Production sharing in Latin American trade: a research note

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Abstract

The recent literature on industry globalisation and global production sharing has called attention to the changing nature of world trade with the predominance of trade in manufactures, the fragmentation of the production process and contractual relations between firms. Even when those changes do not question the most fundamental notion of trade and production specialisation according to factor services endowments, the literature points to a specialisation within a narrow set of activities and likely to be more fragmented. Enterprises may select labour intensive activities from a number of predominantly labour as well as from capital intensive industries initially located in industrial countries to relocate them in developing countries. Nevertheless, those activities can be reconverted to industrial countries if and when technological change makes their consolidation more profitable.

Mexico has a history of integrating its economy with that of the United States and of full adoption of production sharing as a strategy of integrating its economy into the world economy. On the other extreme, Brazil has been oriented towards its domestic market and more recently towards the regional market. Even though imported inputs have increased after trade liberalisation, proportion to domestically produced inputs is still moderate. The contrasting experience of the two countries is an open field for research.

I. Introduction

Over the past century two interwoven trends have been unfolding in the world economy: the growing internationalisation of the production process and the predominance of manufactured goods in international trade.[1] Likewise, a significant part of bilateral trade flows in manufactures is composed of products that belong to the same category in trade classification. The trade literature has been concerned with the conceptual and empirical features of intra-industrial trade since the 1960s with the earlier studies focussed on trade among industrial countries in final goods. Trade between industrial and developing countries followed a colonial pattern. The majority of developing countries was exporting unprocessed goods to industrial countries and importing processed goods from them. Accordingly, the nature of those flows was clearly inter-industrial. It was not until the 1970s that researchers began to analyse the share of intra-industrial trade in trade relations between industrial and developing countries (North-South trade).

A more recent and fast growing literature has linked the new characteristics of intra-industry manufacturing trade that resulted from growing global outsourcing by international firms to the process known as economic globalisation. Although with distinct features cross-border production sharing occurs both in trade among OECD countries and between them and developing countries.

[1] The outstanding importance of manufactured goods in world trade is so extensively asserted that it is almost trivial to mention it. Manufactured goods accounted for more than 80% of the value of world exports in 2000. Nevertheless, in 1923 Alfred Marshall believed that the phenomenon would be temporary and depended on the convergence of development patterns in the world economy. A more even spread of technology and knowledge among countries should determine a decline in the share of trade in manufactures (Rayment, 1983:1).

Lack of data poses severe difficulties in assessing the share of global production sharing. The United States provides regular data on production sharing activities that fall within its production-sharing programme. International production sharing has been promoted as a deliberate policy by the United States through trade preferential arrangements with various countries since the 1950s and more systematically since the 1960s. Due to its proximity to the United States Mexico has been the major user of those tariff provisions whereas Brazil has only made a marginal use of it. Over the last decade, each country has also adopted a different strategy to integrate its economy to the global economy: Mexico chose a greater reliance on the United States markets whereas Brazil is trying to consolidate its role in South America as an exporting basis for enterprises operating in its territory. Mexico is the largest exporter of manufactured goods based on imported inputs and low value added. Conversely, Brazil has a successful project of producing and exporting commercial aircrafts based on international outsourcing of manufactured inputs and the domestic production of high value services.

The purpose of this paper is to present the manufacturing trade of Mexico and Brazil in the context of the literature of international production sharing and industry globalisation. This paper is organized as follows. Section II provides a brief review of the recent and quite exploratory literature on production sharing and industry globalization as a conceptual background for a further analysis of Mexican and Brazilian manufacturing exports. In particular, the section will review the difficulties in measuring the share of international production sharing both in global trade and in particular countries' trade. Section III is based on the production sharing programme promoted by the United States. The relative importance for many Latin American and Caribbean economies of this programme is illustrated by trade data. In addition, the section indicates the weight of the United States together with the Latin American and the Caribbean region for regional trade in manufactures. In particular, the section describes Mexican and Brazilian trade in manufactured goods in recent years. Finally section IV suggests some possible policy implications from the new structure of world trade for economic development.

II. International production sharing and industry globalisation

A. Production sharing and intra-industry trade: a brief survey of the literature

The gradual reduction in trade barriers during the establishment of the European Economic Community (EEC) provided a rare opportunity for many trade economists to observe and measure the impact of trade liberalisation on the commodity composition of trade flows. Several studies that were conducted in the late 1950s and 1960s indicated that contrary to the expectations of trade economists rather than increasing the specialisation in industries in which they had been successful exporters prior to the creation of the EEC, individual member countries had diversified their exports while keeping and expanding the productive structure.[2] At the end, trade liberalisation generated a greater uniformity in the structure of exports of EEC countries than had been foreseen (Balassa, 1967:89). Similarly, ratios of trade balances in intra-EEC trade showed that intra-industry rather inter-industry specialization had resulted from trade liberalisation.[3] Basically, intra-industry trade was defined as consisting of trade in differentiated final goods. Several hypotheses were advanced to explain the determinants of the commodity composition of those trade

[2] Rayment (1983:4) indicated that Meade's theoretical work on customs union (Meade 1955) persuaded economists that the formation of a customs union might be followed by drastic adjustment problems since industries that were previously protected from foreign competition would be virtually eliminated after trade liberalisation.

[3] See Grubel and Llloyd (1975); Giersch (1979) and Tharakan (1981) for references on intra-industry trade literature.

flows: economies of scale and production differentiation (Drèze, 1960; 1961); similarities in consumption patterns (Linder, 1961); association between trade and investment through enterprises with operations in different countries (Vernon, 1966).[4]

In the late 1970s, the analysis of the intra-industry trade of developing countries was in its infancy "partly due to the theoretical belief that simultaneous imports and exports, especially of manufactured products are likely to take place mainly between countries with high and similar income levels" (Tharakan, 1981:270). Also, because attention was still centered on final goods. Nevertheless, Hirsch (1977) found that some developing countries with low-income per capita had higher intra-industry trade indices than most of the countries in the medium low-income group. Balassa (1979) analyzed intra-industry patterns of regional and subregional Latin American integration schemes. He showed that in the intra-scheme trade of LAFTA (Latin American Free Trade Association) and CACM (Central American Common Market) countries, the proportion of intra-industry trade was higher than in trade that the same countries had with developed countries or with the rest of the world (Mexico was an exception). Other studies identified differences across countries: the United States tended to have a higher level of intra-industry trade with developing countries than other OECD countries.[5] Also, with few exceptions, in every developing country, the number of industries with a higher intra-industry index in trade between developing and industrial countries increased between 1970 and 1980 (Roosens, 1980 quoted in Tharakan, 1981:270-272).

The observation that countries with similar factor proportions trade among themselves large volume of goods and services and that a great part of these flows consists of similar products led to the emergence of theoretical efforts that emphasized economics of scale and product differentiation (Helpnan, 1998). Pioneered by the empirical observation in Linder (1961), sectors with product differentiation were included to explain large shares of intra-industry trade. The theory could be applied to consumer goods, producer goods and intermediate inputs. But it has been concentrated on final goods and much less on intermediate goods and services (Krugman, 1995). This is to say, trade in parts components and assembling operations that is also associated with cross border activities of multinational corporations and industry globalization.

An important contribution in this direction was the dynamic theory of specialisation proposed by Rayment (1983) as a general framework for the discussion of intra-industry trade in intermediate goods. Following Lancaster (1966) production is conceived as a joint set of activities and there is increasing disintegrability of the activity set for any product according to the extent of the market. Based on the analysis of the division of labour by Adam Smith and Allyn Young (1928), Rayment suggested that for a given product growth of its market will lead to the establishment of more specialised plants for some activities which may or may not remain under the control of the original enterprise. In addition, he remarked that changes in technology, especially in communications, might have a similar effect not only in terms of geographical extension of the markets but also by reducing the relative costs of co-ordination. Insofar as joint sets contain activities with significant differences in factor requirements there should be predictable effects of trade.[6] The latter explained the trend detected since the mid-1960s when enterprises selected labour intensive activities from a

[4] Rayment (1983:5) asserted that intra-industrial trade is essentially a statistical phenomenon that results from the way traded goods are classified in trade statistics. Conceptually, intra-industrial trade does not exist in trade theory since a country cannot simultaneously have a comparative advantage and disadvantage in the same product. The author calls the attention for the different concepts of industry in trade and production theory. (aggregate of enterprises producing identical products with identical factor ratios).

[5] In addition, only in textile materials and jewelry and gold/silver-smiths' wares the intra-industry trade index between developing and industrial countries exceeded 50 whereas one of the estimates for OECD countries identified 42 out of 52 manufactured products in the sample with measures greater than 50 (Tharakan, 1981, p. 269, 270).

[6] Finger (1975) proposed that "overlapped trade" is consistent with factor proportions theory so long as factor input requirements vary more within product groups than between them (quoted in Tharakan, 1981:275).

number of predominantly skilled labour and capital intensive industries in developed countries to relocate them in developing countries (Rayment, 1983:16-22).[7]

More recently, several authors have linked the empirical evidence on the expansion of outsourcing operations by firms to the disintegration of the production set of activities in manufacturing and service operations that can be purchased abroad and later combined with those performed at home. Based on Feenstra (1998), Knetter and Slaughter (1999:6) defined a model called "Heckscher-Ohlin-plus-production fragmentation" characterized by the increased use of imported intermediate inputs and narrowing of production activities within each country. Similarly to what was exposed above, specialisation is the result of comparative advantage within a narrow set of activities rather than in particular industries embodying those factor services.

The reduction of trade barriers in manufactures and falling costs of transportation, information and communication explain part of the increasing share of international sourcing of parts and materials in world trade. Furthermore, the reduction in trade barriers, either through negotiated trade liberalisation or following trade preference arrangements, is a necessary condition to induce greater cross-border sourcing and international production sharing. Nevertheless, the magnitude of tariff reductions in manufactures in industrial countries since the Tokyo Round was not compatible to the high rates of growth of world trade that have been observed ever since. Conversely, the multiple movements of "goods-in-process" over several national borders during the production process offer a better explanation for the rapid growth in world trade. Yi (1999) argues that trade models need to consider the interconnectedness of production processes in a sequential, vertical trading chain stretching across many countries, with each country specializing in particular stages of a good's production sequence.[8]

This globalisation of the industry involves foreign direct investment, trade and inter-firm collaboration arrangements undertaken by firms with the purpose of organising their development, production, sourcing, marketing and financing activities (OECD, 1996:15). International firms can benefit from locational advantages to distribute their plants in several countries even though outsourcing activities do not need to develop within subsidiaries (intra-firm trade) but can be carried out through arm's length operations.

There is a widespread perception that international sourcing of intermediate inputs by individual firms has increased even thought international trade in manufactured intermediate inputs has declined (Hummels, Ishii and Yi, 1999:4).[9] Also, the evidence so far indicate that the use of production sharing by enterprises varies with the industries. Imported intermediates tend to be larger in assembly industries such as computers, electronics, aerospace, motorvehicles and textiles and clothing (OECD, 1996). The chemicals and machinery industries account for much of the growth in the shares of vertical specialisation in total trade (Hummels, Ishii and Yi, 1999).

Several authors have referred to various aspects of cross-border movements by international firms and designated those movements by different names.[10] The expansion in the use of foreign inputs in domestic production, the tight association between trade and foreign investment, and the

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[7] Rayment (1983: 18) indicated that if production is defined as a set of a joint activity the comparative advantage of producers in a given country in a product 'x' means that on average they have a comparative advantage in those activities whose joint performance is necessary to produce the final product 'x'.

[8] Yi (1999) concluded that elasticities on the order of nine or higher were required to explain all of the growth of trade if several cross-border movements of goods were not included in the models.

[9] Actually, Feenstra (1998:37-38) argued that trade data implied that the United States were importing products at increasingly advanced stages of processing.

[10] Global production sharing (Yeats, 1998; Ng and Yeats, 1999); coproduction (Grunwald and Flamm, 1985); vertical specialization (Hummels, Ishii and Yi, 1999; Yi, 1999; Knetter and Slaughter, 1999; Fontagné et. al., 1997); foreign outsourcing and disintegration of production (Feenstra, 1998, Feenstra and Hanson, 1996); intra-mediate trade (Antweiler and Trefler, 1997); delocalization (Leamer, 1996). Bhagwati and Dehejia (1994) employed the expression "kaleidoscope comparative advantage" to refer to the fast movement of enterprises to locate their international activities; Krugman (1995) preferred the phrase "slicing the value chain".

relation between growing internationalisation of production and trade should be included in current analysis of international trade. In other words, to fully understand the extension of the exposure of a country to external variables, the external orientation of a country cannot be measured solely by the participation of export earnings in total value of domestic production. Additional measures are required (Campa and Goldberg, 1997:53).[11]

Nevertheless, in spite of the important conceptual and theoretical contribution to the field, the magnitude of production sharing in world trade is still based on scattered evidence and case studies. The measurement of production sharing in trade flows faces severe empirical problems.

B. The measurement of production sharing in trade flows

Production sharing or vertical specialisation can be defined to occur when: (i) goods are produced in multiple and sequential stages; (ii) two or more countries provide value-added in the good's production sequence; and (iii) at least one country must use imported inputs in its stage of the production process, and finally some of the output goods must be exported (Hummels Rapoport and Yi, 1998:81; Hummels, Ishii and Yi, 1999: 3).[12] Vertical specialisation can include trade in final goods as long as some imported intermediate goods are used to produce those goods.

Nevertheless, the imported input content of exports, or in other words, the foreign value-added embodied in exports is not readily available. Some of the measures that are employed in the studies on vertical specialisation are constructed on the basis of coefficients estimated from input-output tables. Therefore, the normal problems in dealing with input-output data will be present: among others, the difficulties to construct time series indicators due to the availability of input-output tables for a limited number of years, and the reduced number of sectors for which the information on coefficients is available.[13] Researchers are also faced with the usual empirical difficulties of combining trade and production data and aggregation problems when trying to integrate classification systems that are not compatible.[14]

The ***imported input share*** was proposed by Campa and Goldberg (1997) as one of several indicators of a country's cost-side external orientation. It measures the share of imported goods in the value of the production of each industry ***i.***[15]

$$\zeta^{i}_{j} \mid \frac{\sum_{j\mid 1}^{n41} m^{j}_{t} p^{i}_{t} q^{i}_{j,t}}{VP^{i}_{t}} \qquad (1)$$

where *i* denote the output industry; *j* the production input industry; m^{i}_{j} the share of imports in consumption of industry j in period t; $p^{j}_{t} q^{i}_{j,t}$ the value of inputs from industry *j* used in the

[11] Lassudri-Duchêne et al. (1987:9) showed that final products and services accounted for a constant share of roughly 33% of French imports between 1970 and 1982.

[12] Yeats (1998:1) defines production sharing as the internationalization of a manufacturing process in which several countries participate in different states of the manufacture of a specific good. Production sharing between developing and industrial countries involves the development of specialized labour-intensive production activities within vertically integrated international manufacturing industries.

[13] See Hummels, Ishii and Yi, 1999, apendices I to III.

[14] The number of sectors and subsectors in Standard International Uniform Classification (SITC) for trade data is different from those in the Standard Industrial Classification (SIC).

[15] The intention was to measure the sensitivity of a producer to shocks experienced through the cost side of its balance sheet (Campa and Goldberg, 1997).

production of industry *i* in period t; VP_t^i the value of total production cost of industry *i* in period *t*: and finally *n*, the number of product input categories.[16]

A similar measure of **vertical specialisation** (VS) was proposed by Hummels, Ishii and Yi (1999:6). They focused on one feature of the sequential link in the production of goods: "imported intermediate goods are used by a country to make goods or goods-in-process which are themselves exported to another country. The purpose is to estimate the foreign value-added embodied in exports, when the country uses imported inputs to produce an exported good. For a country *k* and good or sector *I,* then VS in a particular industry i, can be defined as the contribution of imported inputs to gross production. When this ratio is multiplied by the amount that is exported the result is a dollar value for the imported input context of exports, that is .[17]

$$VS_{ki} = \left(\frac{II_{ki}}{GO_{ki}} \right) X_{ki} \qquad (2a)$$

Hence, summing over all industries *i,* the result is the aggregate VS for country *k*.

$$VS_k = \sum_{i=1}^{N} VS_{ki} \qquad (2b)$$

where II is the imported intermediates goods, GO is gross output, and X is exports. Vertical specialisation involves both an import side and export side. On the import side, vertical specialization is essentially a subset of intermediate goods trade whereas on the export side, vertical specialization can involve either intermediate goods or final goods (Hummels, Ishii and Yi (2000: 3). On the export side, the VS share of exports is equivalent to the imported input share of gross output.

$$VS_{ki} = \sum_{j=1}^{n} XI_{kji} \left(\frac{X_{ji}}{GO_{ji}} \right) \qquad (3)$$

where j is the destination country of country k's exports, XI is exports of intermediates, and GO and X the same as in equation (2a).

The use of those coefficients may underestimate the share of vertical specialisation for several reasons: (i) the available trade data do not capture the effective number of cross-border movements undertaken by the same good up to the final operation; (ii) the measurement tends to be concentrated on merchandise trade and to exclude trade in services, since the data are not available.[18] Feenstra (1998:35-36) provide several examples of international production of brand

[16] The authors cautioned that the indicator is useful for comparing industries within a particular country but not for comparisons across countries.

[17] The authors used the input-output OECD tables for individual countries to estimate the imported intermediates. These tables contain only 22 manufacturing sectors.

[18] Hummels, Ishii and Yi (2000) attempted to include service sectors in a new measure of vertical specialisation. Nevertheless, the problem is not just of a model specification but of data.

name goods, such as the doll Barbie and shoes Nike, in which a significant proportion of value-added is retained in the United States as services activities.[19]

Yeats (1998) used a gross measure to estimate global **product sharing** (PS), defined as:

$$PS_{world} \mid X_{SITC7} * \frac{M_{M\&TE,i}}{AC_{M\&TE,i}} \qquad (4)$$

where X_{SITC7} is total exports from OECD countries in products classified as "parts and components" in trade data (SITC revision 2), and the ratio $M_{M\&TE,i}/AC_{M\&TE,i}$ is the share of imported machinery and transportation equipment in domestic consumption. Domestic Consumption is approximated by Apparent Consumption,[20] of machinery and transportation equipment $(AC_{M\&TE,i})$ Yeats face, however the difficulties of getting data on apparent consumption for a disaggregated set of parts and equipment for individual countries. Given the available statistics, and their limitations, Yates concluded that the 30 percent share of parts and components in total SITC 7 exports could constitute a reasonable estimate for the production sharing component of all manufactured goods trade (Yeats, 1998, pp. 38-39).

Along the same lines, the participation of some Latin American countries in global production sharing will be inferred from the commodity composition of their trade and the policies of their major trading partner, the United States.

[19] In the case of the dolls Barbie 70% of the total price are accounted by transportation, marketing, wholesaling and retailing in the United States (Feenstra, 1998:35-36).

[20] Apparent consumption is defined as production less exports plus imports.

III. Manufacturing trade between Latin America and the United States

A. The share of the United States and Latin American markets for Latin American manufacturing trade

The Latin American and Caribbean region includes countries of differing sizes, levels of development, population density and growth patterns. Although there are still similarities in some of the problems facing the various countries, recent decades have seen growing differences in terms of growth rates, factor productivity and business development. These in turn have caused great disparities in the individual performances of the countries of the region. Foreign trade is an example of the region's growing diversity, owing to the relative size of two large exporting countries, Brazil and Mexico, which have adopted different strategies for their integration into the world economy, with results that affect the average values of indicators for the region as a whole.

In 2000, the value of Mexican exports was practically equivalent to exports from the rest of Latin America's external sales, whereas in 1998 Mexico accounted for no more than 28% of the total, including export procesing (*maquila)* exports in both cases.[21] The performance of Mexico's exports and their product and market

[21] In 1965, Venezuela was the largest exporter in Latin America, making up about 26% of the total, while Argentina and Brazil each had a 15% share and Mexico made up only 10%. The total for these four exporting countries was 64%.

composition therefore have a considerable impact on the average figures for the region as a whole. At the end of the 1980s, Brazil stood out as the biggest exporter in Latin America and the Caribbean; however, over the following 10 years it has not managed to double its exports, which stand at just 40% of Mexico's in value terms.

The fastest-growing component of Mexico's exports consists of *maquila* activities: labour-intensive industries using relatively unskilled labour, strongly oriented towards the United States market. In 1988, according to figures from the Banco de México, the *maquila* sector already accounted for almost 33% of Mexico's exports and 28% of its imports. The continuing growth of this segment of Mexican exports over the course of the 1990s raised its share in total export value from 1988 until the entry into force of the North American Free Trade Agreement (NAFTA) in 1994, when its share stood at 43%. The share of the *maquila* industry declined slightly between 1994 and 1996, and then increased again between 1996 and 2000-2001, when it reached more than 48% (see table A1 in the Statistical Appendix).[22]

There have been major changes in Latin American exports over the past 10 years, with the share of industrial goods increasing at the expense of primary goods. From 1988 to 1998, primary goods fell from 35% to about 23% to increase a little to 24% in 2000. Hence the proportion of industrial goods rose from 65% to 77% and decreased to 75%. Among manufactured goods, the share of traditional products (foodstuffs, beverages and tobacco, textiles and metals) increased slightly from 21% to 23% to decrease to less than 20% (with a decline in the case of the foodstuffs, beverages and tobacco category) and an increase in the others (particularly textiles and clothing). Lastly, there were falls in the proportions of goods classified as scale-intensive and natural-resource intensive goods; and the share of durable goods and those goods classified as sources of technical progress increased significantly. These changes are much less pronounced when the figures for Mexico are factored out (see table 1).

In fact, only in the category of durable goods and those goods classified as sources of technical progress can significant changes be seen for the rest of Latin America, where these averages are strongly influenced by the export structure of the region's other major exporter, Brazil.

Moreover, Latin American manufactured exports depend both on regional markets and the United States, since a large part of manufactured goods are sent to these markets. Table 2 shows that these markets accounted for a minimum of 46%-58% of manufactured exports in the case of Brazil and Peru and a maximum of 92%-94% for Bolivia, Mexico, Dominican Republic, El Salvador and Honduras. However, when goods classified as traditional industries (foods and beverages, textiles, shoes and apparel, leather goods etc.) are removed, the dispersion is reduced (see table 3). Those are the product categories in which production sharing tends to be high, although some of the traditional industries such as apparel and shoes have also been reorganized through vertical specialization, as it will be mentioned below.

[22] *Maquila* enterprises, which pay no import taxes on goods and components for re-export, are due to lose this incentive as of 1 January 2001. However, most analysts believe that this will not put an end to *maquila* activities.

Table 1

LATIN AMERICA AND THE CARIBBEAN: EXPORT STRUCTURE, 1988, 1998 AND 2000

(Percentages)

Category	Latin America			Latin America excluding Mexico			Mexico		
	1988	1998	2000	1988	1998	2000	1988	1998	2000
Primary goods	**35.52**	**22.97**	**24.23**	**33.56**	**33.42**	**35.67**	42.93	9.99	12.42
Agriculture	17.42	12.43	8.57	19.19	19.12	13.85	10.74	4.12	3.12
Minerals	4.90	2.90	2.54	5.46	4.94	4.70	2.77	0.36	0.30
Energy	13.20	7.64	13.13	8.91	9.36	17.12	29.42	5.50	9.01
Industrial goods	**63.88**	**76.53**	**75.12**	**65.78**	**65.75**	**63.14**	56.68	89.93	87.50
Traditional	21.73	22.68	19.90	24.63	24.83	21.46	10.76	20.02	18.30
Foodstuffs, beverages and tobacco	11.93	8.73	6.67	14.04	13.91	11.22	3.93	2.30	1.98
Other traditional	9.80	13.95	13.23	10.59	10.92	10.24	6.83	17.72	16.32
Scale-intensive goods	28.75	17.70	16.76	30.90	25.25	26.61	20.60	8.31	6.59
Durables	5.45	14.45	13.78	4.21	6.76	4.79	10.18	24.00	23.06
Sources of technical progress	7.95	21.71	24.68	6.05	8.92	10.27	15.13	37.61	39.55
Other goods	0.51	0.49	0.64	**0.56**	**0.83**	**1.19**	0.31	0.08	0.08

Source: ECLAC, on the basis of official figures.

Table 2

LATIN AMERICAN (17 COUNTRIES) MANUFACTURING[a] EXPORTS SHARE IN TOTAL TRADE TO LATIN AMERICAN (LAC) AND UNITED STATES (U.S.), 1995, 1998 AND 2000

(Shares in total)

Countries	Exports 1995			Exports 1998			Exports 2000		
	LAC (1)	U.S. (2)	Total (1+2)	LAC (1)	U.S. (2)	Total (1+2)	LAC (1)	U.S. (2)	Total (1+2)
Argentina	47.7	12.4	60.2	58.6	9.2	67.8	47.6	12.4	60.1
Bolivia	46.3	48.2	94.4	58.1	35.2	93.2	48.9	43.4	92.3
Brazil	27.6	21.4	49.0	34.6	21.5	56.1	30.3	27.6	57.9
Colombia	48.1	27.4	75.4	63.3	20.0	83.3	62.6	21.2	83.9
Chile	32.9	13.2	46.1	42.0	17.9	59.9	39.5	20.8	60.4
Ecuador	57.9	14.5	72.4	53.3	17.5	70.8	53.2	22.0	75.2
Paraguay	54.7	10.7	65.4	71.6	9.9	81.5	68.8	8.1	76.9
Peru	14.8	20.7	35.5	23.3	34.4	57.7	19.1	26.9	46.0
Uruguay	50.3	6.8	57.1	61.8	6.9	68.7	52.9	9.8	62.7
Venezuela	70.1	15.7	85.8	65.1	18.2	83.3	52.5	34.4	86.9
Mexico	4.3	88.6	92.9	3.9	90.0	93.9	2.3	91.6	93.9
Costa Rica	50.2	33.1	83.3	26.3	48.4	74.7	20.5	54.2	74.8
Dominican Republic	1.9	93.4	95.3	7.2	87.3	94.5	…	…	…
El Salvador	75.9	20.8	96.7	72.9	19.7	92.5	76.8	17.8	94.6
Guatemala	69.8	13.6	83.4	64.9	17.7	82.6	66.6	17.9	84.5
Honduras	35.6	58.0	93.6	55.3	38.7	93.9	34.9	61.2	96.0
Nicaragua	29.1	52.0	81.1	32.2	31.2	63.4	59.6	26.6	86.1
Panama	43.7	41.1	84.8	48.4	33.1	81.5	42.9	38.1	81.0
Total	**18.9**	**57.4**	**76.3**	**19.1**	**63.5**	**82.6[b]**	**13.4**	**70.8**	**84.2**

Source: Authors' calculations based on COMTRADE Database.

[a] Include all manufactures less Scale-intensive goods.

[b] Calculation include data for 1997 in Dominic Republic case

Tables 2 and 3 indicate, however, that with the exception of Mexico, and the Dominican Republic, Latin American markets are more relevant for regional manufacturing exports than the United States. In 2000, Latin American and the Caribbean accounted for a minimum of 19%-20%

(Costa Rica and Peru) and a maximum of 77% for El Salvador for all manufactured goods (less scale and resource intensive exports also called semi manufactures).

Table 3

LATIN AMERICAN (17 COUNTRIES) MANUFACTURING[a] EXPORTS SHARE IN TOTAL TRADE TO LATIN AMERICAN (LAC) AND UNITED STATES (U.S.), 1995, 1998 AND 2000

(Shares in total)

Countries	Exports 1995			Exports 1998			Exports 2000		
	LAC (1)	U.S. (2)	Total (1+2)	LAC (1)	U.S. (2)	Total (1+2)	LAC (1)	U.S. (2)	Total (1+2)
Argentina	80.3	7.3	87.7	88.6	4.7	93.3	77.1	8.1	85.2
Bolivia	44.8	50.8	95.6	51.5	43.9	95.4	19.7	75.7	95.4
Brazil	45.2	26.3	71.4	48.4	26.0	74.4	38.8	33.3	72.1
Colombia	87.4	7.6	95.0	90.7	4.1	94.8	87.3	6.4	93.6
Chile	76.7	8.1	84.8	78.5	12.5	91.0	78.5	11.0	89.5
Ecuador	92.9	4.7	97.6	91.1	6.8	97.9	88.1	9.4	97.5
Paraguay	80.4	2.8	83.2	77.9	12.2	90.1	80.0	9.7	89.7
Peru	65.5	19.2	84.7	50.7	40.3	91.0	61.9	29.5	91.4
Uruguay	89.2	2.0	91.2	91.3	0.6	92.0	89.8	2.1	91.8
Venezuela	77.9	19.8	97.8	72.4	24.4	96.8	47.2	47.4	94.5
Mexico	4.0	89.0	93.0	3.4	90.6	94.0	1.7	91.9	93.6
Costa Rica	75.3	18.4	93.7	13.8	48.9	62.7	11.0	55.5	66.6
Dominican Republic	0.6	97.7	98.3	8.5	89.1	97.6	…	…	…
El Salvador	95.7	2.7	98.4	95.9	2.7	98.6	88.7	7.3	96.0
Guatemala	97.7	1.5	99.2	94.8	2.6	97.5	92.5	6.0	98.6
Honduras	66.5	21.4	87.9	75.1	20.2	95.4	56.2	38.9	95.1
Nicaragua	17.2	51.9	69.1	49.8	16.4	66.2	67.5	18.2	85.7
Panama	79.0	14.1	93.1	72.0	21.0	92.9	72.9	21.9	94.9
Total LAC	**17.0**	**72.4**	**89.3**	**16.6**	**74.1**	**90.7** [b]	**10.5**	**79.7**	**90.1**

Source: Author's calculations based on COMTRADE Database.

[a] Include all manufactures less traditional goods —food, beverages and tobacco and other traditional goods— and Scale-intensive goods.

[b] Calculation include data for 1997 in Dominic Republic cases.

B. The production sharing programmes of the United States

Although enterprises in all industrial countries have been involved with outsourcing and foreign assembly, United States firms have been the most active. The United States have encouraged the use of production sharing through customs provisions that permitted the duty-free reentry of United States components sent abroad for processing or assembly (thereafter called Provision 98).[23] Only the value of the United States components of those items that are reimported in products

[23] Grunwald and Flamm (1985:14) remarked that although the Provisions 806/807 facilitated imports into the United States market in a way that allowed for greater United States export of components and parts for assembly at the same time this effect was probably not intended by explicit design.

fabricated or assembled abroad is exempt from duty.[24] Both European and Japanese countries have similar tariff arrangements but they contain several restrictive clauses.[25]

Table 4 indicates that the imports carried through Production-Sharing provisions increased significantly between 1985 and 1990, but were less impressive in the 1990s, when the value of total imports remained relatively stable around 78 billion dollars or less than 7% of total United States imports. In any case, it should be clear that the Provision 98 is just a trade preferential arrangement that can be superseded by more effective arrangements that suit the production-sharing operations of United States enterprises. Therefore, although Canada was a major user of the Provision 98, this use decreased after 1992 when the Free Trade Agreement (FTA) was signed between Canada and the United States. Similarly, it is evident that the extension of the FTA to include Mexico, or the implementation of the NAFTA led to a reduction of Mexican use of the Provision. Needless to say that the reduction in the use of the Provision 98 does not imply a reduction in production-sharing activities by United States enterprises in those countries.

Table 4

U.S. IMPORTS UNDER THE PRODUCTION-SHARING PROVISIONS OF HTS 9802[a] BY INDUSTRIES, 1985, 1990, 1995-2000

(In million of dollars)

Product Group	1985	1990	1995	1996	1997	1998	1999	2000
Machinery and equipment[a]	27 709	69 697	49 113	54 107	63 171	57 059	61 148	55 488
Transportation equipment:	…	…	23 076	27 317	34 962	29 044	34 851	36 434
Electronic products:	…	…	18 612	18 733	20 215	19 845	18 373	14 044
Seats, wiring, and pumps for vehicles:	…	…	3 276	3 581	2 812	3 124	3 291	1 264
Machinery and equipment:	27 709	69 697	4 149	4 476	5 182	5 046	4 634	3 747
Textiles, apparel, and footwear	1 181	3 524	9 738	11 057	13 847	15 137	15 555	14 352
Miscellaneous manufactures	811	2 005	670	707	686	729	660	461
Minerals and metals	533	408	1 000	1 194	970	722	609	560
Chemicals, coal, petroleum, natural gas, and related products	147	109	268	329	341	275	217	243
Forest products	133	69	83	118	141	131	136	114
Agricultural products	22	8	8	3	6	4	2	2
Special provisions	0	…	0	0	5	12	0	0
All Sectors	**30 535**	**75 820**	**60 880**	**67 514**	**79 167**	**74 068**	**78 327**	**71 220**
SHARE IN TOTAL US IMPORTS	**9,0**	**14,8**	**7,9**	**8,2**	**8,8**	**7,8**	**7,7**	**5,9**

Source: Compiled from official statistics of the U.S. Department of Commerce, USITC, (1999), *Production sharing: Use of U.S. components and materials in foreign assembly operations, 1995-1998*, Table B-13, pp. B7-12.; USITC, (1991), Production Sharing: *U.S. Imports Harmonized Tariff Schedule Subheadings 9802.00.60 and 9802.00.80, 1987-1990*, USITC Publication 2469, December, Washington, Tables B-4; B-16: pp. B-17-18.; (USITC), (1986) *U.S. Imports Harmonized Tariff Schedule Subheadings 9802.00.60 and 9802.00.80, 1985-1988: Formerly Imports Under Items 806.30 and 807.00 of the Tariff Schedules of the United States*, USITC Publication 2243, December, Washington, Tables B-6; B-18, pp. B-19-46.; and data compiled from U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission —http://www.dataweb.usitc.gov/

[a] Includes HTS 9802.00.60; 9802.00.80 and 9802.00.90

[b] Includes Transportation equipment; Electronics products; Seats, wiring, and pumps for vehicles; and Mahinery and equipment itself.

The category "machinery and equipment" accounted for more than 90% of total imports under Provision 98. Its share has been reduced in the 1990s due to the growing importance of production sharing in textiles, apparel, and footwear (see table 4). Most production-sharing operations in Mexico involve assembling of a wide variety of products such as motorvehicles and parts, television sets, and other durable goods, whereas those operations in the Caribbean Basin involve mostly sewing articles of apparel.

[24] Provisions including preferential tariff treatment have a long history in the United States, dating from 1953. Initially, there was the Provision 806.30 referring to the customs system called Tariff Schedules of the United States (TSUS) that permitted the reimport of unfinished metal products into the United States (mostly from Asian countries) for further processing. Provision 807.00 resulted from the expansion in the definition of assembly through a series of decisions in the United States customs courts. In 1989, following the adoption by the country of the Harmonized Tariff Schedules (HTS) the provisions were changed to 9802.00.60 and 9802.00.80 (See Grunwald and Flamm, 1985 and Kuwayama, 1992 for references).

[25] See Grunwald and Flamm (1985) for the first European and Japanese programmes, and Kuwayama (1992) for references on Japanese experience with production sharing.

The use of the Provision 98 has always been highly concentrated among a few countries, although at the beginning it was concentrated among three major countries Germany, Canada and Japan. In 1969, Mexico was exporting 150 million dollars to the United States under the Provision 806/807 and accounted for a little over 8% of total United States imports under that Provision. Germany, Japan and Canada accounted for 60%. In 1983, Mexico was exporting close to 3.7 billion dollars and its share had increased to 17%. The three industrial countries still accounted for more than half of total imports under the production sharing Provision (Grunwald and Flamm, 1985, p.13). In 1999, the first 15 importers under the Provision accounted for 93% of total imports. Actually, the first three major importers accounted for more than 66% of the total, in 1999: Mexico (33%); Japan (19.2) and Germany (14.3%) (see table 5).

Table 5

U.S. IMPORTS UNDER THE PRODUCTION-SHARING PROVISIONS OF HTS 9802[a] BY LEADING COUNTRIES, 1985, 1990, 1997, 1999 AND 2000

(In million of dollars)

Countries	Total PS-Imports (A)					U.S. Content (B)					Share (B/A)				
	1985	1990	1997	1999	2000	1985	1990	1997	1999	2000	1985	1990	1997	1999	2000
Mexico	5537	12811	28883	25875	19430	2934	6387	15483	13928	10271	53.0	49.9	53.6	53.8	52.9
Japan	10990	17107	15667	15058	17851	133	582	548	576	543	1.2	3.4	3.5	3.8	3.0
Germany	4657	5771	8541	11172	9849	109	95	142	156	137	2.3	1.6	1.7	1.4	1.4
Dom. Republic	247	697	2669	2789	2727	177	483	1737	1791	1700	71.6	69.3	65.1	64.2	62.3
Philippines	298	596	2063	2331	2099	141	259	1058	1137	933	47.4	43.5	51.3	48.8	44.4
Malaysia	427	1351	1911	2109	1639	217	578	930	998	885	50.8	42.8	48.7	47.3	54.0
Korea	398	2182	1881	2002	1378	175	602	755	1042	753	44.1	27.6	40.2	52.0	54.6
Honduras	...	...	1380	1882	1890	...	...	983	1329	1300	...	...	71.2	70.6	68.8
Taiwan	518	957	1248	1717	882	96	235	510	585	395	18.5	24.6	40.9	34.1	44.8
China	...	...	1319	1612	1242	...	...	180	272	252	...	...	13.6	16.9	20.3
United Kingdom	659	1435	1665	1573	1870	71	167	124	251	213	10.7	11.6	7.4	15.9	11.4
Belgium	143	445	1105	1455	1066	11	8	35	37	28	7.7	...	3.2	2.5	2.6
Sweden	1143	1610	1433	1352	2080	37	49	15	60	42	3.2	3.0	1.0	4.5	2.0
El Salvador	...	...	912	1186	1315	...	...	544	704	774	...	...	59.6	59.3	58.9
Costa Rica	98	308	851	832	893	71	213	568	548	577	71.8	69.2	66.7	65.8	64.6
TOP 15 countries	25115	45270	71530	72945	66211	4171	9658	23611	23413	18803	16.6	22.7	33.0	32.1	28.4
All others	5000	29838[b]	7636	5381	5009	1379	11151[b]	2954	1945	1736	27.6	21.3	38.7	36.1	34.7
Total	**30115**	**75108**	**79167**	**78327**	**71220**	**5550**	**20809**	**26565**	**25358**	**20539**	**18.4**	**37.4**	**33.6**	**32.4**	**28.8**

Source: U.S. Department of Commerce, USITC, (1999), Production sharing: Use of U.S. components and materials in foreign assembly operations, 1995-1998, Table B-3, pp. B-4-7; USITC, (1991), Production Sharing: U.S. Imports Harmonized Tariff schedule Subheadings 9802.00.60 and 9802.00.80, 1987-1990, USITC Publication 2469, December, Washington, Table B-5, pp. B-15; (USITC), (1986) U.S. Imports Harmonized Tariff Schedule Subheadings 9802.00.60 and 9802.00.80, 1985-1988: Formerly Imports Under Items 806.30 and 807.00 of the Tariff Schedules of the United States, USITC Publication 2243, December, Washington, Tables B-4, pp. B-11.; and data compiled from U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission —http://www.dataweb.usitc.gov/—.

[a] Since 1997, data, includes HTS 9802.00.60; 9802.00.80 and 9802.00.90

[b] In 1990, Canada is the first leading country, with a PS value of US$. 23958, with US$. U.S. content of US$. 9538. These explain the big amount of sum of all others.

The major difference between the industrial countries and developing countries in the use of the provisions lies in the proportion of United States content (the value of United States exports to the country or the value of the products that will be transformed on the importing country) and the total of production sharing (the value of the country's exports to the United States or the total value of the processed United States input). Table 5 shows that for the five industrial countries (Japan, Germany, United Kingdom, Belgium and Sweden) only United Kingdom presented a ratio of almost 16% (and growing). All the other four presented ratios below 4.5%. Conversely, all the 10 developing countries, with the exception of China, presented a ratio greater than 51. This is to say, the processing operations in industrial countries with United States components have greater value-added than those performed by developing countries.

The participation of Brazil in the production sharing provisions has been irregular. Exports to the United States under the Provision 98 increased between 1980 and 1990 and thereafter declined to a minimum level in 1999 (see tables 6a to 6c). In 1990, those exports accounted for more than 8% of total Brazilian exports to the United States whereas in 1999 the proportion had decreased to roughly 0.1%. Conversely, exports in that category constituted a significant share of Central American and Caribbean exports to the United States: 65% for Dominican Republic; 69% for Honduras; 73% for El Salvador; 84% for El Salvador; 45% for Jamaica.

In all cases, the United States content of Mexican exports that could be identified, was higher than 50%. On the other hand, the share of United States imports in Brazilian exports to the United States under the Provision 98 oscillated between 10 and 15% (with the exception of 1985-1986 when the share reached roughly 37%) (see table 6c).

Table 6a

TEN LATIN AMERICAN COUNTRIES: TOTAL PRODUCT SHARING IMPORTS FROM UNITED STATES UNDER HTS, CHAPTER 98: 1980-2000

(In millions of dollars)

Country	1980	1985	1990	1995	1996	1997	1998	1999	2000
Mexico	2278	5537	12811	24962	27925	28883	27162	25875	19430
Dominican Republic	98	247	704	1965	2104	2669	2806	2789	2727
Honduras	…	…	…	676	981	1380	1604	1882	1890
El Salvador	83	…	…	497	605	912	1023	1186	1315
Costa Rica	45	98	311	707	694	851	845	832	893
Guatemala	…	…	…	521	580	652	707	648	672
Jamaica	…	42	162	456	444	430	386	303	240
Haiti	154	221	190	79	102	140	217	253	239
Colombia	…	213	116	272	216	268	264	240	237
Brazil	111	289	656	178	144	259	65	17	10
10 countries	**2769**	**6646**	**14949**	**30313**	**33795**	**36444**	**35080**	**34025**	**27653**
Latin American countries[a]	**2816**	**6646**	**17131**	**32111**	**35582**	**38473**	**36833**	**34200**	**27830**

Table 6b

IMPORTS SHARE OF PRODUCTION SHARING IN TOTAL IMPORTS BY COUNTRIES (HTS CHAPTER), 1980-2000

Country	1980	1986	1990	1995	1996	1997	1998	1999	2000
Mexico	17.7	36.3	42.5	40.5	38.3	33.6	28.7	23.6	14.3
Dominican Republic	11.8	28.9	40.3	57.8	58.9	61.7	63.1	65.1	62.2
Honduras	…	6.7	0.0	46.9	54.6	59.4	63.0	69.4	61.2
El Salvador	18.7	…	0.0	61.1	56.3	67.7	71.1	73.9	68.0
Costa Rica	11.1	18.5	30.8	38.3	35.2	36.6	30.8	21.0	25.2
Guatemala	…	…	0.0	34.1	34.7	32.7	34.1	28.6	25.8
Jamaica	…	21.8	28.4	53.8	52.9	58.3	51.2	44.7	37.1
Haiti	58.3	52.8	55.3	60.9	71.1	74.5	79.8	83.9	80.5
Colombia	…	2.0	3.7	7.2	5.1	5.7	5.7	3.8	3.4
Brazil	2.8	5.4	8.2	2.0	1.6	2.7	0.6	0.1	0.1
10 countries	**14.7**	**25.3**	**32.1**	**36.0**	**34.8**	**32.1**	**28.3**	**23.8**	**16.0**
Latin American countries	**14.9**	**28.4**	**26.8**	**30.9**	**29.2**	**27.6**	**25.4**	**20.3**	**13.3**

Table 6c

TEN LATIN AMERICAN COUNTRIES: SHARE OF U.S. CONTENT IN TOTAL IMPORTS UNDER HTS, CHAPTER 98: 1980-2000

(Shares)

Country	1980	1985	1990	1995	1996	1997	1998	1999	2000
Mexico	50.1	52.3	49.9	51.4	52.5	53.6	53.3	53.8	52.9
Dominican Republic	67.3	71.7	69.4	65.0	64.9	65.1	62.9	64.2	62.3
Honduras	…	69.8	…	71.0	70.7	71.2	71.2	70.6	68.8
El Salvador	80.7	…	…	55.5	56.9	59.6	57.9	59.3	58.9
Costa Rica	66.7	69.0	69.1	66.8	69.3	66.7	65.3	65.8	64.6
Guatemala	…	…	…	49.7	47.6	45.9	43.3	38.9	40.5
Jamaica	…	72.5	74.5	80.9	80.0	81.8	81.0	81.9	80.8
Haiti	68.2	68.7	70.9	68.4	68.6	72.5	73.2	74.9	74.1
Colombia	…	64.5	54.3	62.1	58.3	59.7	58.9	58.9	54.9
Brazil	14.4	36.7	10.0	11.2	8.3	8.1	11.1	14.4	10.0
10 countries	**50.6**	**47.5**	**44.0**	**50.5**	**51.6**	**52.6**	**52.9**	**55.9**	**55.7**

Source: Authors' calculations based on data compiled from U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission —http://www.dataweb.usitc.gov/—

[a] Refer to all Latin American and Caribbean countries.

As mentioned before, the share of United States imports under the Provision 98 decreased after the implementation of the NAFTA. In 1990, those imports accounted for 42.5% of total Mexican exports to the United States whereas in 1999 that proportion had decreased to roughly 24%. However, in the same year, enterprises classified as *maquiladoras* accounted for almost 47% of Mexican exports (see table A-1). Also, table A-2 indicates that in 1999 more than 65% of Mexican exports to the United States were reported under NAFTA.

The differences in labour costs in Mexico and the United States justified the relocalisation of industrial plants from the United States to Mexico, to benefit both from those locational advantages and the tariff preferences from the importing country (see table 7).

Table 7

AVERAGE HOURLY COMPENSATION COST FOR PRODUCTION WORKERS IN MANUFACTURINGBY SELECTING REGIONS AND COUNTRIES, 1995-2000

(US dollars)

Countries	1995	1996	1997	1998	2000
North America					
United States	17.19	17.70	18.21	18.56	19.86
Canada	16.10	16.64	16.46	15.69	16.16
Mexico	1.51	1.54	1.78	1.83	2.46

Source: Compiled by the U.S. International Trade Commission

C. The contrasting experience of Mexican and Brazilian manufacturing trade

Following Yeats (1998) Mexican and Brazilian trade were separated into in goods classified in "machinery and transport equipment" (SITC 7), chemicals (SITC 54) and apparel (SITC 80) for years 1995, 1998 and 2000.[26] Those goods made up more than 48% of total Latin American imports

[26] SITC Rev. 3.

and roughly 40% of Latin American exports in 2000 and these shares increased between 1995 and 2000 (table A-3).

Nevertheless, all those products are more representative in Latin American trade with the United States: machines and parts accounted for 53% of total Latin America imports from the United States and for 54% of total Latin American exports to the United States (see table A-4). Similarly, the United States constitute a primary destination for aggregate exports of apparel (clothing and accessories) (88%); power generating machines (81%); office equipment (77%); telecom equipment (94%); electronic products (91%); other transport equipment (61%) (see table A-5). As mentioned above, those averages are heavily biased by the composition of Mexican manufacturing trade.

The weight of the United States in Mexican trade should determine a lower dispersion in terms of the overall commodity composition of Mexican exports and imports. Effectively, tables A-6 and A-7 suggest that in 2000, the three groups of products accounted for 65% of total Mexican exports and 68% of Mexican exports to the United States, an impressive increase since in 1995 the share was just over 60%. Furthermore, table A-8 indicates that with the exception of chemicals and special industry machinery, the United States is the major destination as well as the major supplier of all product categories in apparel and machinery and transport equipment.

Tables A-9 to A-11 delineate a completely different picture referring to the composition by product markets and origin/ destination of Brazilian exports and imports. Firstly, although the products classified as machinery and transport equipment accounts for a sizable share of Brazilian imports, similar to the figures for Mexico, they do not show a similar symmetry in what refers to the export side. The relative shares accounted for those goods are small and they do not show great dynamism over the period 1995-2000: the share of those products in total Brazilian exports increased from roughly 19% to 29%; and remained around 39% in Brazilian exports to the United States.

Also, there is no clear matching between imports and exports to the United States as in the Mexican case. With the exception of chemicals and road vehicles, the United States is a major destination for Brazilian exports but does not have the commanding position that we find in Mexican exports (see table A-11).

Other studies have already indicated that in spite of Brazilian trade liberalization the Brazilian industry is still relatively closed. Oliveira Junior (2000) estimated imported inputs for 25 Brazilian industrial sectors according to Campa and Goldberg (1997). He found that up to 1995, although there had been an increasing share of imported inputs in domestic production, the only sector to have a share greater than 20% was electronic equipment. Only other four sectors had a coefficient greater than 10%.

Finally, table A-12 brings some information on Brazilian trade in aircraft, a high technology sector in which Brazil has established a solid reputation. Trade data does not allow for greater disaggregation than that contained in table A-12. Therefore, the intense production sharing that occurs in domestic production of airplanes can only be inferred. In this case, Brazil remains with the high value service activities (design, development, marketing, etc.) and outsources most of the manufactured parts and pieces.

IV. Areas for further research

Latin American countries, as a group, have embraced an export-led growth strategy based on trade liberalisation and full integration into the world economy. Albeit countries varied in their domestic political and institutional settings and the policies were implemented at a different pace, they all moved from a development strategy based on discriminatory trade policies to liberal trade and investment regimes. However, even though considerable effort was employed to open their economies to trade and to foreign capital, the results in terms of growth were not compatible with the initial expectations.

A better understanding of the world economy and trade is required in order to provide sound advice to the region as to how countries could improve their integration into world economy and to diversify their exports away from low value added goods and services.

The recent literature on industry globalisation and global production sharing has called attention to the changing nature of world trade with the predominance of trade in manufactures, the fragmentation of the production process and contractual relations between firms. Even when those changes do not question the most fundamental notion of trade and production specialisation according to factor services endowments, the literature points to a specialisation within a narrow set of activities and likely to be more fragmented. Enterprises may select labour intensive activities from a number of predominantly labour as well as from capital intensive industries initially located in industrial countries to relocate them in developing countries. Nevertheless, those activities can be reconverted to industrial countries if and when technological change makes their consolidation more profitable.

Production sharing has not yet been rigorously defined. Some may define the operation as subsuming the very process of international division of labour. The export of unprocessed commodities in exchange for the processed good with the imported commodity serving as input could be conceived as a rudimentary process of production sharing (Yeats 1998). There are several names to designate the same process, and like the very idea of globalisation, it is difficult to clearly establish the boundaries of the concept. And yet, even though the magnitude of the process cannot be rigorously assessed, the importance of production sharing in world trade is undisputed.

The United States, Japan and the European countries have introduced tariff provisions that encouraged the assembly of labour intensive operations in countries abundant in cheap labour. In this case, governmental policies paved the way for strategies by individual enterprises. Through trade preferential arrangements, the United States, in particular, usually with full support of the country's government, can strengthen or weaken a given trend in the other country's economy.

Mexico has a history of integrating its economy with that of the United States and of full adoption of production sharing as a strategy of integrating its economy into the world economy. On the other extreme, Brazil has been oriented towards its domestic market and more recently towards the regional market. Even though the imported input has increased after trade liberalization, the levels are not high. The contrasting experience of the two countries is an open field for research.

Statistical Appendix

Table A-1

SHARE OF MAQUILADORA IN MEXICAN EXPORTS, 1988-2001

(In percentage)

Exports	1988	1989	1990	1995	1996	1997	1998	1999	2000	2001[a]
Totals	30 691	35 171	40 711	79 542	96 000	110 431	117 500	136 752	166 455	**146 376**
Maquiladora Industry	10 146	12 329	13 873	31 303	36 920	45 166	53 083	63 748	79 468	**70 545**
Share in total	0.33	0.35	0.34	0.39	0.38	0.41	0.45	0.47	0.48	**0.48**

Source:: ECLAC, 2001, Latin America and the Caribbean in the world economy, 1999-2000, Santiago., and SECOFI, Mexico

[a] January to November.

Table A-2

U.S. TRADE WITH MEXICO, 1994-1999: TOTAL IMPORTS AND PRODUCT SHARING PROVISIONS OF HTS CHAPTER 98[A]

(Millions of dollars and percents)

item / years	1994	1995	1996	1997	1998	1999	1999[d]	2000[d]
Total imports from Mexico	**48 605**	**61 721**	**74 179**	**85 005**	**93 017**	**109 018**	**79 789**	**100 045**
U.S. imports under production-sharing provisions (PSP) of HTS Chapter 98								
Total value	23 068	24 962	27 925	28 883	27 162	25 785	19 892	15 075
Percent of total imports	47.5	40.4	37.6	34.0	29.2	23.7	24.9	15.1
U.S. components in HTS PSP imports:								
Total value	11 608	12 833	14 649	15 483	14 484	13 928	10 793	8 061
Percent of HTS PSP imports	50.3	51.4	52.5	53.6	53.3	54.0	54.3	53.5
Percent of total imports	23.9	20.8	19.7	18.2	15.6	12.8	13.5	8.1
U.S. imports under NAFTA[b]								
Total value	30 954	43 927	55 076	32 838	68 326	71 318	52 217	62 840
Percent of HTS PSP imports	63.7	71.2	74.2	38.6	73.5	65.4	65.4	62.8
U.S. imports under both NAFTA and HTS product-sharing provisions:								
Total value	14 505	16 721	20 389	20 807	18 831	16 094	…	…
U.S. content	7 215	8 674	10 849	11 209	9 668	8838	…	…
Total exports to Mexico	**49 136**	**44 881**	**54 686**	**68 393**	**75 369**	**81 381**	**57 733**	**74 116**
U.S. exports of components to HTS Chapter 98 PS operation as a percent of total U.S. exports	**23.6**	**28.6**	**26.8**	**22.6**	**19.2**	**17.1**	**18.7**	**10.9**
U.S. merchandise trade balance with Mexico	**531**	**-16 840**	**-19 494**	**-16 612**	**-17 648**	**-27 638**	-22 056	-25 929

Source: Data compiled from U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission —http://www.dataweb.usitc.gov/—. (The difference with the values in table 3A are due to rounding up.

[a] Includes HTS 9802.00.60; 9802.00.80 and 9802.00.90.

[b] Some import entries from Mexico declare eligibility for preferential tariff treatment under NAFTA and the HTS production-sharing provisions (PSP); such entries are reported in the totals for both imports under HTS PS (and U.S. made components in HTS PSP imports) as well as imports under NAFTA.

[c] Represents the total value of U.S. components in HTS production-sharing provision imports.

[c] January to September

Table A-3

LATIN AMERICAN AND CARIBBEAN COUNTRIES (17): PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO WORLD, 1995, 1998 AND 2000

(Million of dollars and percents)

	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	3 789	3.9	5 939	3.9	6 890	3.9	1 171	2.0	1 971	2.0	2 275	1.7
84 Apparel (Clothing and accessories)	3 569	3.7	6 828	4.5	6 555	3.8	4 414	7.4	8 859	8.8	11 150	8.1
07 Machinery and transport equipment	**89 176**	**92.4**	**140 471**	**91.7**	**161 273**	**92.3**	54 318	**90.7**	89 914	**89.2**	123 706	**90.2**
71 Power generating machines	5 507	5.7	10 391	6.8	11 468	6.6	5 437	9.1	6 924	6.9	8 071	5.9
72 Special industry machinery	9 838	10.2	13 880	9.1	11 584	6.6	1 885	3.1	2 453	2.4	2 429	1.8
73 Metal working machinery	2 016	2.1	3 035	2.0	2 613	1.5	324	0.5	308	0.3	299	0.2
74 General Industrial machines	12 799	13.3	19 006	12.4	19 585	11.2	4 147	6.9	5 584	5.5	7 203	5.3
75 Office Equipment	6 422	6.7	9 033	5.9	11 803	6.8	3 269	5.5	9 032	9.0	15 577	11.4
76 Telecom Equipment	9 718	10.1	15 149	9.9	19 061	10.9	8 062	13.5	12 965	12.9	20 996	15.3
77 Electronic Product	21 328	22.1	35 313	23.0	49 611	28.4	13 177	22.0	21 227	21.1	28 831	21.0
78 Road vehicles	19 877	20.6	30 970	20.2	32 278	18.5	16 866	28.2	28 371	28.2	35 127	25.6
79 Other transport equipment	1 669	1.7	3 693	2.4	3 271	1.9	1 151	1.9	3 051	3.0	5 174	3.8
All industries (54+84+SITC-7)	**96 534**	**100.0**	**153 238**	**100.0**	**174 717**	**100.0**	**59 903**	**100.0**	**100 745**	**100.0**	**137 131**	**100.0**
Total Trade	**221 636**	**43.6**	**312 424**	**49.0**	**361 713**	**48.3**	**215 769**	**27.8**	**268 399**	**37.5**	**343 336**	**39.9**

Source: Authors' calculations based on COMTRADE Database.

Table A-4

LATIN AMERICAN AND CARIBBEAN COUNTRIES (17): PARTS AND COMPONENTS IDENTIFIED IN THE SITC REV. 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO UNITED STATES, 1995, 1998 AND 2000

(Million of dollars and percents)

Commodity SITC Revision 3	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	617	1.4	1 157	1.5	1 369	1.4	163	0.4	234	0.3	232	0.2
84 Apparel (Clothing and accessories)	1 962	4.5	4 763	6.2	3 850	3.9	3 523	8.0	7 651	10.1	9 866	9.0
07 Machinery and transport equipment	**41 410**	**94.1**	**71 459**	**92.3**	**93 177**	**94.7**	**40 137**	**91.6**	**67 572**	**89.6**	**99 651**	**90.8**
71 Power generating machines	2 615	5.9	5 752	7.4	6 891	7.0	3 750	8.6	5 012	6.6	6 094	5.6
72 Special industry machinery	3 633	8.3	5 738	7.4	4 875	5.0	767	1.8	1 083	1.4	1 231	1.1
73 Metal working machinery	658	1.5	1 048	1.4	1 140	1.2	155	0.4	142	0.2	147	0.1
74 General Industrial machines	5 793	13.2	9 354	12.1	10 946	11.1	2 527	5.8	3 629	4.8	5 320	4.8
75 Office Equipment	4 229	9.6	5 267	6.8	7 167	7.3	2 368	5.4	6 231	8.3	12 043	11.0
76 Telecom Equipment	4 028	9.2	7 410	9.6	9 173	9.3	7 813	17.8	12 249	16.2	19 637	17.9
77 Electronic Product	13 614	30.9	23 582	30.5	35 016	35.6	11 400	26.0	18 674	24.7	26 128	23.8
78 Road vehicles	5 931	13.5	11 189	14.5	16 156	16.4	10 773	24.6	18 275	24.2	25 876	23.6
79 Other transport equipment	909	2.1	2 120	2.7	1 813	1.8	584	1.3	2 277	3.0	3 174	2.9
All industries (54+84+SITC-7)	**43 989**	**100.0**	**77 379**	**100.0**	**98 396**	**100.0**	**43 822**	**100.0**	**75 457**	**100.0**	**109 748**	**100.0**
Total Trade	**95 571**	**46.0**	**146 826**	**52.7**	**185 940**	**52.9**	**99 131**	**44.2**	**139 465**	**54.1**	**204 259**	**53.7**

Source: Authors' calculations based on COMTRADE Database.

Table A-5

LATIN AMERICAN AND CARIBBEAN COUNTRIES (17): U.S. IMPORTS / EXPORTS IN WORLD IMPORTS/EXPORTS PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM, 1995, 1998 AND 2000

(Percents)

Commodity SITC Revision 3	Imports			Exports		
	1995	1998	2000	1995	1998	2000
54 Chemical (Medicinal Pharm Products)	16.3	19.5	19.9	13.9	11.9	10.2
84 Apparel (Clothing and accessories)	55.0	69.8	58.7	79.8	86.4	88.5
07 Machinery and transport equipment	**46.4**	**50.9**	**57.8**	**73.9**	**75.2**	**80.6**
71 Power generating machines	47.5	55.3	60.1	69.0	72.4	75.5
72 Special industry machinery	36.9	41.3	42.1	40.7	44.2	50.7
74 Metal working machinery	32.7	34.5	43.6	48.0	46.3	49.1
74 General Industrial machines	45.3	49.2	55.9	60.9	65.0	73.9
75 Office Equipment	65.9	58.3	60.7	72.4	69.0	77.3
76 Telecom Equipment	41.4	48.9	48.1	96.9	94.5	93.5
77 Electronic Product	63.8	66.8	70.6	86.5	88.0	90.6
78 Road vehicles	29.8	36.1	50.1	63.9	64.4	73.7
79 Other transport equipment	54.4	57.4	55.4	50.8	74.6	61.4
All industries (54+84+SITC-7)	**45.6**	**50.5**	**56.3**	**73.2**	**74.9**	**80.0**
Total Trade	**43.1**	**47.0**	**51.4**	**45.9**	**52.0**	**59.5**

Source: Authors' calculations based on COMTRADE Database.

Table A-6

MEXICO: PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO WORLD, 1995, 1998 AND 2000

(Million of dollars and percents)

Commodity SITC Revision 3	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	585	1.7	1 089	1.7	1 445	1.4	399	0.9	716	1.0	880	0.8
84 Apparel (Clothing and accessories)	1 912	5.7	3 750	5.8	4 018	4.0	2 731	6.1	6 603	8.8	8 631	8.0
07 Machinery and transport equipment	**31 290**	**92.6**	**59 961**	**92.5**	**96 088**	**94.6**	**41 577**	**93.0**	**68 041**	**90.3**	**98 389**	**91.2**
71 Power generating machines	1 915	5.7	4 311	6.7	6 890	6.8	3 876	8.7	5 043	6.7	6 222	5.8
72 Special industry machinery	2 458	7.3	4 715	7.3	5 397	5.3	745	1.7	971	1.3	1 159	1.1
75 Metal working machinery	760	2.2	1 504	2.3	1 735	1.7	109	0.2	71	0.1	78	0.1
74 General Industrial machines	3 912	11.6	7 026	10.8	10 357	10.2	2 121	4.7	3 403	4.5	4 992	4.6
75 Office Equipment	1 891	5.6	3 186	4.9	5 775	5.7	2 924	6.5	7 536	10.0	11 757	10.9
76 Telecom Equipment	3 162	9.4	5 820	9.0	9 772	9.6	7 560	16.9	12 075	16.0	19 221	17.8
77 Electronic Product	13 131	38.9	22 403	34.6	36 452	35.9	11 667	26.1	18 225	24.2	26 153	24.2
78 Road vehicles	3 832	11.3	9 993	15.4	18 964	18.7	12 157	27.2	19 510	25.9	27 898	25.9
79 Other transport equipment	229	0.7	1 002	1.5	745	0.7	419	0.9	1 207	1.6	908	0.8
All industries (50+84+SITC-7)	**33 787**	**100.0**	**64 799**	**100.0**	**101 551**	**100.0**	**44 707**	**100.0**	**75 360**	**100.0**	**107 900**	**100.0**
Total Trade	**72 453**	**46.6**	**125 193**	**51.8**	**190 790**	**53.2**	**79 541**	**56.2**	**117 325**	**64.2**	**166 192**	**64.9**

Source: Authors' calculations based on COMTRADE Database.

Table A-7

MEXICO: PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO UNITED STATES, 1995, 1998 AND 2000

(Million of dollars and percents)

Commodity SITC Revision 3	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	165	0.7	329	0.7	479	0.6	137	0.3	198	0.3	197	0.2
84 Apparel (Clothing and accessories)	1 677	6.8	3 416	7.0	3 111	4.2	2 674	6.7	6 391	9.3	8 213	8.2
07 Machinery and transport equipment	**22 949**	**92.6**	**45 244**	**92.4**	**70 075**	**95.1**	**37 323**	**93.0**	**62 245**	**90.4**	**91 143**	**91.6**
71 Power generating machines	1 355	5.5	3 575	7.3	4 930	6.7	3 236	8.1	4 365	6.3	5 453	5.5
72 Special industry machinery	1 229	5.0	2 390	4.9	2 784	3.8	566	1.4	774	1.1	902	0.9
75 Metal working machinery	400	1.6	758	1.5	960	1.3	52	0.1	57	0.1	64	0.1
74 General Industrial machines	2 634	10.6	5 007	10.2	7 547	10.2	1 967	4.9	3 085	4.5	4 701	4.7
75 Office Equipment	1 175	4.7	1 955	4.0	3 971	5.4	2 238	5.6	6 067	8.8	10 126	10.2
76 Telecom Equipment	2 164	8.7	4 159	8.5	5 866	8.0	7 458	18.6	11 683	17.0	18 868	19.0
77 Electronic Product	10 798	43.6	18 633	38.0	29 492	40.0	11 148	27.8	17 368	25.2	25 248	25.4
78 Road vehicles	3 070	12.4	7 872	16.1	13 980	19.0	10 277	25.6	17 663	25.7	24 929	25.0
79 Other transport equipment	125	0.5	896	1.8	544	0.7	381	0.9	1 182	1.7	851	0.9
All industries (54+84+SITC-7)	**24 790**	**100.0**	**48 990**	**100.0**	**73 664**	**100.0**	**40 133**	**100.0**	**68 834**	**100.0**	**99 553**	**100.0**
Total Trade	**53 973**	**45.9**	**93 237**	**52.5**	**139 558**	**52.8**	**66 339**	**60.5**	**101 927**	**67.5**	**147 186**	**67.6**

Source: Authors' calculations based on COMTRADE Database

Table A-8

MEXICO: U.S. IMPORTS / EXPORTS IN WORLD IMPORTS /EXPORTS PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM, 1995, 1998 AND 2000 (PERCENTS)

Commodity SITC Revision 3	Imports			Exports		
	1995	1998	2000	1995	1998	2000
54 Chemical (Medicinal Pharm Products)	28.2	30.2	33.1	34.2	27.6	22.4
84 Apparel (Clothing and accessories)	87.7	91.1	77.4	97.9	96.8	95.2
07 Machinery and transport equipment	**73.3**	**75.5**	**72.9**	**89.8**	**91.5**	**92.6**
71 Power generating machines	70.7	82.9	71.6	83.5	86.6	87.6
72 Special industry machinery	50.0	50.7	51.6	76.1	79.8	77.8
76 Metal working machinery	52.6	50.4	55.4	47.9	79.8	81.6
74 General Industrial machines	67.3	71.3	72.9	92.7	90.6	94.2
75 Office Equipment	62.1	61.4	68.8	76.5	80.5	86.1
76 Telecom Equipment	68.4	71.5	60.0	98.6	96.8	98.2
77 Electronic Product	82.2	83.2	80.9	95.6	95.3	96.5
78 Road vehicles	80.1	78.8	73.7	84.5	90.5	89.4
79 Other transport equipment	54.4	89.4	73.0	91.1	98.0	93.7
All industries (54+84+SITC-7)	**73.4**	**75.6**	**72.5**	**89.8**	**91.3**	**92.3**
Total Trade	**74.5**	**74.5**	**73.1**	**83.4**	**86.9**	**88.6**

Source: Authors' calculations based on COMTRADE Database

Table A-9

BRAZIL: PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO WORLD, 1995, 1998 AND 2000

(Million of dollars and percents)

Commodity SITC Revision 3	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	979	4.4	1 606	5.6	1 804	6.9	168	1.8	248	1.9	266	1.7
84 Apparel (Clothing and accessories)	372	1.7	369	1.3	185	0.7	298	3.2	185	1.4	282	1.8
07 Machinery and transport equipment	**21 055**	**94.0**	**26 702**	**93.1**	**24 274**	**92.4**	**8 847**	**95.0**	**12 599**	**96.7**	**15 532**	**96.6**
71 Power generating machines	1 133	5.1	2 532	8.8	2 166	8.2	1 305	14.0	1 550	11.9	1 514	9.4
72 Special industry machinery	2 846	12.7	2 986	10.4	2 249	8.6	922	9.9	1 163	8.9	904	5.6
77 Metal working machinery	772	3.4	898	3.1	539	2.1	178	1.9	183	1.4	175	1.1
74 General Industrial machines	2 681	12.0	3 754	13.1	2 891	11.0	1 570	16.9	1 508	11.6	1 556	9.7
75 Office Equipment	1 684	7.5	1 827	6.4	2 055	7.8	261	2.8	353	2.7	493	3.1
76 Telecom Equipment	2 216	9.9	2 867	10.0	3 206	12.2	400	4.3	595	4.6	1 648	10.3
77 Electronic Product	3 576	16.0	4 938	17.2	6 072	23.1	950	10.2	939	7.2	1 254	7.8
78 Road vehicles	5 784	25.8	5 790	20.2	3 862	14.7	2 663	28.6	4 827	37.0	4 368	27.2
79 Other transport equipment	363	1.6	1 111	3.9	1 234	4.7	596	6.4	1 481	11.4	3 619	22.5
All industries (54+84+SITC-7)	**22 406**	**100.0**	**28 678**	**100.0**	**26 263**	**100.0**	**9 313**	**100.0**	**13 033**	**100.0**	**16 080**	**100.0**
Total Trade	**53 737**	**41.7**	**60 793**	**47.2**	**58 931**	**44.6**	**46 505**	**20.0**	**51 120**	**25.5**	**55 283**	**29.1**

Source: Author's calculations based on COMTRADE Database.

Table A-10

BRAZIL: PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM AND THE IMPORT / EXPORT VALUE TO UNITED STATES, 1995, 1998 AND 2000

(Million of dollars and percents)

Commodity SITC Revision 3	Imports						Exports					
	1995	%	1998	%	2000	%	1995	%	1998	%	2000	%
54 Chemical (Medicinal Pharm Products)	174	2.9	342	4.6	381	4.9	10	0.4	15	0.4	13	0.2
84 Apparel (Clothing and accessories)	47	0.8	26	0.3	10	0.1	116	4.5	39	1.2	100	1.9
07 Machinery and transport equipment	5 901	**96.4**	7 071	**95.0**	7 407	**95.0**	2 423	**95.1**	3 359	**98.4**	5 278	**97.9**
71 Power generating machines	291	4.8	921	12.4	1 007	12.9	494	19.4	601	17.6	564	10.5
72 Special industry machinery	647	10.6	718	9.6	438	5.6	185	7.2	258	7.5	210	3.9
78 Metal working machinery	120	2.0	104	1.4	74	1.0	95	3.7	75	2.2	66	1.2
74 General Industrial machines	721	11.8	1 020	13.7	869	11.1	512	20.1	438	12.8	528	9.8
75 Office Equipment	1 283	21.0	1 016	13.7	1 033	13.2	107	4.2	111	3.2	127	2.4
76 Telecom Equipment	606	9.9	855	11.5	1 157	14.8	346	13.6	342	10.0	714	13.2
77 Electronic Product	1 322	21.6	1 581	21.3	2 099	26.9	144	5.7	145	4.3	306	5.7
78 Road vehicles	646	10.5	501	6.7	309	4.0	388	15.2	424	12.4	726	13.5
79 Other transport equipment	265	4.3	354	4.8	420	5.4	153	6.0	965	28.3	2 035	37.8
All industries (54+84+SITC-7)	**6 122**	**100.0**	**7 439**	**100.0**	**7 798**	**100.0**	**2 549**	**100.0**	**3 413**	**100.0**	**5 391**	**100.0**
Total Trade	**12 752**	**48.0**	**14 319**	**52.0**	**13 648**	**57.1**	**8 799**	**29.0**	**9 889**	**34.5**	**13 549**	**39.8**

Source: Authors' calculations based on COMTRADE Database

Table A-11

BRAZIL: U.S. IMPORTS / EXPORTS IN WORLD IMPORTS /EXPORTS PARTS AND COMPONENTS IDENTIFIED IN THE SITC REVISION 3 CLASSIFICATION SYSTEM, 1995, 1998 AND 2000

(Percents)

Commodity SITC Revision 3	Imports			Exports		
	1995	1998	2000	1995	1998	2000
54 Chemical (Medicinal Pharm Products)	17.8	21.3	21.1	6.0	5.9	4.8
84 Apparel (Clothing and accessories)	12.7	7.0	5.4	38.8	21.3	35.6
07 Machinery and transport equipment	**28.0**	**26.5**	**30.5**	**27.4**	**26.7**	**34.0**
71 Power generating machines	25.7	36.4	46.5	37.8	38.8	37.3
72 Special industry machinery	22.7	24.0	19.5	20.0	22.2	23.3
79 Metal working machinery	15.6	11.6	13.8	53.6	40.9	37.8
74 General Industrial machines	26.9	27.2	30.1	32.6	29.0	33.9
75 Office Equipment	76.2	55.6	50.2	40.8	31.4	25.7
76 Telecom Equipment	27.4	29.8	36.1	86.6	57.5	43.3
77 Electronic Product	37.0	32.0	34.6	15.2	15.5	24.4
78 Road vehicles	11.2	8.7	8.0	14.6	8.8	16.6
79 Other transport equipment	73.0	31.9	34.0	25.6	65.2	56.2
All industries (54+84+SITC-7)	**27.3**	**25.9**	**29.7**	**27.4**	**26.2**	**33.5**
Total Trade	**23.7**	**23.6**	**23.2**	**18.9**	**19.3**	**24.5**

Source: Authors' calculations based on COMTRADE Database.

Table A-12

BRAZIL TRADE IN AIRCRAFT, SITC 792, 1990, 1995, 1998 AND 2000

(In thousand of dollars)

Desegregate SITC 792	Imports				Exports				Net Trade			
	1990	1995	1998	2000	1990	1995	1998	2000	1990	1995	1998	2000
792 AIRCRAFT, ASSOCTD.EQUIPNT	**320 440**	**271 293**	**957 463**	**1089098**	**554 106**	**276 839**	**1 317 515**	**3574348**	**233 666**	**5 546**	**360 052**	**2485250**
79211 Helicopters ULW <=2000kg	6 351	31 890	70 444	29935	0	0	4 314	13952	-6 351	-31 890	-66 130	-15983
79215 Helicopters ULW >2000kg	702	7 060	27 824	23438	3 696	4 843	0	3122	2 994	-2 216	-27 824	-20316
7922 Aircraft etc. ULW <=2000kg	17 950	15 773	27 135	12345	128	438	984	8185	-17 822	-15 335	-26 151	-4160
7923 Aircraft ULW 2001-15000kg	**93 248**	**92 724**	**50 078**	137662	**297 956**	**171 364**	**1 137 586**	2786061	**204 708**	**78 640**	**1 087 508**	2648399
7924 Aircraft etc. ULW >15000kg	9 157	28 100	387 116	225980	178 700	10 000	22 100	635633	169 543	-18 100	-365 016	409653
79291 Propellers rotors parts	9 400	4 069	5 186	2581	121	1 064	96	1491	-9 279	-3 005	-5 091	-1090
79293 Under-carriages parts	15 982	6 007	15 991	20674	5 928	484	3 256	3713	-10 054	-5 523	-12 736	-16961
79295 Other parts airplanes etc	**165 758**	**84 119**	**373 076**	636091	**67 573**	**88 512**	**143 802**	121406	**-98 185**	**4 392**	**-229 274**	-514685
792… Other SITC 792[a]	1 893	1 551	611	392	4	134	5 377	785	-1 889	-1 418	4 766	393

Source: Authors' calculations based on COMTRADE Database.

[a] Include SITC 7925 —Spacecraft etc. launch veh.—; 7928 —Aircraft (Gliders balloons and aircraft launchers)—: and 79297 — Other parts non specified aircraft—.

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