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"Protection and Reindustrialization: The U.S. and the Latin American Automobile Industries".

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INTRODUCTION

Brazil and Mexico are getting ready to export cars and trucks to the U.S.. This is a big change from past periods when U.S. firms used Latin America as a dumping ground for their out-of-date tooling.

What explains the change? It is partly that local governments first lured automakers to supply local markets from within, and then forced them to export. And it is partly the need for U.S. automakers to compete with the Japanese, by using cheap Latin American labor and fiscal incentives.

U.S. automakers first went to Latin America to be present in the emerging and heavily protected markets of the 1920's and 30's. Later, in the 50's and 60's, Latin American governments attached great importance to the auto industry as a dynamic core of industrialization. For this reason they started requiring automakers to include a proportion of local content into their cars, with the purpose of generating demand for new industries. Automakers complied, transferring the higher costs of production to the customers.

A second stage of the Latin American car industry started in the early seventies. Latin American governments began to abandon import substitution strategies of development and turned to export policies. Moreover, their growing auto industry was generating sizable imports that weighted in the

balance of payments. In that period Brazil and Mexico set up programs to first induce and then require automakers to export. However, due to the high cost of local production, early results of these policies were not encouraging.

Shortly after, the first oil shock drastically changed the world environment. U.S. automakers faced increasing competition from Japan, and reacted with a strategy of global production. Latin American export requirements fitted well in the world car concept, specializing in certain parts and components in order to take advantage of economies of scale, to be exported to various assembling sites around the world.

In the seventies there were expectations that the auto industry would gradually relocate into Latin America and other developing countries. This view was based on several facts. The technology to produce automobiles had not changed dramatically. Although intensive in organization skills, those are transferable. Further, the markets of some less developed countries were projected to grow faster than the mature and saturated markets of developed countries. Besides, local manufacture was the only way to access those markets, as governments required local content. Cheap labor, fiscal incentives, and protected markets made local manufacturing profitable. Moreover, the learning process could lower costs, and regional integration would enlarge markets and permit the realization of economies of scale in

due time.

These expectations have failed to materialize. Despite relevant increases in Third World car production, most trade and production continues to take place in the developed world. Some of the assumptions behind the relocation perspective of the seventies have not been fulfilled. Local markets have stagnated, the regional integration under the Latin American Free Trade Association (LAFTA) failed, the Andean Pact automobile plan did not work either.

To be sure, the auto industry is growing in several developing countries, like South Korea, India, Brazil and Mexico. Nevertheless, the future status of the auto industry in developing countries is debatable. Because, most importantly, the world car pattern, under which Latin American car subsidiaries have been able to export, has been complemented by new strategies. In fact, the adoption of Japanese-style management techniques, and the introduction of automation and other manufacturing changes, call for more centralized production processes, and are less intensive in labor, disfavoring location of production in Latin America. It is still not clear which strategy will prevail, or if they will converge. For the moment they are sharing the scene.

The U.S. government policies and decision will affect the emphasis that automakers put on each strategy, via the trade environment, via the regulatory environment, and through

industrial policies. Huge trade imbalances with Japan have brought about protectionist forces, and Japanese exports have been limited in the U.S. and in Europe. Tangentially, Brazilian export subsidies and Mexican car production quotas have also been a matter of conflict with the U.S. government. What is different in the auto industry is that U.S. companies have subsidiaries in Latin America. The scope for entrepreneurial conflicts is low, although Japanese and European companies also operate there through their own subsidiaries. Latin American governments, though, have pressed for local investments and exports, and will continue to do so, squeezed as they are by the debt problem.

The purpose of the paper is to analyze the interaction between business decisions and government policy making in relation to the development of the automobile industry in Mexico and Brazil. We will differentiate a first stage of development, in which governments imposed policies of local content, and the automakers responded flocking into those countries. We will then analyze a second stage, in which export requirements were accompanied by subsidies and by protection from competition. About the same time, changes in the world economy made attractive to the automakers to comply with these demands by exporting auto parts from their subsidiaries to their global networks.

Thirdly, we will analyze further responses of the U.S. auto firms to changes in the global industry. They applied for government assistance, and they developed new approaches to cope with the challenges posed by the Japanese industry. The purpose is to derive the implications of these developments for the future of the industry in Brazil and Mexico, and the policy options for these countries.

II STRUCTURE OF THE INDUSTRY

According to conventional usage, the automotive industry includes the production and assembly of passenger cars and commercial vehicles (trucks and buses), and excludes related products as motorcycles, tractors, and motorized transport used in defense, construction, agriculture or mining. The industry also comprises the production of parts and components (1).

a) Barriers to entry

Assembly is highly concentrated in a few big enterprises based in the U.S., Europe and Japan. The ten biggest motor vehicle assemblers of passenger cars and commercial vehicles accounted for 72% of world production in 1983. General Motors (GM) alone accounted for 19.2%, and that the three first producers, GM, Ford and Toyota, accounted for 39.3%

(see Table I).

This degree of concentration is mainly explained by the high barriers to entry that are characteristic of the industry, and by the complexity of production and marketing, a factor that drove several small manufacturers out of the industry just in the first years of its development.

TABLE I
WORLD MOTOR VEHICLE PRODUCTION
1984 - BY FIRM

	Thousands	Firm Share
1. GENERAL MOTORS	8,071	19.2%
2. FORD	5,349	12.7%
3. TOYOTA	3,842	9.1%
4. NISSAN	2,728	6.5%
5. VOLKSWAGEN	2,135	5.0%
6. RENAULT	1,983	4.7%
7. CHRYSLER	1,885	4.4%
8. PEUGEOT	1,748	4.1%
9. UAZ (U.S.S.R.)	1,675	3.9%
10. FIAT	1,528	3.6%
FIRST 10	30,944	73.0%
TOTAL	41,899	

SOURCE: Table A-1 (Appendix).

Barriers to entry are derived from very high economies of scale in the production process. A sizable investment and a long period are needed to produce a car, although the costs of changing from model to model are going down with the use of more flexible manufacturing techniques. In addition to that, a motor vehicle is a highly complex article, intensive in skilled labor and managerial resources. For these

reasons, it is difficult for a potential new entrant to produce automobiles, even if the basic technology is fairly widespread.

These barriers have only been overcome by new entrants with strong backing by national governments, that have seen this industry as crucial for the industrialization plans of their countries. This is another important characteristic of the industry: it has been shaped by governmental intervention, through protection, subsidies and loans, by local content requirements, and by forced or encouraged mergers (2).

Demand variability adds a further barrier to entry and favors firms of bigger size. Demand for cars, as for other durable goods, is highly sensitive to income variations. Moreover, the used cars market provides a readily available alternative, making most new auto purchases easily postponable. This fact reinforces the income responsiveness of demand for new cars. In addition, consumer demand shifts from size to size depending on energy costs changes. A big firm can be more diversified and can produce a more complete product mix, while a firm producing a single make that turns out to lack consumer attraction, may not have enough time and capital to invest in a new model.

Traditionally the big companies have resorted to incremental innovations, without risking a loss of market

share via aggressive technological changes. In the past U.S. automakers have preferred to compete on car performance and design, and not on technological change or on prices. The kind of competition firms engaged in aimed at covering and attracting different segments of the market, with different models and makes. This strategy also tended to reduce risks associated with market failure of a particular model. Nevertheless, the rapid shifts of demand back and forth to small cars, and the lack of flexibility to change the product mix at short notice, combined to create serious problems to U.S. automakers in the 70's and 80's.

b) Production and trade

Trade patterns between the 60's and 80's have changed towards the internationalization and the dispersion of the car industry. In the 60s international trade in motor vehicles was around 20% of worldwide production (3) and very small in parts and components. Each developed country market was supplied by a domestic industry in relative isolation. Nowadays there is extensive trade in cars, parts and components.

Current patterns of production and trade have been affected by the interaction between a new environment, which in the seventies and eighties included the oil price hike, increased Japanese competition and government regulation, and

varied reactions of the established auto firms. Economic, technological and political forces have been involved. To begin with, governments both from developed and developing countries have actively influenced the evolution of the industry.

Local factor endowments, like cheaper labor and fiscal incentives, have also played a role in attracting investment. Nevertheless, the complicated pattern of production and trade in the auto industry is not easily explained only by government policies and factor endowments. The auto industry exhibits an increasing amount of intra-industry trade, with exchanges of parts and components not only between subsidiaries in different countries, but also among plants owned by different companies. These characteristics are due to economies of scale, product differentiation, an imperfect competition (4).

Dispersion of production diminished international trade of assembled cars, as local manufacturing partly replaced exports in some developing countries. The same trend is taking place today with Japanese investments in the U.S. and Korean investment in Canada. On the other hand, the trend towards a "world car" in the 70's increased international trade in parts and components, partly replacing trade in cars.

On the background of these cycles, there has been a steady decline in trade barriers among EEC countries, between the U.S. and Canada, and between the U.S. and the Mexican "maquiladoras", which have enormously impulsed trade, both in cars and components.

The internationalization and dispersion, and the world car strategy, have been in the final account the results of cyclical shifts in consumer demand after each oil shock, and the advantaged position of the Japanese automakers in U.S. market shifts towards smaller or bigger cars. Consequently, Japan has taken the lead over the United States, which used to be the main individual country producer. In 1985 29% of world production took place in Japan, against 28% in the United States (see Table II).

Western Europe taken in total, though, is still the main producer area. It produced nearly 32% of world motor vehicles output in 1985 (Table A-2 in the Appendix). West Germany and France, with 11% and 7% respectively, are the two European majors.

The Canadian industry is closely integrated to the U.S. industry through ownership and a free trade automobile agreement. If we add both together, the Northamerican area is still the bigger producer.

Brazil occupies the first place among less developed country producers and the eleventh place overall, but it

accounts for only 2.3% of world production, according to 1985 figures. Mexico is 14th, South Korea 15th and Argentina 21th.

TABLE II
WORLD MOTOR VEHICLE PRODUCTION
1984, BY COUNTRY (selected)
(includes cars, trucks and buses)

	Units (thousands)	Share (%)
1. Japan	12,271	29.3
2. United States	11,654	27.8
3. West Germany	4,445	10.6
4. France	3,016	7.2
6. Canada	1,934	4.6
11. Brazil	967	2.3
14. Mexico	398	0.9
15. South Korea	334	0.8
20. India	215	0.5
21. Argentina	138	0.3

SOURCE: Table A-2, appendix.

Even if the pattern of production has been moving in the last years towards Japan and some newly industrializing countries, U.S. companies are still the biggest if production in their U.S. and overseas facilities is added (see Table III). This is due to the fact that U.S. companies have more production than the others in subsidiaries abroad.

TABLE III
WORLD MOTOR VEHICLE PRODUCTION
1983 BY PLACE OF ORIGIN OF FIRMS

	Units (thousands)
North American Companies	15,780
Japanese companies	10,737
Western European companies	10,339
Eastern European companies	3,033

SOURCE: Calculated from MVMA World Motor Vehicle Data 1984-85 Edition p. 16.

The subsidiaries prototype of development has prevailed in Latin America. South Korea, in contrast, has managed to develop an indigenous and successful car industry, with links to traditional firms but domesticlaly owned.

Japan has become the most important exporter of motor vehicles, with 6.7 million units in 1985, followed by West Germany with 2.7 million units, France with 1.7, Canada with 1.6, Belgium almost 1 million, and the U.S. with 0.9 million units. Brazil exported almost 200,000 units in 1983, while Mexico exported only 34,000 (see Table IV).

Japan's value of exports of passenger cars, commercial vehicles and auto parts reached almost US$ 29 billion in 1983, followed by Germany, Canada and United States, Brazil ranked 12th that year, with exports worth almost US$ 900 million (Table V).

There is a substantially trade in motor vehicle parts. It reached almost US$ 34 billion in 1983, Year 1983 US$ millions representing 29% of trade in automotive products in

the market economies (see Table A-5 appendix). Of this amount more than US$ 9 billion was trade in parts between the U.S. and Canada, promoted by the APTA (Automobile Parts Trade Agreement). It is interesting to note that if parts are considered, Canada is as important an exporter of motor vehicles to the U.S. in value as Japan.

TABLE IV
EXPORTS PER COUNTRY - 1985 NEW MOTOR VEHICLES
(thousands)

	CARS	COMMERCIAL VEH	TOTAL
Japan	4,414	2,301	6,715
West Germany	2,566	178	2,744
France	1,524	161	1,685
Canada	1,165	448	1,613
Belgium	925	47	972
United States	703	184	887
Spain (1984)	716	33	749
Italy	448	116	564
United Kingdom	240	54	294
Sweden	222	35	257
Brazil (1984)	152	45	197
Mexico (1984)	31	3	34

SOURCES: Automobile International World Automotive Market 1986, pp. 30, 31; Spain from MVMA World Motor Vehicle Data 1986 Edition, p. 38 and 224; Brazil, id., p. 321; Mexico, id., p. 342-43.

TABLE V
TRADE IN AUTOMOTIVE PRODUCTS
Market Economy Exports - 1983

	(US$ Million)	Percentage in Total
Cars	66,187	56.5%
Commercial vehicles	17,114	14.6%
Parts	33,857	28.9%
TOTAL	117,258	100.0%

SOURCE: UN's International Trade Statistics Yearbook 1983. (Published 1985, latest edition).

Exports of passenger cars from Japan to the US have been limited since 1981 (April 1st) through Voluntary Export Restraints. European governments have also put informal limits on Japanese exports. The Japanese government has enforced those limits to prevent the danger of tougher legislated restraints. While tariffs on car imports are relatively low (see Table A-6), limits on Japanese imports are in some cases very restrictive (5). For this reason, Japanese car penetration in France and Italy is only 2.7% and 0.2% respectively (see Table A-7). The Japanese car market itself, although not protected with tariffs, is very difficult to penetrate because of taxex that discriminate against larger vehicles, and a complex distribution system.

TABLE VI
UNITED STATES TRADE IN AUTOMOTIVE PRODUCTS
1983 - (US$ Million)

		World	Developing Countries	Japan	Canada	Europe
Cars	Imports	24,878	31	11,860	7,303	5,864
	Exports	4,258	275	32	3,864	79
Commercial Vehicles	Imp.	4,619	6	1,890	2,723	a
	Exp.	1,212	404	8	568	49
Parts	Imports	6,488	480	938	3,795	1,252
	Exports	8,122	1,465	88	5,466	832
Others	Imports	358	2	1	334	21
	Exports	527	305	2	102	17
TOTAL	Imports	36,343	519	14,689	14,155	7,137
	Exports	14,119	2,449	130	10,000	227
Net Exports		(22,224)	1,930	14,739	4,155	6,910

a: less than US$ 500,000.
Others include Special Veh NES (7822) and Buses and Tractors (783).
SOURCE: UN's Commodity Trade Statistics 1983.

c) Costs of production

Production in the auto industry requires between 250 and 400 thousand units per year to exhaust economies of scale, being in the higher figure for small cars (see Table VII). Optimum scales of production for commercial vehicles are lower, except for some components as engines and pressings.

TABLE VII
ECONOMIES OF SCALE PLANT LEVEL
(Production cost as a % of minimum cost)

Number of Units	Subcompact	Compact	Standard
400,000	100	100	100
300,000	105	101	100
200,000	115	109	101
100,000	145	133	117
50,000	205	182	147

SOURCE: Jeffrey Allen Hunker, Structural Change in the US Automobile Industry, p. 25, adapted from Eric J. Toder (1980), Trade Policy and the US Automobile Industry.

While economies of scale in assembling are related to an annual period, others are derived from the life of a certain tool, for example a stamping die, and do not depend on the period in which production takes place. This means that if a particular model is produced during several years, smaller annual volumes may be produced with no cost penalties (6). Other economies are found in functions performed centrally, as research and development, engineering, procurements, marketing, accounting and others (7).

Post-war production techniques called for higher economies of scale. For this reason, an ancient technique may yield better results than a modern factory for a small level of production. Discontinous methods of production, for example, are adaptable to small levels of output. In this method, production and assembling of different parts of the car take place by turn, and the machines are then reset to

proceed to the following stage.

The change from a discontinuous (or Batch) method, observed in some assemblies in less developed countries today, to a continuous (or flow-line) method of production, permits cost savings with higher production runs. In the flowline method, special purpose machines are occupied all the time in the same task. Further automation is possible with the introduction of automated transfer machines, that handle the product from one work station to the other.

However, new production techniques being recently introduced will reduce the minimum efficiency of scale. In fact, flexible automation will permit the assembly of a wide range of products on the same line, making the minimum efficiency of scale requirement valid to the cumulative production of several models. It will also reduce market risks associated with one particular model, since it will allow less costly shifts from the production of one model to another. Computer-aided design, engineering and tooling will also reduce the minimum quantity of cars needed to recoup the cost of the development of a particular model (8).

There is a significant cost differential in favor of the Japanese car industry and against the U.S. and European industry. This differential arises partially from wages, partly from productivity disparities. The differences in productivity are due, among other things, to the type of

relations betwen the firm, the labor force and the government, and to savings connected with sourcing from suppliers located nearby. Japanese firms also benefit from lower material costs, most notably steel, which in the U.S. is protected (9). It has also been maintained that Japanese firms have access to capital at lower costs.

The cost advantage of the Japanese industry was estimated in 1981 to be US$ 1,718 (in 1973 dollars) for a typical subcompact car (10). There are several other estimates. An assessment by the International Trade Commission, considering all figures it found available, puts the average Japanese advantage at US$ 1,000 to 1,500 in 1984, even with substantial cost reductions in the U.S. firms (11).

III THE ASCENT OF THE AUTO INDUSTRY IN BRAZIL AND MEXICO

a) Historical background

Various small firms were in competition in the emerging world auto industry of the end of the 19th century. In the U.S. the industry underwent a process of rapid concentration around General Motors, Ford and Chrysler, after the introduction of Ford's methods of mass production, that made it convenient to produce vehicles in very big scale. At the end of the first decade of the century these three firms already accounted for half of the market.

Daimler and Benz began production in Europe in the 1880's establishing subsidiaries in several European countries, from where national firms developed subsequently (12). European producers concentrated initially in luxury cars, not having the enormous potential market the Americans had, and survived behind heavy governmental protection against U.S. imports and even U.S. investments in Europe (13).

Altschuler et.al. (14) have characterized the history of the car industry as the product of three transformations. The first transformation took place from 1902 to 1920, consisting in the standardization of the product and the introduction of mass production techniques, with the U.S. as the area of growth and the U.S. firms seizing the initiative.

The second transformation took place between the 1950's and 60's, and consisted in the differentiation of the product and the development of product technology, with the dominance of European companies.

In the late 60's and the 70's the Japanese took the initiative with "just-in-time" techniques, the improved timing of parts flows to diminish inventories to a minimum. They also introduced the total quality concept and the corporate groups as social organization of production. A fourth transformation is envisaged for the late 80's and the 90's, and the outcome could be a flexible manufacturing system. We will expand on the third and fourth

transformations in section VI.

The development of the auto industry in Latin America may be divided in general terms in two periods, one of production for the local market, and the other period of manufacturing mainly for export. The first period shows two different stages, assembling and manufacturing. Assembling begins with the establishment of local factories as early as 1908 in Brazil, with a firm importing unassembled vehicles from Europe. Very early in that stage Ford and GM installed assembly units in Argentina (1916 and 1925 respectively), in Brazil (1919 and 1924) and in Mexico (1925 and 1937).

The multinational presence in the Latin American vehicle industry has been heterogeneous. In general U.S. firms came first, European ones came afterwards, and Japanese firms arrived last. This early presence in new markets may have been based on cheaper transport costs for completely knock-down units (CKD) in comparison to assembled vehicles (15). In any case, at the beginning these assemblies were very small and most vehicles were sold in Latin America as built-up motor vehicles. During the depression and during World War Two, some firms began to produce parts, as subsidiaries of foreign firms or as joint ventures with local entrepreneurs. Trade disruptions of the 30's and 40's favored the establishment of domestic producers of lights, belts, batteries and other parts. Tire manufacturers had

followed the assembles earlier in the 1920's.

During the assembly stage of the motor industry in Mexico and Brazil locally owned firms operating under license coexisted with joint ventures between local and foreign firms, and with wholly owned subsidiaries.

Manufacturing, the second stage of the development of the Latin American auto industry, began in the 50's, first in Brazil and Argentina, and then in Mexico. The dividing line between assembly and manufacturing is not always clear, but the latter carries on more than simply putting together imported parts. It includes an appreciable but variable portion of locally made components. The transition to manufacturing was the result of government policies requiring a certain proportion of local content.

b) Government policies

Until the 1950's, a laissez-faire attitude prevailed in Latin America. In that decade several countries in the area wished to develop a local industrial base, continuing the phase of forced import substitution that had occurred during the depression and World War Two, when international trade disruptions stimulated local manufacturing, although at high costs.

The infant industry argument was used to protect domestic markets during a period in which firms would learn the

process of production and would diminish costs until being able to compete internationally. The auto industry was selected in several countries as a good starting point, as it presented strong backward linkages. The development of the industry would demand several inputs that could be domestically supplied.

The effect of handling complex technologies would eventually spread throughout the manufacturing sector, via worker and managerial mobility, an externality that justified the costs of initial protection. A manufacturing base would provide employment opportunities, value added and more stable economic conditions, vis a vis economies based mostly on primary sector activities.

Initial regulations in some countries promoted the imports of completely knock down (CKD) units, prohibiting imports of cars or restricting them via high tariffs. A next step was to prohibit imports of CKD units, forcing the domestic procurement of some final components, as tires, batteries, and some others. Later on, local content requirements were formally included in development plans that comprised several other regulations as well. Firms had then to apply to produce cars in the country under the new conditions.

The package typically included a schedule of increasing percentages of local content ot be met in specified dates

through several years, and various financial incentives, such as imports of machinery and equipment free of duties and import of parts with special treatment. The government would additionally prohibit imports of cars or CKD units. It was understood that the government would limit entry from then on, but this understanding, more binding in some cases and non existent in others, was not respected.

This phase may be characerized as production for the domestic market, with high costs and low quality. Minimum efficient levels of production were not achieved, as a consequence of the existence of high economies of scale together with the small size of domestic markets. An excessive number of producers was allowed to enter into these countries, in comparison to the size of the markets and the minimum efficient level of production. Eventually, as the market grew in some of the Latin American countries and the process of learning by doing progressed, average costs of production decreased. Some economies of scale were reaped with growing production, and initial problems inherent to the complexity of the manufacturing process were overcome.

In the import subsitution phase, competition for shares of small markets led to a concentration of the industry in hands of foreign automakers. The domestically owned firms, with less resources backing them, were driven out of the market or absorbed by the foreign ones. Additionally,

government policies encouraged domestic firms in the parts industry but not in the assembly stage. Fragmentation slightly diminished through this process.

Typically, increased production met with an initially high domestic demand for cars in these countries, due to growth of domestic incomes and government policies favoring credits for durable goods. As soon as this period of rapid expansion was exhausted, different kinds of problems appeared. The motor vehicle industry was draining the scarce foreign exchange available. In fact, even though local content was high, equipment and machinery had to be imported, some raw materials did not exist locally, and remittances of profits and technology payments also weighted in the balance of payments.

c) The response of automakers

Firms that already had a foothold in the country and other firms alike, showed their interest in participating in the market under the new conditions imposed by governments in the local content phase. this was true, not only in the bigger Latin American countries, but also in the smaller ones, when there was a perspective of regional integration (16).

The interest of the firms derived from the possibility of capturing a market that some day would be important, as demand for cars would grow with income per capita and there were prospects of integration that would further increase the size of markets. Establishing an early presence in those markets prevented the risk of not being allowed to enter, or of entering at disadvantage with their competitors. Additionally, the generous unducements offered could be short-lived if fiscal policies changed.

This movement has been called defensive positioning, and is the result of the fact that the market is oligopolistic in nature. In that kind of market, firms look at the behavior of others to decide their own strategies, as conditions faced by each firm are considerably affected by what the others do. Once one of the firms has invested in a new market, looking for an increase in sales without engaging in price competition at home, other firms follow suit, in order to minimize risks (17).

In that period, even if the market was dominated by few firms, there was a trend towards increased international competition between U.S. firms and among them and European firms, which provided auto firms with competitive incentives to look for new market opportunities. Furthermore, a protected market was not only a promise of benefits for the future, but could also provide profits in the short run,

taking in account that several financial incentives were offered. Further on, production at low levels could well use equipments that were outdated for higher scale methods of production, and that had no opportunity costs for the owners (18).

At the same time, increased competition among automakers provided Latin American countries with some bargaining power, derived from the fact that some of the firms were more prone to make concessions in order to gain access to those markets. To avoid losing them, European and U.S. auto firms alike agreed to new requirements.

Once established, the transnational firms tried to delay the local content programs, because they meant a strain on managerial resources and on capital for investments. To lower costs, they used production methods adapted for low volume runs, the same that were used in previous stages of the auto industry in their home countries. To comply with the local content requirements, they had to promote the local production of parts and components or to engage themselves in such production. They gave technical assistance to local firms, and encouraged their parts suppliers at home to establish subsidiaries in some Latin American countries.

d) Results: fragmentation of the market

Government regulations to promote the development of the auto industry attracted high numbers of manufacturers, both in the group of countries in which the industry was entering into a manufacturing stage -Argentina, Brazil and Mexico- and in other countries where assembly operations were being promoted -Chile, Colombia, Peru and Venezuela-.

No significant efforts were made to limit the number of entrants, and almost all the firms submitting applications were approved. In the case of Brazil, it seems that there was no awareness of the problem of market fragmentation, and in any case it was assumed that competition would be convenient. In the case of Mexico, there was an attempt to limit the total number of producers, but most firms were already in the country, and in any case had it proved convenient to exclude one of the U.S. firms, it would have carried undesired repercussions in international relations.

Although the number of firms in each Latin American country at the start was high, in the range of 10 to 21 depending on the country, the market was captured by the big firms (see Table VIII). Nevertheless, taking into account the economies of scale of this industry and the small size of the internal markets, the fragmentation of the market was excessive.

TABLE VIII
NUMBER OF FIRMS. LATIN AMERICAN AUTO INDUSTRY

			1970		1984		
	PROPOSALS	BEGAN PRODUCTION	CARS	CVs	CARS	CVs	TOTAL
Brazil	17	11	6	9	8	13	15
Mexico	10	8	7	8	7	8(a)	9
Argentina	23	21	7	10	4	6	8
Chile (b)		20	10	2			
Colombia (b)			3	2	3	2	3
Peru (b)		13	9	7	3	2	4
Venezuela (b)		16	8(c)	13(c)	5	5(d)	8

a: Five other small companies produce buses and truck tractors.
b: Assembly.
c: 1972.
d: Six other small companies assemble buses and heavy CVs.
Cvs: commercial vehicles.
SOURCES: UNCTC Transnational Corporations in the International Auto Industry, p. 106 and MVMA World Motor Vehicle Data, 1986 edition, various pages.

The smaller, domestically owned firms in existence in several of the Latin American countries, were gradually driven out of the market or absorbed by foreign firms, as they competed for a share of the reduced domestic market. Foreign firms had the advantage of a higher scale of total operations, and of access to the backing of their parent company for technology and finance.

Competition among foreign automakers failed to rationalize these fragmented market structures (19). On the contrary, the pattern of competition further increased the fragmentation problem. In fact, auto firms competed in the

Latin American markets in the same way that they did at home, covering the market with several models and makes that would appeal to different segments of the public. The frequent introduction of new models had the intention of enlarging the market share, in a very small total market. Styling and performace, instead of price, had traditionally been the elements on which competition had been based in an oligopolistic auto industry.

This kind of monopolistic competition leads to a suboptimal result, and government regulation can improve the outcome. We have already seen that from the beginning the Latin American governments in general did not limit the number of firms in the market. Some efforts were made afterwards to diminish the number of already established firms. For example, in Chile and Peru tenders were made to select a number of firms that would be engaged in local assembly, Chile later liberalized its market. Tenders in Peru reduced the number of automakers from ten in 1970 to three in 1980. In Mexico the number of firms has not been restricted, but models and makes per firm were later on reduced by government regulations.

The regionalization effort of car production under the Latin American Free Trade Association (LAFTA) was designed to enlarge the market and reach minimum efficient scales of production. The main reason for its failure appears to have

been the absolute lack of commitment of Latin American governments to regional integration in general, with the countries acting competitively rather than cooperatively.

Transnational automakers, on the contrary, were seriously interested in the possibility of a regional market, and even made some investments in the hope that it would materialize. Their interest is not surprising, as the regionalization would have implied a large market and hence the possibility of obtaining some economies of scale (20). Transnational firms by their own have accomplished some integration in the Latin American area, as it has been in their advantage to do so, but the scale has been limited. Local content requirements by each country make it difficult to integrate the operations in a bigger scale (21).

In summary, the fragmentation problem was not faced at the outset, and industries were born with that characteristic. Regional integration efforts of motor vehicle industries in Latin America have not been successful up to now. In Brazil, market growth has made room for several firms producing with some economies of scale. In Mexico, under the pressure of huge sectoral trade deficits, the government finally applied restrictions in the numbers of models and makes per firm, restrictions that were initially contemplated but that had not been implemented before.

e) Brazil

After a local firm by the name of Grassi began assembling vehicles of European origin in 1907, three U.S. firms established assembly units in Sao Paulo, with few years of difference: Ford in 1919, GM in 1924 and International Harvester in 1926. Tire manufacturers followed the automakers. Pirelli and Firestone in 1923, Goodrich Rubber Co. in 1928, and General Tire in 1929.

A second round of tire manufacturers began operations in the thirties: a local firm by the name of Companhia Brasileira de Artefatos de Borracha, in 1937, Goodyear in 1938, and Dunlop in 1939. In 1945 two local firms, Vemag and Companhia Americana Industrial de Onibus (CAIO), joined the ranks of the assemblers (22).

With import problems in the forties, several parts were locally produced. Approximately 100 parts firms were in operation by 1949. In the early 50's three other assemblers began production: Wyllis Overland (1952), Mercedes Benz, (only trucks and buses, 1953), and Volkswagen (1953). Some 280 new parts firms were founded in those years (23).

When government intervention began in the 50's, assembly and parts industries already had years of experience. In 1953 the government enforced import licensing schemes for auto parts, and prohibitions to import complete and assembled vehicles. In 1956 a global policy of import substitution was

decided. Levels of local content were established by percentage of weight, gradually increasing for the coming four years, reaching in 1961 up to 98 to 99%, depending on the type of vehicle (24). By 1956 the local content by weight was in average 43% (25). In fact, local content had already been encouraged by import restrictions on parts. The establishment of local content by weight does not appear to have induced the local production of heavier parts. The short time frame to go from 43% to 99% of local content did not give much room to select which parts to produce first in the local market.

Various incentives were created. For example, access to five different rates of exchange was granted, depending on the type of vehicle and on the degree of local content achieved (26). Import of vehicles was prohibited and financial assistance was provided, in the form of special access to short-and long-term credit. It has been calculated that the subsidies via fiscal incentives and foreign exchange advantages reached up to 89 cents per each dollar invested in the industry between 1956 and 1961 (27).

In 1956 there were eight assemblers operating in Brazil, and 520 factories producing parts (28). Seventeen proposals to operate under the new rules were received by the Brazilian government, but only eleven firms, including the eight already involved in assembling, began production (29). The

three new firms were Simca, Scania Vabis and Toyota. Firms apparently decided to begin manufacturing because of the attraction of a protected market with interesting growth expectations; the enormity of fiscal incentives (30), and to avoid being excluded from the market. There seems not to have been awareness of the potential for fragmentation of the market by the firms or the government. On the contrary, a high degree of competition was well regarded (31).

The final level of local content required was achieved by 1962, initially using high priced and low quality parts. In consequence, the cost of production of a typical Brazilian car was approximately 171% of the U.S. cost of a similar car (32). But aside from costly parts, this result was due to the fact that no firm could achieve a level of production necessary to obtain at least some economies of scale. This was a consequence, in the first place, of the excessive market fragmentation. A total level of production of 200,000 units was first surpassed in 1966, divided between eleven producers. Additionally, firms had initially overinvested in fixed capital, taking advantage of imports incentives that were perceived as short-lived.

In the following years, there was a process of concentration in the industry, during which local ownership almost disappeard. In 1960 two of the eleven automakers were predominantly locally owned, two were joint ventures with 50%

of local ownership, and in three other firms there was a substantial local interest. Only four firms, Ford, GM, International Harvester and Toyota, were fully foreign owned. In 1968 only three assemblers had local interest, in all cases a minority one (33). The government was not particularly interested in promoting local ownershipp, contrary to the Mexican policy of supporting local firms in production of parts.

The number of firms diminished to eight, and Volkswagen established its leading position, maintained until today. In the Brazilian case the market provided a partial solution to the problem of fragmentation, although the government contributed with the decision to sell its participation in one of the firms.

The fragmentation problem was also alleviated by the strong boost in domestic demand during the late 60's and early 70's. The GDP growth from 1968 to 1974 averaged 11% annually. But the increase in domestic car demand grew even faster, as the government promoted the development of a market for cars. In fact, the GNP per capita in Brazil was only of US$ 340 in 1966, a figure that meant a very small auto market. In this situation, any increase in demand needed as a rather skewed distribution of income. According to Kurth (1985), expansionist government policies resulted in increased real salaries of the middle-class, and more readily

available credit, which increased demand for cars (34).

As a consequence of the rapid economic growth and of special measures taken by the government to create markets for consumer durables, the level of production of the industry increased by 325% in the period 1968-1974, representing an annual average growth of 22%. Some firms, the first of them Volkswagen, achieved production runs at which economies of scale appeared. By 1974 Volkswagen was producing 269,000 units, GM 126,000 and Ford 104,000.

TABLE IX
BRAZIL PRODUCTION OF MOTOR VEHICLES
(thousands)

1960	133
1965	185
1970	416
1975	930
1980	1,165
1984	865
1985	967
1986p	1,070

SOURCES: MVMA World Motor Vehicle Data 1986, p. 315 and Table A-2.
p: projection based on production figures for the first eight months, reported in Economist Intelligence Unit Brazil Country Report, 1986: 4.

f) Mexico

In 1958 twelve firms were engaged in assembly operations in Mexico, encouraged by the prohibition to import assembled vehicles that was in effect since the early 1950's. More

than half of the market was dominated by the fully foreign-owned subsidiaries of Ford and General Motors, which had begun operations in Mexico in the 1925 and the 1937, respectively. The other ten firms were fully or mainly controlled by local capital, and operated under licensing agreements, various of them assembling U.S. (Chrysler) and European cars of several makes. By the end of the 50's, the government authorized imports of cars from Europe, with the purpose of balancing the domination of the market by U.S. subsidiaries. Figures involved in that trade were not important.

In 1962 the Mexican government initiated the import-substituting phase of the domestic car industry, by issuing the automobile decree, mandating a local content requirement of 60%, based on the direct cost of production. In general terms, the decree was the result of government plans of import substitution, and of important advantages that the automobile industry appeared to offer in that respect.

The decree was based on a government report. Government departments had prepared it in 1960, after visiting Brazil and Argentina to familiarize with the implementation there of car manufacturing plans and doing some research. The specific provisions of the decree were fixed after informal negotiations took place with Ford. This company led the negotiations for the side of the U.S. companies, mainly

because it had the advantage of a knowledgeable manager with good contacts.

Ford was successful in convincing government officials to require a 60% level of local content, lower than the nearly 100% in use in Brazil, with the argument that a high local content would excessively inflate costs of production.

The decree, apart from fixing a level of local content, included a provision for import licensing, that could be used to exclude firms from the industry. The decree also permitted fixing production quotas. Both clauses were intended to deal with the potential fragmentation of the market if too many firms entered, a problem which Mexican officials were very much aware of. In fact, he experiences of Argentina and Brazil showed that several firms would be interested in establishing domestic manufacturing. These provisions were not effectively used.

The intentions of Mexican officials, as per the 1960 report, were to limit the number of firms to four or five. Furthermore, the report proposed that each firm should be permitted to produce only a limited number of models, and that model changes should be allowed in five years intervals. These last intentions did not appear in the final decree.

Regarding to ownership, the intention of the 1960 draft was to require a majority of Mexican capital both in parts firms and assembly firms, but the final decree permitted

complete foreign ownership at the assembly stage. It forbade those firms, though, to operate in the production of certain parts, with the purpose of promoting local parts firms with Mexican control. A further measure, directed to avoid fragmentation, and to obtain economies of scale, was a provision that firms should standardize some parts, which would be produced by local firms. Foreign firms, led by Ford, opposed this clause, on the ground that it would restraint their competitive strategies.

It proved impossible for the Mexican government to effectively use the provisions of the 1962 decree to limit the number of firms in the industry. Bennett and Sharpe (1985) assign this failure to two elements, one external and the other internal to Mexico. The first one was the pressure exerted by the U.S. government to avoid the exclusion of Ford or GM, and of the Japanese government in favor of the installation of Nissan, using in this later case Japanese imports of Mexican cotton as leverage. The second was the lack of cohesion in the Mexican government, with the technocrats on one side in favor of resisting pressures, and the politicians on the other, worried more about short term political alliances than about longer term problems that could arise in the automobile industry (35).

The smaller Mexican-owned firms who did not apply or were not allowed to manufacture cars, were bought by other firms.

And from 1962 to 1971 all domestically-owned private firms that did not cease operations were bought by foreign auto makers or by the Mexican state. The latest one was Auto-Mex, the largest locally-owned firm, in which Chrysler increased its holdings from 33% to 45% in 1968, and to 99% in 1971. Among the resons for denationalization was the fact that smaller companies were not able to pass from assembling CKD units to proper manufacturing without access to technology and financial resources that they did not have.

The Mexican state bailed out a small company that failed for this reason. It already owned an auto firm. Its presence in the industry continued until recently, when both Vehiculos Automotores Mexicanos (VAM) and state participation in Renault de Mexico were sold to Renault France.

The failure to avoid the market fragmentation, although the problem had been clearly perceived, amounted to an original defect very difficult to overcome. It generated an industry with very high costs. Costs of production in Mexico in 1970 have been estimated at 152% of U.S. costs (36). Furthermore, the number of makes and models was not restricted until 1983, when the pressure of strong balance of payments difficulties forced such a decision (37).

The parts industry was also very fragmented. The requirement to coordinate the production of common parts obtained a limited degree of compliance. The reason was that

the level of local content required did not force the companies to make further progress in that respect. Four companies with U.S. interests standardized the drive-train components (38).

In 1968, due to increasing imports by the car industry, Mexican authorities began its efforts to redress the automobile trade deficit. The government finally used production quotas permitted under the 1962 decree. Quotas were tied to firms' improvements both in local content and in exports levels. The turn to exports on Mexico was early but not very successful.

TABLE X
MEXICO PRODUCTION OF MOTOR VEHICLES
(thousands)

1960	50
1965	97
1970	193
1975	357
1980	490
1984	344
1985	398
1986p	310

SOURCES: MVMA World Motor Vehicle Data 1984-85 p. 334 and 50, and 1986 Ward's Automotive Yearbook.
p: projection based on production figures for the first eight months, reported in Economist Intelligence Unit Mexico Country Report 1986: 4.

IV. LATIN AMERICAN TURN TO EXPORTS

a) Manufacturing for export

The increase in the price of oil in 1973 created a serious problem of balance of payments in Brazil. Several measures were taken to reduce oil and other imports. Among these measures, the government decided to limit the expansion of the dometic market for cars. The gasoline price hike per se had a limiting effect on demand. Additionally, consumer credit was tightened, and the existing favored import status for auto equipment was conditioned to export performance. The industry was induced to export through fiscal incentives tied to the export performance. In 1972, even before the oil price increase, an export incentives program had begun through the Commission for the Granting of Fiscal Benefits for Special Export Programs (BEFIEX). Under this program a firm made a commitment to export in exchange for an incentive package. The automobile industry had been since its beginning the main recipient of support by this program.

In Mexico, as early as 1968 the government had addressed the negative effect of the automobile industry on the balance of payments, imposing production quotas to induce firms both to increase local content and exports.

The Andean Pact automobile plant also implied a turn to exports. It was designed with a view to enlarge the market

for automotive products, and to permit minimum efficient scales of production, to the advantage of all the member countries. The program called for locating some plants producing engines and other important subcomponents in some countries of the Pact, and assembly lines in others. Several categories of cars and trucks were defined, and the location of all the plants was negotiated, so that each country would produce some parts and assemble some lines of motor vehicles. After that, each country called international bids for the plants it had been assigned. A common protective tariff for imports from outside the Pact was enacted.

Nevertheless, those plants have exported mainly to world markets. Although designed to reduce fragmentation, too many plants were established. As a result, in many cases economies of scale can not be reaped without exporting to world markets. In fact, as a result of a process that necessarily involved lengthy negotiations in which every country's interests had to be accommodated, the resulting numbers of plants, of assembly lines and of categories of motor vehicles naturally tended to be too big for the local demand (39).

In Brazil auto manufacturers committed themselves through the BEFIEX program to export about US$ 17 billion, in exchange for subsidies and easier access to about US$ 4 billion of imported capital and parts, according to estimates

by BEFIEX available to the U.S. International Trade Commission in early 1985 (40).

TABLE XI
CAR AND TRUCK PRODUCTION IN BRAZIL
Thousands - 1984

	TOTAL	CARS	TRUCKS
Volkswagen	309	290	19
General Motors	197	173	24
Ford	180	142	38
Fiat Auto	138	101	37
Mercedes-Benz	29	-	29
Scania	3	-	3
Toyota	3	a	3
Volvo	2	-	2
Others (6 firms)	2	a	2
TOTAL	865	706	159

a: less than 500.
SOURCE: MVMA World Motor Vehicle Data, 1984-85 edition, p. 48, and 1986 edition.

Fiscal incentives were so high, that the industry could not but export. From 3.3% of total production exported in 1973, the percentage jumped to 13.4% in 1980. In absolute terms, it meant a multiplication by six, from 24,300 to 154,700 units (41). In 1984 Brazil exported 197,000 motor vehicles (see Table IV), figure that represented a 23% of that year's (depressed) production.

Exports of auto parts increased from US$ 21 million in 1973 to US$ 287 million in 1981, to decline to US$ 224 million in 1983 (see Table A-12).

TABLE XII
BRAZIL TRADE IN AUTOMOTIVE PRODUCTS
1983 - (US$ Million)

	Exports	Imports	Net Exports
Cars	429	---	429
Commercial Veh.	246	---	246
Parts	224	156	68
Others (*)	39	---	39
TOTAL	938	156	782

(*) Others include Special Veh NES (7822) and Buses and Tractors (783).
SOURCE: UN's International Trade Statistics Yearbook 1983. (Published 1985).

b) Government-firms negotiations in Mexico

The turn to exports in Mexico was more complicated than in Brazil and involved more negotiations. In 1968, due to increasing imports by the car industry, production quotas were tied to firms' improvements both in local content and in exports levels. However, a higher local content in presence of a highly fragmented market, would have implied higher costs. On the other hand, export increases did not appear feasible, due to high dometic costs.

The government then considered alternative plans to deal with the automobile trade deficit. Auto-Mex, with a minority Chrysler interest before 1971, proposed a plan to reduce the number of firms in the industry. The four majority Mexican-owned firms, including Auto-Mex, would be merged. Chrysler would be a minority partner of the new company, which would

have more than half of the Mexican market, via sharing the quotas of the four original firms. Eventually, it would reach economies of scale.

The Auto-Mex plan also increased local content requirements. Auto-Mex liked the idea of having all firms buying more parts locally. Currently it had to import parts from Chrysler at a profit for the latter, while Ford and GM supplied their wholly owned subsidiaries at lower prices. On the other hand, Chrysler interests as part supplier would not suffer much, because its loss of parts sales would be compensated by an increase in demand for some specific parts that still would have to be imported. Recall that Chrysler would be associated with a firm dominating the Mexican market.

Ford and GM were expecting a plan under which additional production quotas would be granted against increased exports. The Auto-Mex plan was not in their convenience. In fact, these firms had access to lower priced parts from their parents. Moreover, they would have to compete for less than half the Mexican market.

The government used the Auto-Mex proposal as leverage to force Ford to accept increased export requirements without increasing production quotas. Other firms followed suit. Under this plan, each firm had to compensate its imports with exports, in percentages rising from 5% of its imports in 1969

to 60% in 1976. A provision established that at least 40% of these exports had to come from independent auto parts suppliers. Although these firms were majority Mexican-owned, as required by law, almost all the biggest of them had strong minority participation of important foreign parts companies.

As a result of these policies, exports grew rapidly at first. Nevertheless, imports also increased. As a consequence, the sectoral deficit was not reduced. Moreover, from 1974 on, the deficit expanded again, mainly because the companies were not able to comply with the export requirements.

Part of the problem was the depressed market conditions after 1974. Another part of it was that companies needed a time to find a niche for exports coming from their subsidiaries. This happened with the advent of the "world car strategy" prompted by changes in the world environment in the seventies.

A new automobile decree issued in 1979 put more pressure on auto makers to export. The general orientation towards export promotion was shared by most automakers, but not the specific details of the decree. More than that, some firms, as Volkswagen and the state-owned DINA did not even share the emphasis on export promotion. In fact, they preferred higher local contents and less export requirements. The position of DINA can be explained by their lack of an international

network through which to export.

TABLE XIII
CAR AND TRUCK PRODUCTION IN MEXICO
Thousands: 1984

	TOTAL	CARS	TRUCKS
Volkswagen	100	90	10
Chrysler	60	36	24
Nissan	56	44	12
Ford	50	26	24
General Motors	46	18	28
Renault *	19	19	-
V.A.M. *	6	-	6
Diesel Nacional	6	-	6
Others (6 firms)	3	-	3
TOTAL	344	232	112

(*) Subsidiaries of Renault de France.
SOURCE: MVMA World Motor Vehicle Data 1984-85 edition p. 50, and 1986 edition.

In the case of Volkswagen, the attractiveness to export to Germany was low because of transportation costs. Exports to Brazil, where it is the main producer, were barred by local content requirements. Moreover, the fact that it produced only one model gave the firm an advantage in terms of economies of scales in parts supplies. For this reason, Volkswagen had already made investments in Mexico.

The 1979 decree called for a complete trade balance in the automobile sector, even including in the calculations the import content of locally produced parts, and other foreign payments. In exchange, the government terminated the

production quota system and price controls. However, the government also increased the local content level to 50% (42).

On this occasion, again, Ford led the response of foreign automakers. It objected the extent of trade compensation included in the decree, the responsibility for obtaining markets for parts produced by independent firms, and the timing allowed to comply with the new requirements. The firm obtained the support of the U.S. government, which was worried about the anti-trade characteristicis of performance requirements, about government subsidies, and about clauses that discriminated against foreign companies, not allowing them to produce diesel engines, for example.

The Mexican government in this opportunity stood firm in its attitude, and objections faded out. Moreover, when General Motors announced that it would invest in Mexico in order to comply with the requirements of the decree, the other companies prepared their own investment plans. Capital expenditures by U.S. firms in the Mexican car industry increased from US$ 31 million in 1978 to US$ 405 million in 1980 (43).

Although major investments were made in export facilities, the automobile trade deficit continued to increase, in part due to the investment lag and other delays in production for exports. The government froze imports by

the industry for 1982 at the level of 1981 and production of cars with less than the minimum required local content were prohibited instead of just fined.

TABLE XIV
MEXICO TRADE IN AUTOMOTIVE PRODUCTS
1983 - (US$ Million)

	Exports	Imports	Net Exports
Cars	72	38	34
Commercial Veh.	12	6	6
Parts	159	272	(113)
Others (*)	8	9	(1)
TOTAL	251	325	(74)

(*) Others include Special Veh NES (7822) and Buses and Tractors (783).
SOURCE: UN's International Trade Statistics Yearbook 1983. (Published 1985).

In 1983 a new decree was issued, increasing the local content for cars from a 50% to 55% in 1986 and 60% in 1987, and in similar proportions for trucks and buses. But more importantly, it addressed the problem of market fragmentation. In 1981 there were 7 manufacturers in the industry, producing 19 makes and 47 models. The decree did not intend to force any firm out of the industry, but to drastically reduce the number of makes and models. The limits were established at 3 makes and 7 models per firm for 1984, 2 and 5 for 1985, and one make with 5 models for 1987. Firms are allowed to produce an additional model only if it will be self sufficient in terms of foreign exchange (44).

After a very bad performance in 1982 and 1983, the Mexican auto industry began to recover in 1984. Global unit production peaked in 1981 at 597,000 units, fell by 21% in 1982 and by a further 40% in 1983. In 1984 production was 21% up, and in 1985 increased a further 16% (see Table XV). The first eight months of 1986 showed a 28% decrease in output compared with the same period of the previous year (45).

The automobile trade balance reached a peak deficit of US$ 2.1 billion in 1981, but returned to surplus in 1984 (46).

TABLE XV
MEXICO PRODUCTION OF MOTOR VEHICLES
(thousands)

1980	490
1981	597
1982	473
1983	285
1984	344
1985	398
1986p	310

SOURCES: MVMA World Motor Vehicle Data 1984-85 p. 334 and 50, and 1986 Ward's Automotive Yearbook.
p: projection based on production figures for the first eight months, reported in Economist Intelligence Unit Mexico Country Report 1986: 4.

c) The "world car" strategy

Only when new strategies came about in the auto industry, prompted by oil price hikes and Japanese competition, there appeared an opportunity for an insertion of less developed

countries' subsidiaries into the international motor vehicle industry. US firms then had to invest huge amounts of capital to change their models and their methods of production. They took advantage of the numerous subsidiaries abroad that had been established over the years, induced by a strategy of defensive investment. Two forces were operating in the direction of increased exports: government requirements and the shift to the world car strategy.

GM led the car industry into the production of a standard car, with minor alterations for each market, assembled in different centers, from parts produced in massive scales all over the world, fully using the economies of scale characteristic of parts production and assembly. For this purpose, the companies reduced the number of lines and arranged cooperative schemes between them to mutually supplement lines of cars or to benefit from economies of scale in the production of common parts, typically engines. The location of facilities to produce parts takes advantage of factor endowments, using local labor and government incentives, and gaining access to local markets by complying with export requirements (47).

The strategy permitted lowering production costs using economies of scale and cheaper inputs. It hedges operational and political risks by duplicating plants in different locations, sometimes at some cost of diseconomies of scale.

Finally, it allows to take advantage of exchange rate fluctuations by modifying the sourcing according to currency movements (48).

The world car strategy, though, was not the result of export subsidies or requirements by less developed countries, but of Japanese competition, shifts in demand and oil price hikes. Nevertheless, the world car strategy provided the opportunity for Latin American exports to be inserted into the international networks of auto makers.

In this reorganization, automated facilities were located at home and wage-intensive operations in low-wage countries. Duplicated plants in less developed countries were rationalized, production of parts was divided among different locations, reaching minimum efficient scales of production, and at the same time taking advantage of local incentives that reduced costs. A common interest in export promotion was established between foreign automakers and governments of less developed countries (49).

V. GOVERNMENT ASSISTANCE

As a consequence of the loss of U.S. competitiveness brought about by improvements in the Japanese industry, the shift in demand towards smaller cars and other elements above mentioned, the U.S. companies lost a share of the market to Japanese competitors Additionally, the recession implied a

contraction of the total demand. The companies suffered a rapid deterioration in their financial results as their sales plummeted. Employment in the industry declined by three percent in 1979, and Chrysler reported a loss of 1.1 billion dollars (50). In the first six months of 1980, employment declined an additional 22% and the industry suffered losses for 2.9 billions.

TABLE XVI
US AUTO INDUSTRY. NET OPERATING INCOME (LOSS)
(US$ millions)

Year	General Motors	Ford	Chrysler	AMC	TOTAL
1978	3,508	1,589	(205)	37	4,929
1979	2,893	1,169	(1,097)	84	3,049
1980	(763)	(1,543)	(1,710)	(198)	(4,214)
1981	333	(1,060)	(476)	(137)	(1,339)
1982	963	(658)	170	(154)	322
1983	3,730	1,867	701	(147)	6,151
1984	4,517	2,907	2,400	15	9,839
1985	3,999	2,525	1,635	(125)	8,024

Volkswagen of America: financial data not reported separately from Volkswagenwerke AG.
SOURCE: 1986 Ward's Automotive Yearbook, p. 183.

Automakers and workers reacted in several ways. On one hand, they looked for government help in three areas: protection from imports, relaxation of government regulations, and, in the case of Chrysler, financial assistance. The UAW also pressed for local content requirements. On the other hand, the companies devised three

strategic approaches: the "world car" strategy already commented upon; the adoption of Japanese management techniques; and a great research and development effort to innovate in production technologies.

These reactions and business strategies will impact on the Latin American car industry. Chrysler financial difficulties marked its exit from South America. It sold all its subsidiaries abroad, except for those in Mexico and Canada, in order to get cash to save the core of its business and concentrate its managerial attention on North American operations. This decision did not affect much the status quo because Chrysler was not a major actor in Brazil or Argentina. More importantly, protection from imports via tariff or quotas might have limited the access to the U.S. market not only of Japanese cars but also of parts from Latin American plants. As it was worked out, Japanese voluntary restraints did not have direct negative impacts on Latin American exports. A labor content requirement would also have been damaging because it would have effectively impeded or at least severely limited imports of parts and components, without discriminating per origin.

Long term strategies of the auto industry will determine the possibilities of action of the Latin American governments in relation to future development of their auto industries. Depending on which type of global organization the big

companies decide for themselves, there will be an enhanced or depressed role for their subsidiaries in Latin America. The direction of the big automakers' decisions is affected by government regulations. There are tow effects of policy making on these decisions, and through them on the scope of the Latin American auto industry. One is the trade environment; a restricted environment disfavors the "world car" strategy and is contrary to the interests of Latin American industrialization. A voluntary restraint on the Japanese part, though, is perhaps the more convenient outcome, since it defuses most of the protectionist impulse, and at the same time does not affect directly Latin American exports. It makes, though, the U.S. a more convenient place for Japanese car investment in relation to Brazil or Mexico, just because local production in the States is effective in diminishing anti-Japanese resentment.

A second effect is the amount that the automakers have to spend in research and development and in retooling plants. This is very much affected by government regulations on safety, emissions, and fuel efficiency, which demand additional investments, or by their relaxation, which frees funds for other purposes.

With the possible effects on the Latin American industry, we first analyze government assistance to the car industry in the U.S. In the next section we analyze the strategies of the

industry.

At the government level there were several differing attitudes towards the auto industry and its problems. The traditional attitude had been one of suspicion, due to the fact that the industry is highly concentrated. A longstanding investigation on antitrust grounds was dropped only when import penetration provided enough additional competition. A series of regulations, already discussed, had been the main relation of the government with the auto industry during the 70s.

When the problems of the industry began, some government officials were of the opinion that the government should not intervene. Nevertheless, the traditional perception in the U.S. that the car industry has been central to the industrial performance of the country prevailed, and that it is in the national interest to have a strong domestic car industry. Moreover, the car industry constituency is important enough to influence election results in several locations.

Although there was initial opposition both in the Carter and Reagan Administrations to some of the demands of the auto industry, they ended helping it. The Carter Administration provided guarantees to Chrysler. On the trade protection issue President Carter was emphatic in his opposition (51), although it had the support of several Democratic Congressmen. His Administration deflected the issue to the

International Trade Commission, which rejected the petition of temporary relief against import.

The Reagan Administration was also opposed to trade protection, favoring instead the relaxation of regulations imposed during the Carter period (52). Under bipartisan pressure from Congress, Reagan later accepted Japanese voluntary export restraints.

a) Regulations

In the 70s safety regulations mandating air bags were enacted. Its implementation would have required sizable investments, and a surcharge on each car of about $ 60, according to William Nordhaus in 1982 (53), or of about $ 400 to $ 600, according to Lee Iaccoca, Chairman of the Board of Chrysler in 1979 (54). The application of the Act was delayed by the Administration at the requirement of the auto industry (55), but after judicial intervention, the Administration was forced to issue rules requiring the gradual inclusion of some type of crash protection for front seat occupants, beginning with 10% of car production in 1987 and reaching 100% in 1990.

On pollution controls the Clean Air Act established a time table reducing the allowance of pollutant emissions until it reaches the new standard in 1994 (56). At the requirement of the industry, the Reagan Administration

implemented since 1981 a series of measures that implied capital cost reductions of US$ 1.13 billion in the period 1981-1983 (57).

The most important regulation in its effects on the industry, though, has been fuel efficiency. The Energy Policy and Conservation Act of 1975 (EPCA) set the Corporate Average Fuel Economy (CAFE) standard. Under the Act, the average fleet of each domestic car manufacturer should reach certain levels of fuel efficiency in miles per gallon, gradually increasing from 18 miles per gallon in 1978 to 27.5 miles per gallon in 1985.

The companies have failed in several years to meet these standards. In 1985 the required level was diminished to 26 m/g, with the complaint of Chrysler, that had spent enough to comply with the higher figure. With this relaxation Ford and GM avoided paying sizable fines or having to apply for 'credits' drawn from future years. For a comparison, note that the imported fleet reached values in the proximity of 31 miles per gallon as average in 1985 (58).

It has been claimed that fuel-efficiency-related expenditures have been a burden imposed by the government on the industry. After the oil embargo, the Carter Administration established controls on the price of gasoline, suppressing the market signal for consumers to adjust (59). Even before, gasoline was heavily taxed and consequently much

more expensive in Japan and Europe, forcing a trend towards smaller cars. U.S. consumers, instead, demanded big cars and continued to do so with a brief interval after 1973. Nevertheless, the EPCA forced auto companies to produce small cars, while consumers were demanding bigger ones.

If the government had allowed the domestic gasoline prices to increase sooner, the industry would have adjusted more rapidly to changes in the environment. The CAFE standards may in fact have acted as a subsitute of market forces in speeding up the industry adaptation inhibited by the suppression of market forces implicit in the gasoline price policy. The problem then was more the cheap gasoline policies, both in the past and after the first oil embargo, and not the CAFE standards, which, given the cheap gasoline, corrected some of its effects. After the second oil shock the domestic price was deregulated. The Japanese producers were already in an advantaged position to satisfy the demand for fuel efficient cars.

b) The Chrysler debate

On the 24th. of July of 1979 officials of Chrysler Corporation approached the Treasury Department with a request for 1.2 billion dollars in guarantees. Chrysler's market share had gone down from 16% to 10%, its losses during the previous months had been sizable (60), and it was running out

of cash. A new management had taken the direction of the company at the end of the previous year, with a plan to rescue it from bankruptcy. Part of the plan was toobtain guarantees from the Federal government to help finance its recovery.

In its proposal the company argued that the sources of its problems were the excessive government regulation, the sudden shift in demand towards smaller cars, and the business recession. In the opinion of the Federal Trade Commission, management mistakes in Chrysler had been a very important reason of current problems. Management mistakes included chronic production and quality control problems; failure to modernize its U.S. plants, disproportionate preoccupation with overseas operations; sharp reductions in its engineering staff to cut costs in the recession of 1974; failure to introduce a subcompact some years ago, defaulting that entire market to its competitors; and finally, the practice of maintaining a manufacturing inventory, whereby Chrysler manufactured cars before having any dealer commitment to purchase (61).

Chrysler's problems seem to have come from much earlier. According to Maryann Keller, an industry analyst, the company had been periodically near to financial disaster since the 1960's, due to its disadvantages in smaller company size, lower level of vertical integration, and greater

financial leverage than its competitors (62).

Although Chrysler had always had a higher concentration in smaller cars than the other U.S. auto companies, it did not get an advantage from that when demand shifted. According to a Wall Street Journal columnist, Chrysler had concentrated in the wrong small cars at the wrong times. In 1953 Chrysler downsized its already small cars in the wrong time, just when Ford and GM began one of their market wars which reduced the market share of Chrysler and other independents. In 1969 Chrysler decided to push for a larger share of the big-car market, and not to produce a subcompact. With the oil embargo, Chrysler found itself with no car in the appropriate market segment. Finally, although Chrysler had a valuable share in Mitsubishi that permitted it to cover the small-car segment with imports, the 1975 EPCA did not allow imports to be counted toward the corporate average fuel economy (63).

The new Chairman of the Board of Chrysler, Lee Iaccoca, recognized in the Senate Hearings that management mistakes accounted for about half of Chrysler's problems. At the same time, though, mentioned that both Ford and GM were anticipating sizable losses. In consequence, it could not be only a matter of bad management, unless the three companies suffered of it. He emphasized instead the effects of excessive government regulations in emissions, safety, and energy savings (64).

On the subject of regulations it has been sustained that Chrysler was unfairly disadvantaged. Because of its size, it could spend less than GM and Ford in looking for technological alternatives to comply with energy savings or emissions standards. On the other hand, its expenditures needed to reach a sort of threshold amount to be productive, which weighted more heavily in the cost of each car due to its lower volume. Secretary of the Treasury Miller acknowledged the argument, though he recognized that the Treasury staff had not been able to measure this effect (65).

On emissions control, Chrysler developed electronic technologies which were not approved by the regulatory authorities. Instead, the catalytic converter developed by GM was approved, which the other auto companies would have to buy. David Stockman, then a Republican Representative for Michigan, the most affected State by an eventual Chrysler

bankruptcy, opposed the bailing-out but at the same time blamed the difficulties of the company on government regulations, and proposed lifting or relaxing them, a course that the next (Republican) Administration took (66).

The debate on the Chrysler bail-out focused on government intervention as opposed to free enterprise. It addressed only tangentially the issue of industrial policy. The supporters stressed the enormous costs of a bankruptcy to the national economy and to the states where Chrysler was located. Although the company or parts of it would eventually continue under different owners (67), the "consumer franchise" argument stated that the value of the company as a going concern depended on the good will of the customers, good will that would totally disappear in the case of a reorganization under the bankruptcy laws, because of the time that a reorganization takes and the customer fears of future availability of parts (68).

To justify the government decision to support Chrysler, Secretary of the Treasury William Miller stated that a bankruptcy reorganization would be more costly to the taxpayers, because of loss of revenues, unemployment claims and welfare costs, additional costs to the states and local governments, and support of unfunded liabilities of Chrysler pension fund. The unemployment effects were calculated around 300,000 direct and indirect jobs, that would not be

reabsorbed by other auto firms or by a takeover. The need to maintain a competitive auto industry was also argued, given that Chrysler had played a significant role as a technological force and had a relevant third position in market share. Finally, Miller mentioned Chrysler's planned increases in small cars production and the negative impact of a Chrysler closure on the nation's product mix and on the balance of payments (69).

Supporters also emphasized the precedent of help previously given to other firms, like American Motors and Lockheed. American Motors, the smaller U.S. automaker, received a limited waiver for emission controls, was authorized to purchase technologies from GM, was designated a small business in order to be able to sell vehicles to the Federal Government, and got a tax loss carryforward (70).

In favor of government relief were a majority of legislators from 13 states where Chrysler had manufacturing operations. The United Auto Workers were strong supporters because of the employment efects of failure. Officials of the States and cities that would be affected were also strong advocates, beginning with the major of Detroit. The dealers and suppliers of Chrysler alsolobbied extensively. The package that was proposed to Congress and the one that was finally approved draw on the financial support of most of them. In fact, the act was based on the principle that the

government would give its guarantee if the firm could gather enough support from those that would be most affected by a Chrysler failure. It required sacrifice by its workers, contributions from dealers, suppliers, states, cities, and also from the creditor banks. For this purpose a Chrysler Loan Guarantee Board was formed, which had to require a plan and formal commitments before granting the guarantees.

Against the government intrusion in free enterprise were the great majority of the press, and free market advocates (71). General Motors' President Thomas Murphy made his disagreement be known, although declined to testify in the Chrysler's hearings. Among the banks, Citicorp testified against the guarantees on free market rules grounds, but most others did not give any opinion, except to show reluctance to extend financial support to the company, even after receiving government guarantees. In fact, they did not increase their exposure with Chrysler except for capitalizing interest payments. The Business Roundtable, a business association, also testified against on the basis of non-government messing with the competitive processes, Chrysler retiring from it immediately after.

The House Banking Subcommittee on Economic Stabilization voted for the guarantees on partisan lines, twelve democrats to five republicans plus one democrat. The democrat representative that crossed lines to vote against argued that

Chrysler should be required to scale down its operations before receiving any government help (72). In any case, Chrysler did reduce its operations to survive, as we will note. Probably the mention was due to the intentions of Chrysler of continuing a strategy of full-line producer, instead of concentrating only on some market segments.

The Senate Banking Committee voted 10-4 in favor of a substitute of the government bill, which sponsored by a Republican and a Democrat required more sacrifices from labor and reduced the amount of guarantees (73). Finally a compromise bill was approved in the House by a 2 to 1 margin and by 54-43 in the Senate (74).

Chrysler Corporation survived, but reduced its size. To begin with, it sold its foreign operations, except for those in Mexico and Canada. It also sold its real state operations, its financial subsidiary and its defense unit, which was for a long period the only profitable part of the company. It rapidly built up capacity to produce small cars with front-wheel drive. For this purpose it adapted a plant in Michigan to produce small engines, built a new plant in Mexico to the same end, and entered into import contracts of small engines with Japanese and German manufacturers.

Since 1982 chrysler has shown profits. Moreover, it had started to rebuild its financial business. In 1985 it bought E.F. Hutton Credit Corp. and Finance America, and entered

into a joint venture with General Electric Credit Corp. Chrysler's strategic goal is to diversify towards high-tech, aerospace and financial services. By 1990 half of its assets will be not related to automobiles. It has been recently announced, though, that Chrysler will buy the 46% share that Renault holds in American Motors Corp. (75).

c) Trade protection

On May 6, 1980, top executives of the big four auto industries and the president of the United Auto Workers met with a group of senators to explore options for relief. Each participant in the meeting valued the options differently, according to their particular situation.

The companies agreed on the need to reexamine the regulations on safety, emissions and fuel efficiency, and on supporting tax credits for the purchase of U.S.-made small cars. GM dissented over alternatives such as accelerated depreciation or any other kind of tax cut to help the industry to retool, citing the need to balance the budget. Nevertheless, it is probably easier for the bigger firm in an industry to obtain investment funds.

The four companies manifested opposition to legislated import quotas. Ford, Chrysler and AMC favored Japanese import restraints, while GM opposed them on the grounds that it could lead to protectionism abroad that would hurt its

auto sales. The UAW was also for some sort of agreement with Japan to curb imports, and favored Japanese investment in the U.S. (76). Local content requirements were apparently not touched on this occasion.

In mid 1980 the United Automobile Workers turned to the International Trade Commission under section 201 of the Trade Act of 1974. This statute permits granting import relief in cases of fair but disruptive trade. Relief may be conceded even if no subsidies or dumping are present, provided that the industry is suffering serious injury and imports are the substantial cause of that injury. If a majority of the ITC commissioners give an affirmative determination, they recommend a remedy to the President. The remedy can be a tariff, quotas, tariff-quotas or a combination of them. The President may enforce the recommendation of the ITC, adopt another remedy or reject it altogether. He may also negotiate an Orderly Market Agreement (OMA) with foreign governments to restrict exports of the article in question to the U.S. market.

The UAW asked for the imposition of quotas on car imports at the level of 1975 or 1976 imports and an increase in the tariff from 2.9% to 20%. Ford Motor Company joined the petition, asking for quotas on cars and light trucks at 1976 imports level of 1.7 billion cars and 260,000 small trucks. Ford expected that its petition would add to the pressures on

the President to negotiate on OMA with Japan after an affirmative finding of the ITC, as the lesser evil for an Administration contrary to quotas or tariffs.

Ford officials also argued for excluding imports from Canada under the Automobile Products Trade Agreement (APTA), which provides free trade of these articles between both countries. The position of Ford seemed to derive from its conception that the U.S. market pertains to firms manufacturing locally.

GM was more concerned of repercussions of trade restraints on its businesses abroad. In fact GM had started an aggressive program of international sourcing, while Ford had preferred not to increase sourcing abroad. For this reason GM favored voluntary restraints only as a strategy to prevent legislated tariffs or quotas. GM rapidly moved to hedge the potential harmful effects of protection on its worlwide sourcing network by investing in a joint venture with Toyota that would benefit from protection (77).

The ITC gave a negative determination by a 3 to 2 vote. Although it found that the industry was suffering serious injury, the majority of Commissioners determined that the main cause of injury had been the decline in domestic demand due to the economic recession in the country. Increased imports and shifts in demand were also considered causes of injury to the industry, but not more important than decline

in demand.

The automobile industry turned again to Congress, and to the Administration. This time it found a warmer reception to its plights. Senator Danforth introduced a bill calling for a three year quota of 1.6 million passenger cars on Japanese imports, compared with 1.9 million units imported in 1980 (78).

Furthermore, President Reagan had committed himself as a candidate to address the issue (79).

The Administration was reluctant at first to act. The cabinet was split about evenly on the issue. The Secretary of State, the Secretary of the Treasury and the Trade Representative were against it because of its impact on a free trade environment, the Chairman of the Council of Economic Advisors and the Director of the Office of Management and Budget against it because of its inflationary effects. The Secretaries of Transportation, Commerce, and Labor were for import quotas (80).

The President opted for encouraging the Japanese to voluntarily limit their exports to the U.S. They were reportedly reluctant to do so, because of the antitrust implications of such behavior. On the other hand, the Japanese government would not act unless an explicit requirement from the U.S. government was forthcoming. Nevertheless, both the U.S. and the Japanese governments were

forced into action by fears of congressional mandated restraints (81). In fact, the administration finally made clear to the Japanese government that there was a danger of legislated protection, according to the current mood in Congress. The Japanese government then announced that it would restrict exports to the U.S. market.

After the US government stated in 1985 that it would not seek an extension of this commitment, the Japanese government declared that it would continue controlling car exports all the same, although the limit was substantially risen (82). In 1987 the Japanese government extended the restraint, which will apply for a seventh fiscal year. The news was received with adverse comments of Chrysler and the UAW, which find that maintaining the ceiling in a year of expected decline in sales amount to increased market share for imports. The U.S. representative has stated, nevertheless, that the course the Administration is following is to press Japan to open further its markets to U.S. products (83).

According to Lenway (1985) the commitment of the U.S. to the GATT escape clause provisions constrained the ability of the auto industry to influence trade policy, in that it provided the government with political leverage and a competing rationale for import protection. She backs her conclusion on the fact that the Japanese voluntary limits were not as restrictive as the auto industry was demanding,

both at the ITC hearings and in Congress.

According to other opinions, the voluntary export restraints (VER) have been convenient to the Japanese automakers and contrary to the interests of the US industry. In the first place, the VER, based as it was in units and not in value, induced exports of larger and more expensive Japanese cars to the U.S. Some observers have argued that U.S. government intervention has again helped the Japanese industry to be in a position to take advantage of U.S. demand shifts. In the recent past oil price regulations inhibited demand to react and demand smaller cars on time. Now import protection lead Japanese automakers to export bigger cars, just when domestic demands reacts to declining oil prices (84). Secondly, the increase in the price of the Japanese cars that came about with the VER was important, and a sizable source of profits for Japanese automakers. USITC (1985b) puts the increase in the average price of Japanese cars in US$ 1,500 in 1984. And thirdly, the price of U.S. made cars increased in average in US$ 660 in the same year, raising the cost of the VER to U.S. consumers, who were the net losers, to US$ 15.7 billion in the 1981-1984 period (85). In any case, all U.S. manufacturers have been importing Japanese cars to complement their lines in the subcompact size.

Despite Japan's voluntary restrictions, the imports share of the market continued growing, not so much because of increasing imports but due to declining sales by domestic manufacturers. Out of frustration and increasing unemployment, the UAW pressed a local contents bill. Local content requirements had already been advocated by the UAW on March 1980 (86). On December 1981 Representative Richard Ottinger, Democrat from New York, introduced a bill in Congress, that would require local content from 8.3% in 1983 for automakers with annual sales between 100,000 and 150,000 units a year, to 90% in 1985 for firms selling more than 500,000 units. Directed against Japanese firms, it could, nevertheless, effect engine imports from Mexico and other countries.

The big three automakers supported in public the intention of the bill, but were skeptical of its possibilities of passing the Senate. Moreover, the effect on them was mixed, as it could harm their plans of integrating cars with imported parts and of covering certain market segments with imports. Although eventually the bill faded away, it was cosponsored by 214 members of the House (87).

Further bills and resolutions have been presented in Congress. For example, in 1985 the Senate unanimously approved a resolution calling the President for restrictions in Japanese imports in cars, electronic and

telecommunications if no progress were made in opening Japanese markets. More general bills addressing the whole trade imbalance have been presented from time to time, mostly designed to penalize imports from Japan.

Partly for these reasons, Japanese firms have, although reluctantly at first, moved to invest in the U.S. A sort of implicit domestic content effect has taken place. Honda, Mazda, Nissan and a Toyota/GM joint venture have already made investments in U.S. territory. Additionally, Toyota by its own, and a Mitsubishi/Chrysler joint venture will start production in 1988. Further, Toyota, Honda and Hyundai (this last one from South Korea) will begin production in Canada by 1989-90. Japanese parts firms have followed automakers to the U.S. Nippondenso, for example, has already installed a producing and importing facility (88).

VI. REINDUSTRIALIZING THE U.S. AUTO INDUSTRY

Apart from asking for government help, the industry undertook major plans to modernize and to reduce costs. As a consequence, the break even point had already descended by 30% in 1985 (89). The first measures taken consisted in closing inefficient plants and slashing the work force by approximately 25%; obtaining from the UAW concessions on wages and workplace regulations, and from suppliers concessions on prices and credits; and streamlining

operations and reducing inventories (90).

Next, automakers moved to downsize their fleets. The models already in production were changed to the full extent possible without demanding a complete retooling. The first aim was to reduce weight in order to improve fuel performance. It was pursued using thinner sheets, shifting to smaller engines and using smaller and lighter components, such as radiators, axles and suspension parts.

Other strategies to reduce costs consisted in outsourcing more parts and components than in the past, relying on subsidiaries in developing countries where lower wages prevail and government subsidies are given in order to attract foreign investment in the car industry. U.S. firms also began to import cars from Japan and afterwards also from Korea, in order to cover the subcompact segment of the market. This strategy helped in slashing costs by exploiting more fully plant economies of scale.

The third phase represented major changes and consisted in a shift to front wheel drive, use of a unitized body design, use of new alloys, and finally the inclusion of new technologies, such as electronics for engine control and instruments and more advanced engines (91). This phase would have represented an investment by the domestic auto industry of nearly $ 70 billions from 1975 to 1985. In the period 1979-84 it reached $ 53 billions. Investment expenditures

grew enormously from 1975-76 to 1979-80, but decreased after import restraints were put into effect (92). In 1984, however, investment had picked up vigorously.

TABLE XVII
U.S. MOTOR VEHICLES NEW PLANT & EQUIPMENT EXPENDITURES
(US$ billions)

1973	3.83
1974	4.29
1975	3.33
1976	3.60
1977	5.82
1978	7.19
1979	8.34
1980	9.02
1981	9.83
1982	7.77
1983	7.29
1984	11.20

p: preliminary.
SOURCE: Department of Commerce
Survey of Current Business,
Vol. 66 N. 2, February 1986.

The firms in the industry have followed some common strategies, but there also are some differences in their responses. General Motors entered in coalitions with Japanese firms to import subcompacts, in order to complement its product line. In 1983 started to operate a joint venture with Toyota, and opposed the continuation of imports restriction, because of its effects on its strategy of coalition with foreign firms.

Ford, instead, has made, labor relations a top priority and has somewhat restricted foreign outsourcing. It started, nevertheless, a joint venture with Mazda in Mexico. Chrysler has had more severe problems to face. It has concentrated in fuel efficient, front-wheel cars, and utilized its longstanding relationship with Mitsubishi to cover certain segments of the market with imports. It has relied extensively on foreign suppliers of parts and components in order to reduce costs, and initially obtained wage concessions well beyond the other automakers.

a) The world car strategy

The world car strategy, which we have described above, was the initial response of the automakers to the changes in the competitive environment in the seventies.

The world car strategy implies increasing trade in parts and components and finished vehicles. This strategy, though, seems to be yielding its place to new corporate organizations that tend towards the geographical centralization of production. This new organization appears to be determined by the new social organization systems pioneered by the Japanese companies, and by new production technologies, reviewed in the next sections (93).

b) The Japanese car production system

The U.S. industry has been adapting Japanese methods through direct observation, as for example in the GM-Toyota joint venture in Fremont, California. The Japanese production system has evolved incrementally through the years, adapting Western technology bought or assimilated under license agreements, to their own social organization systems. Japanese automakers have fine-tuned the manufacturing systems to achieve high volume output with high quality and low labor content. In this manner they have lowered the costs of production using the same production technologies, and incorporating the new that have become available.

The Japanese management paradigm differs from the traditional one in three important aspects: the inplant organization, the relationship with suppliers, and the relationship with companies in the same industrial group.

The inplant organization laid down by Henry Ford consists in the articulation of several sets of workers. Production workers use limited skills, while the machinery is maintained by a second set of workers. A third group supervises the production and maintenance workers, and checks quality. Improvements in the production process are the responsibility of a group of industrial engineers, and senior management coordinates all the operations.

The new paradigm is based on production workers that are trained with the necessary skills to take several responsibilities, like repairing machinery, spotting defects, diagnosing problems, and contributing new ideas. The number of workers in supervising and maintenance are in this form lowered down dramatically. Labor relations are based on long time employment, quality circles and other forms of worker participation, attaining a decisive attitude from the labor force (94).

The manufacturing system is based on the concepts of just-in-time and total-quality. Big inventories between stages of production are eliminated because their existence conceals the real problems, apart from being costly. Elimination of stocks exposes deficiencies and makes easier to solve them. Under the zero-defect system flaws are prevented instead of being detected after the fact. This approach has shown more savings in detection systems than costs in pursuing the elimination of even the last defect.

The relations with suppliers employ a different system of integration, based neither on vertical integration nor on arms-length transactions, but on operational coordination maintaining legal and financial independence. Coordination includes here long-term joint planning, cooperation in research and in product development information flows, and product crossflows. This facilitates having tight production

schedules and low inventories. Finally, membership in the large industrial groups confers advantages to the automakers in financing and access to technologies, and encourages competition among the groups (95).

These improvements in the management of mass production have resulted in a high level of quality, with high flexibility in production, while employing fewer hours of labor per car, which are paid with lower wages.

c) The new technologies

The technologies to produce cars have been fairly stable for the most part of the post-war period. Production systems have accordingly tended to use increasingly automated lines of continous flows, with high volume of standard output, and with no flexibility. Traditional equipment attains considerable scale economies, but is totally dedicated to a particular model, necessitating to be totally replaced with each change of model. This production system is complemented with semiskilled labor that accomodates year-to-year changes in the product.

The technology is now gradually changing with the introduction of several advances in the production system, in the design process, and in the characteristics of the car. On one hand, there has been a significant research and

development effort by the automobile industry in the seventies and eighties. On the other, progress has been going on both in electronics and in new materials, adding to the menu of applications that can be introduced.

The production system is incorporating computer controlled lines, computer aided machining, robots in the assembly of parts into components and in material handling, and automatic inspection. Robots can be programmed to perform varying tasks, introducing flexibility into the manufacturing process, while at the same time reducing the production labor.

The design process is time consuming and costly in engineers and model builders. On the way is the computer aided design, which will permit simulations without prototypes, with a major impact in areas such as aerodynamics, which presently necessitates extensive trial and error in wind tunnels. The product itself will incorporate new features, like skid control, using microprocessors (96).

In sum, flexibility in design and in production systems will reduce the costs of variants of basic models, and after an initial investment it will reduce the costs of changing models and the economies of scale. The transition period in GM seems to have been very long, though. In early 1979 GM launched a $ 40 billion seven-years plan to redesign all its

cars and factories, incorporating new flexible and automated technologies to produce fuel-efficient front-wheel drive cars. Although in eight years GM has spent $ 60 billion, its costs are still high. Management contends that this is the outcome of duplications in the transitory period while the new systems replace the traditional ones. Apparently, costs are now being slashed at increasing speed (97).

GM delays in getting results appear to be due to problems in performance of new equipments, and to the turmoil generated by massive corporate reorganizations. At the same time, though, GM has been exploring other alternatives. In 1982 conceived a project to invent a new class of car. It was established in 1985 as a separate and independent unit, in an effort to avoid the interference of its own bureaucracy. Saturn Corporation will launch by 1990 a not-so-novel car to compete with imports in the middle-price level.

A different route has been the better use of traditional technologies in a Japanese-type management environment. GM's joint venture with Toyota has outperformed its new automated plants. Results reported in the adoption of Japanese management methods in the U.S. indicate that they are transferable (98).

Relations with competitors, suppliers and labor have also been changing in character. Although competition continues

in a world scale, several cooperative arrangements have been implemented between firms of different nationalities, in order to produce parts with greater economies of scale, or even to concentrate in certain sizes, trading others with their partners. Relations with suppliers have been changing toward multi year contracts, mutual technical support, and a closer location.

Relations with labor also tended to change, at least initially. As the membership of the UAW diminished, its bargaining power also decreased, and the union opted for more job security, making wage and workplace concessions. In order to save jobs, the UAW was willing to permit a temporary break of its traditional policy of standardize wages throughout the industry, that it had traditionally enforced to remove wage differentials as a competitive basis. Further, with the bailing out of Chrysler a worker representative sat for the first time in a car company board.

The UAW have recently moved towards more benefits and less job security, given that the industry has been in a good financial position in the last years. Nevertheless, its bargaining power has dramatically diminished, and the union is compelled to adopt a middle-of-the-road path (99). Employment in the industry decreased fromn almost one million workers in 1978 to 650,000 in 1982 (100). Further losses are expected from productivity gains, labor-saving innovations,

and sourcing of parts abroad, although these trends could be countered by improvements in the general economic situation (101).

In conclusion, producing a car in the competitive environment of today requires the integration of a vast collection of technologies with a complex social organization. U.S. automakers are combining the adaptation of Japanese style management methods with a more automated and flexible production system.

VII. CONCLUSIONS

THE INDUSTRY IN THE FUTURE AND CONSEQUENCES FOR LATIN AMERICA

The development of the auto industry in Latin America appears to support the thesis of oligopolistic reaction of multinational enterprises. First, U.S. automakers, mainly GM, Ford and International Harvester, entered into these markets in the early stages of assembly there, a few years apart one from the others. When Latin American governments began their import substitution policies and selected the auto industry as a target, several firms got interested in establishing assemblies there even with requirements o high levels of local content and with low probabilities of short-term profits. In cases where international auctions were held to determine the local assembler or engine producer for

some kind of vehicle, again several firms competed among them, even if the market was not yet developed in a sufficient scale as to provide profit opportunities.

This "trump card for the less developed countries", as Knickerbocker (1973) puts it (102), was used by them, although it is debatable if they used it in their full extent. Brazil put a very high "entrance fee", through local content requirements reaching to nearly 100% in a few years. In Mexico the local content requirement was lower, and it was not enforced in the first years. As a consequence, a sectoral trade deficit soared in Mexico.

Countries that have a more developed auto industry in the region and that we have surveyed here, did not put any limit to enter. This led to market fragmentation and inefficient production, the outcomes described by Knickerbocker for oligopolies entering into defensive investments in new markets. In Brazil it was thought that more firms would mean more competition. In the case of Mexico, with the experiences of Argentina and Brazil available, technicians proposed limits to encourage a more efficient industry. For political reasons, no significant limits were put until the balance of payments critical situation made unavoidable to face the problem. In fact, due to a low local content requirement, the local auto parts industry was slow to develop, and imports of parts were a high burden in the

country's import bill.

Partial solutions to the fragmentation problem have been reached, in Brazil through market growth, induced by government policies until the oil shock of 1973, and in Mexico, through limits in the number of makes and models per firm since 1983. Exports of parts and components, promoted by local governments, and engrained into the "world car" strategy of auto makers, with some trade-offs for lesser local content requirements, have also moved local auto industries to more efficient scales of production and some steps away from fragmented market situations.

The development of auto industries in Mexico and Brazil also show that comparative advantages are non static but dynamic. Governments can induce changes in comparative advantages and shift the composition of their exports, with initial costs of subsidization in the industries targetted to be developed. Of course, this has been outstandingly shown by the much more successful experiences of East Asian countries in upgrading their exports toward higher technology areas, than by import substitution policies in Latin America (103).

The big automakers have had a busy time in the seventies and eighties. Their interactions with the U.S. government have already given results. They completed negotiations with governments of Brazil and Mexico. They also obtained the

elimination of Brazilian export subsidies and Mexican car quotas are not longer a problem for bilateral relations.

They also embraced three parallel strategies which for the time being are coexisting: world sourcing, new shop floor rules in some plants, and automated methods in others. The final evolution of these strategies is not known yet.

The future role of Latin American car production in the world industry will very much depend on the technological trends in the industry and in the resulting trade arrangements. The world car strategy operated in the direction of increasing international trade, mainly of parts. However, new technologies being developed may well operate in the inverse direction. The minimum efficient scale of production is being dramatically reduced, and parts production is taking place nearer to the assembly site, with various advantages in coordination, in identifying quality problems immediately, and in reducing inventories through "just-in-time" delivery. Only when scale considerations are strong, these advantages are overridden.

Furthermore, new technologies are labor-saving, and at the same time require more skilled labor to manage more complex equipments. This will mean that the attractiveness of low-wage areas will diminish, except for minor parts that will continue to be labor-intensive. In short, under new technologies being developed, it appears that economies of

scale might not be the driving force it was in the past, nor low wages. These trends would concentrate production near the assembly site, decreasing the international trade of parts and components.

Under the world car concept, the Latin American countries had the opportunity to push the insertion of their local industries into the international networks of automakers. Three elements favored the location of parts production in those countries: the access to their markets, low wages, and fiscal incentives given by them. Economies of scale made unimportant the costs of parts transportation to the assembly sites. However, if trends towards a reduction of the importance of economies of scale prevail, and low wages become less important, then some of the motives for locating new investment in developing countries will disappear.

Under the world car concept, it appeared that eventually these countries would be the main growth areas of the future. Under new technologies, the location advantage may revert to the main places of consumption. Fiscal incentives given by Latin American countries in their industrial targetting policies may be a worthy cost to incur if they create comparative advantages that permit the subsidies to be discontinuated at some time in the future. In the new circumstances, the possibility of creating such advantages should be reassesed.

A market will continue to exist in these countries, although the medium-term growth rate may be low in the coming years due to the debt problem. Fabricating cars only for local consumption is not a feasible strategy. In order to reach sectoral trade balance, some cars and parts must be exported. The market of other developing countries may not be enough. In fact, Brazil and Mexico are so pressed to obtain foreign earnings that the governments will push for more auto exports.

Japanese voluntary export restraints have proved that there is a political limit to the amount of cars that can be imported by the U.S. The US car industry has not been unanimous, while the UAW has been extremely vocal. Ford and GM were in favor of voluntary restraint on imports. Ford seconded the UAW petition before the ITC to increase the pressure for an orderly market agreement. GM's position was on that occasion that voluntary restraint of imports from Japan could avert the threat of legislated quotas, a greater evil from the point of view of its global operations. In 1985 GM opposed the renovation of the VER. Chrysler was very vocal in demanding import restrictions and in opposing termination of the VER.

The fact that U.S. manufacturers were at least not unanimously in favor of continued Japanese restraints does not mean that Japanese automakers have assumed that they have

the area free to increase their production and exports at will. The same forces that operated before could be put in action again. Further, the limits to Japanese imports in Europe continue in effect. This explains Japanese investments in the U.S.

Are the same limits applicable, although in other scale, to Latin America? The fact that the main U.S. producers have subsidiaries in the Latin American countries, and that exports from these countries are mainly intra-firm trade of parts, indicates that the chances for conflict are reduced. This is an important difference with other U.S. industries that have experienced restructuration because of import competition. In the extent that various Latin American auto firms are subsidiaries of U.S. automakers, there is no much margin for conflict of interests.

Non-US automakers, though, are also important producers in Mexico and Brazil. Volkswagen is the most important producer both in Brazil and in Mexico, and it also produces in the U.S. A regional integration of Volkswagen plants could eventually push exports of parts from Latin America to its U.S. subsidiary. Toyota is also present in various Latin American countries. Perhaps, if these firms used the Latin American countries as launching pads towards the U.S. market, a conflict would arise.

The depression in local markets and the need to compete internationally moved Ford and Toyota to announce a cooperative arrangement between their subsidiaries both in Argentina and in Brazil, forming Autolatina Ltd. and Autolatina Inc. respectively. The move was completed under the announcement in 1986 of the governments of those two countries that they would pursue economic integration. It may seem rather strange the credulity of these two transnational companies on that announcement. But cooperatives arrangements such as this one are not rare, in fact they are now common. This joint venture is reportedly working on future products aimed at the U.S. market (104).

A continued export success in the less developed countries might unleash protectionist forces again, particularly if that success is based on export incentives from governments (105).

However, the local content legislation that has been promoted by the UAW in 1982 and again in 1985, appears to have very limited possibilities of being ever passed. In addition, the union bargaining power is today weaker than before, because employment in the industry has decreased, due to less production, more outsourcing, and cost-reducing measures. Moreover, new technologies being introduced are further reducing labor requirements.

The auto industry development in Latin America shows that exports are less vulnerble when there are common interests with some segment of the importing country. U.S. automakers are engaged in the production of cars and parts in Latin America, and it is not in their interest to restrict this trade flow. This is even more clear in the Canadian connection.

In summary, protection from Latin American exports appear not to be in the convenience of U.S. automakers, to the extent that this trade is mainly of an intra-firm kind. Even if European or Japanese firms begin exporting parts to their U.S. operations, another kind of defensive behavior than protection would probably be more advisable from their point of view.

To sum up, it appears that the threat to Latin American automotive exports might come from the emphasis that big automakers put in new technologies that reduce the role their subsidiaries in Latin America play in their global production network. The speed and direction of change will partially depend on the global trade and regulatory environment, mainly affected by U.S. government policies and decisions.

APPENDIX

TABLE A-1

WORLD MOTOR VEHICLE PRODUCTION 1984, BY FIRM
(thousands)

	TOTAL	FIRM SHARE
1. GENERAL MOTORS	8,071	19.3%
2. FORD	5,349	12.8%
3. TOYOTA	3,482	8.3%
4. NISSAN	2,728	6.5%
5. VOLKSWAGEN	2,135	5.1%
6. RENAULT	1,983	4.7%
7. CHRYSLER	1,885	3.4%
8. PEUGEOT	1,748	4.2%
9. UAZ (USSR)	1,675	2.9%
10. FIAT	1,528	3.7%
11. MAZDA	1,133	2.9%
12. HONDA	1,127	2.7%
13. MITSUBISHI	1,095	2.6%
14. SUZUKI	690	1.7%
15. DAIMLER-BENZ	667	1.6%
16. DAIHATSU	566	1.4%
17. FUJI	549	1.3%
18. LEYLAND	471	1.1%
19. VOLVO	437	1.0%
20. ISUZU	434	1.0%
21. B.M.W.	412	1.0%
22. AMERICAN MOTORS	391	0.9%
FIRST 10	30,584	73.0%
FIRST 20	37,753	89.8%
FIRST 40	40,976	97.8%
TOTAL	41,899	

SOURCE: Calculated from Motor Vehicles Manufacturers Association (MVMA), World Motor Vehicle Data, 1986 edition, p. 16.

TABLE A-2

WORLD MOTOR VEHICLE PRODUCTION 1984, BY COUNTRY
(includes cars, trucks and buses)

	Units (thousands)	Share
1. JAPAN	12,271	29.3%
2. UNITED STATES	11,654	27.8%
3. WEST GERMANY	4,445	10.6%
4. FRANCE	3,016	7.2%
5. U.S.S.R.	2,200	5.3%
6. CANADA	1,934	4.6%
7. ITALY	1,572	3.8%
8. SPAIN	1,417	3.4%
9. GREAT BRITAIN	1,311	3.1%
10. BELGIUM	1,035	2.5%
11. BRAZIL	967	2.3%
12. SWEDEN	462	1.1%
13. AUSTRALIA	394	0.9%
14. MEXICO	398	0.9%
15. SOUTH KOREA	334	0.8%
16. POLAND	312	0.7%
17. YUGOSLAVIA	249	0.6%
18. CZECHOSLOVAKIA	227	0.5%
19. EAST GERMANY	235	0.6%
20. INDIA	215	0.5%
21. ARGENTINA	138	0.3%

SOURCE: Calculated from 1986 Ward's Automotive Yearbook, p. 50.

TABLE A-2b

WORLD MOTOR VEHICLE PRODUCTION TRENDS
(includes cars, trucks and buses)
(million units)

1978	42.3
1979	41.5
1980	38.5
1981	37.2
1982	36.1
1983	39.7
1984	41.8
1985	44.0

SOURCE: 1986 Ward's Automotive Yearbook, p. 57.

TABLE A-2c

WORLD MOTOR VEHICLE PRODUCTION BY MAJOR AREAS 1985
(million units)

U.S.-Canada	13.6
Western Europe	12.6
Japan	11.5
Eastern Europe	3.2

SOURCE: 1986 Ward's Automotive Yearbook, p. 57.

TABLE A-3

NEW MOTOR VEHICLE REGISTRATIONS, 1984
(thousands)

United States	14,165
Japan	5,437
West Germay	2,524
France	2,074
United Kingdom	1,989
Italy	1,714
Canada	1,207
Netherlands	510

SOURCE: Motor Vehicles Manufacturers Association (MVMA), World Motor Vehicle Data 1986, edition p. 39.

TABLE A-4

TRADE IN AUTOMOTIVE PRODUCTS
Market Economy Exports
1983

SITC CTC1 Rev 2 (Rev 1)		(US$ Million)	Percentage in Total
781 (7321)	Cars	66,187	56.5%
7821 (7323)	Commercial Vehicles	17,114	14.6%
784 (7328)	Parts	33,857	28.9%
	TOTAL	117,258	100%
	Others:		
7822 (7324)	Special Veh NES	1,857	
783 (7322,7325)	Buses and Tractors	2,470	
(732)	Grand Total	121,485	

SOURCE: UN's International Trade Statistics Yearbook 1983. (Published 1985).

TABLE A-5

EXPORTS OF AUTOMOTIVE PRODUCTS
(US$ millions)

	Cars	Commercial Vehicles	Parts	Total
JAPAN	19,535	5,782	3,615	28,932
GERMANY	16,221	2,267	6,017	24,505
CANADA	7,809	3,442	4,941	16,192
UNITED STATES	4,352	1,261	8,206	13,819
FRANCE	4,722	878	3,331	8,931
BELGIUM-LUX	4,942	441	669	6,052
UNITED KINGDOM	1,506	417	2,300	4,223
ITALY	1,672	720	1,533	3,925
SWEDEN	1,707	761	804	3,272
SPAIN	1,630	178	523	2,331
NETHERLANDS	445	222	284	951
BRAZIL	429	246	224	899
MEXICO	72	12	159	243

SOURCE: UN's International Trade Statistics Yearbook 1983.

TABLE A-6

TARIFFS

	Cars	Commercial Vehicles	APTA (from Canada)
US	2.5%	25%	0%
EEC	10.0%	20-22%	
JAPAN	0%	0%	

As a result of the Kennedy Round of GATT negotiations the US tariff rate on cars is to be reduced in five steps from 3.0% to 2.5%, and the EEC tariff from 11% to 10%.

The Automobile Products Trade Agreement between the U.S. and Canada permits the free trade of automotive products, with certain conditions.

For a list of nontariff barriers, see Cohen (1983) pp. 532-534.

TABLE A-7

IMPORT PENETRATION
PASSENGER CARS
(In percentage of domestic market; 1984)

	ALL IMPORTS	JAPAN
FRANCE	35.9%	2.7%
WEST GERMANY	26.7%	12.0%
GREAT BRITAIN	57.5%	11.1%
ITALY	36.9%	0.2%
SWEDEN	65.1%	15.0%
JAPAN	1.3%	
U.S.A.	24.9%	18.3%

SOURCE: Calculated from Motor Vehicles Manufacturers Association (MVMA), World Motor Vehicle Data 1986 edition, pp. 34 and 36.

TABLE A-8

U.S. NEW CAR REGISTRATIONS

	Millions	Import Share
1976	9.8	14.2%
1977	10.8	18.3
1978	10.9	17.8
1979	10.4	22.7
1980	8.8	28.2
1981	8.4	28.8
1982	7.8	29.3
1983	8.9	27.5
1984	10.1	24.9
1985	10.9	27.2e

SOURCES: Crandall (1984) p. 9 until 1983, and 1986 Ward's Automotive Yearbook, p. 57.

TABLE A-9

UNITED STATES
TRADE IN AUTOMOTIVE PRODUCTS
1983
(US$ Million)

		World	Developing Countries	Latin America	Brazil	Mexico
Cars	Imports	24,878	31	13	---	13
	Exports	4,258	275	67	a	4
Commercial Vehicles	Imports	4,619	6	---	---	---
	Exports	1,212	404	53	---	2
Parts	Imports	6,488	480	385	87	293
	Exports	8,122	1,465	980	34	511
Others	Imports	358	2	2	1	a
	Exports	527	305	69	2	12
TOTAL	Imports	36,343	519	400	88	306
	Exports	14,119	2,449	1,169	36	529
Net Exports		(22,224)	1,930	769	(52)	223

US exports to Latin America include all Developing America. All US imports from Developing America come from the Latin American Integration Association (LAIA).

a: less than US$ 500,000.

Other include Special Veh NES (7822) and Buses and Tractors (783).
SOURCE: UN's Commodity Trade Statistics 1983.

TABLE A-10

TRADE IN PASSENGER CARS.
BRAZIL AND MEXICO
(US$ millions)

	Brazil *	Mexico		
	Exports	Exports	Imports	Net Imports
1973	18	35	149	114
1974	29	37	256	219
1975	63	3	9	6
1976	48	a	8	8
1977	82	a	a	-
1978	183	64	a	(64)
1979	171	91	10	(81)
1980	327	31	134	103
1981	545	56	184	128
1982	460	9	132	123
1983	429	72	38	(34)

(*) Imports of Brazil were negligible.

SOURCE: UN's International Trade Statistics Yearbook 1983. 1981, 1979, 1977.

TABLE A-11

TRADE IN COMMERCIAL VEHICLES
BRAZIL AND MEXICO
(US$ millions)

	Brazil *	Mexico		
	Exports	Exports	Imports	Net Imports
1973	19	4	83	79
1974	72	7	107	100
1975	98	4	27	23
1976	139	4	25	21
1977	143	13	24	11
1978	153	42	24	(18)
1979	221	24	47	23
1980	355	10	81	71
1981	459	31	157	126
1982	316	4	82	78
1983	246	12	6	(6)

(*) Imports of Brazil were negligible.
SOURCE: UN's International Trade Statistics Yearbook 1983, 1981, 1979, 1977.

TABLE A-12

TRADE IN AUTOMOTIVE PARTS.
BRAZIL AND MEXICO
(US$ millions)

	BRAZIL			MEXICO		
	Exports	Imports	Net Imports	Exports	Imports	Net Imports
1973	21	45	23	55	89	34
1974	41	95	54	67	109	32
1975	45	114	69	55	617	562
1976	57	123	66	23	628	603
1977	97	120	23	32	538	506
1978	143	142	(1)	147	775	628
1979	201	155	(56)	162	1,043	881
1980	252	188	(64)	244	1,500	1,256
1981	287	182	(105)	203	1,822	1,619
1982	241	147	(94)	317	1,091	774
1983	224	156	(68)	159	272	113

SOURCE: UN's International Trade Statistics Yearbook, 1983, 1981, 1979, 1977.

TABLE A-13

MEXICO
SECTORAL TRADE BALANCE
(US$ Million)

	1980	1981	1982	1983	1984 (*)
EXPORTS	404	378	484	675	824
Automobiles	99	70	67	72	58
Automobile motors	30	61	214	395	471
Automobile parts	209	165	131	152	230
IMPORTS	1,903	2,507	1,213	350	632
Automobiles	155	182	94	14	20
Assembly materials	949	1,003	583	194	289
Motor and motor parts	145	177	109	51	104
Spare parts	394	552	296	78	160
Trucks and special	227	333	118	14	55
SURPLUS (DEFICIT)	(1,499)	(2,129)	(730)	325	200

(*): Projection based on figures foro July-August.
Note: only major items detailed.
SOURCE: Banco de Mexico, reproduced in Business Mexico February 1985, p. 74.

TABLE A-14

BRAZIL
EXPORTS OF AUTOMOTIVE PRODUCTS.
PRINCIPAL COUNTRIES

Year 1982	(US$ millions)
Italy	302
Colombia	102
Venezuela	94
United States	92
Nigeria	86
Peru	83
France	31
Chile	26
Argentina	26

SOURCE: UN, Commodity Trade Statistics Series 1982.

TABLE A-15

BRAZIL
AUTOMOTIVE EXPORTS
1982
(Million US$)

	World	Developed Economies	Developing Economies
Cars	460	232	227
Comm Veh	316	126	191
Parts	240	120	12
Others (*)	100	1	99
TOTAL	1,127	479	649
Percentages	100%	42%	58%

(*) Mainly buses and tractors for trailers.
SOURCE: UN Commodity Trade Statistics Series 1982.

NOTES

1. Depending of the purpose, different criteria may be used to define an industry. In practice, it is necessary to use the information that is available. I have used here statistics from the International Trade Commission based on TSUS definitions, data from the United Nations based on SITC CTCI Rev. 1 and Rev. 2., together with domestic sources from Brazil and Mexico. For statistics on world production and trade I have followed Lall's usage; see Lall (1980).

2. For mergers in the European car industry, see Wells (1974).

3. M. Whitman (1981), p. 7.

4. Marina v. N. Whitman (1981).

5. For a complete list of European restrictions, see US ITC (1985b), p. 3.

6. These are called economies at the product level. Other economies of scale at the product level consist mainly in improvements that are introduced with time, and so they depend on the cumulative production of the particular product, more than on the volume of production per period.

7. These are called firm level economies. Another economy of scale at the firm level is the significant stimulus that exists to produce at least two makes, enlarging the size of the firm. The incentive comes from the risks involved in producing only one make in a market whose demand is highly unstable and difficult to predict, and with conditions of production that delay any production response to market shifts. For this reason, it is observed that in some plants two related models of automobiles or trucks are assembled, in order to be prepared to rapidly change the model mix to meet consumer demands, even at the expense of losing some economies of scale or incurring in some costs in coordination and holding higher inventories.

8. Altschuler et.al. (1984), p. 182.

9. M. Whitman (1981), pp. 6-10.

10. Cohen, (1981), p. 552, citing a study by Harbour and Associates for the US Department of transportation.

11. USITC (1985b), pp. vi and 11-12.

12. Wells (1974), p. 23.

13. Wells (1974), p. 23.

14. Altschuler et.al. (1984), p. 12.

15. The product cycle theory provides an approach to explain the expansion abroad of "product pioneering" firms. The follow-the-leader theory gives an explanation for the behavior of followers; see Vernon (1971), also Vernon (1984). The follow-the-leader hipothesis has been tested by Knickerbocker (1983).

16. UN CTC (1981), p. 124.

17. Knickerbocker (1973), p. 22.

18. Industrias Kaiser Argentina (IKA) was installed with used equipments transferred by a US firm.

19. Jenkins (1977), p. 197.

20. For a discussion of the regionalization process of the car industry in the LAFTA region, see Moore (1980), chapter III.

21. In some countries, though, regional origin qualifies as local, with some limits. Brazil is one of these countries.

22. Stephens (1985), pp. 11-19.

23. Stephens (1985), p. 27.

24. For the timetable, see Stephens (1985) Table II-4, p. 50, based on Nascimento (1976), p. 66.

25. Mericle (1984), p. 5.

26. Stephens (1985) Table II-3, p. 49; Table II-5, p. 54; Tables II-6 and 7, p. 55.

27. Mericle (1984), p. 6.

28. Mericle (1984), p. 5.

29. Table XI, based on UN CTC (1981), p. 106.

30. Kronish and Mericle (1984), p. 270.

31. Mericle (1984), p. 7.

32. Stephens (1985), p. 60.

33. Moore (1980), p. 133.

34. Kurth (1985), p. 334.

35. Bennett and Sharpe (1985), p. 108-114.

36. Bennett and Sharpe (1985), p. 147, citing the United Nations Economic Commission for Latin America. The cost of production for Brazil in 1970 is put at 135%.

37. Violante-Morlock (1982) cites the 1972 decree as already restricting makes and models in some amount.

38. Bennett and Sharpe (1985), pp. 94 and 101-105.

39. See UN CTC (1981), p. 123, for the plant allocation agreements.

40. USITC (1985), p. 64.

41. Stephens (1985), p. 99.

42. The percentage was fixed at 50% of the costs of parts excluding the assembly costs, which before had been included in the calculation. This change represented an estimated 8% increase in local content over the 60% in previous use, based on total costs.

43. Bennett and Sharpe (1985), p. 232.

44. Bennett and Sharpe (1985), p. 278, and Economic Intelligence Unit, Annual Supplement 1985, p. 15.

45. Economic Intelligence Unit, Quarterly Economic Report, No. 4 (1986).

46. According to official figures the deficit peaked at $2,129,000 in 1981 (see Table A-13). UN figures put the deficit for that year at $1,873,000 (see Table A-10 to A-12). In 1983 it had recovered to a surplus of US$ 325 million. ($73 million according to UN figures). The projected figure for 1984, based on eight months, was a surplus of $ 200 million. There was a surplus of $ 161 million in the first semester of 1985.

47. Whitman (1981), pp. 10-.

48. An additional example of exchange rate hedge is the flexibility in the production line, at some additional cost, of changing from a domestic market model to an export one and backwards. It seems that the Ford plant at Hermosillo, Mexico, was designed so as to be able to produce for the local market when the local currency is overvalued, generally coinciding with a domestic boom, and for export markets after a devaluation, generally coinciding with a domestic recession. The source is Professor Don Lessard, reporting experiences of Sloan Fellows at the Sloan School of Management, M.I.T..

49. Bennett and Sharpe (1985), p. 197.

50. Mahshigian (1983), p. 172. Employment has not reached its previous peak of 1978-79.

51. "I cannot freeze imports of the small foreign cars that American consumers want", President Carter in his April 17, 1980 news conference, reported by Congressional Quarterly, May 10, 1980, p. 1266.

52. This position was sustained already in 1979 by the Republican Representative from Michigan David A. Stockman, later Director of the Office of Management and Budget under Reagan, in a newspaper editorial: "Chrysler Bail-Out: Rewarding Failure?", Wall Street Journal, Sept. 4, 1979.

53. Statement of Prof. William Nordhaus before the House Subcommittee on Telecommunications, Consumer Protection and Finance, 27 and 30 April 1982, Washington D.C.: US. Government Printing Office, pp. 119-120, cited by Leone, Robert A. (1986), Who Profits: Winners, Losers, and Government Regulation, New York: Basic Books, p. 68.

54. Chrysler Corporation Financial Situation Hearings, November 1979, Part I, p. 649.

55. For an account, see Leone (1983). See also Leone (1986), p. 96.

56. Leone (1986), p. 18.

57. Leone (1983), p. 29. For regulation effects on safety and technology, see Nader (1985), "How Law has Improved Auto Technology", New York Times, December 29, p. E-15.

58. Ward's Automobile Yearbook (1985), p. 15; Coleman (1980); Business Week, various issues.

59. Until the first Reagan Administration the gasoline price was controlled. In fact, one of the first acts in government was to announce the deregulation of the oil industry.

60. Chrysler's losses reached more than one billion dollars in 1979.

61. Statement of Alfred F. Dougherty, Jr., Director, Bureau of Competition, Federal Trade Commission, before the Senate Committee on Banking, Housing, and Urban Affairs, Chrysler Corporations Financial Situation, (1979), Hearings before the Senate Committee on Banking, Housing, and Urban Affairs, October 10, 11, and 12, 1979, Washington D.C.: US. Government Printing Office, pp. 17-30.

62. Statement of Maryann N. Keller, Vicepresident, Kidder, Peabody & Co., Chrysler Corporation Financial Situation Hearings, October 1979, pp. 313 ff.

63. B. Bruce-Biggs (1979), "Chrysler and the Small-Car Morality Fable", Wall Street Journal, September 20.

64. Chrysler Corporation Financial Situation, Hearings, November 1979, Part I, pp. ff.

65. Chrysler Corporation Financial Situation, Hearings, November 1979, Part I, p. 33.

66. David A. Stockman (1979), "Chrysler Bail-Out: Rewarding Failure?", Wall Street Journal, September 4.

67. As indicated by several opponents of the Chrysler deal, f.e. Milton Friedman (1979), "Bailing Out Chrysler Would Preserve Unproductive Jobs at the Expense of Productive Jobs", Newsweek, September 10.

68. See Statement of Lee Iacccca, Chrysler Corporation Financial Situation Hearings, November 1979, Part I, p. 629; and testimony of Secretary Miller, same hearings: "The reason we have felt it is not a proper way to go (bankruptcy) is because Chrysler really depends upon one thing, the consumer franchise". Reported by Congressional Quarterly (1979) "House Subcommittee Backs $ 1.5 Million Chrysler Aid", November 10, p. 2549.

69. Statement of Secretary Miller, Chrysler Corporation Financial Situation Hearings, November 1979, Part I, p. 169; see also Statement of Alfred F. Dougherty, Jr., Director, Bureau of Competition, Federal Trade Commission, Chrysler

Corporation Financial Situation, Hearings, October 1979, p. 17.

70. Chrysler Corporation Financial Situation, Hearings before the Committee on Banking, Housing and Urban Affairs, US Senate, October 10, 11, and 12, 1979, Washington DC: US. Government Printing Office, p. 236.

71. See above Friedman (1979), and Stockman, (1979). For the same reasons Alan Greenspan, President Ford's chief economic adviser, was in opposition; see his Statement, Chrysler Corporation Financial Situation, Hearings, October 1979, p. 272.

72. Congressional Quarterly, (1979), November 10, p. 2549.

73. In the opposition were one Republican and three Democrats, although these for different reasons. Senator Williams, from New York, opposed the wage freeze required by the bill, while Senators Proxmire, Chairman of the Committee, and A. Stevenson were against government intervention on the grounds that several firms would have the same merits that Chrysler had for being helped. See Congressional Quarterly (1979), December 1, p. 2752.

74. For a description of the Act see Congressional Quarterly (1979), December, p. 2873.

75. The Boston Sunday Globe, March 22, 1987.

76. "The Japanese will have to put their capital where their markets are", Donald Fraser, UAW President. Chrysler joined the UAW in that concern. Nevertheless, Japanese firms were not willing to invest in the US, due to the adversarial labor-management relationships prevailing in the country and probably because the higher labor costs. Honda and Nissan are producing in the US since 1982 and 1983 respectively, but their labor force isi not affiliated with the UAW. On the other hand, Toyota has engaged in a joint venture with General Motors and is in the process of installing a fully owned plant. This firm, and Mazda, other recent investor in the US, have come to terms with the UAW. See Corrigan (1985), p. 343. A report on this meeting was published by Congressional Quarterly, May 10, 1980, p. 1263.

77. New United Motors Manufacturing Inc. invested $ 400 million in Fremont, California, to produce 250,000 front-wheel drive cars.

78. Lowenfeld (1983), p. 400.

79. Lowenfeld (1983), p. 399.

80. Lowenfeld (1983), p. 400.

81. See "Congress Prepared to Slow Influx of Japanese Autos If Negotiations Founder", Congressional Quarterly, March 28, 1981, p. 551; see also "Reagan's Early Test", National Journal, March 28, 1981, p. 536.

82. Limits during fiscal years (April 1 to March 31) beginning in 1981 to 1983 were 1,680,000 cars and 1,832,500 in total, considering other motor vehicles. In the 1984-1985 fiscal year the limits were raised to 1,850,000 and 2,017,931 respectively (USITC 1985b, p. 2). For fiscal years 1985-86, 1986-87 and 1987-88 the Japanese government put limits of 2,300,000 cars.

83. Reported by Automotive News (1987), February 2 p. 1.

84. Laffer et.al. (1985), p. 280.

85. USITC (1985b), pp. viii and ix. See also Crandall (1984), pp. 13-15, for effects of Voluntary Export Restraints on US car prices, and p. 16 for consumer costs.

86. Statement by Douglas Fraser before the Subcommittee on Trade of the House Ways and Means Committee, March 7, 1980, cited by Lenway (1985(, p. 137.

87. See "Detroit's Advocates in Congress Want to Stamp Cars with 'Made in America'", National Journal, September 10, 1982, pp. 1221-3.

88. See capacity and expenditure figures in Ward's Automotive Yearbook 1986, p. 14.

89. Coleman (1985), p. 36-3.

90. Ibid.

91. Cohen (1983), p. 238.

92. Crandall (1984), p. 42 argues for a causal relationship between import protection and a slow down in investments in new plant and equipments.

93. For a critique of the assumptions behind the world car strategy, see Jones and Womack (1986).

94. Altschuler et.al. (1984), pp. 29-, 137-.

95. Jones and Womack (1986), pp. 254-.

96. Altschuler et.al. (1984), pp. 96-, 135-, and Jones and Womack (1986), pp. 252-. See also "Automakers Shift Rapidly to High-Tech Manufacturing", Ward's Automotive Yearbook, 1986.

97. "General Motors: What Went Wrong", Business Week, March 16, 1987, pp. 102-10.

98. As reported by Schonberger (1982), cited by Jones and Womack (1986), p. 256.

99. See Business Week, April 22, 1985, p. 80: "The Auto Workers Strategy: Straddle the Fence".

100. US ITC (1985b), p. A-38.

101. The management-labor traditional adversarial relation in the US and the need to change it in order to compete have been the subject of recent literature. See Salter, Webber and Dyer (1985).

102. Knickerbocker, p. 197.

103. On national strategies and industrial targetting, see Scott and also USITC 1985.

104. "Latin-made Automobiles to Flow to the US", The Boston Sunday Globe, March 8, 1987.

105. Altschuler et.al., p. 193.

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