price differences.

[11] Following Armington (1969) again, we make the independence assumption; i.e., marginal rates of substitution between any two products of the same kind must be independent of the quantities of the products of all other kinds; and quantity index functions, relating the quantity of a good to the quantities of its products, must be linear and homogeneous.

Economic growth and the new taxonomy

What is the relation between this product classification and economic growth? The idea is that the returns from new technologies come most often in the form of economic rents in product markets operating in imperfect competition, as it has been seen in theoretical models. These monopoly profits provide the impetus for economic growth in these models. If a product follows the law of one price, it means that firms are price takers operating in perfect competition. Therefore, firms will not get economic rents in the long run. It is presumed that productivity gains in the production of homogeneous products are rapidly diffused among competitors.

Exporters of differentiated products, on the other hand, operate in imperfectly competitive product markets. Firms have some degree of monopoly power and are price makers. In order to differentiate their products or to maintain their products different from those of their competitors, exporters need to innovate and, presumably, get returns in the form of economic rents.

However, to the extent that exporters can gain market share through price cuts, the degree of differentiation may be regarded as relatively small. Hence, when competition is quite insensitive to price changes, products may be regarded as highly differentiated. The rate of innovation is likely to be greater among exporters of these products. In point of fact, although Carlin et al. (2001) found that R&D expenditures have not been able to help relative unit labour costs to explain the export performance of OECD countries over the period between 1970 and 1992, they found evidence that the sensitivity of export performance to these costs tends to be smaller in high-tech industries.

Moreover, as it is well known, exporters of a differentiated product may well prefer to maintain their export price relatively stable and thus change their margin of profits when unit costs change, as it happens when, for example, the exchange rate changes. When changes in exchange rates are fully transmitted to relative prices, exporters are said to have passed through completely the change in cost. When exporters absorb at least part of the exchange rate changes into their profit margins to keep their destination price stable, they are said to be pricing-to-market[12].

In this literature, Yang (1998) finds empirical evidence that exporters of highly differentiated products do not price to market as much as exporters in other industries. This is true when product differentiation is measured by the ratio of non-production workers to total employees, the ratio of scientists and engineers to total employees, or by an intra-industry trade index. However, this is not true when product differentiation is measured by advertising intensity. This appears to imply that profit rates are greater for exporters of highly differentiated products, which can be regarded as having a high technology intensity, at least when differentiation is measured by the ratio of scientists and engineers to total employees.

Therefore, countries specialized in homogeneous products are unlikely to catch up with those specialized in differentiated products. Specialization in differentiated and highly differentiated products is likely to require competitiveness in research, resulting in higher rates of innovation and growth in the countries exporting them.

Policy implications

If trade integration induces relative specialization in stagnant industries, diminishing R&D activities in the economy of a country, it is very tempting to propose government policies to relocate resources favouring high-technology industries, products and R&D activities. But what are these stagnant/non-innovative industries? What are the reasons behind the reduction in R&D

[12] See Krugman (1987).

activities? Is it simply because of economic integration? Is it related to the pattern of specialization?

G&H have argued that," when technological spillovers are local, by strengthening the incentives for private research, the government of a technologically lagging country can 'level the playing field', then a nation that would otherwise specialize in traditional manufacturing can be transformed into an exporter of high-technology goods" [13]. However, when technological spillovers are global, they argue that R&D incentives may turn an exporter of high-tech goods into an importer, as more human capital goes to R&D.

Faced with a highly uneven industrial development, in which a few developing countries have shown spectacular and sustained successes and a large number of other countries have experienced dismal and prolonged failures, it is only natural to ask if these disparities will correct themselves over time. It has been argued that they will not. "Structural drivers of industrial development are slow, difficult and expensive to change, and the new global setting only raises their importance. Some of the drivers can improve only through greater reliance on market forces. But most need strong policy support"[14]. This may be correct, but which policies should be implemented?

Market forces do not operate in a vacuum. They require rules, regulations, institutions as well as good policies. It may well be that slow growth in some countries is the result of lack of institutions conducive to physical and human capital accumulation and to providing rewards to innovative effort. These institutions "include the rule of law in general (as opposed to bureaucratic whim), security of private property, business contract law, a functional mechanism for domestic payments (i.e., a working banking system), intellectual property rights, and a minimization of government corruption"[15]. Bad policy management leading to inflation or political instability may also be at the root of slow growth. There is no reason to blame trade, as the cause of stagnation, nor, a priori, consider industrial policies as an essential part of the strategy to promote growth.

Theoretical models yield ambiguous predictions about the welfare effects of economic integration as well as policies such as R&D subsidies or strengthening intellectual property protection. "At the heart of this ambiguity is the tradeoff between competition in pricing (which increases social welfare by cheapening old goods, but reduces the incentive to invent new ones) and temporary monopoly in new innovations (which promotes incentives by insuring the rewards of invention to the monopolist, but also prevents useful dissemination of the innovation)"[16].

3. Dynamism and structure of world trade

World Imports: 1987-2000

In order to examine the dynamism and structure of world trade, world import data[17] were collected from 1987 to 2000. Table (1) breaks down world imports in different groups of products, according to their resource and technology intensity [18]. Given our concern with the relative performance of resource-based products, world imports have been divided into two groups: resource-based products and non-resource based products. Resource-based products are, in turn,

[13] Grossman and Helpman (1991), p.339.
[14] UNIDO (2002), p.28.
[15] USITC (1997), p.2-13.
[16] USITC (1997), p.2-10.
[17] United Nations database, in which products are classified according to the Standard International Trade Classification (SITC), Revision 3, and disaggregated at 3 and 5-digit levels have been used throughout this section. Whenever possible, world imports are used as a measure of world trade, as import data are generally regarded as more accurate than export data.
[18] See Appendix A (1) for the list of products in each category.

broken down into primary goods (excluding crude petroleum), agro-industrial goods, energy-related goods, low-tech manufactures and high-tech manufactures. High-tech products are classified according to the ratio of R&D expenditure to total sales[19]. Non-resource based products are split into low and high-tech manufactures.

The figures in Table (1) reveal that trade of resource-based products tended to expand much more slowly than trade of non-resource-based products in all examined periods[20]. Primary products had the worse performance. Trade of agro-industrial products grew above the resource-based average for the whole period, but was below that average in most recent periods. And even trade of resource-based manufactures, the best performing in the group of resource-based products, expanded below total world imports. The trade growth-rate of energy-related products reflected the dynamism of crude petroleum, being equal to the average of resource-based products for the whole period, but growing faster in most recent periods. Within non-resource-based products, trade of high-tech manufactures turned up to be the most dynamic of all categories. On the other hand, within resource-based products, trade of high-tech manufactures was the slowest of all categories.

Note that, excluding energy-related products and ignoring the distinction between low-tech and high-tech, Table (1) shows that trade has tended to be more dynamic for groups of products that are less related to natural resources, as we move from primary products to agro-industrial, resource-based manufactures and non-resource-based manufactures. However, it is worth mentioning that, as far as low-tech manufactures are concerned, the rate of growth of resource-based manufactures has been higher than that of non-resource-based manufactures.

Table (2) shows the shares of each category in world imports from 1987 to 2000. It reveals that resource-based products have accounted for a much smaller share in world imports than non-resource-based products and the gap has broadened in the period. Within resource-based products, the weight of primary goods has decreased significantly and now accounts for about the same share as crude petroleum. In fact, the products that go through some kind of industrial processing, which roughly exclude primary products and crude petroleum, account for almost 88% of total world imports. It is worth noting that trade in manufactures[21] has also gone up from 70% of world imports in 1987 to 80% in 2000[22]. High-tech-resource-based manufactures account for a tiny and decreasing share of world imports. On the other hand, trade in high-tech-non-resource-based products has doubled its share in world imports between 1993 and 2000 and now accounts for almost one fifth of the total. Nevertheless, low-tech-non-resource-based manufactures, though declining, still account for almost half of world imports, while low-tech-resource-based manufactures maintains a firm 9% share of world imports.

Looking now at the composition of world exports[23] by groups of products and countries[24] in Table (3), it can be seen that developed countries, except for crude petroleum, hold a much higher proportion of world trade than the other countries together. But the group of non-developed

[19] Expert opinion also helped to classify these products. See OECD classification in Hatzichronoglou (1997).
[20] Growth-rates were calculated on the basis of the coefficient of a line adjusted by OLS to the trade data in logarithmic form. Considering only the initial and end years would tend to distort the rates of expansion.
[21] SITC from 5 to 9.
[22] Manufactures accounted for approximately 55% of total world trade in 1980. Many (2001) makes the same observation.
[23] SITC, Rev.3, 3 to 5-digit level.
[24] The list of developed countries is taken from the United Nations, which basically includes the US, Canada, the countries of Western Europe, Japan, Australia, New Zealand, Israel and South Africa. All other countries are non-developed countries, including developing economies as well as economies in transition. Appendix A (2) shows the list of countries included in tables (3) and (4).

countries reveals comparative advantage[25] in non-manufactured-resource-based products. On the other hand, the group of developed countries reveals comparative advantage in resource-based manufactures and in non-resource low-tech manufactures. It is interesting to see that developed countries do not any longer reveal comparative advantage in non-resource high-tech manufactures, due to the quite spectacular rise in the share of a few Asian countries in world exports of these products[26]. Note that Latin America's revealed comparative advantages remain well established within the groups of non-manufactured-resource-based products.

Table (4) shows that although resource-based products remain more important in the export structure of non-developed countries than in the group of developed countries, non-resource-based-high-tech manufactures have a slightly greater weight in the export structure of non-developed countries than of developed countries. Again, countries of emerging Asia[27] are basically responsible for that. In point of fact, non-resource-based-high-tech manufactures account for very high shares of total exports for countries like the Philippines (38.5%), Singapore (33.3%), Malaysia (29.7%) and the Republic of Korea (20.5%). It is not clear to what extent these countries have developed the technological capability to produce these goods or if they are merely assembling them[28].

Looking at the composition of exports of Latin American countries in more detail in Table (5), it can be seen that Mexico accounts for almost half of Latin American exports and has an export structure that is quite different from the other countries of the region. Mexico reveals comparative advantage only in crude petroleum, among the resource-based product groups, and in low-tech manufactures, among the non-resource-based product groups. Without Mexico, Latin America's revealed comparative advantages are well defined within the resource-based products. Brazil is the main country responsible for Latin American comparative advantage in resource-based-high-tech manufactures and, together with Chile, for comparative advantage in resource-based-low-tech manufactures. Costa Rica is the only Latin American country to reveal comparative advantage in non-resource based high-tech manufactures.

Table (6) shows quite clearly that, without Mexico, resource-based products still account for almost two-thirds of Latin American exports[29]. On the other hand, non-resource-based products account for 83% of Mexico's exports. Given its weight in world exports, non-resource-based-low-tech manufactures constitute the main group of Latin America's exports, particularly of Mexico. But primary products, crude petroleum, agro-industrial products, and resource-based-low-tech manufactures also account for significant shares of LA's exports[30].

When the composition and dynamics of world imports in the period from 1996 to 2000 are examined at a more disaggregated level (5-digit level SITC Rev.3) some new features of world trade emerge. World imports show a very high and growing level of concentration, as the Top 20 products[31] by value account for 27% of total imports of 3112 products[32], rising from 25% in 1996

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[25] Revealed comparative advantage is measured here as the ratio of the world share of a country's exports in a particular group of product and the world share of this country's (or group of countries) total export.

[26] UNIDO, (2002).

[27] That is South Asia, including China.

[28] Mani (2001) has termed this as the statistical artifact debate and has argued that in the cases of Korea and, increasingly, Singapore there seems to be local capability to design, manufacture and export high tech items. Thailand and Philippines appear to be at the other end with very low (relatively speaking) capability, while Malaysia is somewhere in the middle.

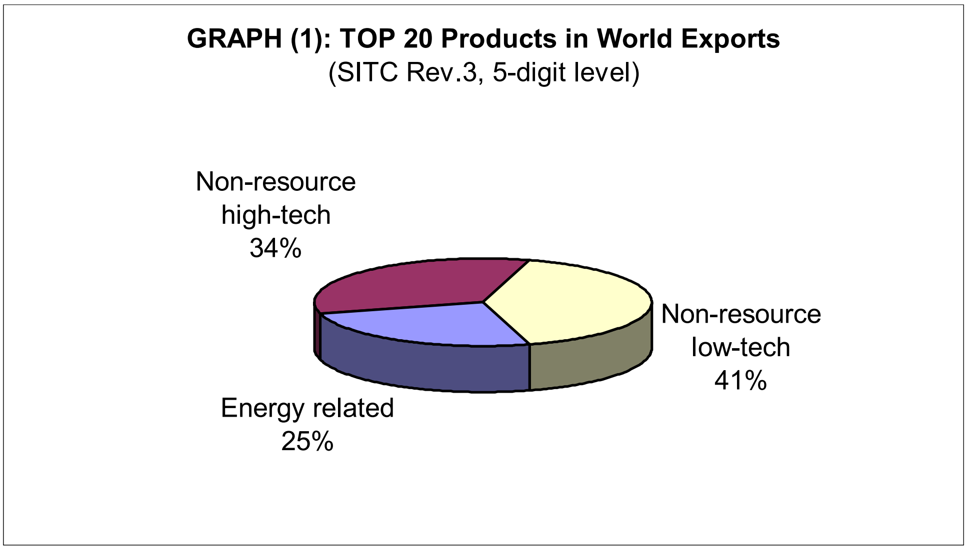
[29] Including Mexico, resource-based products would account for only 43% of Latin America's total exports. See Table (4).

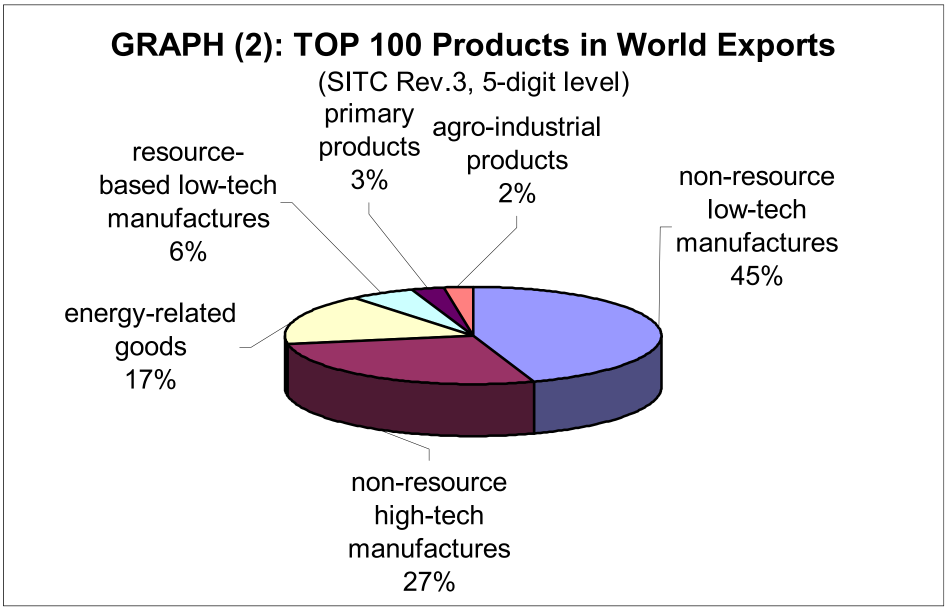
[30] Although the data set, the period of analysis and the breakdown by countries and groups of products were somewhat different the general picture here is quite similar to the one shown in Lall (2000).

[31] See Appendix A (3) for a complete list of the Top 20 products.

[32] Excluding sector 9.

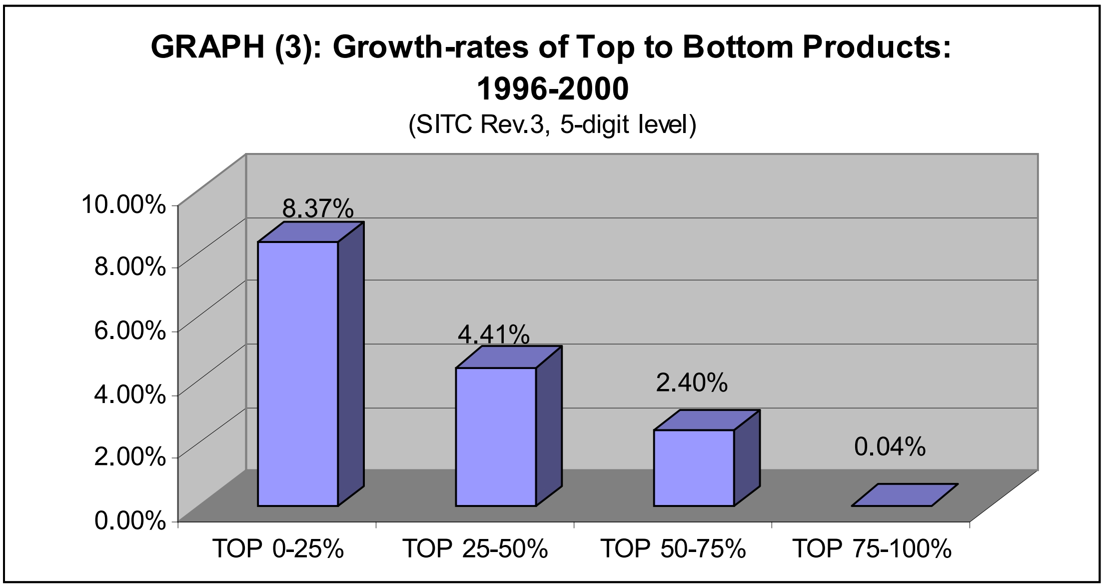
to 30% in 2000. Among these Top 20 products, Graph (1) shows that non-resource-based-low-tech products account for the largest share of these imports, but non-resource-based-high-tech products and energy-related products also have significant shares. Therefore, excluding crude petroleum and other energy-related goods, there are no resource-based goods among the Top 20 products and high-tech products are proportionally much better represented at the top than in total world trade. The Top 100 products account for 45% of world imports, rising from 43% in 1996 to 49% in 2000. Again, Graph (2) shows that non-resource low-tech manufactures and non-resource high-tech manufactures account for most of the top 100's import value. Energy-related goods have a significant share, but resource-based-low-tech manufactures, agro-industrial and primary products account for a very small proportion of the total.





Among the Top 20 products, four belong to the computers and office machines industry, four to the motor vehicle industry, three to the petroleum industry, three to electronics and telecommunication industries, two to the aerospace industry and each of the following industry has one product: pharmaceuticals, non-electrical machine, articles of apparel and clothing accessories and footwear.

As the rising level of concentration already indicates, products at the top have risen faster than world trade average in the period. The Top 20 expanded at 8.2% per year from 1996 to 2000, while the Top 100 expanded at 6.9% per year, compared to the growth-rate of 4.2% per year of total world imports. Dividing the products from top down into four equal parts in import value, Graph (3) clearly shows that the dynamism rises sharply as we move from the bottom to the top of the list. This is largely due to some very important non-resource-high-tech manufactures that are at the top of the list and are quite dynamic.



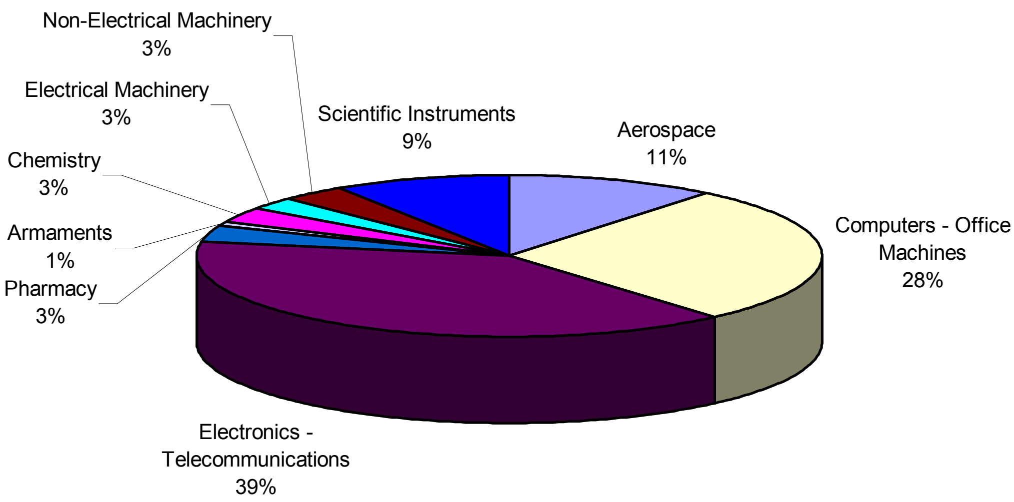
Examining the group of high-tech manufactures[33] more closely, it can be seen that they are extremely concentrated in a few products, since the Top 20[34] out of 221 products account for about two-thirds of total exports of high-tech manufactures in the period from 1996 to 2000[35]. These Top 20 products tend to have the highest rates of growth and are, therefore, responsible for the dynamism of the non-resource-based-high-tech group of products. In other words, the non-weighted average of the rates of growth for the products of this group is much smaller (3.3%) than the weighted average (9.5%), reflecting the fact that trade for the majority of high-tech products was not dynamic at all in the period – the rate of growth of world imports of 124 high-tech manufactures was indeed below total world imports in the period and 74 high-tech manufactures actually showed negative growth-rates. Apparently, this point has not been noticed in the literature, as it tends to analyse the performance of the group of high-tech products as whole.

Non-resource-based-high-tech exports are very concentrated in two industries: electronics & telecommunications and computers & office machines. As shown in Graph (4), together they account for over two thirds of world exports of high-tech products. Mani (2000) shows that exports of high-tech products from developing countries are even more concentrated on these two industries than those of developed countries, reaching 87% of the total for the former group and 57% for the latter[36].

[33] SITC, Rev.3, 5-digit level.
[34] See Appendix A (4) for the list of these Top 20 high-tech products.
[35] Concentration has increased from 49.6% in 1993 to 69.8% in 2000.
[36] Data are as of 1997.

GRAPH (4): High-Tech Products by Sector: 1996/2000

(SITC Rev.3, 5-digit level)

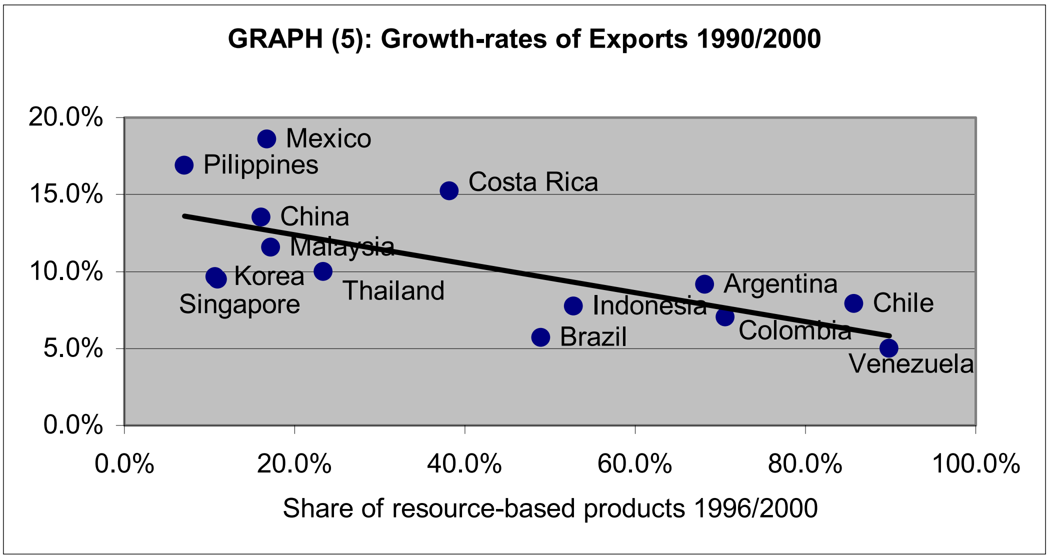


The concentration of exports of high-tech products by countries is also extremely high. Table (7) shows that the Top 5 largest exporters accounted for 54% of total high-tech exports in the period from 1996 to 2000, the Top 10 for 75% and the Top 25 for 96%[37]. Mexico appears as the 13th largest exporter. The group of developed countries accounts for 73% of world exports of high-tech products, whereas non-developed countries are responsible for 26,8%. Emerging countries of Asia alone take 22.4% of these exports, as many of them are quite noticeable among the Top 25 countries, while Latin America has only 2.9% of this market. Within Latin America, Table (8) shows that Mexico leads with 78% of the region's exports of high-tech products. Brazil comes in second with 12,5% of these exports and Costa Rica is in third with a surprising 4.6% share.

In contrast with high-tech manufactures, resource-based products[38], excluding energy-related products, are much less concentrated both by products and countries. The Top 20 products account for 21% of the exports of 1133 products in the period between 1996 and 2000. Table (9) shows that the Top 5, Top 10 and Top 25 countries account for 38%, 55% and 83% of these exports, respectively. It is interesting to note that the Top 9 countries belong to the group of developed countries. China is the tenth and Brazil the thirteenth. There are only two non-developed countries among the Top 15 countries and eight among the Top 25 countries. Out of 1125 resource-based products at the 5-digit level for which the rates of growth can be calculated, only 216 turn up to be dynamic (growth-rate higher than 4.2% per year) in the period between 1996 and 2000 and they account for only 21% of total exports of resource-based products, or a mere 4% of total world imports in the period.

Graph (5) shows that the growth-rates of exports in the period between 1990 and 2000 were negatively related to the share of resource-based products in total exports of the main countries in Latin America and in East Asia in the period between 1996 and 2000. Mexico and Costa Rica, the two best export performers in Latin America in the period, have the lowest shares in the region of resource-based products in their exports. Brazil's export performance was disappointing, considering that it has a much lower share of resource-based products than countries that outperformed it, like Argentina and Chile.

[37] This distribution by countries is very similar to that of 1998 presented by UNIDO (2002), p.31, though Taiwan was included in that database there but not in here.
[38] SITC, Rev.3, 5-digit level.



US Imports 1989-2002

As with world imports, US imports were broken down into the same groups of products. In Table (10), it is possible to see that US import dynamism in the period between 1989 and 2002 was very similar to that observed for world imports from 1987 to 2000. The rate of growth of imports of resource-based products was lower than that of non-resource-based products. Non-resource-based-high-tech manufactures were the most dynamic group, while resource-based-high-tech manufactures was the least dynamic of all groups. Dynamism rises as we move from primary to energy-related goods, and then to agro-industrial and manufactured products.

However, for the two most recent periods, from 1993 to 2002 and from 1996 to 2002, the rates of growth of resource-based products have been higher than those of non-resource-based products. This has been partly due to the rise in US import of energy-related goods, especially crude petroleum, but also because of the firm expansion of imports of resource-based-low-tech manufactures, while the rate of growth of non-resource-based-high-tech manufactures declined sharply. In point of fact, the growth-rate of imports of resource-based (low-tech) manufactures has remained higher than non-resource-based manufactures both in 1989/2002 as well as in the most recent periods. On the other hand, imports of primary goods, agro-industrial products and resource-based-high-tech manufactures have maintained a slow rate of growth throughout these periods.

The structure of US imports, showed in Table (11), is also very similar to that of world imports, though it tends to have a higher proportion of non-resource-based products than world imports, as the US is well endowed with natural resources. Indeed, non-resource based products rose from slightly over 70% at the beginning of the 1990s to over 76% in the mid-1990s, largely due to the rise in high-tech imports, but fell again to 71% in 2001/2002, basically because of a fall in non-resource-low-tech products, though imports of high-tech products also fell in the last two years.

Trade performance of Latin American countries in the US market: 1996/2002

In this section, a constant market share analysis is applied to US imports from Latin American countries. The constant market share (CMS) model accounts explicitly for the effects of import demand, product composition, and competitiveness on the change in export revenues from a particular country in a given market. The model can be expressed as follows:

[2] $$\underbrace{\sum_i \left(X_i^t - X_i^{t-1}\right)}_{\substack{export\\variation}} - \underbrace{r\sum_i X_i^{t-1}}_{\substack{demand\\effect}} \equiv \underbrace{\sum_i \left(r_i - r\right) X_i^{t-1}}_{\substack{product\\effect}} + \underbrace{\sum_i \left(X_i^t - X_i^{t-1} - r_i X_i^{t-1}\right)}_{\substack{competitiveness\\effect}}$$

where:

X_i is the value of the focus country's exports of product *i*;

r is the growth rate of US imports between the periods *t* and *t-1*; and

r_i is the growth rate of US imports of product *i* between the periods *t* and *t-1*.

The model breaks down into two basic effects the difference between the increase in the value of a country's exports over a given period and the increase that would be required in order for that country to maintain its share in the market (*the demand effect*). A positive difference means that the country has increased its share in the market, while a negative difference indicates a reduction in that share. The first effect (measured by the first term on the right-hand side of the identity above) –identified as the *product effect*, i.e., the composition of exported merchandise– calculates to what extent market share gains (losses) can be attributed to the concentration of exports in goods for which demand is growing more rapidly (or slowly) in relative terms. The second effect (measured by the second term on the right-hand side of the identity) –identified as the *competitiveness effect*– is calculated as the residual and estimates to what extent factors other than the product effect can explain market share gains or losses in the market[39].

Latin-American countries gained market share in US imports in 2002 compared with 1996 and this gain was equivalent to US$22 billion or 10.6% of their exports to the US in 2002. Competitiveness and product composition effects were both positive in this period, but the former accounted for 80% of the total gain. However, as Table 12(a) reveals, the group of non-resource-based products was responsible for this positive effect, whereas the group of resource-based commodities negatively contributed to the Latin America (LA) gain in terms of both competitiveness and product composition effects[40].

It is interesting to note that, within the group of non-resource-based manufactures, low-tech goods accounted for the largest part of the gains. But this was largely due to the product composition effect, shown in Table 12(c), since non-resource high-tech manufactures accounted for the largest part of the competitiveness effect, shown in Table 12 (b). In other words, LA has substantially improved its competitiveness in non-resource-based manufactures in the period, especially in high-tech goods, but the relatively slow growth of these high-tech US imports in 1996 to 2002 meant that the group of low-tech goods allowed larger gains in absolute value[41].

On the other hand, LA's losses in primary and energy-related goods were the result of lack of both competitiveness and dynamism in these commodities. LA's gain in agro-industrial products was the result of competitiveness gains, since the product composition effect for this group of commodities was negative. However, LA's gains in resource-based manufactures resulted from positive competitiveness and product composition effects, except for resource-based-high-tech manufactures, which revealed low dynamism. Note that for Latin America, in general, the lack of dynamism of imports of resource-based products accounted for over 80% of the region's loss in this sector.

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[39] See Leamer and Stern (1970) for a detailed analysis of the constant market share model and Chami Batista and Azevedo (2001) for a recent application of this model to US imports.

[40] See Table 12, parts (b) and (c) for competitiveness and product composition effects, respectively. The formulae for the competitiveness effect remains the same as exports are broken down into groups such as resource and non-resource-based products. But the left-hand side of equation (2) should be calculated as: $\sum_i [\mathbf{X}_i^t - \mathbf{M}^t . (\mathbf{X}_i^{t-1} \div \mathbf{M}^{t-1})]$, where M is total US imports. The product effect can then be calculated as a residual.

[41] Note that, as a proportion of exports, gains in non-resource high-tech goods were much larger.

However, Table (12) also shows that there are major differences among the countries that make up Latin America. On the one hand, Mexico, Honduras, Brazil, Guatemala, Chile, and Costa Rica were the big winners in the US import market[42]. On the other, the Domenican Republic, Venezuela, and Colombia were big losers in the same market, while Argentina experienced a small loss of market share in US total imports.

It should be noted that the countries that had the largest gains in absolute value, as well as in proportion to their exports to the US, also had large gains in non-resource-based manufactures. Mexico, Honduras, Guatemala, and Costa Rica only gained, because of their gains in non-resource-based manufactures, as they all experienced losses of market share in resource-based products in the period. Honduras and Guatemala's gains of market shares in non-resource manufactures came, by and large, from low-tech products, whereas Costa Rica's gains came exclusively from high-tech products.

Mexico, the largest winner[43], had substantial gains in both low-tech and high-tech non-resource based manufactures, but benefited enormously from a large and positive product composition effect in low-tech exports, and to a much lesser degree in high-tech products. Indeed, most Latin American countries benefited from large and positive product composition effects in their exports of non-resource-based manufactures, especially of low-tech products. However, Brazil, Argentina, Guatemala and Venezuela had negative product composition effects in non-resource-based manufactures, indicating that being an exporter of this group of products provides no guarantee that markets will be dynamic. In the case of Argentina, the slow growth of US imports of resource as well as non-resource-based goods exported by this country more than offset Argentina's competitiveness gains in both types of goods.

In sharp contrast to Latin America in general, Brazil and Chile gained market share in resource-based products. In the case of Brazil, this gain came from energy-related goods, resource-based manufactures and agro-industrial products. Brazil had positive competitiveness effects in all groups of resource-based products. Therefore, the loss in primary commodities was due to the negative product composition effect in this item. On the other hand, Chile's gains in resource-based products came from all items, but resource-based-low-tech manufactures. The gain in primary commodities is quite extraordinary, since Chile was the sole country amongst the largest exporters from LA to gain in this group of commodities. Yet more surprisingly, this gain in primary products came about as a result of a positive product composition effect, as Chile lost competitiveness in these commodities in the period. This suggests that countries may specialize in resource-based products, or even primary commodities, for which markets can be quite dynamic.

4. Resource-based products by degree of differentiation

In this section, fifty-one resource-based products and thirteen machines that produce resource-based products have been tested and classified, according to the methodology described in section 2[44]. Monthly US import data by product and by country of origin from 1996 to the end of 2002 and, in some cases, to July 2003 were used for the tests and classification of products. The lack of continuous series of monthly US import data has prevented the test and classification of a number of other products.

Most products were defined at HS 10-digit level, though in some cases HS 8-digit level, HS 6-digit level and SITC 5-digit level were thought to be more appropriate. As seen in section 2, the

[42] These countries were put in descending order, according to their gains as a proportion of their exports.
[43] Mexico's gains were actually larger than those of LA as a group.
[44] The econometric results of these tests are available at the reader's request.

level of aggregation is extremely important for testing the role of price in the mechanism through which countries gain market share in a particular product. If the level of aggregation is too high, it may include products that compete in different regimes[45]. In other words, it may include a few products that compete following the law of one price and others that may, for example, have a low price elasticity of substitution. The result is an average between an infinite elasticity of substitution and a near zero elasticity. Though this average is a mathematical impossibility, it is quite possible that a figure between zero and infinite may be found for the elasticity of substitution. Some might even apply this elasticity in some simulations of free trade agreements. But, in point of fact, any other arbitrary number could be equally used, probably changing entirely the results of the simulation. If the level of aggregation is too low, it might miss important product substitutes that might as well distort the analysis of the role of prices in competition.

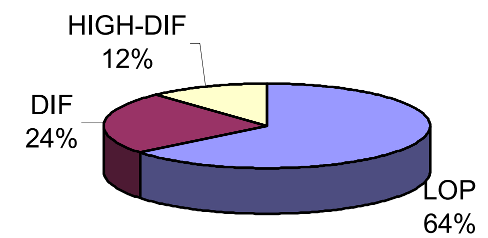
US imports of the products actually classified amounted to US$296 billion from 1996 to 2002. This is equivalent to 36.5% of US imports of resource-based products, excluding energy-related products, in the period. Considering the products converted to SITC 5-digit level, the classified sample would be equivalent to 19% of world imports of resource-based products in 1996 to 2000. In fact, the weight of each product in both world imports and US imports was a relevant variable in selecting the sample.

Table (13) shows the distribution of the sample by the degree of industrial processing and technology intensity. It can be seen that the sample has a smaller share of primary and manufactured products and a bigger share in agro-industrial goods than total US imports of resource-based products. But the difference does not appear to be significant to distort the overall analysis, though it can in principle distort the trade pattern of specific countries.

Out of the fifty-one products, twenty-one (41.2%) were classified as LOP, fifteen (29.4%) as DIF and fifteen (29.4%) as HIGH-DIF. However, according to their import value, LOP products accounted for US$190.1 billion, DIF products for US$70.5 billion and HIGH-DIF for US$35.2 billion. GRAPH (6) shows the share of each group in the total. Therefore, most resource-based products, excluding energy-related products, appear to be homogeneous products that follow the law of one price.

In the machinery sample, there were no LOP products, only two were found to be DIF, while the other eleven were classified as HIGH-DIF. But the two DIF machines accounted for one third (US$1.3 billion) of total imports (US$4.0 billion), while the other eleven products responded for two-thirds (US$2.7 billion).

GRAPH (6): Groups of Products by the Degree of Differentiation



[45] It may also capture product composition effects, which are not expected to be negatively related to relative prices, rather than competitiveness effects, which may be negatively related to relative prices of competing exporters.

Table (14) shows that, within resource-based products and excluding Mexico, Latin American countries reveal some comparative advantage in LOP products, but so do developed countries and East Asia. Mexico, on the other hand, reveals comparative advantage in HIGH-DIF products, while the "other" countries reveal comparative advantage in DIF products.

An entirely different picture emerges from the distribution of US imports of machinery amongst the exporting countries[46]. Table (15) shows that developed countries account for over 90% of total imports from the US, while Latin America takes less than 5% and East Asia slightly more than 2%. Germany alone accounts for 34% of these US imports, and together with the United Kingdom, Italy, Japan and Canada, they account for 75% of these US imports. Brazil is responsible for 88.5% of Latin America's exports, whereas Mexico takes 7.1%.

Among Latin American countries, Table (16) shows that Mexico is the Top first country in all categories of products, holding a very large share in HIGH-DIF products. Brazil is second in LOP products, but loses this position to Chile in DIF, HIGH-DIF and in the total of resource-based products. As Chile, Argentina also improves its position as we move from LOP to DIF and HIGH-DIF products. On the other hand, Peru, worsens its position as we move from LOP to DIF and HIGH-DIF products.

Table (17) shows that LOP products revealed the lowest dynamism between 1996 and 2002, expanding at 3.5% per year in the period. The vast majority of products showed a negative rate of growth in the period, but the high rate of growth of imports of diamonds and its significant weight among the LOP products helped to raise the overall expansion of this group of commodities[47]. Nevertheless, the rate of growth of LOP products was much smaller than that of US imports of resource-based products (excluding energy-related goods).

On the other hand, the dynamism of DIF and HIGH-DIF products was much greater than that of LOP products[48]. In fact DIF products turned up to be more dynamic than HIGH-DIF products in the period, also surpassing the overall growth-rate of US imports of all types of manufactures (resource and non-resource-based, low-tech and high-tech manufactures)[49].

Examining now the structure of exports by groups of countries in Table (18), it can be seen that LOP products account for a very large proportion of exports from Latin American countries, excluding Mexico. This proportion is much larger than the world average. Mexico, on the other hand, has a relative low proportion of LOP products in its exports of resource-based products, as HIGH-DIF products account for more than one third of these exports, and DIF products for over 20%. Chile also has a better distribution of its exports of resource-based products among LOP, DIF and HIGH-DIF products. The shares of DIF and HIGH-DIF products in Argentina's resource-based exports are quite significant, though the largest part of these exports is classified as LOP products. Most other countries, including Brazil, Peru, Colombia, Ecuador, Guatemala, Venezuela, Costa Rica and Honduras, just to mention some of the largest exporters, have a very large proportion of their exports concentrated on LOP products.

In order to see whether or not the new taxonomy adds anything to explaining the export performance of resource-based products from Latin American countries to the US in the period between 1996 and 2002, I have re-applied the constant market share model just to the US imports

[46] See Appendix A (5) for the detailed description of the machinery included in the sample.
[47] See Appendix A (6) for the rates of growth and total imports of each LOP product.
[48] See Table (17) and Appendix A (7) and A (8) for the rates of growth and total imports of each DIF and HIGH-DIF product.
[49] See Table (10) for the growth-rates of US imports.

of resource-based products (excluding energy related goods) and to the sample of products classified by the degree of differentiation. The results are in Tables (19) and (20).

At the bottom end of both tables, it is possible to observe that Latin America lost market share in total resource-based products (excluding energy-related goods) in the US and in the sample in the period in 2002 compared to 1996. In point of fact, only Chile and Venezuela gained market share in the US in the period among the major exporters of LA. However, in the sample, Argentina and Mexico gained, whereas Venezuela lost market share. The competitiveness effects are also quite different when the results from US imports of resource-based products in Table (19) are compared to the results from the sample in Table (20). In the former, LA lost competitiveness, whereas in the latter it gained.

As a result of these discrepancies, Mexico and Venezuela have negative product composition effects in the sample when, in fact, these effects were positive for the whole range of resource-based products exported to the US. Nevertheless, except for these two countries, the sign of the product composition effects are the same for the whole set of resource-based products and for the sample, including the positive sign of Chile. And it is in the product composition effects that one ought to focus when examining the distribution of resource-based products by the degree of differentiation, since the competitiveness effects have to do with changes in each exporter country rather than with the characteristics of each product, especially the dynamics of product markets.

Table (20) show the product composition effects in the sample. It can observed that they are negative in LOP products for all countries. For LA as a group, the negative product effect is solely due to the LOP products, as DIF and HIGH-DIF products contribute positively to the product composition effect. The same pattern occurs for Argentina, Chile, Costa Rica, Domenican Republic, Mexico and Venezuela. Furthermore, for all countries that have negative DIF product composition effects, the negative contribution of LOP products is always much greater. Finally, the HIGH-DIF product composition effects of all countries are positive. In other words, the dynamism of the markets for HIGH-DIF products contributed positively to the expansion of resource-based exports of all countries examined.

Therefore, the break down of the product composition effects by groups of products classified according to their degree of differentiation seems to capture the different market dynamism effects within the resource-based products. It should be noted that the same is not true for the groups of products classified according to their degree of industrial processing (primary, agro-industrial and manufactures) and technology intensity (low and high-tech manufactures).

In point of fact, there is a significant number of low-tech manufactured resource-based products in the group of LOP products. They account for 48% of the total imports of the group. Agro-industrial products account for 28%, while primary products account for 24%. There is even a high-tech manufactured product among the LOP group, though it accounts for only 0.2% of the total imports of the group. Therefore, the characteristics of the LOP products in this much enlarged sample reinforce the conclusion drawn in a previous study[50] that, contrary to a general view that associates the law of one price to primary goods, the sample of products that were here found to follow this law consists of products that go through some basic industrial processing, even when they are classified as agricultural or primary good. In fact, products that are extracted from nature tend to be different according to their location. Therefore, some degree of basic industrial processing is necessary to standardize the products and turn them into homogeneous goods, wherever their production is located.

[50] See Chami Batista and Silveira (2003).

Products like aluminium ores, unworked diamonds, a variety of fish and fruits were found to be DIF or HIGH-DIF products. Indeed, products classified as primary commodities account for 16% of imports of HIGH-DIF products and 7% of DIF products. Agro-industrial products account for over half of imports of HIGH-DIF products and over one third of DIF products[51]. Low-tech manufactures account for over half of DIF products, but less than one third of HIGH-DIF products. Just one high-tech product appears in the DIF group and another in the HIGH-DIF group, and they account for only 1% and 2% of their imports, respectively.

A Note on the methodology for the new taxonomy

In every classification of traded goods there is some degree of arbitrariness, this is one is no exception. The methodology used in this paper to classify traded products according to their degree of differentiation also faces a number of difficulties and limitations. Perhaps the first difficulty is to choose the level of aggregation of products. The best I could do was to start at the most possible disaggregated level. In the case of LOP products, price time series of individual countries would typically be non-stationary, as one would expect, though in some cases a few outliers had to be withdrawn for them to be non-stationary. Then, relative prices would have to be stationary for the product to be classified as LOP[52]. In most cases, including those in which the weaker version of the law of one price applied, it was possible to see graphically that individual prices moved together over time[53].

When at the highest level of disaggregation, there was not enough data to apply the tests or when some changes in the definition of products occurred in the period at this level, I have moved down to the next level of disaggregation. But although a product found to be LOP at a lower level of disaggregation could include products that were not LOP at a higher level of disaggregation, I was happy to ignore these non-LOP products as they were clearly dominated by those following the law of one price.

Differentiated (DIF) products require a more complicated analysis. For a product to be classified as DIF, the first condition is that the time series of relative prices between each pair of country has to be non-stationary. The times series of relative quantities between the same pair of countries also has to be non-stationary. Finally, the time series of relative quantities must cointegrate with the time series of relative prices with a negative coefficient for at least one pair of major exporters.

When no cointegration with a negative coefficient was found, products were categorised as HIGH-DIF[54]. Typically, however, the time series of prices of HIGH-DIF products were stationary for individual countries. Although, rigorously, the ADF test requires that each time series is non-stationary, relative prices would often be stationary as well[55]. In this case, when individual and relative prices were stationary and relative quantities were either stationary or non-stationary, products were classified as HIGH-DIF[56]. The same would happen if relative prices were non-stationary and relative quantities were stationary, since it was assumed that there could be no

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[51] The shares of agro-industrial products in DIF and HIGH-DIF imports are likely to be overestimated as they were over represented in the sample. The opposite is true for primary and manufactured goods.

[52] Given the low power of the test, critical values at 5% level were applied throughout the classification process to determine that a time series was stationary.

[53] Some of these graphs are shown in Appendix A (9).

[54] In the case of products classified as HIGH-DIF, it is very often possible to see graphically that exporters tend to gain market share, though with rising relative prices, or at least without having to lower their relative prices.

[55] An even more complicated econometric problem would arise when time series of prices or quantities seemed to be seasonal. In these cases, as long as relative prices and quantities did not seem to be seasonal, tests were carried out normally. When relative prices or quantities seemed to be seasonal, the product was not classified.

[56] In a few instances negative relationships between stationary relative quantities and prices have been found through OLS regressions. However, these relationships were regarded as short term and, therefore, do not characterize a DIF product.

long-run relationship between them. In some cases, individual and relative prices and quantities were all non-stationary, but no cointegration with the right sign was found.

Given that the classification depends on the analysis of pair of countries, it is possible that the same product has different classification for different pairs of countries. Especially when a product is classified as DIF, which in our criterion requires that one right sign cointegration is found at least for one pair of major exporters, it is possible that for all other pairs of countries the product would behave as a HIGH_DIF product[57]. A more rare event, but also possible is a product that behaves as LOP for some pairs of countries and as DIF or HIGH-DIF for others[58]. Here again I have used the weight of the countries in the market to decide how to classify the product. These sorts of hybrid products can be found in the real world, given that what I am calling a traded product here is determined by the existing harmonized (HS) and standard international trade (SITC) systems of classification of traded goods. The methodology applied in this work is, therefore, able to capture the complexity of this reality.

By choosing very high levels of disaggregation, one has to sacrifice the coverage of one's classification. The sample here examined covers more than one third of US imports, but less than one fourth of world imports of resource-based products, excluding energy-related goods.

One fundamental limitation of the data is that they refer to imports by countries rather than by firms. Intra-firm trade may cause prices to behave in a manner that would not occur otherwise. Hence, products may be classified differently in different markets because of the presence of intra-firm trade[59] in one market but not in another. The same can happen if domestic suppliers (US suppliers in our case) offer a product that has very different elasticities of substitution with regard to the different exporters to the domestic market. Finally, time may change the characteristics of a product. Because this methodology does not consider a point in time, but a period of time, it is quite possible that the product being analysed is in the process of moving from one classification to another, blurring somewhat the result.

5. Conclusions

The countries of East Asia, including China, and Mexico, that have raised their ranks and become top exporters in the world in the past fifteen years, have all benefited enormously from market share gains in the very dynamic groups of non-resource-based manufactured goods, especially in high-tech products. On the other hand, countries that have gained market share in resource-based goods, particularly in primary commodities or even agro-industrial products, have generally suffered from the slow expansion of world imports.

Generally speaking, exporter countries with a low share of resource-based products in total exports tended to perform better in the last decade than those with high shares. Within Latin

[57] This was the case, for example, of unworked diamonds, spirits, baker's wares and diamonds weighing less than 0.5 carat each. It should be recognized that the distinction between DIF and HIGH-DIF products can be very difficult in some cases.

[58] This was the case of, for example, frozen shrimps and coffee, nesoi, not roasted, not decaffeinated. The prices of shrimp from Thailand, Ecuador and Indonesia follow the law of one price, but Chinese shrimps do not. Likewise, prices of coffee from Colombia, Guatemala and Indonesia follow the law of one price, but Brazil's prices are a determining factor in Brazil's changes in market share as compared to Colombia and Indonesia. In the case of nickel powders and flakes, Canada is the main supplier to the US and its price is not related to the prices of the other smaller suppliers: Australia, Finland and Russia. However, the prices of these three smaller suppliers seem to follow the law of one price, though there are insufficient data for a proper ADF test. See Appendix A (10), Graph (A-10.1).

[59] Long-term contracts between importers and exporters may have similar effects on prices as intra-firm trade. Products such as aluminium ores, for example, are known to be traded within firms or under long-term contracts. The stability of Canadian prices of unrefined copper, as opposed to the prices of Chile and Mexico, suggests either the presence of intra-firm trade or long-term contracts. See Appendix A (10), Graph (A-10.2).

America, Mexico and Costa Rica with low shares of resource-based exports performed relatively well, while Brazil, Colombia and Venezuela, with high shares of resource-based exports, did not do very well.

However, this paper has shown that within each category of resource-based and non-resource-based goods, dynamism varies quite considerably. Indeed, the dynamism of the high-tech group is very much concentrated in few products, whereas the vast majority of high-tech products have not been dynamic at all. Furthermore, considering the expansion of US imports as a basis, the rate of growth of imports of high-tech products has substantially declined in recent years, especially after 2000. Still taking the expansion of US imports until 2002 as a basis, it has been seen that the growth-rate of resource-based-low-tech manufactures has been higher than that of non-resource-based-low-tech manufactures.

Examining the export performance of Latin American countries in the US in 2002 compared to 1996, it could be seen that as a group they had significant gains in market share. Nevertheless, these gains were largely the result of competitiveness gains, while the product composition effect was relatively small. These gains also came from the group of non-resource-based exports, whereas the group of resource-based commodities negatively contributed to Latin America's competitiveness and product composition gains. The lack of dynamism of imports of resource-based products accounted for over 80% of Latin America's losses in this group of commodities.

Latin American countries that had the largest gains in the US market also had large gains in non-resource-based manufactures. Some of them like, for example, Mexico, Honduras, Guatemala and Costa Rica only gained because of their gains in non-resource-based manufactures, as they all experienced losses of market share in resource-based products in the period.

Most Latin American countries benefited from large and positive product composition effects in non-resource-based manufactures, especially in low-tech products. But Brazil, Argentina, Guatemala and Venezuela, for example, had negative product composition effects in their group of manufactured exports. The Domenican Republic, Chile and Guatemala, for example, had negative product effects even in their exports of non-resource-high-tech manufactures. This proves that being an exporter of non-resource-based manufactures, or even of non-resource-based-high-tech manufactures, generally dynamic groups of products, provide no guarantee that the country's specific export specialization in a subset of these groups of products is dynamic.

In sharp contrast with Latin America in general, Brazil and Chile have recently gained market share in resource-based products in the US market. Chile's gains in this group of products resulted from positive competitiveness as well as product composition effects. More especially, Chile's product composition effect was positive for its exports of primary commodities. This proves, again, that even within a generally no dynamic group of commodities, a country may specialize in a subset of dynamic products.

In point of fact, the new taxonomy presented in this paper, that classifies resource-based products (excluding energy-related goods) according to their degree of differentiation, has shown that exports of differentiated and highly differentiated products tend to be much more dynamic than that of homogeneous products that follow the law of one price.

Moreover, the new taxonomy, despite the relatively small size of the sample of products actually classified, seems to be able to explain why countries like Chile, for example, have their exports of primary goods benefiting from positive product composition effects. And the reason is that most of Chile's exports of primary and agro-industrial products are classified as differentiated or highly differentiated products. On the other hand, Brazil's exports of primary and agro-industrial products are classified as homogeneous goods following the law of one price. Hence, Brazil's product composition effects in these products tend to be negative.

The greater dynamism of differentiated and highly differentiated products does not imply that governments ought to be implementing policies designed to promote these exports in particular. However, there may be a case for both the public and private sectors to try to identify the causes why exporters in some countries have failed to increase the shares of differentiated and highly differentiated products in their total exports.

Bibliography

Armington, P. S. (1969). "A Theory of Demand for Products Distinguished by Place of Production". In: *IMF Staff Papers*, vol. 16, March.

Carlin, W., A. Glyn and J. Van Reenen (2001). "Export Market Performance of OECD Countries: an empirical examination of the role of cost competitiveness". *The Economic Journal*, 111, p.128-162, January, Oxford.

Chami Batista, J and J.P. Azevedo (2002) "El TLC y las pérdidas de mercado de Brasil en los Estados Unidos: 1992-2001", *Revista de la Cepal*, No.78, December.

Chami Batista, J. and G.B. da Silveira (2003) "International Competition: is there a place for the law of one price yet?" *Discussion Paper*, Instituto de Economia/UFRJ, Rio de Janeiro.

Grossman G. & E. Helpman (1991). "*Innovation and Growth in the Global Economy*", The MIT Press, Cambridge.

Hatzichronoglou, T. (1997). "Revision of the High-Technology Sector and Product Classification", *STI Working Papers*, OECD/GD (97)216, Paris.

Krugman P., 1987 Pricing to Market When the Exchange Rate Changes, In: Ardnt, S. W. and Richardson, J.D. (Eds.), *Real_Financial Linkages Among Open Economies*, Cambridge, MA: MIT Press, pp. 49-70.

Lall, S (2000). "The Technological Structure and Performance of Developing Country Manufactured Exports, 1985-1998", *Oxford Development Studies* 28(3):337-369.

Leamer, E. and Stern (1970). "*Quantitative International Economics*". Aldine Publishing Co., Chicago.

Mani, S. (2000). "Exports of High Technology Products from Developing Countries: Is it eal or a Statistical Artifact", *Discussion Paper Series*, Institute for New Technologies, The United Nations University.

UNIDO (2002). "*Industrial Development Report 2002/2003 Competing through Innovation and Learning*", United Nations Industrial Development Organization, Vienna.

USITC (1997), "The Dynamic Effects of Trade Liberalization: An Empirical Analysis", Investigation No. 332-375, *Publication 3069*, US International Trade Commission, October 1997, Washington D.C..

Yang, J., 1998. Pricing-to-market in US imports and exports: a time series and cross-sessional study, *The Quarterly Review of Economics and Finance* 38, No. 4, pp. 843-861.

TABLE (1): Annual growth-rates of world imports

CATEGORIES YEAR	1987/2000	1993/2000	1996/2000
RESOURCE-BASED PRODUCTS	5.0%	4.9%	2.5%
PRIMARY	3.3%	2.3%	-2.4%
ENERGY-RELATED	5.0%	6.7%	6.4%
CRUDE PETROLEUM	5.0%	7.2%	7.7%
COAL,COKE & OIL DERIVATIVES	3.7%	5.0%	4.2%
GAS & ELECTRIC CURRENT	8.5%	8.8%	5.5%
AGRO-INDUSTRIAL	5.2%	2.9%	-0.5%
MANUFACTURES	6.4%	6.2%	3.7%
LOW-TECH MANUFACTURES	N.A.	6.3%	3.8%
HIGH-TECH MANUFACTURES	N.A.	1.9%	-3.6%
NON-RESOURCE-BASED PRODUCTS	8.0%	7.1%	4.8%
LOW-TECH MANUFACTURES	N.A.	4.6%	3.2%
HIGH-TECH MANUFACTURES	N.A.	17.2%	9.7%
UNALLOCATED	11.0%	9.2%	7.2%
TOTAL	7.1%	6.5%	4.2%

SOURCE: BASED ON UNCTAD DATA (SITC Rev.3, 3 to 5-digit levels)

TABLE (2): STRUCTURE OF WORLD IMPORTS

CATEGORIES YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
RESOURCE-BASED	37%	35%	36%	35%	34%	32%	31%	30%	30%	31%	30%	27%	27%	29%
PRIMARY	10.4%	10.7%	10.6%	9.5%	9.2%	8.9%	8.4%	8.4%	8.3%	8.1%	7.7%	7.4%	6.8%	6.2%
ENERGY-RELATED	11.1%	8.8%	9.5%	10.6%	10.0%	9.1%	8.9%	7.9%	7.5%	8.6%	8.5%	6.4%	7.3%	10.3%
CRUDE PETROLEUM	6.0%	4.7%	5.2%	5.9%	5.5%	5.1%	4.9%	4.2%	4.0%	4.7%	4.6%	3.2%	4.0%	6.0%
COAL,COKE & OIL DERIVATIVES	3.9%	3.2%	3.4%	3.6%	3.3%	3.0%	3.0%	2.6%	2.4%	2.7%	2.6%	2.1%	2.3%	2.9%
GAS & ELECTRIC CURRENT	1.2%	0.9%	0.9%	1.0%	1.2%	1.0%	1.1%	1.1%	1.0%	1.2%	1.2%	1.1%	1.1%	1.4%
AGRO-INDUSTRIAL	5.4%	5.5%	5.4%	5.3%	5.1%	5.2%	5.2%	5.2%	5.3%	4.9%	4.7%	4.6%	4.5%	4.0%
LOW-TECH MANUFACTURES	9.6%	10.1%	10.1%	9.6%	9.4%	9.1%	8.8%	9.0%	9.4%	8.9%	8.9%	8.9%	8.9%	8.7%
HIGH-TECH MANUFACTURES							0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%
NON-RESOURCE-BASED	61%	63%	62%	63%	64%	65%	66%	66%	66%	66%	67%	69%	69%	67%
LOW-TECH MANUFACTURES	61.4%	62.6%	62.1%	62.6%	63.8%	64.8%	56.5%	56.3%	55.5%	51.5%	51.4%	52.7%	51.6%	48.9%
HIGH-TECH MANUFACTURES							9.1%	9.9%	10.6%	14.6%	15.3%	16.3%	17.4%	18.1%
UNALLOCATED	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%	4%	4%	4%	4%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

SOURCE: BASED ON UNCTAD DATA (SITC, Rev.3, 3 to 5-digit levels).

TABLE (3): Composition of exports by groups of products and countries - 1996/2000

Groups of products and countries	Developed Countries	Non-developed countries	Latin America	Emerging Asia	Other Asia	Economies in Transition	Africa	TOTAL
Resource-based products	67.0%	33.0%	10.0%	11.1%	7.2%	2.8%	1.9%	100.0%
Primary	68.0%	32.0%	15.0%	9.2%	4.0%	2.2%	1.5%	100.0%
Crude petroleum	29.0%	71.0%	19.8%	6.7%	38.4%	1.5%	4.5%	100.0%
Other energy-related products	57.7%	42.3%	6.8%	18.8%	8.2%	3.2%	5.3%	100.0%
Agro-industrial	73.3%	26.7%	8.2%	13.0%	1.4%	3.3%	0.8%	100.0%
Low-tech manufactures	79.7%	20.3%	5.1%	9.9%	1.5%	3.3%	0.5%	100.0%
High-tech manufactures	77.6%	22.4%	3.5%	14.9%	3.2%	0.8%	0.0%	100.0%
Non-resource-based products	75.3%	24.7%	3.9%	17.0%	1.5%	2.1%	0.3%	100.0%
Low-tech manufactures	75.8%	24.2%	4.1%	15.6%	1.8%	2.4%	0.3%	100.0%
High-tech manufactures	73.4%	26.6%	2.9%	22.6%	0.2%	0.9%	0.1%	100.0%
Unallocated	86.9%	13.1%	2.4%	9.1%	0.8%	0.8%	0.1%	100.0%
TOTAL	73.8%	26.2%	5.2%	15.5%	2.7%	2.2%	0.6%	100.0%

SOURCE: BASED ON UNCTAD DATA (SITC Rev.3, 3 to 5-digit levels)

TABLE (4): Structure of exports by groups of products and countries - 1996/2000

Groups of products and countries	Developed Countries	Non-developed countries	Latin America	Emerging Asia	Other Asia	Economies in Transition	Africa	TOTAL
Resource-based products	20.3%	28.2%	43.0%	16.2%	59.1%	28.3%	68.2%	22.4%
Primary	5.2%	6.9%	16.1%	3.4%	8.3%	5.6%	13.9%	5.6%
Crude petroleum	1.0%	6.9%	9.6%	1.1%	35.9%	1.8%	18.6%	2.5%
Other energy-related products	2.3%	4.7%	3.8%	3.6%	8.7%	4.3%	25.1%	2.9%
Agro-industrial	4.0%	4.1%	6.4%	3.4%	2.1%	6.1%	5.0%	4.1%
Low-tech manufactures	7.6%	5.5%	6.9%	4.5%	3.9%	10.5%	5.6%	7.1%
High-tech manufactures	0.2%	0.2%	0.1%	0.2%	0.2%	0.1%	0.0%	0.2%
Non-resource-based products	76.5%	70.5%	55.8%	82.3%	40.1%	70.8%	31.4%	74.9%
Low-tech manufactures	61.7%	55.3%	47.4%	60.4%	39.0%	64.8%	30.1%	60.0%
High-tech manufactures	14.9%	15.2%	8.4%	21.8%	1.1%	6.0%	1.3%	15.0%
Unallocated	3.1%	1.3%	1.2%	1.6%	0.8%	0.9%	0.4%	2.6%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: BASED ON UNCTAD DATA (SITC Rev.3, 3 to 5-digit levels)

TABLE (5): World share of Latin American exports by groups of products and countries - 1996/2000

Groups of products and countries	Latin America without Mexico	Brazil	Mexico	Argentina	Venezuela	Chile	Colombia	Costa Rica
Resource-based products	8.18%	2.01%	1.85%	1.33%	1.56%	1.05%	0.63%	0.17%
Primary	13.17%	4.03%	1.83%	2.83%	0.18%	1.72%	0.95%	0.50%
Crude petroleum	12.97%	0.03%	6.83%	1.39%	8.22%	0.00%	1.90%	0.00%
Other energy-related products	6.28%	0.26%	0.47%	0.65%	3.50%	0.05%	0.79%	0.01%
Agro-industrial	7.05%	2.80%	1.18%	1.60%	0.12%	1.07%	0.21%	0.16%
Low-tech manufactures	4.05%	1.39%	1.06%	0.28%	0.32%	1.33%	0.11%	0.04%
High-tech manufactures	2.91%	2.29%	0.60%	0.37%	0.04%	0.01%	0.02%	0.01%
Non-resource-based products	1.15%	0.60%	2.73%	0.18%	0.05%	0.04%	0.08%	0.08%
Low-tech manufactures	1.28%	0.66%	2.84%	0.21%	0.06%	0.05%	0.09%	0.07%
High-tech manufactures	0.63%	0.34%	2.31%	0.06%	0.01%	0.01%	0.03%	0.14%
Unallocated	2.18%	0.79%	0.18%	0.17%	0.04%	0.41%	0.04%	0.01%
TOTAL	2.75%	0.92%	2.47%	0.44%	0.39%	0.28%	0.20%	0.10%

Grey areas represent products in which countries or groups of countries have revealed comparative advantages.
SOURCE: BASED ON UNCTAD DATA (SITC Rev.3, 3 to 5-digit levels)

TABLE (6): Structure of exports by groups of products and countries of Latin America - 1996/2000

Groups of products and countries	Latin America without Mexico	Brazil	Mexico	Argentina	Venezuela	Chile	Colombia	Costa Rica
Resource-based products	66.5%	49.0%	16.8%	68.2%	89.8%	85.7%	70.6%	38.2%
Primary	26.9%	24.6%	4.2%	36.3%	2.6%	35.1%	26.7%	28.2%
Crude petroleum	12.0%	0.1%	7.0%	8.1%	53.8%	0.0%	24.1%	0.0%
Other energy-related products	6.7%	0.8%	0.6%	4.3%	26.3%	0.5%	11.5%	0.4%
Agro-industrial	10.4%	12.4%	1.9%	14.8%	1.2%	15.9%	4.3%	6.7%
Low-tech manufactures	10.4%	10.6%	3.0%	4.5%	5.8%	34.2%	4.0%	2.9%
High-tech manufactures	0.2%	0.4%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Non-resource-based products	31.4%	48.8%	83.0%	30.8%	9.9%	10.3%	28.9%	61.6%
Low-tech manufactures	28.0%	43.2%	69.0%	28.7%	9.5%	9.9%	26.4%	41.4%
High-tech manufactures	3.4%	5.6%	14.0%	2.0%	0.3%	0.4%	2.4%	20.3%
Unallocated	2.1%	2.3%	0.2%	1.1%	0.3%	3.9%	0.5%	0.2%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: BASED ON UNCTAD DATA (SITC Rev.3, 3 to 5-digit levels)

TABLE (7):Top 25 exporters of high-tech products -1996 to 2000

Countries	(US$ 000)	Share	Cummulative shares
USA,PR,USVI	870,591,403	19.4%	19.4%
JAPAN	550,369,448	12.3%	31.7%
GERMANY	358,969,653	8.0%	39.7%
UNTD KINGDOM	327,498,824	7.3%	47.0%
Singapore	306,705,544	6.8%	53.9%
FRANCE	261,693,935	5.8%	59.7%
NETHERLANDS	189,354,287	4.2%	63.9%
Korea, Republic of	185,562,200	4.1%	68.1%
Malaysia	174,673,528	3.9%	71.9%
China	132,274,455	3.0%	74.9%
IRELAND	121,377,895	2.7%	77.6%
CANADA	119,964,964	2.7%	80.3%
Mexico	102,085,937	2.3%	82.6%
Philippines	92,808,691	2.1%	84.6%
ITALY	89,417,272	2.0%	86.6%
SWITZ_LIECHT	72,230,394	1.6%	88.2%
Thailand	69,428,663	1.5%	89.8%
SWEDEN	66,973,433	1.5%	91.3%
FINLAND	39,218,218	0.9%	92.2%
BELGIUM-LUX	33,175,479	0.7%	92.9%
SPAIN	31,768,101	0.7%	93.6%
DENMARK	29,523,776	0.7%	94.3%
AUSTRIA	28,928,569	0.6%	94.9%
BELGIUM	28,181,603	0.6%	95.5%
China, Hong Kong SAR	25,385,688	0.6%	96.1%
Total for TOP 25	4,308,161,960	96.1%	
WORLD TOTAL	4,482,922,090	100.0%	

Taiwan is not included, but thirty-two other countries were added to the list of Appendix A(2). Developed countries are in capital letters.

SOURCE: Based on UNCTAD data

TABLE (8): Latin American exports of high-tech products - 1996 to 2000

Countries	(US$ 000)	Share
Mexico	102,085,937	77.7%
Brazil	16,380,544	12.5%
Costa Rica	6,002,782	4.6%
Argentina	2,811,697	2.1%
Colombia	1,451,584	1.1%
Bolivia	678,580	0.5%
Venezuela	382,772	0.3%
Chile	333,396	0.3%
Guatemala	320,196	0.2%
Peru	236,730	0.2%
El Salvador	195,693	0.1%
Ecuador	108,689	0.1%
Uruguay	107,230	0.1%
Barbados	91,886	0.1%
Nicaragua	73,333	0.1%
Others	124,780	0.1%
Total	131,385,829	100.0%

SOURCE: Based on UNCTAD data

TABLE (9):Top 25 exporters of resource-based products* -1996 to 2000

Countries	(US$ 000)	Share	Cummulative shares
United States	606,245,589	12%	12%
Germany	403,933,396	8%	20%
France	338,477,183	7%	27%
Canada	324,014,244	6%	33%
Netherlands	263,460,940	5%	38%
United Kingdom	233,389,019	5%	43%
Italy	186,092,360	4%	47%
Japan	156,579,747	3%	50%
Belgium-Luxembourg	148,326,047	3%	53%
China	145,439,473	3%	55%
Spain	144,786,896	3%	58%
Australia	141,985,455	3%	61%
Brazil	130,468,313	3%	64%
Belgium	104,245,540	2%	66%
Ireland	100,265,297	2%	68%
Indonesia	84,740,105	2%	69%
Switzerland	81,952,277	2%	71%
Sweden	80,754,648	2%	73%
Thailand	78,585,016	2%	74%
Finland	78,419,396	2%	76%
Denmark	75,843,997	1%	77%
Argentina	72,102,666	1%	79%
Chile	69,096,133	1%	80%
Malaysia	68,698,438	1%	81%
Korea, Republic of	67,114,112	1%	83%
TOP 25 countries	4,185,016,287	83%	
WORLD TOTAL	5,064,443,333	100%	

* It excludes energy-related goods.

SOURCE: Based on UNCTAD data.

TABLE (10): ANNUAL GROWTH-RATES OF US IMPORTS			
CATEGORIES YEAR	**1989/02**	**1993/02**	**1996/02**
RESOURCE BASED	6.6%	7.9%	7.4%
PRIMARY	4.1%	3.7%	1.4%
ENERGY	5.6%	8.6%	10.0%
CRUDE PETROLEUM	1.6%	3.0%	6.7%
COAL,COKE&OIL DERIVATIVES	9.1%	15.4%	11.9%
GAS AND ELECTRIC CURRENT	16.7%	18.2%	17.0%
AGRO-INDUSTRIAL	6.9%	6.8%	5.5%
MANUFACTURES	8.5%	9.4%	8.1%
LOW-TECH MANUFACTURES	8.6%	9.6%	8.3%
HIGH-TECH-MANUFACTURES	3.2%	0.0%	-4.2%
NON-RESOURCE-BASED	8.2%	7.5%	6.7%
LOW-TECH-MANUFACTURES	7.6%	7.3%	7.1%
HIGH-TECH-MANUFACTURES	10.0%	8.1%	5.6%
UNALLOCATED	23.5%	26.8%	10.5%
TOTAL	8.2%	8.2%	7.0%

SOURCE: USITC

TABLE (11): STRUCTURE OF US IMPORTS														
CATEGORIES YEAR	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
RESOURCE BASED	28.9%	29.9%	27.8%	26.5%	25.2%	24.0%	23.9%	24.7%	24.0%	21.6%	21.8%	24.6%	24.7%	24.1%
PRIMARY	5.2%	5.0%	5.1%	5.0%	4.6%	4.3%	4.3%	4.2%	4.2%	4.0%	3.6%	3.2%	3.2%	3.2%
ENERGY	11.2%	13.2%	11.3%	10.4%	9.6%	8.6%	8.0%	9.4%	8.4%	6.0%	6.6%	10.0%	10.0%	9.4%
CRUDE PETROLEUM	7.6%	9.0%	7.8%	7.3%	6.7%	5.9%	5.7%	5.7%	4.5%	2.8%	3.1%	4.7%	4.4%	4.7%
COAL,COKE&OIL DERIVATIVES	2.9%	3.4%	2.7%	2.2%	2.0%	1.7%	1.4%	2.5%	2.6%	2.0%	2.3%	3.4%	3.2%	2.9%
GAS AND ELECTRIC CURRENT	0.7%	0.8%	0.8%	0.8%	0.9%	1.0%	0.9%	1.2%	1.4%	1.2%	1.3%	1.9%	2.4%	1.8%
AGRO-INDUSTRIAL	3.5%	3.3%	3.2%	3.2%	3.3%	3.2%	3.1%	3.1%	3.1%	3.0%	3.0%	2.7%	2.9%	3.0%
MANUFACTURES	9.0%	8.4%	8.2%	7.9%	7.7%	7.9%	8.5%	8.0%	8.2%	8.5%	8.6%	8.7%	8.7%	8.5%
LOW-TECH MANUFACTURES	8.9%	8.2%	8.0%	7.7%	7.5%	7.7%	8.3%	7.9%	8.1%	8.4%	8.5%	8.6%	8.6%	8.4%
HIGH-TECH-MANUFACTURES	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%
NON-RESOURCE-BASED	71.1%	70.1%	72.2%	73.5%	74.8%	76.0%	76.1%	71.6%	72.2%	74.2%	73.5%	71.1%	70.8%	71.4%
LOW-TECH-MANUFACTURES	56.3%	55.3%	55.7%	56.1%	56.8%	57.1%	55.5%	52.0%	52.5%	54.5%	53.6%	50.7%	52.2%	53.7%
HIGH-TECH-MANUFACTURES	14.8%	14.8%	16.5%	17.4%	18.0%	18.9%	20.6%	19.6%	19.8%	19.6%	20.0%	20.4%	18.6%	17.7%
UNALLOCATED	1.0%	1.0%	1.2%	1.2%	1.1%	1.0%	1.0%	3.6%	3.7%	4.3%	4.6%	4.3%	4.5%	4.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: USITC

Table (12): Gains and Losses of Latin American Countries in the US - 1996/2002
(a) Total Effect

in US$	Latin America	Mexico	Brazil	Guatemala	Argentina	Chile
Resource-based	-7,601,855,899	-1,087,490,842	633,852,995	-278,517,987	-103,801,939	237,890,393
primary	-5,474,570,276	-1,725,452,486	-747,299,711	-203,879,068	-336,385,039	106,108,789
agro	604,114,883	952,402,297	36,244,023	-125,590,075	-101,795,173	116,909,456
energy	-3,550,661,167	-255,336,165	904,057,075	63,639,669	138,974,279	46,906,800
Manufactures	819,260,662	-59,104,487	440,851,608	-12,688,513	195,403,993	-32,034,653
low-tech	786,007,744	-72,777,475	416,313,605	-12,692,472	187,548,194	-32,388,973
high-tech	33,252,917	13,672,988	24,538,003	3,959	7,855,799	354,320
Non-Resource-Based	27,831,474,490	25,156,111,412	1,823,625,410	652,289,313	71,334,977	128,632,089
low-tech manufactures	15,672,100,656	16,021,283,814	-772,797,103	638,924,768	67,908,266	131,205,393
high-tech manufactures	12,159,373,834	9,134,827,597	2,596,422,513	13,364,545	3,426,712	-2,573,304
Unallocated	1,864,941,446	1,514,295,139	247,042,935	19,984,117	12,540,854	-28,705,826
TOTAL	22,094,560,037	25,582,915,709	2,704,521,340	393,755,442	-19,926,107	337,816,656

in US$	Honduras	Costa Rica	Colombia	Domenican Rep	Venezuela	Other Countries
Resource-based	-231,725,402	-172,477,524	-969,411,890	-274,185,917	-4,019,228,342	-1,336,759,444
primary	-225,057,444	-145,799,592	-711,407,754	-108,702,832	-153,283,261	-1,223,411,878
agro	630,928	-54,952,144	1,256,412	-140,545,505	-16,143,153	-64,302,183
energy	0	8,679,593	-386,196,267	-969,017	-4,084,258,265	13,841,131
Manufactures	-7,298,886	19,594,619	126,935,718	-23,968,562	234,456,337	-62,886,514
low-tech	-7,298,886	19,594,619	126,935,718	-23,992,540	239,113,031	-54,347,078
high-tech	0	0	0	23,978	-4,656,694	-8,539,436
Non-Resource-Based	692,024,564	346,346,310	-63,228,259	-920,466,530	-201,574,297	146,379,502
low-tech manufactures	691,313,568	-178,059,046	-55,888,652	-889,833,139	-202,185,558	220,228,345
high-tech manufactures	710,996	524,405,356	-7,339,607	-30,633,392	611,261	-73,848,843
Unallocated	117,505,798	58,666,434	-53,354,377	-45,417,263	33,023,971	-10,640,335
TOTAL	577,804,960	232,535,220	-1,085,994,526	-1,240,069,710	-4,187,778,669	-1,201,020,278

as % of exports in 2002	Latin America	Mexico	Brazil	Guatemala	Argentina	Chile
Resource-based	-11.8%	-4.8%	11.2%	-27.4%	-4.1%	6.7%
primary	-37.7%	-39.3%	-52.5%	-27.9%	-71.4%	5.3%
agro	9.3%	32.4%	3.1%	-131.6%	-30.8%	18.3%
energy	-10.5%	-2.2%	77.7%	38.2%	9.7%	64.7%
Manufactures	8.4%	-1.6%	23.3%	-51.8%	60.2%	-3.8%
low-tech	8.1%	-2.0%	22.7%	-51.8%	59.4%	-3.8%
high-tech	29.5%	36.5%	39.1%	100.0%	89.1%	55.8%
Non-Resource-Based	20.5%	23.5%	17.6%	31.1%	8.4%	33.5%
low-tech manufactures	14.2%	18.7%	-10.7%	30.7%	8.3%	35.2%
high-tech manufactures	48.2%	42.9%	81.9%	83.9%	11.5%	-22.7%
Unallocated	21.1%	26.0%	31.6%	45.4%	12.1%	-14.7%
TOTAL	10.6%	18.8%	16.1%	12.5%	-0.6%	8.2%

as % of exports in 2002	Honduras	Costa Rica	Colombia	Domenican Rep	Venezuela	Other Countries
Resource-based	-44.5%	-15.1%	-22.0%	-49.4%	-28.6%	-15.9%
primary	-54.8%	-14.7%	-67.9%	-60.5%	-26.3%	-52.8%
agro	0.7%	-97.0%	0.9%	-39.4%	-53.3%	-10.2%
energy	0.0%	100.0%	-13.6%	-892.9%	-33.7%	0.3%
Manufactures	-44.2%	22.4%	34.1%	-133.4%	17.9%	-4.8%
low-tech	-44.2%	22.4%	34.1%	-133.7%	18.3%	-4.1%
high-tech	0.0%	0.0%	0.0%	100.0%	-6387.5%	-298.3%
Non-Resource-Based	24.7%	16.8%	-7.0%	-25.3%	-24.6%	3.3%
low-tech manufactures	24.7%	-12.2%	-6.3%	-24.7%	-24.7%	5.0%
high-tech manufactures	78.6%	86.9%	-83.8%	-95.1%	20.0%	-129.2%
Unallocated	74.8%	38.6%	-11.3%	-35.6%	15.9%	-1.4%
TOTAL	16.6%	6.9%	-18.8%	-28.7%	-27.8%	-8.8%

Table (12): continuation

(b) Competitiveness Effect

in US$	**Latin America**	**Mexico**	**Brazil**	**Guatemala**	**Argentina**	**Chile**
Resource-based	-1,422,742,152	50,948,833	1,595,866,373	231,194,582	432,537,899	184,952,549
primary	-1,158,077,686	-841,643,383	186,482,879	168,761,276	-26,649,939	-16,719,582
agro	894,935,914	508,569,713	279,385,919	-11,268,313	-17,994,990	100,763,271
energy	-1,408,190,585	1,153,610,976	855,436,050	82,728,717	283,211,931	43,489,493
Manufactures	248,590,205	-769,588,473	274,561,524	-9,027,098	193,970,896	57,419,367
low-tech	182,303,767	-793,271,939	237,205,724	-9,031,057	185,600,148	57,207,686
high-tech	66,286,437	23,683,466	37,355,801	3,959	8,370,749	211,681
Non-Resource-Based	18,267,337,114	16,108,016,428	2,486,790,540	711,958,965	210,817,646	85,927,702
low-tech manufactures	8,064,758,725	8,713,317,001	20,523,008	697,869,844	210,140,028	84,262,807
high-tech manufactures	10,202,578,390	7,394,699,427	2,466,267,532	14,089,121	677,618	1,664,894
Unallocated	900,772,915	469,665,750	324,038,012	10,418,474	-8,049,927	25,937,105
TOTAL	17,745,367,877	16,628,631,011	4,406,694,925	953,572,021	635,305,617	296,817,356

in US$	**Honduras**	**Costa Rica**	**Colombia**	**Domenican Rep**	**Venezuela**	**Other Countries**
Resource-based	-137,278,970	-48,986,600	-219,020,661	-31,952,361	-3,242,298,780	-238,705,015
primary	-131,078,601	-41,186,915	20,086,247	-12,531,057	-21,625,359	-441,973,252
agro	6,917,092	-22,756,327	27,860,291	-214,721	-33,299,306	56,973,284
energy	0	8,679,593	-343,696,399	-1,318,430	-3,343,488,224	-146,844,293
Manufactures	-13,117,461	6,277,049	76,729,199	-17,888,154	156,114,109	293,139,246
low-tech	-13,117,461	6,277,049	76,729,199	-17,912,132	158,895,719	293,720,831
high-tech	0	0	0	23,978	-2,781,611	-581,585
Non-Resource-Based	288,023,864	109,168,658	-112,631,637	-1,144,810,144	-166,235,577	-309,689,330
low-tech manufactures	287,330,884	-402,242,776	-104,200,375	-1,125,092,932	-166,203,573	-150,945,193
high-tech manufactures	692,980	511,411,434	-8,431,262	-19,717,212	-32,003	-158,744,137
Unallocated	107,812,992	46,504,773	-68,875,990	-32,852,480	4,462,445	21,711,761
TOTAL	258,557,886	106,686,830	-400,528,288	-1,209,614,986	-3,404,071,912	-526,682,584

Table (12): continuation

as % of exports in 2002	Latin America	Mexico	Brazil	Guatemala	Argentina	Chile
Resource-based	-2.2%	0.2%	28.3%	22.7%	16.9%	5.2%
primary	-8.0%	-19.2%	13.1%	23.1%	-5.7%	-0.8%
agro	13.8%	17.3%	24.1%	-11.8%	-5.4%	15.7%
energy	-4.2%	9.8%	73.6%	49.7%	19.8%	60.0%
Manufactures	2.5%	-21.4%	14.5%	-36.8%	59.8%	6.8%
low-tech	1.9%	-22.3%	13.0%	-36.8%	58.8%	6.8%
high-tech	58.9%	63.2%	59.6%	100.0%	94.9%	33.4%
Non-Resource-Based	13.5%	15.0%	23.9%	34.0%	24.7%	22.4%
low-tech manufactures	7.3%	10.1%	0.3%	33.5%	25.5%	22.6%
high-tech manufactures	40.5%	34.7%	77.7%	88.4%	2.3%	14.7%
Unallocated	10.2%	8.1%	41.5%	23.7%	-7.8%	13.3%
TOTAL	8.5%	12.3%	26.2%	30.2%	18.1%	7.2%

as % of exports in 2002	Honduras	Costa Rica	Colombia	Domenican Rep	Venezuela	Other Countries
Resource-based	-26.3%	-4.3%	-5.0%	-5.8%	-23.1%	-2.8%
primary	-31.9%	-4.2%	1.9%	-7.0%	-3.7%	-19.1%
agro	7.4%	-40.2%	20.7%	-0.1%	-109.9%	9.1%
energy	0.0%	100.0%	-12.1%	-1214.8%	-27.6%	-3.5%
Manufactures	-79.5%	7.2%	20.6%	-99.6%	11.9%	22.3%
low-tech	-79.5%	7.2%	20.6%	-99.8%	12.2%	22.4%
high-tech	0.0%	0.0%	0.0%	100.0%	-3815.5%	-20.3%
Non-Resource-Based	10.3%	5.3%	-12.5%	-31.5%	-20.2%	-6.9%
low-tech manufactures	10.3%	-27.5%	-11.7%	-31.2%	-20.3%	-3.4%
high-tech manufactures	76.6%	84.8%	-96.3%	-61.2%	-1.0%	-277.7%
Unallocated	68.6%	30.6%	-14.5%	-25.7%	2.1%	2.8%
TOTAL	7.4%	3.2%	-6.9%	-28.0%	-22.6%	-3.8%

Table (12): continuation

(c) Product Composition Effect

in US$	Latin America	Mexico	Brazil	Guatemala	Argentina	Chile
Resource-based	-6,179,113,747	-1,138,439,675	-962,013,377	-509,712,569	-536,339,838	52,937,844
primary	-4,316,492,590	-883,809,103	-933,782,590	-372,640,344	-309,735,100	122,828,371
agro	-290,821,031	443,832,584	-243,141,896	-114,321,762	-83,800,182	16,146,185
energy	-2,142,470,582	-1,408,947,141	48,621,025	-19,089,049	-144,237,652	3,417,307
Manufactures	570,670,457	710,483,986	166,290,084	-3,661,414	1,433,097	-89,454,019
low-tech	603,703,977	720,494,463	179,107,881	-3,661,414	1,948,047	-89,596,658
high-tech	-33,033,520	-10,010,478	-12,817,798	0	-514,950	142,639
Non-Resource-Based	9,564,137,376	9,048,094,983	-663,165,131	-59,669,652	-139,482,668	42,704,388
low-tech manufactures	7,607,341,931	7,307,966,813	-793,320,111	-58,945,076	-142,231,762	46,942,586
high-tech manufactures	1,956,795,444	1,740,128,171	130,154,981	-724,575	2,749,094	-4,238,199
Unallocated	964,168,531	1,044,629,389	-76,995,077	9,565,642	20,590,781	-54,642,931
TOTAL	4,349,192,160	8,954,284,697	-1,702,173,585	-559,816,578	-655,231,724	40,999,300

in US$	Honduras	Costa Rica	Colombia	Domenican Rep	Venezuela	Other Countries
Resource-based	-94,446,432	-123,490,924	-750,391,229	-242,233,555	-776,929,562	-1,098,054,429
primary	-93,978,843	-104,612,677	-731,494,001	-96,171,775	-131,657,902	-781,438,626
agro	-6,286,165	-32,195,817	-26,603,879	-140,330,784	17,156,153	-121,275,468
energy	0	0	-42,499,868	349,412	-740,770,041	160,685,424
Manufactures	5,818,576	13,317,570	50,206,519	-6,080,409	78,342,228	-356,025,760
low-tech	5,818,576	13,317,570	50,206,519	-6,080,409	80,217,312	-348,067,909
high-tech	0	0	0	0	-1,875,083	-7,957,851
Non-Resource-Based	404,000,700	237,177,652	49,403,378	224,343,614	-35,338,721	456,068,831
low-tech manufactures	403,982,684	224,183,730	48,311,723	235,259,793	-35,981,985	371,173,537
high-tech manufactures	18,016	12,993,922	1,091,655	-10,916,179	643,264	84,895,294
Unallocated	9,692,805	12,161,661	15,521,613	-12,564,783	28,561,526	-32,352,096
TOTAL	319,247,073	125,848,389	-685,466,238	-30,454,724	-783,706,757	-674,337,694

as % of exports in 2002	Latin America	Mexico	Brazil	Guatemala	Argentina	Chile
Resource-based	-9.6%	-5.0%	-17.1%	-50.1%	-21.0%	1.5%
primary	-29.7%	-20.1%	-65.6%	-51.0%	-65.7%	6.2%
agro	-4.5%	15.1%	-21.0%	-119.8%	-25.3%	2.5%
energy	-6.3%	-11.9%	4.2%	-11.5%	-10.1%	4.7%
Manufactures	5.8%	19.8%	8.8%	-14.9%	0.4%	-10.6%
low-tech	6.2%	20.3%	9.8%	-14.9%	0.6%	-10.6%
high-tech	-29.3%	-26.7%	-20.5%	0.0%	-5.8%	22.5%
Non-Resource-Based	7.1%	8.4%	-6.4%	-2.8%	-16.4%	11.1%
low-tech manufactures	6.9%	8.5%	-11.0%	-2.8%	-17.3%	12.6%
high-tech manufactures	7.8%	8.2%	4.1%	-4.5%	9.2%	-37.4%
Unallocated	10.9%	17.9%	-9.9%	21.7%	19.9%	-28.0%
TOTAL	2.1%	6.6%	-10.1%	-17.7%	-18.6%	1.0%

as % of exports in 2002	Honduras	Costa Rica	Colombia	Domenican Rep	Venezuela	Other Countries
Resource-based	-18.1%	-10.8%	-17.1%	-43.7%	-5.5%	-13.0%
primary	-22.9%	-10.5%	-69.9%	-53.5%	-22.6%	-33.8%
agro	-6.7%	-56.8%	-19.8%	-39.3%	56.6%	-19.3%
energy	0.0%	0.0%	-1.5%	322.0%	-6.1%	3.9%
Manufactures	35.3%	15.3%	13.5%	-33.8%	6.0%	-27.1%
low-tech	35.3%	15.3%	13.5%	-33.9%	6.1%	-26.5%
high-tech	0.0%	0.0%	0.0%	0.0%	-2572.0%	-278.0%
Non-Resource-Based	14.4%	11.5%	5.5%	6.2%	-4.3%	10.1%
low-tech manufactures	14.4%	15.3%	5.4%	6.5%	-4.4%	8.4%
high-tech manufactures	2.0%	2.2%	12.5%	-33.9%	21.0%	148.5%
Unallocated	6.2%	8.0%	3.3%	-9.8%	13.7%	-4.2%

TABLE (13): COMPOSITION OF THE SAMPLE AND OF US IMPORTS OF RESOURCE-BASED PRODUCTS FROM 1996 TO 2002

	SAMPLE	US IMPORTS
PRIMARY	19%	24%
AGRO-INDUSTRY	32%	20%
MANUFACTURES	49%	57%
LOW-TECH MANUF.	48%	56%
HIGH-TECH MANUF.	1%	1%
TOTAL	100%	100%

TABLE (14): DISTRIBUTION BY GROUPS OF COUNTRIES OF RESOURCE-BASED PRODUCTS CLASSIFIED BY DEGREE OF DIFFERENTIATION

LOP	SHARE IN SUBTOTAL	SHARE IN TOTAL
LATIN AMERICA WITHOUT MEXICO	15.8%	10.2%
MEXICO	4.0%	2.6%
DEVELOPED COUNTRIES	66.3%	42.9%
EAST ASIA	5.4%	3.5%
OTHERS	8.5%	5.5%
SUBTOTAL	100.0%	64.7%
DIF		
LATIN AMERICA WITHOUT MEXICO	9.6%	2.3%
MEXICO	5.6%	1.3%
DEVELOPED COUNTRIES	59.8%	14.2%
EAST ASIA	5.2%	1.2%
OTHERS	19.8%	4.7%
SUBTOTAL	100.0%	23.8%
HIGH DIF		
LATIN AMERICA WITHOUT MEXICO	12.0%	1.4%
MEXICO	19.0%	2.2%
DEVELOPED COUNTRIES	62.3%	7.2%
EAST ASIA	1.6%	0.2%
OTHERS	5.1%	0.6%
SUBTOTAL	100.0%	11.5%
TOTAL		
LATIN AMERICA WITHOUT MEXICO	13.9%	13.9%
MEXICO	6.1%	6.1%
DEVELOPED COUNTRIES	64.3%	64.3%
EAST ASIA	4.9%	4.9%
OTHERS	10.8%	10.8%
TOTAL	100.0%	100.0%

TABLE (15): Distribution of US Imports of Machinery* by Groups of Countries	
LATIN AMERICA	4.9%
EXCLUDING MEXICO	4.5%
DEVELOPED COUNTRIES	92.3%
EAST ASIA	2.3%
OTHERS	0.5%
TOTAL	100.0%

*Machinery for the production of resource-based products
SOURCE: BASED ON USITC DATA.

TABLE (16): TOP 10 COUNTRIES IN LATIN AMERICA BY GROUP OF RESOURCE-BASED PRODUCTS

COUNTRIES	LOP	COUNTRIES	DIF	COUNTRIES	HIGH-DIF	COUNTRIES	TOTAL
Mexico	4.0%	Mexico	5.6%	Mexico	19.0%	Mexico	6.1%
Brazil	3.9%	Chile	4.8%	Chile	8.8%	Chile	3.4%
Chile	2.0%	Brazil	1.6%	Brazil	0.9%	Brazil	3.0%
Peru	2.0%	Colombia	0.8%	Argentina	0.8%	Peru	1.3%
Colombia	1.7%	Jamaica	0.6%	Dominican Rep	0.4%	Colombia	1.3%
Ecuador	1.5%	Argentina	0.4%	Colombia	0.3%	Ecuador	1.0%
Guatemala	1.0%	Costa Rica	0.3%	Jamaica	0.2%	Guatemala	0.7%
Venezuela	0.8%	Guyana	0.2%	Uruguay	0.1%	Venezuela	0.6%
Honduras	0.5%	Peru	0.2%	Ecuador	0.1%	Argentina	0.5%
Costa Rica	0.5%	Guatemala	0.2%	Venezuela	0.1%	Costa Rica	0.4%
Others	1.8%	Others	0.7%	Others	0.3%	Others	1.6%
TOTAL	100.0%		100.0%		100.0%		100.0%

TABLE (17): ANNUAL RATES OF GROWTH OF LOP, DIF AND HIGH-DIF PRODUCTS

	FROM 1996 TO 2002*
LOP PRODUCTS	3.5%
DIF PRODUCTS	8.9%
HIGH-DIF PRODUCTS	8.0%

*growth-rates were calculated by OLS regressing annual import data in logarithmic form on years from 1996 to 2002.

TABLE (18): STRUCTURE OF RESOURCE-BASED PRODUCTS BY THE DEGREE OF DIFFERENTIATION

	LOP	DIF	HIGH-DIF	TOTAL
WORLD	65%	24%	12%	100%
DEVELOPED COUNTRIES	67%	22%	11%	100%
EAST ASIA	71%	25%	4%	100%
LATIN AMERICA	64%	18%	18%	100%
MEXICO	43%	22%	36%	100%
LATIN AMERICA EXCL. MEXICO	74%	16%	10%	100%
ARGENTINA	61%	19%	21%	100%
BRAZIL	84%	12%	4%	100%
CHILE	38%	33%	29%	100%
COLOMBIA	84%	14%	2%	100%
COSTA RICA	80%	19%	1%	100%
DOMENICAN REP	47%	3%	50%	100%
GUATEMALA	95%	5%	0%	100%
HONDURAS	99%	1%	0%	100%
VENEZUELA	82%	17%	1%	100%
OTHERS LATIN AMERICA	90%	8%	2%	100%
OTHERS	51%	44%	5%	100%

TABLE (19): MARKET SHARE ANALYSIS OF US IMPORTS OF RESOUREC-BASED PRODUCTS FROM LATIN AMERICAN COUNTRIES* - 2002/1996

PRODUCT EFFECTS					
COUNTRIES	PRIMARY	AGRO	LOW-TECH	HIGH-TECH	TOTAL
Argentina	-277,574,328	-66,570,791	7,069,776	-476,678	-337,552,021
Brazil	-847,292,724	-198,401,088	221,466,821	-11,298,789	-835,525,780
Chile	198,107,220	36,991,906	-55,438,929	153,804	179,814,001
Colombia	-661,457,313	-21,293,099	46,373,290	0	-636,377,122
Costa Rica	-59,308,005	-27,750,362	14,290,218	0	-72,768,149
Dominican Rep	-84,688,701	-120,516,063	-4,428,672	0	-209,633,436
Guatemala	-335,438,698	-105,517,878	-2,179,712	0	-443,136,288
Honduras	-68,654,997	-2,575,633	6,766,435	0	-64,464,196
Mexico	-640,255,592	523,128,004	864,658,886	-9,061,436	738,469,862
Venezuela	-102,362,416	19,005,339	121,900,505	-1,686,714	36,856,714
Others	-640,510,728	-93,713,513	-294,590,449	-7,503,733	-1,036,318,423
AL	-3,519,436,281	-57,213,178	925,888,170	-29,873,547	-2,680,634,837

COMPETITIVENESS EFFECTS					
COUNTRIES	PRIMARY	AGRO	LOW-TECH	HIGH-TECH	TOTAL
Argentina	-26,649,939	-17,994,990	184,183,321	8,370,749	147,909,141
Brazil	186,482,879	279,385,919	209,436,767	37,355,801	712,661,366
Chile	-16,719,582	100,763,271	57,392,621	211,681	141,647,992
Colombia	20,086,247	27,860,291	53,570,050	0	101,516,588
Costa Rica	-41,186,915	-22,756,327	6,101,506	0	-57,841,736
Dominican Rep	-12,531,057	-214,721	-16,700,652	23,978	-29,422,452
Guatemala	168,761,276	-11,268,313	-9,009,024	3,959	148487897.8
Honduras	-131,078,601	6,917,092	-13,094,381	0	-137,255,890
Mexico	-841,643,383	508,569,713	-778,939,946	23,683,466	-1,088,330,151
Venezuela	-21,625,359	-33,299,306	159,811,556	-2,781,611	102,105,280
Others	-441,973,252	56,973,284	298,642,797	-581,585	-86,938,756
AL	-1,158,077,686	894,935,914	151,394,615	66,286,437	-45,460,719

TOTAL EFFECTS					
COUNTRIES	PRIMARY	AGRO	LOW-TECH	HIGH-TECH	TOTAL
Argentina	-304,224,267	-84,565,781	191,253,097	7,894,071	-189,642,880
Brazil	-660,809,845	80,984,832	430,903,588	26,057,011	-122,864,414
Chile	181,387,638	137,755,177	1,953,693	365,485	321,461,993
Colombia	-641,371,066	6,567,193	99,943,340	0	-534,860,534
Costa Rica	-100,494,920	-50,506,689	20,391,724	0	-130,609,885
Dominican Rep	-97,219,758	-120,730,784	-21,129,324	23,978	-239,055,888
Guatemala	-166,677,422	-116,786,191	-11,188,736	3,959	-294,648,390
Honduras	-199,733,598	4,341,459	-6,327,947	0	-201,720,086
Mexico	-1,481,898,975	1,031,697,717	85,718,940	14,622,030	-349,860,288
Venezuela	-123,987,775	-14,293,967	281,712,062	-4,468,325	138,961,995
Others	-1,082,483,980	-36,740,229	4,052,348	-8,085,319	-1,123,257,180
AL	-4,677,513,967	837,722,736	1,077,282,785	36,412,890	-2,726,095,556

*The analysis includes all countries, though only the results of Latin American countries are shown.

TABLE (20): MARKET SHARE ANALYSIS OF RESOURCE-BASED PRODUCTS BY THE DEGREE OF DIFFERENTIATION - 2002/1996*

PRODUCT EFFECTS

COUNTRY	LOP	DIF	HIGH-DIF	TOTAL
Argentina	-82,760,686	6,113,133	5,849,534	-70,833,436
Brazil	-344,882,176	-18,576,628	11,335,921	-352,384,257
Chile	-50,118,333	260,954,811	175,351,907	386,067,639
Colombia	-357,352,880	-48,024,695	3,551,787	-401,968,713
Costa Rica	-7,591,129	3,617,109	236,779	-3,771,153
Dominican Rep	-34,219,090	336,757	25,871,211	-8,022,354
Guatemala	-217,509,669	-4,802,828	206,429	-222,193,435
Honduras	-26,864,470	-277,464	143,121	-27,034,761
Mexico	-427,569,035	125,144,270	263,997,324	-38,787,999
Venezuela	-116,101,351	21,922,577	5,591,781	-88,663,017
Other Countries	-298,716,988	-67,217,070	9,280,444	-356,956,052
LA	-1,963,685,806	279,189,972	501,416,240	-1,184,547,538

COMPETITIVENESS EFFECTS

COUNTRY	LOP	DIF	HIGH-DIF	TOTAL
Argentina	90,289,898	24,325,625	43,453,803	158,069,325
Brazil	299,120,918	-85,014,398	39,047,182	253,153,701
Chile	223,022,508	-208,820,082	-31,983,859	-17,781,432
Colombia	25,423,470	14,624,145	309,917	40,357,532
Costa Rica	-21,199,901	14,224,542	-506,933	-7,482,292
Dominican Rep	-8,586,431	1,274,406	-17,134,695	-24,446,720
Guatemala	-4,619,853	6,953,269	327,227	2,660,643
Honduras	-41,165,384	-180,193	517,395	-40,828,182
Mexico	-543,196,884	87,183,049	502,520,074	46,506,239
Venezuela	3,313,466	-61,132,159	1,620,668	-56,198,025
Other Countries	32,845,311	-24,971,521	30,734,542	38,610,951
LA	55,247,117	-231,533,316	568,905,321	392,621,739

TOTAL EFFECTS

COUNTRY	LOP	DIF	HIGH-DIF	TOTAL
Argentina	7,529,212	30,438,758	49,303,336	87,235,889
Brazil	-45,761,258	-103,591,027	50,383,103	-99,230,555
Chile	172,904,176	52,134,729	143,368,049	368,286,207
Colombia	-331,929,411	-33,400,549	3,861,704	-361,611,182
Costa Rica	-28,791,031	17,841,650	-270,154	-11,253,445
Dominican Rep	-42,805,521	1,611,163	8,736,517	-32,469,074
Guatemala	-222,129,522	2,150,442	533,657	-219,532,791
Honduras	-68,029,854	-457,656	660,516	-67,862,943
Mexico	-970,765,919	212,327,319	766,517,398	7,718,239
Venezuela	-112,787,885	-39,209,581	7,212,449	-144,861,042
Other Countries	-265,869,059	-92,188,590	40,014,986	-318,345,101
LA	-1,908,436,072	47,656,656	1,070,321,560	-791,925,799

*The analysis includes all countries, though only the results of Latin American countries are shown.

APPENDIX A (1): SITC products classified by the degree of manufacturing and technology intensity.

(1) PRIMARY GOODS: SITC 0,1,2 and 4, excluding those products classified as agro-industrial.

(2) AGRO-INDUSTRIAL GOODS: SITC 01 (excl. 011), 023, 024, 025, 035, 037, 046, 047, 048, 056, 058, 06, 073, 098, 1 (excl. 121), 232 (OR 233 rev.2), 247, 248, 25, 264, 265, 269 and 4.

(3) ENERGY-RELATED GOODS: SITC 3.

(4) RESOURCE-BASED MANUFACTURES: SITC 51 (excl. 512 and 513), 52 (excl. 525 or 524 rev.2), 53 (excl. 533), 551, 592, 62, 63, 641, 66 (excl. 665 and 666) and 68.

(5) RESOURCE-BASED-HIGH-TECH MANUFACTURES: SITC 52222, 52223, 52229, 53111, 53112, 53113, 53114, 53115, 53116, 53117, 53119, 53121, 53122.

(6) RESOURCE-BASED-LOW-TECH MANUFACTURES: (4) – (5).

(7) NON-RESOURCE-BASED MANUFACTURES: SITC 5, 6, 7, 8 – (4).

(8) NON-RESOURCE-BASED-HIGH-TECH: SEE HATZICHRONOGLOU (1997).

(9) NON-RESOURCE-BASED-LOW-TECH MANUFACTURES: (7) –(8).

(10) UNALLOCATED: SITC 9.

APPENDIX A (2): Non-developed countries

LATIN AMERICA
Argentina
Barbados
Belize
Bolivia
Brazil
Chile
Colombia
Costa Rica
Ecuador
El Salvador
Grenada
Guatemala
Honduras
Mexico
Nicaragua
Panama
Paraguay
Peru
Saint Lucia
Saint Vincent and the Grenadines
Trinidad and Tobago
Uruguay
Venezuela
EAST ASIA
China
China, Hong Kong SAR
China, Macao SAR
Indonesia
Korea, Republic of
Malaysia
Philippines
Singapore
Thailand
OTHER ASIA
Bangladesh
Cyprus
India
Jordan
Kuwait
Nepal
Oman
Pakistan
Syrian Arab Republic
Turkey
ECONOMIES IN TRANSITION
Croatia
Czech Republic
Estonia
Hungary
Kazakhstan
Latvia
Lithuania
Moldova, Republic of
Poland
Romania
Slovakia
Slovenia
AFRICA
Algeria
Egypt
Kenya
Madagascar
Morocco
Mauritius
Saudi Arabia
Senegal
Tunisia
Zimbabwe

APPENDIX A (3): TOP 20 PRODUCTS TRADED IN THE WORLD FROM 1996 TO 2000

PRODUCT DESCRIPTION	SITC NO.	Trade Value in US$ from 1996 to 2000
Motor vehicles for the transport of persons (other than public transport), nes.	78120	1,327,265,845
Petroleum oils and oils from betuminous minerals, crude	33300	1,218,572,047
Digital monolithic units	77641	714,798,824
Parts,auto data.proc mch	75997	555,174,708
Petroleum oils and oils from betuminous minerals (other than crude), preparations…	33400	415,107,452
Other parts,motor vehl.nes	78439	324,065,900
Storage units, whether or not presented with the rest of the system for data processing	75270	269,911,263
Input or output units whether or not presented with the rest of a system	75260	247,578,786
Goods vehicles, nes	78219	228,738,981
Medicaments,nes,for retail	54293	208,328,374
Airplanes, other aircraft (other than helicopters), unladen weight exceeding 15,000 KG	79240	184,192,732
Digital processing units whether or not presented with the rest of the system	75230	183,090,240
Transmssn,receptn appart	76432	172,651,963
Jerseys, pullovers, cardigans, waistcoats and similar articles, knitted or crocheted.	84530	134,889,761
Part,TV,telecom,etc.eqpt	76493	132,400,233
Natural gas, in the gaseous state	34320	125,513,638
Other parts,vehicle bodies	78432	124,796,141
Footwear nes,leather sole	85148	124,037,948
Other parts,aeroplanes etc	79295	120,150,065
Mch with indiv funct nes	72849	113,429,998
		6,924,694,899

Appendix A (4): TOP 20 HIGH-TECH PRODUCTS: 1996-2000

01 Monolithic integrated circuits, digital (Eletronics - Telecomunications)
02 Parts&accessories of automatic data processg machines&units thereof (Computers - Office Machines)
03 Aircraft nes of an unladen weight exceeding 15,000 kg (Aerospace)
04 Storage units, whether or not presented with the rest of a system (Computers - Office Machines)
05 Input o output units,whether o not presentd w the rest of a system etc (Computers - Office Machines)
06 Transmission apparatus,for radioteleph incorporatg reception apparatus (Eletronics - Telecomunications)
07 Digital process units whether/not presentd w the rest of a system etc (Computers - Office Machines)
08 Monolithic integrated circuits, nes (Eletronics - Telecomunications)
09 Parts of electrical apparatus for line telephone or line telegraphy (Electronics - Telecomunications)
10 Digital auto data process mach cntg in same housg a CPU input&output (Computers - Office Machines)
11 Electronic integrated circuits and microassemblies, nes (Eletronics - Telecomunications)
12 Parts of turbo-jets or turbo-propellers (Aerospace)
13 Recorded media for sound or other similarly recorded phenomena, nes (Eletronics - Telecomunications)
14 Apparatus, for carrier-current line systems, nes (Eletronics - Telecomunications)
15 Video recording or reproducing apparatus (Eletronics - Telecomunications)
16 Printed circuits (Eletronics - Telecomunications)
17 Aircraft nes of an unladen weight > 2,000 kg but not exceedg 15,000 kg (Aerospace)
18 Turbo-jets (Aerospace)
19 Other machines, having individual functions (Electrical Machinery)
20 Hybrid integrated circuits (Eletronics - Telecomunications)

APPENDIX (5): MACHINERY USED IN THE PRODUCTION OF RESOURCE-BASED PRODUCTS

Product description	classification	share	US Imports ($)*
SELF-PROPELLED SCRAPERS	HS 84293000	4.1%	164151192
TAMPING MACHINES AND ROAD ROLLERS, VIBRATORY, NEW	HS 8429400020	18.5%	740760041
BORING OR SINKING MACHINERY, SELF-PROPELLED	HS 8430410000	6.7%	266848301
MVING, GRDING, LVLING, SCRPING, EXCVTING, EXTRCTING MACHINERY	HS 8430505000	19.2%	768789749
TAMPING OR COMPACTING MACHINERY, NOT SELF-PROPELLED	HS 8430610000	3.8%	151133054
COMBINE HARVESTER-THRESHERS, SELF-PROPELLED	HS 8433510010	10.1%	405403287
PRESSES AND SIMILAR MCH, USED IN THE MANUFACTURE OF BEVERAGES	HS 8435100000	2.2%	88991417
MCH FOR CLNING, SRTING OR GRDING SEED, GRAIN OR DRIED LEGS VEGS	HS 8437100000	1.4%	56075315
MCH USED IN MILLING IND OR WORK CEREALS OR DRIED LEGS VEGS.	HS 8437800090	1.0%	39055974
BAKERY MACHINERY	HS 8438100010	13.3%	531581944
MACHINERY FOR THE MANUFACTURE OF MACARONI OR SIMILAR PRODUCTS	HS 8438100090	5.0%	201117171
MCH FOR INDUST PREPARATION OR MANUF OF FOOD OR DRINK	HS 8438800000	14.2%	567926611
MCH FOR THE EXTRCTN OR PREPRTN OF ANIMAL OR FIXED VEG FATS OR OILS	HS 8479200000	0.6%	25019365
TOTAL MACHINERY		**100.0%**	**4006853421**

* total from 1996 to 2002.

APPENDIX (6): RESOURCE-BASED PRODUCTS CLASSIFIED AS LOP PRODUCTS - 1996/2002

Product description	**classification**	**growth-rate***	**share**	**US Imports ($)****
boneless meat	HS 0201305000	25.2%	2.1%	4,070,676,698
haddock fillets, nesoi, frozen	HS 0304203062	3.9%	0.2%	317,572,457
shrimps cooked in shell or uncooked, dried, salted or in brine, frozen	HS 03061300	3.8%	9.8%	18,586,178,395
crab cooked in shell or uncooked, dried, salted or in brine, frozen	HS 03061440	25.2%	1.3%	2,430,339,030
coffee,arabica,not roasted,not decaff	HS 0901110010	-11.7%	4.4%	8,354,938,447
coffee,nesoi,not roasted,not decaff	HS 0901110090	-19.4%	3.5%	6,614,868,647
coffee,nesoi,roasted,not decaff.	HS 0901210060	10.0%	0.1%	262,722,987
coffee,roasted,decaff.,nesoi	HS 0901220060	-18.8%	0.0%	66,662,482
apple juice	HS 200970	-6.3%	1.0%	1,839,202,404
iron ore agglomerated pellets	HS 2601120030	-12.2%	1.1%	2,184,045,799
silicon less than 99% pure	HS 2804695000	-11.7%	0.2%	368,678,271
coniferous wood sawn or chipped lengthwise of a thickness exceeding 6mm	HS 44071000	-1.2%	24.4%	46,352,336,452
pine (pinus SPP.) standard wood molding	HS 4409104000	12.3%	1.3%	2,443,244,098
chemical woodpulp, sulfate or soda, other than dissolving grade, nonconiferous, bleached	HS 4703290040	7.5%	2.2%	4,121,867,053
diamonds nonindustrial (cut, faceted, set or mounted) weighing 0.5 carat and over each	HS 7102390050	13.7%	23.6%	44,892,166,093
refined copper cathodes and sections of cathodes	HS 7403110000	4.6%	5.0%	9,452,870,173
nickel, unwrought, not alloyed	HS 7502100000	-2.7%	2.8%	5,322,314,780
unwrought aluminum not alloyed nesoi	HS 7601106000	1.8%	6.8%	12,952,062,189
zinc, unwrought, not alloyed, containing by weight 99.99% or more zinc	HS 7901110000	-7.8%	2.5%	4,687,793,356
tin, unwrought, not alloyed	HS 8001100000	-3.2%	0.8%	1,496,074,147
paper and paperboard, uncoated, nesoi, in rolls or sheets	SITC 64129	5.6%	7.0%	13,249,136,998
Total LOP		**3.5%**	**100.0%**	**190,065,750,956**

* growth-rates were calculated by regressing import values in logarithmic form on years from 1996 to 2002.

** total from 1996 to 2002.

APPENDIX (7): RESOURCE-BASED PRODUCTS CLASSIFIED AS DIF PRODUCTS

Product description	**classification**	**growth-rate***	**share**	**US Imports ($)****
farmed Atlantic salmon	HS 0304104093	16.9%	2.3%	1,654,867,083
salmonidae frozen	HS 0304206006	34.4%	0.5%	332,822,778
fish fillets	HS 0305306080	4.8%	0.3%	210,097,575
coffee,not roasted,decaffeinated	HS 0901120000	-10.3%	2.5%	1,775,742,089
cigarettes	HS 2402208000	33.5%	1.2%	832,524,295
aluminum ores and concentrates not calcine bauxite	HS 2606000090	-13.2%	2.0%	1,403,308,033
silicon: containing by weight not less than 99.99% of silicon	HS 2804610000	-4.1%	0.9%	617,517,786
new pneumatic radial tires of rubber used on motor cars	HS 40111010	6.6%	17.3%	12,223,581,853
doors and frames of wood	HS 44182080	16.9%	3.0%	2,140,306,211
diamonds nonindustrial (cut,faceted,not set or mounted) weighing less than 0.5 carat each	HS 7102390010	0.3%	25.2%	17,733,355,246
unrefined copper	HS 7402000000	11.3%	4.0%	2,793,875,959
aluminum plates sheets a strip rect inc sq alloy not clad with a thickness of 6.3mm or less, nesoi	HS 7606123090	10.2%	6.9%	4,849,197,312
bakers' wares,n.e.s.,communion wfrs,empty cachets for pharmactcl use,sealing wfrs,rice,paper,etc	SITC 04849	10.5%	5.8%	4,077,612,151
wine or fresh grapes (other than sparkling wine); grape fermentation by the addition of alcohol	SITC 11217	10.2%	17.1%	12,076,710,332
Spirits and distilled alcoholic beverages	SITC 11249	12.9%	11.0%	7,776,148,996
Total DIF		**8.9%**	**100.0%**	**70,497,667,699**

* growth-rates were calculated by regressing import values in logarithmic form on years from 1996 to 2002.

** total from 1996 to 2002.

APPENDIX (8): RESOURCE-BASED PRODUCTS CLASSIFIED AS HIGH-DIF PRODUCTS

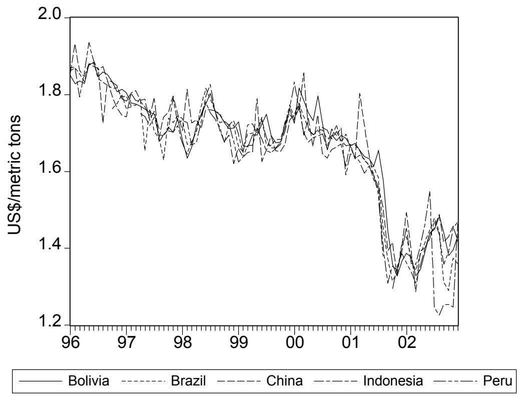
Product description	**classification**	**growth-rate***	**share**	**US Imports ($)****
beer made from malt (including ale, stout and porter)	(SITC) 11230	11.0%	41.3%	14,536,278,236
sugar confectionary (including white chocolate), not containing cocoa, nes	(SITC) 6229	10.3%	12.3%	4,313,167,246
smoked salmon	HS 03054100	15.5%	0.4%	127,920,501
crabmeat frozen	HS 03061420	12.2%	0.3%	114,076,604
cheese	HS 040690	6.4%	12.0%	4,226,724,132
avocados	HS 08044000	28.5%	1.5%	514,859,322
grapes	HS 080610	10.0%	10.1%	3,538,694,009
fresh apples	HS 08081000	2.3%	1.9%	667,811,681
blueberries	HS 0810400028	27.6%	0.5%	168,983,463
coffee,roasted,not decaff.,in retail containers 2kg or less	HS 0901210030	5.4%	1.9%	667,523,316
coffee,roasted,decaff.,in retail containers 2kg or less	HS 0901220030	-3.7%	0.3%	113,534,548
silicon containing by weight less than 99.99% but not less than 99% of silicon	HS 2804691000	7.7%	1.9%	653,755,604
diamond except industrial,unworked or simply sawn, cleaved or brutd	HS 7102310000	-3.0%	13.0%	4,557,847,367
unwrought nickel alloys	HS 7502200000	4.7%	0.8%	273,719,072
nickel powders	HS 7504000010	-4.8%	1.9%	682,896,793
Total HIGH-DIF		**8.0%**	**100.0%**	**35,157,791,894**

* growth-rates were calculated by regressing import values in logarithmic form on years from 1996 to 2002.

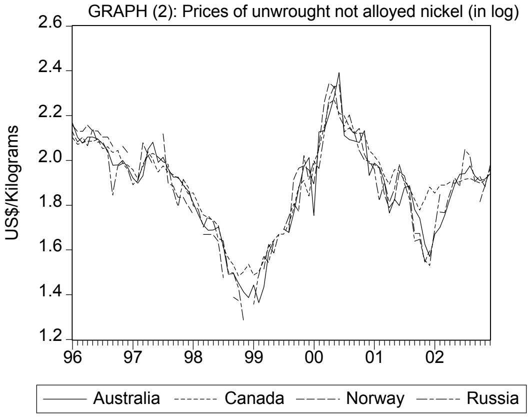
** total from 1996 to 2002.

APPENDIX A (9): GRAPHS OF SOME LOP PRODUCTS

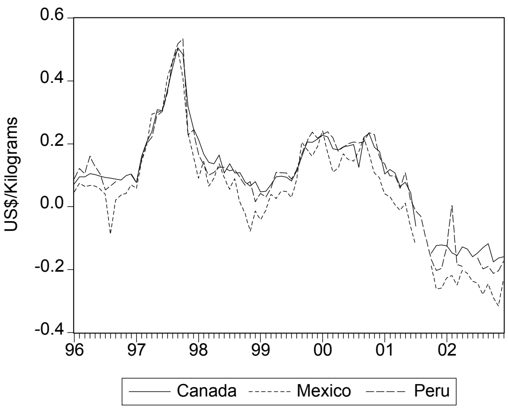
GRAPH (1): Prices of unwrought not alloyed tin (in log)



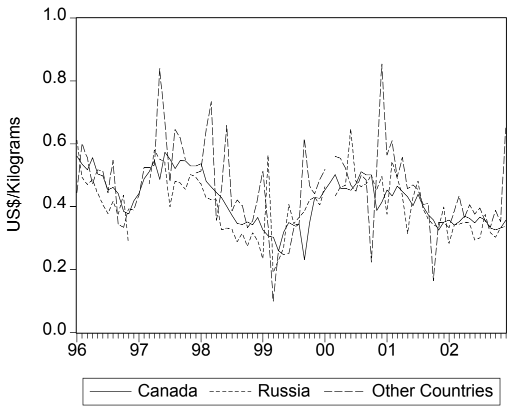
GRAPH (2): Prices of unwrought not alloyed nickel (in log)



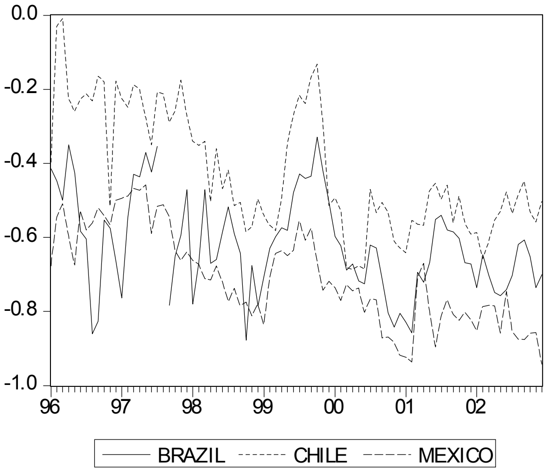
GRAPH (3): Prices of unwrought not alloyed zinc (in log)



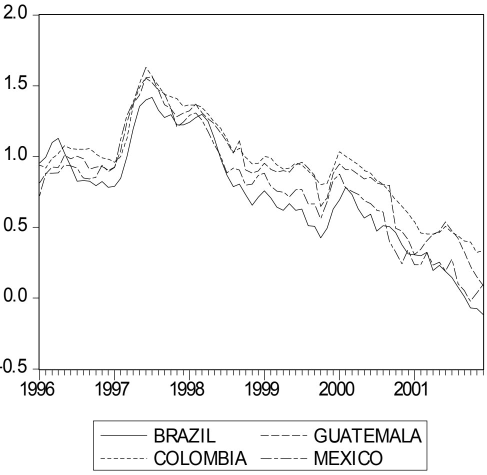
GRAPH (4): Prices of unwrought not alloyed aluminium



GRAPH (5): Prices of pine standard wood molding

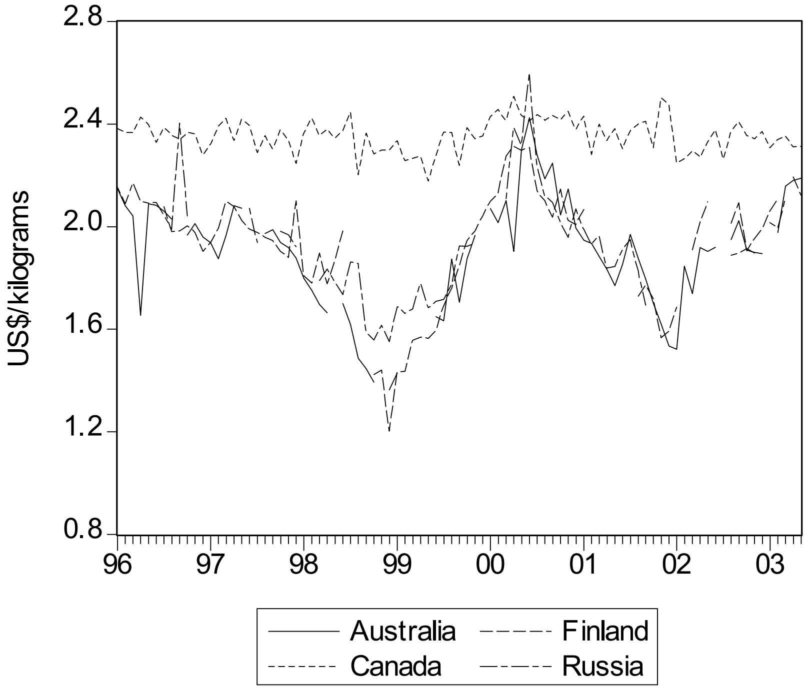


GRAPH (6): Prices of arabica coffee, not roasted, not decaff.



APPENDIX A (10): GRAPH (A-10.1) AND (A-10.2)

Graph (A-10.1): Prices of nickel powders and flakes (in log)



GRAPH (A-10.2): Prices of unrefined copper (in log)