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**RESTRUCTURING AND INTERNATIONAL COMPETITIVENESS:
THE MEXICAN AUTOMOBILE INDUSTRY*/**

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INTRODUCTION

A growing literature now refers to a "flying wild geese scheme" (Ozawa, 1991 and 1992; and Mortimore, 1993) of industrialization which envisions technological progress in Asia in terms of the image of the arrow-shaped pattern of migrating waterfowl. There is a lead goose which is more advanced and gives direction to the flock. In Asia, that role is played by Japanese industry which is more technologically-sophisticated and which, during the innovation-driven stage of competitive development spins off investment-driven industries (intermediate and capital-intensive goods) to the more advanced of the developing countries of the region in similar fashion as it did previously with labor-intensive manufacturing when it left the factor-driven stage of competitive development. In this sense, the Asian newly industrializing countries (Korea, Taiwan, Hong Kong and Singapore) take up positions in the flying geese pattern immediately behind Japan. Certain members of the Association of South-East Asian Nations, the ASEAN 4 (Indonesia, Malaysia, Philippines and Thailand) follow by picking up the labor-intensive activities spun off in turn by the Asian NICs. China might be considered to be further back in the pack picking up the most labor-intensive and least technologically-demanding of assembly operations in which the ASEAN 4 currently are losing relative competitiveness.

As can be appreciated, the operational element of this scheme is **the process of learning associated with technological development**, which begins with the original foreign technology and passes through several progressive stages —assimilation, absorption, diffusion, adaptation, institutionalization, generation and innovation— until the original technology (or, an improved version of it) is again transferred, this time by the recipient to a relatively less technologically-advanced economy. Several countries of developing Asia have been particularly astute at employing export processing zones to begin the process of technology transfer which culminates in the challenge in the international market to the provider of such technology.¹

The flying wild geese scheme as applied to Asia by Fukusaku (1992), among others, demonstrates that some developing countries are capable of consciously altering the structural nature of their integration into the international production system in respect of their exports of manufactures by increasing their human capital- and technology- intensive nature as compared to their natural resource- and unskilled labor- intensive aspects. In this manner their industrialization process becomes centered on **technological upgrading** which in turn provides a more sustained basis to that process and ensures a measure of local control over the industrialization process in the context of the new international industrial order.

The flying geese scheme suggests that if one must imitate others in order to gain a place in the new international industrial order, it is of utmost importance to emulate a successful example. At the other extreme, uncompetitive national industries not functionally integrated into the new international order could end up as sitting ducks, falling prey to rapacious predators. Flying geese are better placed than the sitting ducks to take advantage of the ongoing shake up of the global automobile industry. The ability to transform a sitting duck into some kind of flying goose is what gives the Mexican automobile industry such importance.

¹ A good example is South Korea. See Chang (1993) and Amsden (1989).

I. EVIDENCE OF THE TRANSFORMATION OF THE MEXICAN AUTOMOBILE INDUSTRY

The transformation of the Mexican automobile industry can be appreciated in various manners. In this section, the available evidence will be grouped according to three principal themes: increased productive capacity and export performance, the changes in the balance of payments situation, and improvements in international competitiveness. The second section will deal with explaining the evidence.

1. Increased production capacity and export performance

Mexican passenger car production had peaked at 356,000 units in 1981 and did not surpass that level of production until 1989, reaching the 823,200 level in 1993. At the same time, exports of passenger cars blossomed from the 50,000 level during 1985-1986 to the 150,000 level during 1987-1989; stabilizing at over 400,000 units as of 1993. Three of Mexico's passenger car producers were among the 10 top exporters (of all goods) of Latin America during 1992. There is little doubt that passenger car production in and exports from Mexico have witnessed a tremendous expansion and transformation during the last decade or so.

The complete story of the advance of the Mexican automotive industry is more complex than these figures suggest. Table 1 gives an interesting overview of the principal investment projects implemented during 1979-1990 which account for the lion's share of the new production capacity brought on stream and the exports generated during that period. The producers of passenger cars at the beginning of the 1990s all had put into practice capacity-enhancing investments, first for engines and thereafter for passenger vehicles. It should be noted that substantial investments, measured in US dollars, were made and that they were manifest mainly in new production facilities located closer to the US market and targeted primarily for export.

An important portion of the foreign direct investment that entered the Mexican economy during the 1978-1989 period came by way of the majority-owned affiliates of the major automobile producers active in Mexico. Unpublished data from the Banco de Mexico made available to the author indicates that during the 1978-1983 period of investment in engine production these subsidiaries accounted for over 20 percent of total foreign direct investment inflows to Mexico from all sources. The investment realized during the period of expansion of passenger car capacity for which there is information, 1984-1989, was the equivalent of 16 percent of total foreign direct investment, however, these figures do not include the major investments of Volkswagen (\$1,500 millions) and Nissan (\$1,000 millions) made during the early 1990s.

Table 1

MEXICO: CHARACTERISTICS OF THE PRINCIPAL INVESTMENT PROJECTS IN THE AUTOMOBILE SECTOR, 1979-1990

On stream	Company	Plant location	Investment value (US\$ millions)	Product	Annual capacity (000 units)	Targeted markets	Export target (percent)
1979	Volkswagen	Puebla	270	4 cyl. engines	300	United States	80
1982	General Motors	Ramos Arizpe	c/ 350	6 cyl. engines	400	United States	90
1982	General Motors	Ramos Arizpe	c/	Passenger vehicles	100	United States	60
1982	Chrysler	Ramos Arizpe	135	4 cyl. engines	270	North America	85
1983	Nissan	Aguascalientes	220	4 cyl. engines	750	Japan	80
1983	Ford Motor Co.	Chihuahua	300 a/	4 cyl. engines	400	North America	90
1984	Renault	Gómez Palacio	n.d.	6 cyl. engines	320	North America	80
1984	Chrysler	Ramos Arizpe	80	4 cyl. engines	130	United States	85
1985	Chrysler	Toluca	n.d.	Passenger cars	n.d.	United States	n.d.
1986	Ford Motor Co.	Hermosillo	500 b/	Passenger cars	130	North America	90
1989	Volkswagen	Puebla	n.d. c/	Passenger cars	300	North America	20
1990	Nissan	Aguascalientes	n.d. d/	Passenger cars	200	North America	33
			1 855	Engines	2 570		
				Passenger cars	730		

Sources: On the basis of data provided by the Mexican Automobile Industry Association (AMIA) and secondary sources.

a/ A \$ 700 million investment to double engine capacity was initiated in 1990.

b/ A \$ 840 million investment to expand capacity to 170 000 passenger cars began in 1990.

c/ A \$ 1,500 million investment to expand passenger vehicle production to 450 000 units by 1995 was initiated.

d/ A \$ 1,000 million investment to expand passenger vehicle production to 200 000 units by 1994 was initiated.

It might be mentioned in passing that almost 20 percent of the value of foreign direct investment funneled through the first Mexican program for converting external debt into equity went to the automotive sector (UNCTC, 1990a, p.73; Mortimore, 1991). This feature is confirmed as well by the fact that new investment (as versus reinvestment or intercompany debt) was particularly important during the 1984-1989 phase, when it reached the equivalent of 73 percent of total foreign direct investment, considerably higher than that reached during 1978-1983 (40 percent). In other words, the expansion of productive capacity in the automotive sector was one of the principal targets of foreign direct investment in Mexico, particularly that by the subsidiaries of the automobile TNCs already operating in Mexico.

This investment in new and expanded productive capacity had immediate ramifications in the export performance of the automotive industry. Table 2 indicates that before 1980 the export performance of the sector was rather dismal. The hopes raised by the improved exports of auto parts and automobiles at the beginning of the 1980s were stymied by the recession linked to the debt crisis which negatively impacted these automotive items during 1981-1982. Never the less, engine exports (from \$200 millions in 1982 to \$1,510 millions in 1990), vehicle exports (from \$140 millions in 1985 to \$3,973 millions in 1992) and even auto parts exports (from \$200 millions to 836 millions) grew appreciably during the 1983-1991 interim. Motor vehicle parts exports to the US via maquiladoras rocketed from the \$100 million to the \$5,758 million level in 1992 (Torres, 1994, table 27; USITC, 1991). Evidently, the export performance of the automotive industry was a significant element in the ability of the Mexican economy to adjust to the external debt crisis during the 1980s.

One of the side effects of the magnificent export performance of the automotive industry was the further concentration of the most dynamic exports of manufactures in the hands of TNCs. Table 3 demonstrates that, even excluding exports by maquiladoras, the share of the total value of exports of manufactures corresponding to foreign firms rose from about half in the early 1980s to two thirds by 1991, representing a value of more than \$10,500 millions.

In the metal mechanical sectors the share of foreign firms rose from the 67-75 percent level to reach 85 percent by 1991. With regard to the transport equipment sector, foreign firms saw their share increase from about 80 percent to almost 100 percent in 1991, representing over \$5,700 millions. More than one-half of all exports of manufactures by foreign firms came from the transport equipment sector alone and these exports were equivalent to two-thirds of all exports of manufactures from the metal mechanical industries and over one-third of those from the manufacturing sector as a whole, up from one-half and 13 percent respectively at the beginning of the 1980s. Thus, the most dynamic elements of the export performance of the Mexican economy during the 1980s and early 90s were those directly related to the transformation of the automobile industry.

2. Changes in the balance of payments situation

The huge deficit generated by the automobile industry has traditionally been the major, or one of the major, elements in the overall trade deficit evident in the Mexican balance of payments and this has been one of the principal points of friction in the relationship between the national government and the automobile producers. The Mexican government exerted increasing pressure on the automobile manufacturers to export more and to increase the local content of their products as a means to lessen the balance of payments burden generated by these companies. One of the consequences of the balance of payments crisis of 1976 in Mexico was the implementation of the automobile sectoral program of the following year which required producers to redress the problem.

Table 2

MEXICO: EXPORT INDEX FOR AUTOMOBILE SECTOR AND DISTRIBUTION BY ITEM, 1960-1991
(percent)

Year	Export index	Vehicles	Engines	Parts	Total
1960	...	-	-	100	100
1965	...	13	-	88	100
1970	1	1	-	99	100
1975	6	5	19	76	100
1980	12	35	9	56	100
1981	11	34	18	48	100
1982	13	18	53	29	100
1983	31	17	64	19	100
1984	46	12	69	19	100
1985	47	10	73	17	100
1986	68	26	56	18	100
1987	100	43	43	14	100
1988	106	47	41	12	100
1989	114	45	39	16	100
1990	144	56	31	13	100
1991	172	66	21	13	100
1992	182	65	21	14	100

Source: Calculated from official information supplied by the National Institute of Statistics, Geography and Informatics (INEGI), the Ministry of Commerce and Industrial Development (SECOFI) and Banco de México (BANXICO).

Table 3

MEXICO: EXPORTS OF GOODS, BY CATEGORY OF FIRM, 1980-1991
(millions of dollars and percentage)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Manufacturing sector	3.0	3.4	3.0	4.6	5.6	5.0	7.2	9.7	11.5	12.6	14.0	16.0
Foreign firms	1.4	1.7	1.5	2.6	3.2	3.0	4.2	5.9	6.9	7.8	9.0	10.5
National firms	1.6	1.7	1.5	2.0	2.4	2.0	3.0	3.8	4.6	4.8	5.0	5.5
Metal-mechanical sector	0.8	0.9	0.9	1.7	2.2	2.1	3.4	4.5	5.2	5.9	7.2	8.7
Foreign firms	0.6	0.6	0.6	1.3	1.6	1.7	2.5	3.6	4.2	4.7	5.9	7.4
National firms	0.2	0.3	0.3	0.4	0.5	0.4	0.9	0.9	1.0	1.2	1.3	1.3
Transport equipment	0.4	0.5	0.5	1.1	1.6	1.6	2.5	3.2	3.5	3.9	4.8	5.8
Foreign firms	0.4	0.3	0.4	1.0	1.3	1.4	2.2	2.8	3.1	3.5	4.5	5.7
National firms	...	0.1	0.1	0.1	0.3	0.2	0.3	0.4	0.4	0.4	0.3	0.1
Manufacturing sector	47	50	50	57	57	60	58	61	60	62	64	66
Foreign firms	53	50	50	43	43	40	42	39	40	38	36	34
National firms	15	67	67	76	73	81	74	80	81	80	82	85
Metal mechanical sector	25	33	33	24	27	19	26	20	19	20	18	15
Transportation equipment	87	74	80	88	83	88	88	89	89	91	93	99
Foreign firms	13	26	20	12	17	12	12	11	11	9	7	1
National firms												
Foreign firms transportation equipment exports as % of:												
- Metalmechanical sector	50	33	44	59	59	67	65	62	60	59	63	66
- Manufacturing sector	13	9	13	22	23	28	31	29	27	28	32	36

Source: Calculated from information provided by the Banco de México (BANXICO).

In response most producers invested in new engine plants aimed at export markets. In Table 4 one can appreciate how exports of engines exploded during the 1980s. The onset of the debt crisis in 1982 produced a new sectoral agreement for the automotive industry the following year, one that facilitated rapid growth in the production and export of passenger cars. The combination of the surges in engine and passenger vehicle exports created a solid surplus for the automotive trade balance, which averaged over \$1,300 millions during 1985-1989. The automobile industry stopped being a major and constant drag on the Mexican balance of payments.

The principal difference between the rapid expansion of engine exports as compared to that of passenger vehicles was that the former produced only a relatively minor and easily sustainable increase in the importation of parts and pieces while the latter provoked an avalanche of imported components, especially after the 1989 automotive program permitted reduced levels of local content for export models. This situation created as of 1990 an escalating new balance of payments deficit on trade account for the automotive industry. If one factors in the positive balance of payments effect of the numerous greenfield investments by auto makers (about \$5,000 millions over the 1980-1992 period) and the value-added stemming from maquiladora activities —parts— directly related to the automotive industry (\$1,000 million in 1990) it is evident that the impact of the automotive industry on the balance of payments was positive and mainly for the right reasons, however, the new deficit should not be underestimated.

3. Improvements in international competitiveness

The concept of international competitiveness consists of a number of elements, among which market penetration, specialization, productivity and quality factors pertain. A study by Casar, on the competitiveness of the Mexican manufacturing industry during 1980 to 1990, found that automobiles and their parts ranked fourth among 43 sectors (two digits) in terms of its revealed comparative advantage and that the improvements registered were a consequence both of productivity rises and reduced real salaries (Casar, 1993; Expansión, 1993a, pp. 80-84).

The Competitive Analysis of Nations (CAN) computer software of ECLAC provides the wherewithal to describe and evaluate the Organization for Economic Co-operation and Development (OECD) import market share which corresponds to Mexican manufacturing (at three digits of the Standard International Trade Classification (SITC)) as well as the dynamic components of the structure of Mexican exports to that market. Table 5 points out that in terms of the OECD market, Mexican exports of manufactures during the 1980-1992 interim rose sharply. The share for internal combustion piston engines (SITC 713) rose from 0.96 percent in 1980 to 5.36 percent in 1992, and that parts and accessories of motor vehicles (SITC 784) increased from 0.85 percent to 3.87 percent over the same period. Passenger motor cars with a market share of 1.0 percent in 1980 increased to 2.28 by 1992 to become one of the 25 Mexican manufactures with the highest OECD market shares.

Table 5 also indicates that products from the automotive industry in 1992 accounted for seventeen percent of all Mexican exports to the OECD, up from only 2.2 percent in 1980. The big gainers were passenger motor cars (SITC 781) which increased from 0.3 to almost 8 percent, parts and accessories of motor vehicles (SITC 784) which grew from 1.3 to 5.4 percent, internal combustion piston engines (SITC 713) which blossomed from 0.6 to 3.0 percent and motor vehicles for the transport of goods and materials (SITC 782) which went from zero to 0.9 percent during 1980-1992. Undoubtedly, Mexico was **specializing** in several areas of the automotive industry. The new plants were designed for 4 and 6 cylinder engines and small and mid-size passenger cars, mostly for export. (Moreno, 1994; Ramírez, 1993, p. 59).

While the depreciation of the real effective exchange rate since 1985 has been an important factor in the improvement of Mexico's international competitiveness until the early 1990s, the new ability to compete internationally in automotive exports had more to do with other factors, such as increased productivity, improved quality, better performances from local suppliers, greater use of maquiladora options, etc., as well as factors related to the auto producers themselves in terms of their corporate strategies or to the national policy dealing with the sector. With regard to productivity and quality de Maria y Campos, citing Krafcik, has demonstrated that the new productive facilities in Mexico have caught up (and in some cases surpassed) the productivity (measured in terms of hours required to assemble a vehicle) and quality (measured with regard to defects per 100 vehicles) benchmarks established by the US auto industry, including the Japanese transplants operating there (de Marfa y Campos, 1992, pp. 131-141). Ford's engine plant at Chihuahua and its vehicle assembly operations at Hermosillo have been extensively examined and now serve as examples of how advanced production processes can be transferred to newly industrializing countries (Shaiken and Herzenberg, 1987, p. 119; Shaiken 1990, pp. 16-17). In particular, the Ford vehicle assembly plant at Hermosillo had a defects per vehicle rating (0.276) well below the weighted average for all Mexican auto producers (0.665) and close to the world optimum suggested by Womack, Jones and Roos (Olea, 1993, p. 355).

The Hermosillo plant was designed primarily by Mazda, a major Japanese auto producer in which Ford has a minority participation, thereby introducing to the Mexican automobile industry many of the modern production and organizational practices of the Japanese automobile industry. The new production facilities of Ford and others have been referred to as world-scale and world class and are increasingly integrated into the North American automotive industry (Holmes, 1993, p. 40). Aside from the significant exports of vehicles and engines, the Mexican automotive industry specializes in a number of auto parts for which the Mexican industry is the principal or second most important foreign supplier for the US automobile industry. That was the case in 1990² for the maquiladoras producing windshield wipers (77.3 percent of US imports of such), insulated ignition wiring sets (73.7%), safety seat belts (64.5%), and seats for motor vehicles (60.8%). Mexican-based companies were the second most important foreign suppliers of mufflers and exhaust pipes (31.3%), steering wheels and columns (22.6%) and radiators for motor vehicles (22.4%). Outside of the maquiladoras the principal foreign supplier for windshields of laminated safety glass (37.9%) was Mexico-based. In 1982, the only item of US automotive imports in which Mexican producers were the principal suppliers were insulated ignition wiring sets and windshields of laminated safety glass. In other words, the 1980s brought significant changes to the Mexican auto parts industry especially in terms of its role as supplier to the US automobile industry.

In sum, a large amount of evidence points toward the conclusion that the Mexican automotive industry was thoroughly transformed during the 1980s. Such evidence covers distinct aspects of the industry, such as the enlargement and modernization of productive capacity, a new export orientation, a healthier balance of payments situation and a vastly improved international competitiveness. Whether this constitutes its conversion from a "sitting duck" status to a "flying goose" one has yet to be determined.

² Figures taken from Berry, Grilli, and López-de-Silanes (1992, tables 6 and 8).

Table 5
MEXICO: OECD MARKET SHARE AND STRUCTURE OF 25 MOST DYNAMIC EXPORTS OF
MANUFACTURES, 1980 AND 1992
(percentages)

	SITC Code	Product Group	OECD Market Share a/ 1980	1992	SITC Code	Product Group	Percentage of total exports b/ 1980	1992
1	773	Equipment for distributing electricity	7.29	20.18	781	Passenger motor cars (not public service vehicles)	0.3	7.8
2	761	Television receivers and related equipment	0.18	12.13	784	Parts and accessories of motor vehicles (SITC 722, 781-3)	1.3	5.4
3	771	Electric power machinery (exc. 716) and parts	4.93	7.65	773	Equipment for distributing electricity	1.1	4.8
4	762	Radio broadcast receivers and related equipment	0.09	7.18	713	Internal combustion piston engines and parts	0.6	3.0
5	532	Dyeing and tanning extracts, synthetic materials	1.11	6.73	761	Television receivers and related equipment	0.4	2.9
6	685	Lead	5.80	6.63	761	Television receivers and related equipment	0.1	4.1
7	713	Internal combustion piston engines and parts	0.96	5.36	772	Electrical apparatus for making/breaking circuits, etc.	1.3	2.7
8	716	Rotating electric plant and parts thereof	2.06	5.14	778	Electrical machinery and apparatus	1.2	2.3
9	772	Electrical apparatus for making/breaking circuits, etc.	2.66	4.54	821	Furniture and parts thereof	0.3	1.9
10	784	Parts and accessories of motor vehicles (SITC 722, 781-3)	0.85	3.87	762	Radio broadcast receivers and related equipment	0.1	1.7
11	612	Manufactures of leather, parts of footwear, etc.	2.38	3.83	752	Automatic data processing machines and units thereof, etc.	0.1	1.5
12	697	Household equipment of base metal, n.e.s.	0.38	3.52	771	Electric power machinery (exc. 716) and parts	0.6	1.3
13	778	Electrical machinery and apparatus	2.00	3.49	776	Thermionic, cold cathode and photocathode valves, semiconductors, etc.	1.0	1.2

Table 5 (concl.)

	SITC Code	Product Group	OECD Market Share a/ 1980	1992	SITC Code	Product Group	Percentage of total exports b/ 1980	1992
14	872	Medical instruments and appliances, n.e.s.	0.33	3.32	775	Household type electrical and non- electrical equipment	0.2	1.1
15	686	Zinc	1.90	3.29	874	Measuring, checking, analyzing and controlling instruments	0.5	1.1
16	821	Furniture and its parts	0.63	3.23	843	Outer garments, women's, girl's and infant's, of textile fiber	0.4	1.1
17	513	Carboxylic acids and their derivatives	0.25	3.17	716	Rotating electric plant and parts thereof	0.4	1.1
18	665	Glassware	0.75	3.12	759	Parts and accessories for office machines and computers	0.5	1.0
19	658	Made-up articles, chiefly of textile materials, n.e.s.	0.60	3.05	782	Motor vehicles for the transport of goods or materials	0.0	0.9
20	763	Sound and video recording equipment	0.44	3.02	699	Manufactures of base metals, n.e.s.	0.4	1.9
21	775	Household type electrical and non- electrical equipment	0.52	2.77	894	Sporting goods, games, toys and baby carriages	0.4	0.8
22	664	Glass	0.38	2.49	763	Sound and video recording equipment	0.1	0.8
23	812	Sanitary, plumbing, heating and lighting fixtures and fittings	1.13	2.48	741	Heating and cooling equipment and parts thereof	0.1	0.8
24	741	Heating and cooling equipment and parts thereof	0.19	2.42	842	Outer garments, mens and boys, of textile fabrics	0.4	0.7
25	781	Passenger motor cars (not public service vehicles)	0.10	2.28	872	Medical instruments and appliances, n.e.s.	0.0	0.7
		Average 25 products	0.88	3.94		TOTAL	11.3	47.7

Source: ECLAC, "Competitive Analysis of Nations (CAN)" software, version 2.0.

a/ Ranked by share of OECD imports of each product group for products whose share increased over 1980-1992 period.

b/ Ranked by contribution to Mexican total exports for products whose contribution to total exports increased over 1980-1992 period.

II. EXPLANATIONS OF THE OBSERVED TRANSFORMATION

A large number of factors underlie the major changes taking place in the Mexican automotive industry. The most important of such can be grouped into three principal categories which serve to best explain the phenomenon under examination. They are international automobile market factors, the corporate strategies of the major auto makers, and national automotive policy.

1. International automobile market factors

The automobile industry is undergoing a global shake-up. To better understand the current shake-up at the global level it is advisable to refer very briefly to one of the major transformations which have rocked the industry during the last two decades, that is, the Japanese challenge.

The effect of the Japanese challenge was to advance the internationalization of the automobile industry. Measured in terms of overall imports of the OECD, the automotive industry's share rose from 4.1 to 9.6 percent between 1963 and 1992, the single largest share of any industry. Trade in passenger cars alone grew from 2.1 to 6.1 percent of total imports over the same period. Table 6 presents relevant information on the OECD market shares for traded automotive goods, by region and country, during 1963-1992. Although these figures do not distinguish inter-regional trade within the OECD, they do provide an interesting overview in terms of the principal "winners" in automotive industry trade during this period of rapid expansion of trade in that industry. A first observation is that the steep increase in Japan's share of this trade during the 1963-1980 period coincided with a sharp decline in Europe's share (particularly that of Germany and United Kingdom) and North America (the increase during 1963-1971 relates to US-Canadian trade resulting from the Auto Pact of 1964). The 1980s and early 1990s witnessed a less rapid increase in Japan's share coupled with continued decline in North America (the United States) and Europe (excepting Germany and Spain) and the appearance of "Others" (in particular, Mexico and South Korea).

The globalization process in the automotive industry generated powerful forces in favor of increased competition and created the need for specialization and restructuring on the part of the other major auto makers due to the increasing **overcapacity** evident in the industry. Some industry analysts foresee a kind of "car wars" scenario for the next century (Keller, 1993). By 1985 annual world motor vehicle production had reached about 45 million units distributed relatively evenly among North America, Europe and Japan with 30 percent each. The major distinction among these regional producers was the destination of their production: over 30 percent of Japanese production and about 15 percent of European automobile production took the form of extra-regional exports. Furthermore, attempts at detaining the Japanese onslaught through quotas and other trade restrictions resulted in Japanese foreign direct investment in new production facilities, mainly in North America but also in Europe, which only worsened the situation for national auto makers there.

One inference that can be made from this glance at the Japanese challenge in the automobile sector is that the stakes are now extremely high. Strategic mistakes by individual national-based automobile manufacturers can be fatal. Individual governments no longer possess the financial capacity to orchestrate grandiose rescues of national champions, as happened in the 1970s and 1980s. The policy quandary facing the industrial countries' governments, that are for the most part the most ardent defenders of liberal market policies, is to allow or not adjustment to take place solely via head-to-head price competition which, undoubtedly, would leave Japanese producers with huge market shares (OECD, 1988, pp. 50 and 61). It is in this political economy context that one must interpret the essentially technical nature of the Japanese challenge to the existing industrial order as manifest in their increased competitiveness within the automotive industry.

Table 6

OECD MARKET SHARES IN TRADED AUTOMOTIVE GOODS,^{a/}
1963-1992
(percent)

Source Country	1963	1971	1980	1990	1992
Japan	0.6	7.8	19.3	21.9	21.7
North America	23.0	37.5	23.3	19.7	19.8
United States	21.4	19.0	14.9	10.0	9.9
Canada	1.6	18.5	8.4	9.7	9.9
Europe	74.6	53.1	51.5	51.8	51.3
Germany	32.3	22.1	22.9	22.2	24.4
France	9.6	8.9	10.3	8.3	7.8
Belg/Lux.	3.9	6.1	5.7	5.1	4.0
United Kingdom	18.4	7.0	3.2	3.8	3.7
Italy	6.1	5.0	4.4	3.8	3.0
Spain	0.1	0.4	1.5	3.8	4.3
Sweden	3.0	2.6	1.8	2.6	2.5
Netherlands	1.0	0.8	0.9	1.4	1.3
Austria	0.2	0.2	0.8	0.8	0.3
Others	1.8	1.6	5.9	6.6	7.2
Mexico	0.0	0.2	0.4	2.3	3.0
South Korea	0.0	0.0	...	0.9	0.9
Brazil	0.6	0.6	0.4
All others ^{b/}	1.8	1.4	4.9	2.8	2.9
Total	100.0	100.0	100.0	100.0	100.0

Source: ECLAC, "Competitive Analysis of Nations (CAN)" software, versions 1.1 and 2.0.

^{a/} Defined as SITC 713, 781 and 784, that is engines, passenger vehicles and auto parts.

^{b/} Countries which possessed less than 0.4% of market in 1992.

Table 7 offers several indicators of that competitive advantage by comparing Japanese automobile production in Japan to Japanese production located in the United States, to American production in the US and to European producers. The principal advantages are found in reduced stocks, greater productivity, more teamwork, lower worker absenteeism, fewer assembly defects and more automation. It might be noted in passing that the Japanese had demonstrated that their "system" was for the most part transferable as can be seen by the indicators for the Japanese production in the US, where \$19 billion investments produced a very competitive 2 million car per year capacity (even considering that it carried a 60 percent level of local content) (Adams and others, 1991, p. 468). Also noteworthy is the fact that the European producers trailed even the US producers by a significant margin indicating perhaps that industrial restructuring by the US auto transnational corporations (TNCs) had produced some positive results for them relative to European competitors. Other important advantages which have been ascribed to the Japanese producers is their "frankly superior" style of corporate management³ and, until recently, their financial depth to continue the TNC combat in the global auto market, particularly by relying on their solid profit center in Asia.⁴ The central point, none the less, is that the Japanese auto producers were victorious, more than elsewhere, **on the factory floor.**

Table 7
INDICATORS OF THE COMPETITIVE ADVANTAGE OF JAPANESE
AUTOMOBILE PRODUCERS, 1989 a/

	Japanese in Japan	Japanese in America	Americans in America	European producers
Productivity (hours per vehicle)	16.8	21.2	25.1	36.2
Assembly defects per 100 vehicles	60.0	65.0	82.0	97.0
Repair area (% of assembly space)	4.1	4.9	12.9	14.4
Stock (days) <u>b/</u>	0.2	1.6	2.9	2.0
Work-force in a team (%)	69.3	71.3	17.3	0.6
Number of job classifications	12	9	67	15
Training of new workers (hours)	380	370	46	173
Absenteeism (%)	5.0	4.8	11.7	12.1
<u>% of process automated:</u>				
Welding	86.2	85.0	76.2	76.6
Painting	54.6	40.7	33.6	38.2
Assembly	1.7	1.1	1.2	3.1

Source: The Economist, 10 August 1991, p. 63, on the basis of Massachusetts Institute of Technology (MIT) and J.D. Power & Associates.

a/ Averages for plants in each regions, 1989.

b/ For eight sample parts.

³ According to Shintaro Ishihara, joint author with Akio Morita of "The Japan That Can Say No", The Economist, 1991a, p. 26.

⁴ Urata demonstrates that the Japanese share of national automobile markets in Australia, New Zealand and Philippines is superior to 50 percent and it surpasses 80 percent in fast-growing Hong Kong, Singapore, Thailand, Malaysia and Indonesia (Urata, 1988 p. 21).

The situation in the US automotive market, a result of the Japanese challenge, explains a significant part of the new found interest in Mexico on the part of Big Three US auto manufacturers. Over the 1960-1990 period these major automobile producers saw their participation in the US market for passenger cars and trucks nosedive from 95 to 64 percent of total sales as foreign motor vehicles penetrated the market; some minor improvements were registered in 1993. Figure 1 aids in comprehending the situation in the US market. In the context of the so-called "voluntary" export restraints of Japanese producers, in which the level of Japanese vehicles imported into the US was maintained in the order of 2 million units (although average unit value rose appreciably as luxury models increased as a proportion of all Japanese automobile imports), there was a sharp increase in the number of vehicles assembled by Japanese companies in the US (commonly referred to as "transplants" in the US). In a declining market, market share gains by Japanese transplants were primarily made at the expense of the US Big Three producers (Volkswagen also closed its US assembly operations in the late 1980s) (*Fortune*, 1993a, pp. 65-66). In other words, US motor vehicle producers were in a bind.

While there were no Japanese assembly plants in North America in 1980, by 1993 nine Japanese-operated assembly plants in the US and three in Canada produced 1.5 million passenger cars, the equivalent of 26 percent of total passenger vehicle production in North America, as Table 8 indicates.⁵ In just six years the Big Three US car manufacturers decreased their production of passenger cars by over 1.1 million units while foreign-owned or operated (read Japanese-owned or operated as of 1990) doubled to 1 million units, leaving the "transplant" facilities with one quarter of production in 1993 and the US Big Three with huge operating losses, share price declines and work force reductions.⁶ In effect, the North American passenger car industry was being restructured by the principal Japanese manufacturers,⁷ as Womack has feared. Writing in 1987, he stated that:

"Although the prospect of a Japanese-dominated North American motor industry is startling, it should be clear that it is a real possibility within the next twenty years. Four Japanese-owned or managed assembly plants are now operating in the United States and Canada, and six more are under construction. More than two million units of Japanese assembly capacity will therefore be in place in North America by 1990, at a direct investment cost exceeding \$5 billion. The scale of this enterprise comes into focus when one realizes that, in less than eight years, a new Japanese-US motor industry will have emerged with nearly four times the assembly capacity of the entire Mexican motor vehicle sector." (Womack, 1987, pp. 106-107).

⁵ According to *Ward's Automotive Yearbook*, 1994 and Miller and Winter (Inkpen, 1993, p. 135).

⁶ General Motors had the hardest time during 1991-3 when it lost \$13 billions on its North American operations, it saw its share price bottom out at \$29 dollars (down from a high of \$94 in 1987, according to *Moodys Industrial Manual*, 1990) and cut its work force by 18 percent to 250,000. On top of this, it was obliged to recognize that its company pension was under funded in the order of \$14 billions. (*Fortune*, 1993b and 1993c; *Business Week*, 1993a; *The Economist*, 1993a).

⁷ One might note in passing that, aside from the well-known unfavorable welfare effects for US consumers, one of the principal effects on promoting "voluntary" export restraints on the part of Japanese auto exporters to the US was the sharp increase in their profits and, concomitantly, an improved financial situation (Ries, 1993).

The example chosen provides an excellent point of reference. The truth of the matter is that the Japanese challenge, once it arrived to the North American doorstep, provoked a reaction on the part of US and other producers. One aspect of the reaction of these producers involved Mexico as an element of their international production facilities, in terms of both production and sales. In terms of production because US producers attempted to take advantage of Mexico's geographic proximity and the 40 percent decline in real wage rates during the 1980s to compete better in the US market by way of cheaper production in and sourcing from Mexico.⁸ This held true for both vehicle manufacture in new plants⁹ as well as auto part assembly by way of maquiladoras.¹⁰ In terms of sales, it was the promise of a huge Mexican domestic market in the early 1980s which had induced the auto TNCs to begin engine production for export and it was the desire to maintain a strong participation in that market,¹¹ which recuperated in the late 1980s,¹² which helped justify increased investment there, especially in the context of the privileged access promised by the NAFTA negotiations.¹³ These considerations on the international automobile market clarify the interest of the Big Three US automobile manufacturers in transforming their production and sales operations in Mexico.

⁸ Some sources maintain that Mexico's competitive advantage is so strong that US auto producers will shift their Asian plants to Mexico. (Expansión, 1991a, pp. 46-47; The New York Times, 1993).

⁹ USITC data indicates that US automobile imports from Mexico jumped from 42,000 to 216,000 over the 1986-90 period, raising Mexico's share from 3.6 to 15 percent, and placing Mexico ahead of Korea. Another source expects Mexican annual vehicle production to reach 2.2 million by the year 2000, half of which will be exported (The Economist, 1993b, p. 70).

¹⁰ Olga Torres (1994) pointed out that autopart exports from Mexican maquiladoras reached \$5,758 million in 1993 producing Mexican value added in the order of \$1,000 million.

¹¹ The US Big Three auto producers expect to raise their vehicle exports to Mexico from 7,700 in 1993 to 60,000 in 1994. (Business Week, 1993b, p. 40). This places Mexico in the position of a 'residual destination' for their excess capacity for larger vehicles in the US, according to Olea (1993, p. 366).

¹² The US Government thinks that the Mexican market for passenger vehicles may equal that of Canada by the year 2000 (Business America, 1993, p. 10).

¹³ Refer to S. Reich's argument of how NAFTA 'stacks the deck' in favor of US auto producers (Reich, 1993, pp. 84 and 88).

Figure -1—U.S. Production and Sales of Passenger Cars and Trucks

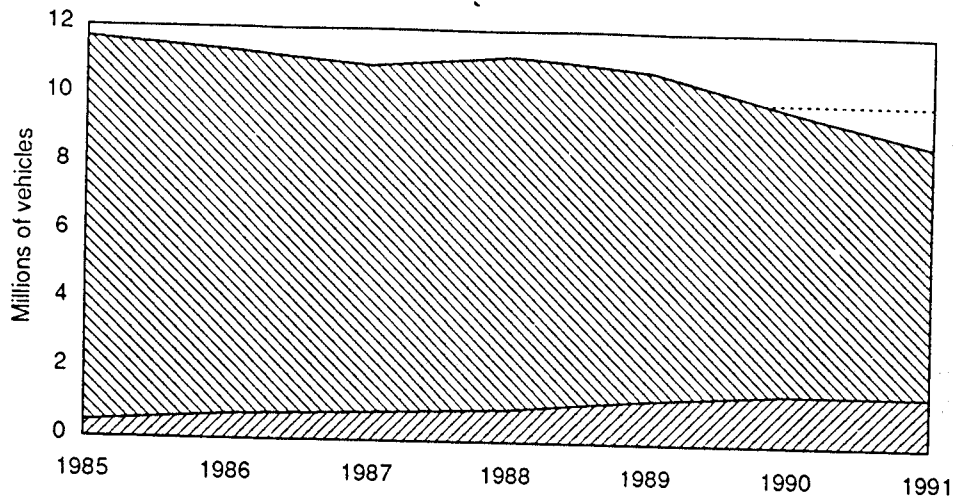


Figure -1(a)—Production

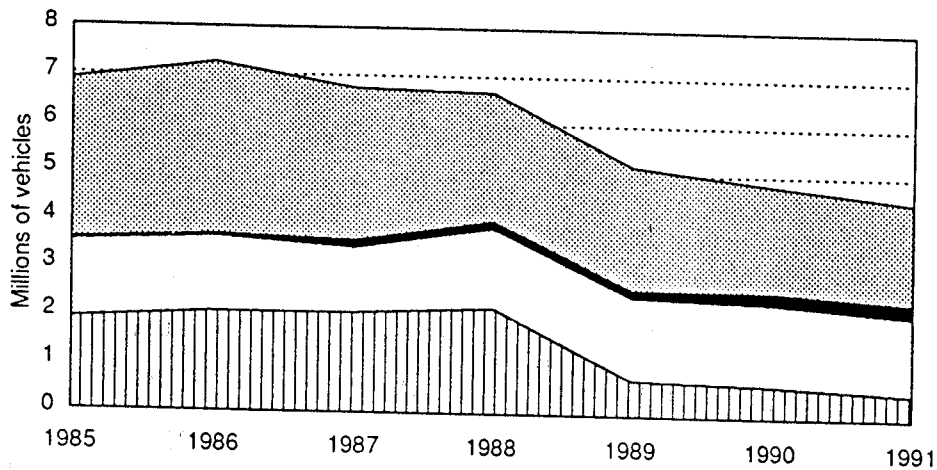


Figure -1(b)—Imports

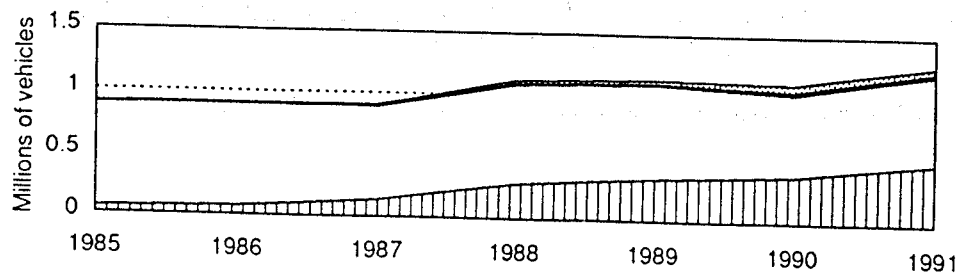


Figure -1(c)—Exports

Table 8

U.S. AUTO PRODUCTION, BY COMPANY, 1987, 1990 AND 1993
(in thousands of passenger cars)

Company	1987	1990	1993
U.S. owned:			
General Motors	3 603	2 653	2 458
Ford	1 830	1 377	1 490
Chrysler	1 109	726	495
Foreign-owned/operated:			
Volkswagen	65	0	0
Honda	324	435	404
NUMMI	44	204	207
Nissan	117	95	293
Toyota	0	211	234
Mazda	4	184	219
Subaru-Isuzu	0	32	47
Diamond Star	0	148	136
Total, all producers:	6 097	6 069	5 983
U.S. owned	5 543	4 757	4 443
Foreign	554	1 312	1 540
Foreign share (percent)	7.8	21.6	25.7

Source: Ward's Automotive Yearbook 1994 and Ward's Automotive Reports, D. Datton, "Foreign Direct Investment in the U.S. Automotive Industry", Foreign Direct Investment in the United States, Department of Commerce, Washington D.C., August, 1991, p. 55.

Note: NUMMI is a GM-Toyota joint venture. Diamond Star is a Chrysler-Mitsubishi joint venture.

2. Corporate strategies of the major auto TNCs

The dynamics of the international auto market led TNCs to seek low cost production bases in developing countries for the new market in smaller engines and front wheel drive vehicles. This took place in the context of a tendency among the major auto TNCs to reduce the number of suppliers by contracting complete systems rather than many separate components (López-de-Silanes, 1992, pp. 89 and 112). This held powerful consequences for the Mexican automobile industry in terms of its new specialization (entry-level passenger cars) within the international auto industry. In this section, the emphasis will be placed on the sales —domestic and export— of the major auto TNCs operating in Mexico.

As can be appreciated in Figure 2, the Mexican automobile industry for passenger cars has experienced a revolution of sorts in the last 15 years. It is possible to distinguish three clear phases during the period: the 1978-1982 interim which consisted of a closed market which initially showed much promise but entered into decline due to the unfavorable impact of the debt crisis; the 1983-1987 phase of virtual collapse in which the only positive feature was the initiation of a serious export activity; and, the 1988-1992 period of accelerated recovery of domestic sales coupled with an explosion of exports. The Mexican automobile industry was transformed from a small, closed one into a larger and increasingly international one.

Another way to view the internationalization of the Mexican automobile industry is in terms of the importance of export sales during the mentioned phases of the 1978-1992 period. One can distinguish three separate orientations: the domestic market alone, mainly the domestic market, and mainly the export market. The information contained in Table 9 indicates with clarity that the major changes in passenger car sales concern the sharp decline from 49.7 to 12.3 percent of models aimed exclusively at the national market and the sharp rise from 0.4 to 34.4 percent of models destined primarily at export markets.

Tables 10 and 11 provide an overview of the export performance and external orientation of the major auto TNCs operating in Mexico. Export sales increased by a factor of 4 from a low base in the 1978-1982 period to the 1983-1987 one, then they increased again by another factor of 4 by the 1988-1992 period, reaching the 350,000 unit level by 1992. During 1993, exports sales (425 thousand units) surpassed domestic sales (399 thousand units). The export propensity of the industry rose from 5 percent in 1978-1982 to 22.6 percent in 1983-1987 increasing to 42 percent in the 1988-1992 interim, before reaching 51.6 percent in 1993. The export performance and external orientation varied considerably according to the manufacturers. The US Big Three (Ford, General Motors and Chrysler) exported considerably more vehicles than the non-US manufacturers (Volkswagen and Nissan) and the US Big Three had much higher export propensities.

The US Big Three accounted for almost 80 percent of the total exports of passenger cars by the Mexican auto industry. During the 1988-1993 period, Ford alone accounted for over one-third of total exports of passenger cars, while General Motors and Chrysler exported a little over twenty percent each. The stratification of the industry in terms of its external orientation is captured by the export propensities of the major producers. Ford and General Motors are in the upper category with export propensities of over 60 percent. Chrysler alone is found in the second category with an export propensity of 46.7 percent. The non-US producers represent the third or lower category with export propensities in the order of 20 percent.

Figure 2

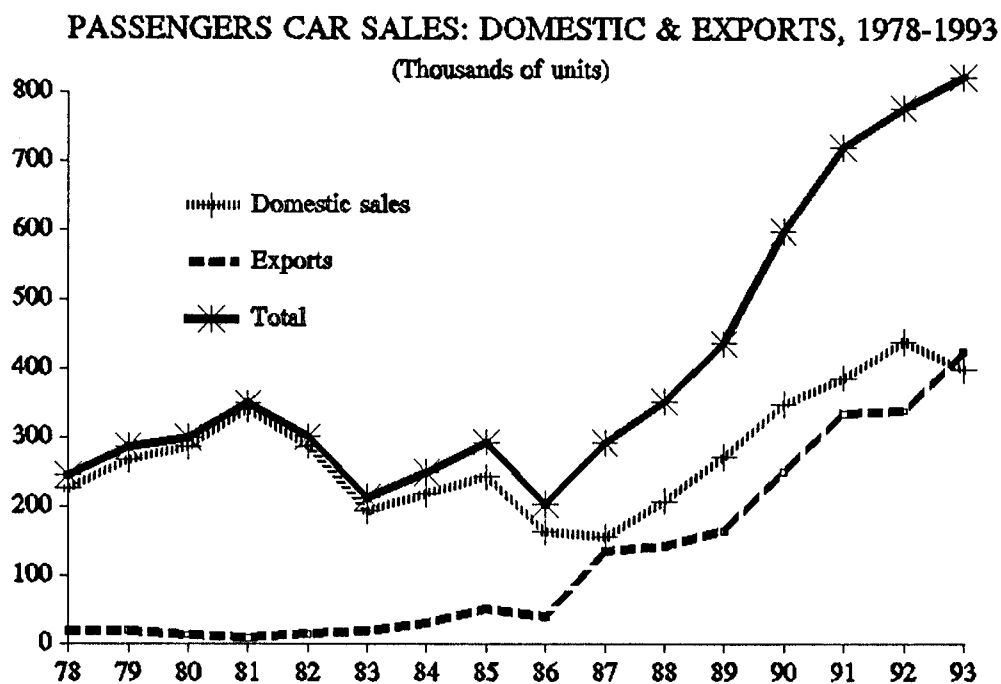


Table 9

**MEXICO: PASSENGER CAR SALES, BY PRINCIPAL MARKET,
ANNUAL AVERAGES BY PERIOD, 1978-1992**

Units	1978-82	1983-87	1988-92
National market <u>a/</u>	147.1	78.3	70.8
Dual market <u>b/</u>	138.6	116.9	307.5
Export market <u>c/</u>	10.5	54.5	199.0
TOTAL	296.1	249.7	577.4
<u>Percent</u>			
National market <u>a/</u>	49.7	31.4	12.3
Dual market <u>b/</u>	46.8	46.8	53.3
Export market <u>c/</u>	0.4	21.8	34.4
TOTAL	100.0	100.0	100.0

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

a/ Sales in domestic market only.

b/ More than 50% of sales in domestic market less than 50% of sales in export markets.

c/ More than 50% of sales in export markets.

Table 10
 MEXICO: PASSENGER CAR SALES IN EXPORT MARKETS,
 ANNUAL AVERAGES, BY PERIOD, 1978-1993
 (thousands of units and percent)

Units	1978-82	1983-87	1988-92	1993
Ford	-	10.4	87.3	117.2
General Motors	-	17.7	52.6	90.7
Chrysler	...	15.8	53.7	101.7
Volkswagen	14.7	8.3	30.4	77.5
Nissan	...	4.2	18.4	32.4
TOTAL	14.8	56.4	242.4	424.5
<u>Percent</u>				
Ford	-	18.4	36.0	27.6
General Motors	-	31.4	21.7	21.4
Chrysler	...	28.0	22.2	24.0
Volkswagen	99.0	14.7	12.5	18.2
Nissan	...	7.4	7.6	8.8
TOTAL	100.0	100.0	100.0	100.0

Source: ECLAC on the basis of data provided by the Mexican Automobile Industry Association (AMIA).

Table 11
 MEXICO: EXPORT PROPENSITIES OF PASSENGER CAR MANUFACTURERS,
 BY PERIOD, 1978-1993

	1978-82	1983-87	1988-92	1993
Ford	-	28.8	62.9	68.9
General Motors	-	53.3	61.5	63.9
Chrysler	0.2	35.2	46.7	63.1
Volkswagen	13.4	11.4	21.5	33.8
Nissan	-	8.4	19.0	31.0
TOTAL	5.0	22.6	42.0	51.6

Source: ECLAC on the basis of data provided by the Mexican Automobile Industry Association (AMIA).

Before examining the particular situation of each manufacturer in terms of its corporate strategy for the Mexican industry, particularly in terms of export performance, it makes sense to refer briefly to the situation in the national market. Table 12 provides the necessary information. Looked at from the perspective of the three periods of analysis, it is apparent that there has been considerable stability in the passenger car market shares of the major producers in the national market, in spite of the collapse of the market during 1983-1987. Aside from the fact that two producers (manufacturers of Renault and American Motors vehicles) decided to exit the market during the crisis, the only major change was Nissan's constant increase in market share from 14 to 24 percent during the mid-1980s. Smaller gains were registered by the other producers, except Volkswagen the dominant producer which maintained its one-third of the domestic market in good times and bad. Thus, the domestic market shares for passenger cars suggest a stratification which is the reverse of that of export performance, that is, the major exporters (Ford and General Motors) are at the bottom of the domestic market share league, with Chrysler in the middle and the non-US producers accounting for more than one-half of domestic passenger car sales.

Table 12
MEXICO: PASSENGER CAR SALES IN DOMESTIC MARKETS
ANNUAL AVERAGES, BY PERIOD, 1978-1993 a/

Units	1978-1982	1983-1987	1988-1992	1993
Volkswagen	93.0	64.5	111.3	151.7
Nissan	39.0	45.9	78.0	83.4
Chrysler	49.7	29.1	61.3	59.6
Ford	39.6	25.7	51.4	52.8
General Motors	23.0	15.5	32.9	51.2
Others <u>b/</u>	37.2	12.6	-	-
TOTAL	281.3	193.3	334.9	398.7
<u>Percent</u>				
Volkswagen	33.1	33.4	33.2	38.0
Nissan	13.9	23.7	23.3	20.9
Chrysler	17.7	15.1	18.3	14.9
Ford	14.1	13.3	15.3	13.2
General Motors	8.2	8.0	9.8	12.8
Others <u>b/</u>	23.2	6.5	-	-
TOTAL	100.0	100.0	100.0	100.0

Source: ECLAC on the basis of data provided by the Mexican Automobile Industry Association (AMIA).

a/ Imported vehicles which reached a high of only 6 000 units in 1992, are not included.

b/ Diesel Nacional S.A. (Renault) and Vehículos Automotores Mexicanos S.A. (American Motors).

One principal factor which accounts in large part for the dominance of the domestic market by non-US producers is the structure of the market and the nature of domestic demand. Subcompact or "popular" models have traditionally accounted for about 60 percent of total domestic passenger car sales and Volkswagen (the Beetle, Golf and Jetta models) and Nissan (the Tsuru model) are the only producers of such. The US Big Three dominate the other segments of the Mexican auto industry (mainly compacts, but also sports and luxury models), and they are the smaller (but faster growing) parts of the market as measured by units sold. The compact model market segment increased from 20 percent in 1983 to 33.9 percent in 1993 (AMIA, 1994, p. 9). The fact that subcompact models faced a much higher level of demand in Mexico during the period following the debt crisis than did compact models, and that non-US producers are the only manufacturers of subcompacts, explains why the US Big Three have the short end of the domestic market for passenger cars. The modernization and specialization of the Mexican auto industry is more directly related to the production for export as is evident by way of the analysis of the corporate strategies of the principal manufacturers.

Ford Motor Company has done the most to integrate its operations in Mexico into its international production system. Like other North American producers of passenger cars, Ford had been losing competitiveness in the US market itself. Its strategy seemed to have relied more on forming strategic alliances with or taking minority capital participations in rivals possessing superior technology or organizational practices, such as was the case with Mazda in which Ford holds 25 percent of Mazda (Japan) and 50 percent of Mazda (US). Mazda was important in Ford's attempt to put together a "world car" based on the Escort model. In fact, developing new models at reasonable cost¹⁴ has been described as Ford's biggest headache (Business Week, 1993c, p. 67). Ford's new investments in Mexico, almost \$3 billion during 1982-1992 (Scheinman, 1993, p. 347) were aimed at improving its competitive position in the US and world markets.

Ford's original production facilities based in Cuautitlan, close to Mexico City, were established in the 1960s to assemble cars and trucks for the domestic market. They have been described by Automotive Industries as "horribly inefficient" (Expansión, 1993b, p. 53). With an annual capacity of 60,000 units, the Ghia, Topaz, Cougar and Thunderbird passenger car models were assembled.

Ford's new strategy began in 1983 when it established the Chihuahua engine plant with an annual capacity of 200,000 units for export to US factories for the production of the Topaz and Tempo models. It has been described as "a high-volume, export-oriented facility meant to compete with the most successful engine plants anywhere in the world" (Shaiken and Herzenberg, 1987, p. 2) which demonstrated that "advanced production processes can successfully be transferred to newly industrializing countries" (Shaiken and Herzenberg, 1987, p. 119). During 1992-1993, it was expanded to an annual capacity of 500,000 units in part to supply the new Mondeo model being assembled in various parts of the world with the new high-tech Zeta engine.

The next major new investment was the Mazda-designed Hermosillo assembly plant for Mercury Tracers established in 1986 and expanded in 1990 to include the Escort model and raise annual capacity to 160,000 units. This plant was designed to achieve world-class quality and productivity, aiming to match or exceed its best international rivals in these critical areas and, presently, it produces the highest quality Ford car in all of North America (Shaiken, 1990, pp. 24 and xi; and 1991). The rest of the Ford facilities in Mexico consist of 11 in-bond or maquiladora operations mostly in Ciudad Juárez, Chihuahua, and three auto part joint ventures for the manufacture of windshields, aluminum cylinder blocks and plastic parts.

¹⁴ The new world car, the recently unveiled Mondeo model, cost Ford \$6 billion to develop and apparently it will do well to break even in the US market (Fortune, 1993d, p. 76; The Economist, 1994a).

Table 13 provides statistical information on sales of passenger cars in and export from Mexico, according to model. As can be readily appreciated, Ford sold locally-assembled models, such as the Fairmont, the LTD/Gran Marquis and the Mustang, during the 1978-1982 period. These models were replaced in the 1983-1987 period, first, by the Topaz, later by the Cougar and Thunderbird models, all still produced in the aging Cuautitlan plant. Aside from the Fairmont in 1978 and 1981 and the Topaz in 1985, the annual sales of any individual model did not exceed 20,000 units and no exports were recorded until the Tracer model came on stream in the new Hermosillo plant in 1987. The 1988-1992 period witnessed the explosion of Tracer and Escort exports, both of which averaged more than 50,000 units a year. Although the Taurus and Ghia models began production for domestic sales during this period and an updated version of the LTD/Gran Marquis was reintroduced, the export operations of the Tracer and Escort became the dominant aspect of Ford's Mexican production facilities for passenger cars. That situation continued in 1993 although total sales fell off. In 1992, Ford (Mexico) had sales in the order of \$3.3 billion and exports estimated at \$1.5 billion (up from \$143 millions in 1985 and only \$20 millions in 1980).

In sum, changes in Ford's corporate strategy during the 1980s carried significant impact for Mexico. The centerpiece of the new strategy was to specialize in one engine (the modern Zeta one) and two passenger vehicles (the Mercury Tracer and Ford Escort), all for export. The strategy clearly did not originally entail modernizing and making internationally competitive the existing Cuautitlan plant, the production of which was destined only to the domestic market.¹⁵ Rather, the strategy was based on new and high-tech engine and vehicle assembly facilities, the production of which was destined primarily to the highly competitive US market. In this way and based on investment in the order of \$3 billion, Ford Motor Company successfully integrated its new facilities in Mexico into its North American and international production system.¹⁶

General Motors followed a somewhat similar corporate strategy as did Ford for its Mexican operations in the sense that exports of passenger cars became a principal activity; however, GM's strategy was murkier and relied much more on cheap labor than world class technology than did Ford in order to do so. To appreciate the corporate context of the Mexican strategy, it is necessary to take into account that GM, once considered the flagship of US TNCs, had become "a paradigm of America's failure to compete with the Japanese" (*Time*, 1990, p. 36). General Motors, considered "one of the most intransigent companies in America" (*Business Week*, 1993d, p. 126) had become over-extended with 7 car and truck divisions, 19 body types and 65 different models, (*Fortune*, 1992, pp. 94-95) and no amount of financial shenanigans (*Institutional Investor*, 1991, pp. 202-206) allowed it to avoid seriously initiating the restructuring or rationalization of its operations, which by early 1992 consisted in the programmed closure of 21 plants and the elimination of 74 thousand jobs (*The Economist*, 1992a, pp. 76-77 and 1992b, pp. 79-80). Of all US auto TNCs, by the early 1990s GM was in the worst shape and most in need of a thorough restructuring.¹⁷ Its US passenger car market share had collapsed from almost 50 in 1978 to only 31 percent in 1993 in good part due to a lack of new models to offer (*Business Week*, 1994c, p. 71).

¹⁵ Currently, the low volume production of larger models is being shifted back to the United States and consideration is being given to the introduction of a modern subcompact model based on the European Fiesta in order to compete with Volkswagen and Nissan in that market segment (*Business Week*, 1994a, p. 50; *Expansión*, 1993b, p. 53; and 1994, p. 18).

¹⁶ It might be mentioned that the Hermosillo plant reports directly to the Detroit offices not the Mexico City office of Ford Motor Company, even though it formally corresponds to the Mexican subsidiary (Shaiken, 1990, p. 21, note 59).

¹⁷ GM accounted for most of the passenger car overcapacity in the US at the beginning of 1994 (*Business Week*, 1994b, p. 71).

Table 13

FORD MOTOR CO: PASSENGER CAR SALES IN MEXICO AND EXPORTS
FROM MEXICO, 1978-1993
(units)

Category/Model		1978	1979	1980	1981	1982	Total
<u>1. National models:</u>	<u>Total</u>	<u>333 404</u>	<u>35 899</u>	<u>38 533</u>	<u>53 365</u>	<u>3 667</u>	<u>197 868</u>
Fairmont		21 797	16 848	17 919	27 821	16 107	100 492
LTD/Gran Marquis		8 249	11 686	10 750	15 130	13 355	59 170
Mustang		3 358	7 365	9 864	10 414	7 205	38 206
<u>2. Dual models:</u>		-	-	-	-	-	-
<u>3. Export models:</u>	<u>Total</u>	-	-	-	-	-	-
	Mexico	-	-	-	-	-	-
	Exports	-	-	-	-	-	-
<u>FORD MOTOR CO.</u>	<u>Total</u>	<u>33 404</u>	<u>35 899</u>	<u>38 533</u>	<u>53 365</u>	<u>36 667</u>	<u>197 868</u>
	Mexico	33 404	35 899	38 533	53 365	36 667	197 868
	Exports	-	-	-	-	-	-

Category/Model		1983	1984	1985	1986	1987	Total
<u>1. National models:</u>	<u>Total</u>	<u>27 553</u>	<u>26 861</u>	<u>38 129</u>	<u>19 516</u>	<u>16 524</u>	<u>128 583</u>
Fairmont		10 123	-	-	-	-	10 123
LTD/Gran Marquis		9 483	4 666	-	-	-	14 149
Mustang		6 720	5 196	-	-	-	11 916
Topaz		1 227	15 842	23 001	13 177	10 589	63 836
Cougar		-	844	9 134	4 202	3 954	18 134
Thunderbird		-	313	5 994	2 137	1 981	10 425
<u>2. Dual models:</u>		-	-	-	-	-	-
<u>3. Export models:</u>	<u>Total</u>	-	-	-	-	<u>51 773</u>	<u>51 773</u>
	Mexico	-	-	-	-	-	-
	Exports	-	-	-	-	51 773	51 773
Tracer	Exp/total	-	-	-	-	51 773	51 773
<u>FORD MOTOR CO.</u>	<u>Total</u>	<u>27 553</u>	<u>26 861</u>	<u>38 129</u>	<u>19 516</u>	<u>68 297</u>	<u>180 356</u>
	Mexico	27 553	26 861	38 129	19 516	16 524	128 583
	Exports	-	-	-	-	51 773	51 773

Table 13 (concl.)

Category/Model		1988	1989	1990	1991	1992	Total
<u>1. National models:</u>	<u>Total</u>	<u>32 001</u>	<u>47 801</u>	<u>51 412</u>	<u>55 545</u>	<u>68 020</u>	<u>254 779</u>
LTD/Gran Marquis		-	-	-	2 738	15 290	18 028
Topaz		19 116	33 714	31 885	25 261	29 862	139 838
Cougar		2 961	1 419	6 553	7 030	4 788	22 751
Thunderbird		3 069	3 656	5 431	3 859	3 680	19 695
Taurus		6 855	9 012	4 073	3 004	-	22 944
Ghia		-	-	3 470	13 653	14 400	31 523
<u>2. Dual models:</u>		-	-	-	-	-	-
<u>3. Export models:</u>	<u>Total</u>	<u>66 361</u>	<u>39 580</u>	<u>88 604</u>	<u>111 983</u>	<u>132 139</u>	<u>438 667</u>
	Mexico	-	-	-	-	-	-
	Exports	66 361	39 580	88 604	111 983	132 139	438 667
Tracer	Exp/total	66 361	39 580	47 702	71 884	53 712	279 239
Escort	Exp/total	-	-	40 902	40 099	78 427	159 428
<u>FORD MOTOR CO.</u>	<u>Total</u>	<u>98 362</u>	<u>87 381</u>	<u>140 016</u>	<u>167 528</u>	<u>200 159</u>	<u>693 446</u>
	Mexico	32 001	47 801	51 412	55 545	68 020	254 779
	Exports	66 361	39 580	88 604	111 983	132 139	438 667

Category/Model		1993					Total
<u>1. National models:</u>	<u>Total</u>	<u>52 421</u>					<u>52 421</u>
LTD/Gran Marquis		7 417					7 417
Topaz		25 372					25 372
Cougar		4 687					4 687
Thunderbird		3 783					3 783
Taurus		-					-
Ghia		11 162					11 162
<u>2. Dual models:</u>		-					-
<u>3. Export models:</u>	<u>Total</u>	<u>117 216</u>					<u>117 216</u>
	Mexico	-					-
	Exports	117 216					117 216
Tracer	Exp/total	48 627					48 627
Escort	Exp/total	68 589					68 589
<u>FORD MOTOR CO.</u>	<u>Total</u>	<u>169 637</u>					<u>169 637</u>
	Mexico	52 421					52 421
	Exports	117 216					117 216

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

With regard to the US small car market which had been the starting point of the stampede of Japanese passenger cars in the 1970s, GM attempted a counter attack in the form of its Saturn project. This was billed as an "all-out, all-American effort to beat the Japanese in the small-car market" (Business Week, 1990, p.56). Named after the rocket which allowed the US space program to leapfrog an initial Soviet technological advantage, it was conceived in 1982 after GM cancelled an existing small car project when it learned that its Japanese associate —Isuzu— was capable of building the same planned car for \$2,000 less than GM. Although it resulted in the largest single construction project ever undertaken by GM, the reality in the 1990s was far removed from the original concept. Rather than a \$5 billion investment to create a highly automated plant with an annual productive capacity 500,000 highly fuel efficient (45 miles per gallon in the city) subcompacts priced at \$6,000 each, the result was more like a \$3 billion investment in a not-so-automated facility capable of producing just 240,000 not-so-fuel-efficient (25 MPG in the city) compacts each carrying a price tag in the \$10-12,000 range (Business Week, 1990, pp. 56-62). Moreover, in 1991 this smaller than planned facility produced only 50,000 cars (Business Week, 1992a, p. 117). Saturn later gained more credibility,¹⁸ however, the adjustment process proved gruesome for a humbled General Motors.

A second failure which merits mention, although it did not relate primarily to small cars manufacture, was the attempt by General Motors to shortcut the Japanese lead in automation for automobile production. It has been estimated that General Motors invested around \$50 billion during the 1980s in order to modernize its operations and that about 20 percent of the spending on new technology was wasted (The Economist, 1991b, p. 62). One of the more spectacular disappointments was the new heavily-automated Hamtramck plant for manufacturing Cadillacs which ranked "among the least competitive plants in the United States" (The Economist, 1991c, p. 87). It was equipped with 260 robots for welding and painting cars, 50 automatic guided vehicles, televisions, computers and laser-based measuring systems to check quality, yet a year after it opened in 1985 it still had not surpassed half its productive capacity, that is, 60 cars an hour (The Economist, 1991b, p. 63). Things eventually improved at the Hamtramck plant (it won a Malcolm Baldrige National Quality award in 1990) (Business Week, 1992b, p. 88), however, not before it became the most-cited example of how not to face up to the Japanese challenge: by throwing truckloads of cash at new or untried technologies.

GM, similar to Ford, had more success with a strategic alliance with a technologically superior rival, in this case Toyota, in their joint plant called NUMMI in California which produced the Toyota Tercel and Geo Prism models, and with its minor capital participation in Suzuki, which supplied it with certain small cars: the Swift model. Nevertheless, unlike Ford, these successes did not directly affect GM's corporate strategy in Mexico. GM's actions were less definitive than Ford's and that was reflected somewhat in the strategy for the Mexican operations.

With regard to that corporate strategy, GM's original activities in Mexico were centered on truck production for the local market. During the early 1960s an engine plant was initiated at Toluca (capacity: 120,000) and the truck assembly took place in the Mexico City plant (capacity: 60,000). That remained the raison d'être of GM (Mexico) until the late 1970s when a concern for export production became manifest in the US\$250 million investment in the new Ramos Arizpe complex for engines and passenger cars, and new arrangements for auto parts (in-bond plants and "projects" with national companies).

¹⁸ An editorial in Business Week (1994d, p. 146) stated: "GM's Saturn and Chrysler's new Neon show that Detroit can now compete in the segment of the market that the Japanese have dominated: subcompacts." However, one should also consult Business Week (1994e, p. 34).

The Ramos Arizpe complex had a 450,000 unit capacity for engines and a 100,000 unit capacity for passenger cars. This facility accounted for 38 percent of all engines exported from Mexico during the 1982-1990 period (making it the largest exporter of engines in Latin America) and a significant proportion of passenger car exports as of 1987. GM became the principal exporter of auto parts via in-bond plants of all vehicle assemblers operating in Mexico with 23 plants with a total of 38,000 employees which exported a wide range of auto parts but mostly harnesses and car radios. Rather than joint ventures with local auto parts makers, GM employed "projects" with local companies, such as Condumex, for wire harnesses, Aralmex, for shock absorbers, and Tebo, for steering mechanisms. The cheap labor aspect of GM's strategy is self-evident in the case of the in-bond plants. In respect of the Ramos Arizpe facility it should be pointed out that it was semi-automated, not fully automated as was Ford's Hermosillo plant, and it was severely criticized for replacing vehicle production with vehicle assembly due to the fact that its level of national inputs (about 28 percent) was the lowest among the auto TNCs operating in Mexico (Carrillo 1990, p. 84; Micheli, 1990, p.63).

GM (Mexico) was reassigned twice within the GM (US) corporate framework. In 1987 it was moved from the International group to the Chevrolet-Pontiac Canada group where its principal role was to fill in for the US and Canadian plants when their capacity for mid-sized vehicles, such as the Century, was fully utilized. In 1992 it was removed from the mid-size car division and integrated into the Lansing Automotive Division for small cars, a move related to the new specialization in the Cavalier model in Mexico (Expansión, 1993b, p. 50). Another programmed investment is to produce the fast selling "popular" model Corsa in Mexico to compete head-on with VW and Nissan in that market (América Economía, 1994a, p. 32). A new concern which arose was the "twinning" of plants in northern Mexico with similars in the southern US, especially Texas, so that they relied on the same low cost suppliers (Lamont, 1993). Finally, the most recent shift in GM's Mexican strategy concerns a \$400 million investment in a new truck-assembly plant scheduled to come on stream in 1995 in Silao. Information on sales by model assist in comprehending the shifts in corporate strategy.

The statistics in Table 14 indicate with that clarity that during the 1978-1982 period GM (Mexico) adapted to the local market situation for passenger cars by concentrating on assembling and selling models aimed solely at the national market. The aging Chevy Nova was replaced, first, by the Malibu and Caprice models, later, by the Celebrity, Citation and Montecarlo ones. Even so, sales volume was very low, never reaching even 20,000 units a year for any specific model, including the best selling Malibu.

The 1983-1987 period was one in which changes in corporate strategy became evident. The first shift was from a concentration on national models to the transfer of the production of the Camino and Caballero models from the US to Mexico to squeeze out the last few years of the product cycle, taking advantage of low wages in Mexico but selling the product in the US market. The second shift was manifest in the decision to produce the Century model for local consumption and as a back-up to US production of the same model. As of 1987, the Century became an export model. As a result, exports surpassed domestic sales during 1983-1987.

Table 14

GENERAL MOTORS: PASSENGER CAR SALES IN MEXICO AND
EXPORTS FROM MEXICO, 1978-1993
(units)

		1978	1979	1980	1981	1982	Total
<u>1. National models:</u>	<u>Total</u>	<u>22 847</u>	<u>25 908</u>	<u>17 278</u>	<u>26 345</u>	<u>22 450</u>	<u>114 828</u>
Chevy Nova		13 763	991	-	-	-	14 754
Malibu		4 172	19 400	12 832	17 630	725	54 759
Caprice		4 912	5 517	4 446	4 429	2 445	21 749
Celebrity		-	-	-	74	9 118	9 192
Citation		-	-	-	207	8 002	8 209
Montecarlo		-	-	-	4 005	2 160	6 165
<u>2. Dual models</u>	<u>Total</u>	-	-	-	-	-	-
<u>3. Export models</u>	<u>Total</u>	-	-	-	-	-	-
<u>GENERAL MOTORS</u>	<u>Total</u>	<u>22 847</u>	<u>25 908</u>	<u>17 278</u>	<u>26 345</u>	<u>22 450</u>	<u>114 828</u>
	Mexico	22 847	25 908	17 278	26 345	22 450	114 828
	Exports	-	-	-	-	-	-

		1983	1984	1985	1986	1987	Total
<u>1. National models:</u>	<u>Total</u>	<u>12 235</u>	<u>14 102</u>	<u>13 159</u>	<u>9 395</u>	<u>11 652</u>	<u>60 543</u>
Malibu		116	20	-	2	-	138
Caprice		168	47	10	4	-	229
Montecarlo		3 194	1 053	35	-	-	4 282
Citation		5 256	7 527	6 526	2 344	317	21 970
Celebrity		3 501	5 455	6 588	5 638	3 765	24 947
Cutlass		-	-	-	1 407	7 570	8 977
<u>2. Dual models</u>	<u>Total</u>	-	-	-	-	-	-
<u>3. Export models</u>	<u>Total</u>	<u>2 127</u>	<u>12 344</u>	<u>35 471</u>	<u>20 370</u>	<u>35 064</u>	<u>105 376</u>
	Mexico	2 127	4 368	5 635	1 979	2 792	16 892
	Exports	-	7 976	29 836	18 400	32 272	88 484
Century	Total	2 127	4 368	5 765	1 970	23 502	37 732
	Mexico	2 127	4 368	5 635	1 970	2 792	16 892
	Exports	-	-	130	-	20 710	20 840
Camino	Exp/total	-	7 037	26 649	16 502	10 249	60 437
Caballero	Exp/total	-	939	3 057	1 898	1 313	7 207
<u>GENERAL MOTORS</u>	<u>Total</u>	<u>14 362</u>	<u>26 446</u>	<u>48 630</u>	<u>29 765</u>	<u>46 716</u>	<u>165 919</u>
	Mexico	14 362	18 470	18 794	11 365	14 444	77 435
	Exports	-	7 976	29 836	18 400	32 272	88 484

Table 14 (concl.)

		1988	1989	1990	1991	1992	Total
<u>1. National models:</u>	<u>Total</u>	<u>13 234</u>	<u>18 830</u>	<u>13 953</u>	<u>17 928</u>	<u>18 982</u>	<u>82 927</u>
Cutlass		9 152	13 442	13 686	17 927	18 982	73 189
Citation		2	-	-	-	-	2
Celebrity		4 080	5 388	267	1	-	9 736
<u>2. Dual models</u>	<u>Total</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>3. Export models</u>	<u>Total</u>	<u>38 436</u>	<u>43 582</u>	<u>58 289</u>	<u>103 758</u>	<u>106 016</u>	<u>350 085</u>
	Mexico	2 050	4 046	17 296	22 527	30 598	76 517
	Exports	36 386	39 536	40 993	81 231	75 418	273 564
Century	Total	38 436	43 582	45 077	42 317	36 560	205 972
	Mexico	2 050	4 046	4 084	4 108	4 818	19 106
	Exports	36 386	39 536	40 993	38 209	31 742	186 866
Cavalier	Total	-	-	13 212	61 441	69 456	14 4109
	Mexico	-	-	13 212	18 419	25 780	57 411
	Exports	-	-	-	43 022	43 676	86 698
<u>GENERAL MOTORS</u>	<u>Total</u>	<u>51 670</u>	<u>62 412</u>	<u>72 242</u>	<u>121 684</u>	<u>124 998</u>	<u>433 006</u>
	Mexico	15 284	22 826	31 249	40 453	49 580	159 442
	Exports	36 386	39 536	40 993	81 231	75 418	273 564

		1993					Total
<u>1. National models:</u>	<u>Total</u>	14 899					14 899
Cutlass		14 899					14 899
Citation		-					-
Celebrity		-					-
<u>2. Dual models</u>	<u>Total</u>	-					-
<u>3. Export models</u>	<u>Total</u>	126 332					126 332
	Mexico	35 669					35 669
	Exports	90 663					90 663
Century	Total	38 478					38 478
	Mexico	4 340					4 340
	Exports	34 138					34 138
Cavalier	Total	87 854					87 854
	Mexico	31 329					31 329
	Exports	56 525					56 525
<u>GENERAL MOTORS</u>	<u>Total</u>	141 231					141 231
	Mexico	50 568					50 568
	Exports	90 663					90 663

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

The 1988-1992 period witnessed the consolidation of the export strategy. The Century model exports were maintained at about the 35,000 unit level and the successful Cavalier model¹⁹ came on stream generating exports at the 43,000 level and it accounted for about half of domestic sales as well, more than the Cutlass. In 1993 total export sales jumped to the 90,000 unit level. GM (Mexico) had become the most profitable of all GM's North American operations by 1991 (Shapiro, 1993, p. 124). The following year, its sales reached almost \$6.6 billion and its exports over 2.5 billion (up from \$478 millions in 1985 and only \$40 millions in 1980) (*América Economía*, 1993, p. 50 and 1994b).

The changes in GM's strategy were very important for the Mexican automobile industry. Similar to Ford, the strategy was not so much to modernize the existing Mexico City/Toluca facilities and convert them into export operations, rather the principal concern was to establish new export facilities in Ramos Arizpe, first, for engines, then slowly but surely for passenger cars. A new truck plant for export is currently under construction. GM's strategy was less clear-cut than Ford's and was based more solidly of low wage advantages rather than high-tech world class facilities, however, competitive standards were reached. The new strategy entailed specialization in certain engines, two passenger vehicles (the Century and Cavalier models) and certain auto parts via in-bond plants, all for export but for different reasons. Thus, in somewhat different fashion GM also integrated its new facilities in Mexico into its North American production system and, in the case of auto parts, especially engines, into its international one.

Chrysler Corp. almost went under in the late 1970s and was resuscitated in good part because the US Government came to the rescue of one of its "national champions".²⁰ After a severe restructuring effort, which included its withdrawal from most of Europe and Latin America (except profitable Mexico), Chrysler became more competitive in terms of production costs but still was plagued by quality concerns (*Fortune*, 1994 p.53; *Business Week*, 1994, p. 26). Part of its successful recovery relates to initiatives in terms of new passenger models (the K-models of the 1980s and the Neon model of the 1990s), market niches (such as minivans), a capital shareholding in Mitsubishi of Japan and a strategic association with same (until 1991) in the form of the Diamond Star venture (Inoue, 1993, pp. 13-15).

Chrysler's presence in Mexico dates from 1959 when it took a minority position in a Mexican firm, a former licensee, with a truck plant (capacity: 73,000 units) and car assembly facility (capacity: 40,000) established in Mexico City. This was complemented in 1964 with a new passenger vehicle assembly operation (capacity: 120,000) and engine plant (125,000). Chrysler bought out its local partner. These facilities gave Chrysler a strong position in the market segment for compact passenger cars in the domestic markets versus both Ford and General Motors.

In spite of the problems of Chrysler (US) in the late 1970s and in line with the strong financial position of Chrysler (Mexico), a new engine plant for export (capacity: 270,000) was built in Ramos Arizpe in 1981. Chrysler was the first major producer to establish a significant export program for vehicles from Mexico. Unlike Ford and General Motors, Chrysler invested more in modernizing existing facilities than establishing new ones closer to the US border, and it concentrated in exporting both cars and trucks. In 1985 it modernized the Toluca plant in order to export Ram Chargers to the US. The K-versions of the Dart and Volare (Acclaim) served both the domestic and export markets in simultaneous

¹⁹ In 1993, the Chevrolet Cavalier reached fifth spot in the US list of best-selling cars and light trucks, up from tenth spot in 1992 (*Fortune*, 1993e, p. 20).

²⁰ The Loan Guarantee Act of January, 1980 provided the company with \$1,500 millions in federal guarantees on the condition that the company obtain commitments for another \$2,000 millions from other sources, including the sale of assets.

fashion. During the 1990s, the export specialization was increased by way of the upgrading of the Ramos Arizpe engine plant so as to supply the US production of the Eclipse and Talon models, and the modernization of the Toluca vehicle assembly plant for the purpose of producing the new and competitive Neon model for export. Whereas in the 1987-1990 period Chrysler's export drive was based on the dual model K-cars which were sold mainly in the domestic market, during the 1990s the emphasis shifted toward export models, such as the Phantom and Sundance, at least until 1993. Chrysler's export coefficient reached the same general level as Ford and General Motors by 1993.

Vehicle assembly was not supported by joint ventures or shared projects with national component producers, as was the case for the other US auto TNCs. In fact, Chrysler preferred to produce its own automatic transmissions (capacity: 60,000 units) and was the only producer in Latin America. Furthermore, Chrysler operated only five in-bond plants, for harnesses, mufflers and seat covers and interior trim. Chrysler had the highest level of local integration of the US automobile producers operating in Mexico. Its sales reached \$3.5 billion in 1992 and exports were \$2.3 billion a year later (up from \$585 millions in 1985 and \$26 millions in 1980).

Table 15 indicates that "dual models", that is, passengers cars assembled in Mexico for which less than half of the production as exported, were an important element in Chrysler's Mexican repertoire, unlike either Ford or General Motors. The K-versions of the Dart and Volare (Acclaim) demonstrate as much even though the latter was converted into an export model (more than 50 percent of sales in export market) during the 1988-1992 period. In that period, dual models, basically the Shadow and Spirit models, still accounted for one-third of overall passenger car exports and total domestic sales still exceeded total export sales. In 1993, the Spirit became an export model. At the same time it should be pointed out that "national models" virtually disappeared from Chrysler's product lineup which is now based primarily on the Shadow (32,770 units/yr.), the Spirit (66,951 units/yr.) and the Volare (34,484 units/yr.) which together accounted for 86 percent of total sales during 1993.

Chrysler's corporate strategy in Mexico differed in important ways from the other US auto TNCs. The modernization or reconversion of existing production facilities was relatively more important for Chrysler, its export propensity for passenger cars (not trucks or engines) was markedly lower, and more concern was shown for integrating their passenger car production in Mexico in terms of both the domestic and export markets. The integration of its Mexican facilities into the US production system was not as advanced as the cases of Ford and General Motors, however, Chrysler appears to be taking the lead in terms of creating a NAFTA-based network of suppliers in Mexico (Business Latin America, 1994a, p. 6).

Volkswagen is Europe's most important and most internationalized car manufacturer and it specializes in small, cheap automobiles. In 1974 it transferred the production of its aging Sedan (Beetle) to Mexico and exports of such began in 1977. In the mid-1980s, VW's US plants for the Golf and Jetta models experienced low demand due to limited price competitiveness and in 1987 they were transferred to Mexico, creating a subsequent export flow (Expansión, 1990, p. 26). The Mexican operation then became a significant part of VW's international production system.

Table 15

**CHRYSLER: PASSENGER CAR SALES IN MEXICO AND
EXPORTS FROM MEXICO, 1978-1993**
(units)

		1978	1979	1980	1981	1982		Total
1. National models:	<u>Total</u>	<u>43 757</u>	<u>50 349</u>	<u>56 850</u>	<u>57 730</u>	<u>40 015</u>		<u>248 701</u>
Cordoba		-	44	4 583	3 530	594		8 751
Lebaron		9 278	11 124	8 948	10 316	1 534	b/	41 200
Magnum		2 226	2 367	2 033	3 181	871		10 678
Volare (Acclaim) a/		7 995	8 355	8 573	10 127	8 172	c/	43 222
Dart a/		24 258	28 459	32 712	30 576	28 419	d/	144 425
2. Dual models:	<u>Total</u>	-	-	-	-	-		-
	Mexico	-	-	-	-	-		-
	Exports	-	-	-	-	-		-
3. Export models:	<u>Total</u>	-	-	-	-	-		-
	Mexico	-	-	-	-	-		-
	Exports	-	-	-	-	-		-
CHRYSLER	<u>Total</u>	<u>43 757</u>	<u>50 349</u>	<u>56 850</u>	<u>57 730</u>	<u>40 015</u>		<u>248 701</u>
	Mexico	43 757	50 349	56 850	57 730	39 590		248 276
	Exports	-	-	-	-	-		-

		1983	1984	1985	1986	1987		Total
1. National models:	<u>Total</u>	<u>7 029</u>	<u>10 709</u>	<u>11 862</u>	<u>7 585</u>	<u>2 828</u>		<u>40 013</u>
Lebaron		4 768	6 409	5 651	3 349	638		20 815
Magnum		2 261	2 956	3 127	2 323	765		11 432
New Yorker		-	1 344	3 084	1 913	1 425		7 766
2. Dual models:	<u>Total</u>	<u>19 335</u>	<u>27 029</u>	<u>40 468</u>	<u>35 410</u>	<u>37 944</u>		<u>160 236</u>
	Mexico	17 137	20 393	26 934	19 954	16 215		100 639
	Exports	2 198	6 686	13 534	15 456	21 729		59 603
Dart a/	<u>Total</u>	<u>14 076</u>	<u>17 722</u>	<u>23 781</u>	<u>18 521</u>	<u>19 957</u>		<u>94 057</u>
	Mexico	12 671	14 505	17 436	10 928	9 884		65 424
	Exports	1 405	3 217	6 345	7 593	10 073		28 633
Volare (Acclaim) a/	<u>Total</u>	<u>5 259</u>	<u>9 357</u>	<u>16 687</u>	<u>16 889</u>	<u>17 987</u>		<u>66 179</u>
	Mexico	4 466	5 888	9 498	9 026	6 331		35 209
	Exports	793	3 469	7 189	7 863	11 656		30 970
3. Export models:	<u>Total</u>	-	-	-	<u>325</u>	<u>23 728</u>		<u>24 053</u>
	Mexico	-	-	-	282	4 421		4 703
	Exports	-	-	-	43	19 307		19 350
Phantom	<u>Total</u>	-	-	-	<u>325</u>	<u>23 728</u>		<u>24 053</u>
	Mexico	-	-	-	282	4 421		4 703
	Exports	-	-	-	43	19 307		19 350
CHRYSLER	<u>Total</u>	<u>26 364</u>	<u>37 788</u>	<u>52 330</u>	<u>43 320</u>	<u>64 500</u>		<u>224 302</u>
	Mexico	24 166	31 102	38 796	27 821	23 464		145 349
	Exports	2 198	6 686	13 534	15 499	41 036		78 953

Table 15 (cont.)

		1988	1989	1990	1991	1992	Total
1. National models:	Total	2 971	2 845	2 850	4 928	6 863	20 457
Lebaron		-	-	-	2 033	4 232	6 265
Magnum		819	-	-	-	-	819
New Yorker		2 152	2 845	2 850	2 895	2 631	13 373
2. Dual models:	Total	40 364	73 027	60 998	85 838	92 485	352 712
	Mexico	29 411	51 154	47 644	57 219	73 332	258 760
	Exports	10 953	21 873	13 354	28 619	19 153	93 952
Dart	Total	21 379	28 824	-	-	-	50 203
	Mexico	14 406	6 960	-	-	-	21 366
	Exports	6 973	21 864	-	-	-	28 837
Shadow	Total	18 985	35 959	28 417	41 642	38 100	163 129
	Mexico	15 005	35 944	23 703	25 687	32 367	132 706
	Exports	3 980	15	4 714	15 955	5 733	30 397
Spirit	Total	-	8 250	32 581	44 196	54 385	139 412
	Mexico	-	8 250	23 941	31 532	40 965	104 688
	Exports	-	-	8 640	12 664	13 420	34 724
3. Export models:	Total	33 890	26 717	44 010	41 683	55 627	201 927
	Mexico	16 350	2 953	2 009	2 500	3 441	27 253
	Exports	17 540	23 764	42 001	39 183	52 186	174 674
Volare (Acclaim)	Total	21 892	23 516	8 612	15 128	10 591	79 739
	Mexico	13 159	339	-	-	-	13 498
	Exports	8 733	23 177	8 612	15 128	10 591	66 241
Phantom	Total	7 778	3 201	35 398	26 555	29 205	102 137
	Mexico	3 191	2 614	2 009	2 500	3 441	13 755
	Exports	4 587	587	33 389	24 055	25 764	88 382
Sundance	Total	4 220	-	-	-	15 831	20 051
	Mexico	-	-	-	-	-	-
	Exports	4 220	-	-	-	15 831	20 051
CHRYSLER	Total	77 225	102 589	107 858	132 449	154 975	575 096
	Mexico	48 732	56 952	52 503	64 647	83 636	306 470
	Exports	28 493	45 637	55 355	67 802	71 339	268 626

Table 15 (concl.)

		1993	Total
1. National models:	Total	4 085	4 085
Lebaron		2 405	2 405
Magnum		-	-
New Yorker		1 680	1 680
2. Dual models:	Total	103 121	103 121
	Mexico	52 214	52 214
	Exports	50 907	50 907
Dart	Total	-	-
	Mexico	-	-
	Exports	-	-
Shadow	Total	36 170	36 170
	Mexico	23 992	23 992
	Exports	12 178	12 178
Spirit	Total	66 951	66 951
	Mexico	28 222	28 222
	Exports	38 729	38 729
3. Export models:	Total	48 161	48 161
	Mexico	1 356	1 356
	Exports	46 805	46 805
Volare (Acclaim)	Total	34 484	34 484
	Mexico	-	-
	Exports	34 484	34 484
Phantom	Total	8 533	8 533
	Mexico	1 356	1 356
	Exports	7 177	7 177
Sundance	Total	5 144	5 144
	Mexico	-	-
	Exports	5 144	5 144
CHRYSLER	Total	155 367	155 367
	Mexico	57 655	57 655
	Exports	97 712	97 712

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

a/ A K- model began production in 1982-83.

b/ 79 units were exported during 1982.

c/ 34 units were exported during 1982.

d/ 391 units were exported during 1982.

The 1990s brought problems to the German operations of VW. The headquarters company was labelled "the most fragile of Europe's carmakers" and "one of Germany's least adaptable firms" (The Economist, 1994b, p. 28). A Fortune article commented:

"The company is cursed by a deadly combination of high-cost manufacturing on the one hand and low output on the other. ... VW's factories are so inefficient that to break even last year they had to operate at more than 100% of rated capacity, through overtime or by adding shifts; 70% to 80% is the normal industry breakeven point" (Fortune, 1993a, p. 65).

Evidently, Volkswagen entered into a period of crisis which called for a thorough restructuring, which recently has been undertaken. It implied firing 30,000 of VW's 274,000 employees in 1994 and the implementation of a four day work week to cut the wage bill. On top of the serious problems of inefficiency, Volkswagen experienced in 1993 a bitter dispute with General Motors over VW's apparently illicit access to GM's plans for cost-cutting for small car (Opel) production which were obtained when VW hired J.I. López, a senior GM official. After a fall in European passenger car sales of almost 20 percent in 1992-1993 which produced losses in 1993 of \$1.4 billion, the dispute with GM seemed to ratify the opinion that VW's problems required a revolution above and beyond simple efficiency preoccupations (The Economist, 1994b, p. 28).

Volkswagen operates the largest single automobile plant in Mexico at Puebla, where it manufactures engines (capacity: 540,000), operates iron, aluminum and magnesium foundries and assembles cars (original capacity: 160,000) and trucks (capacity: 24,000). Volkswagen is the major player in the largest market segment, that for subcompacts, and it has the largest network of distributors with 214 members. In 1980, VW (Mexico) was practically bankrupt (Expansión, 1991b, p.45) and the defensive strategy that it implemented led to the collapse of passenger car exports (the Beetle model), although it did continue to export engines, in fact, it was responsible for 17 percent of the engines exports of the 1982-1990 period.

The transfer to Mexico of the US plant for Golfs and Jettas in 1988 produced a significant change in the VW (Mexico) strategy. Passenger car capacity was raised to 300,000 units and a new export focus took hold, however, grievous quality problems affected the production of those models in Mexico, according to the J.D. Power quality rankings (i.e. VW's Puebla plant was in last place of 32 North American plants) (Expansión, 1993b, p. 55), and VW's share of the US car market nosedived from 5 percent in 1987 to close to zero in 1992.

The early 1990s brought good news and bad. The good news was that VW benefitted from a government program in favor of cheap "popular" cars, which consisted of lower taxes on production and lower profits for producers (Berry, Grilli and López-de-Silanes, 1992, p. 19), in order to breathe new life into the Beetle (the sales of which jumped from around 18,000 units a year during 1986-1988 to about 85,000 units during 1990-1992). This allowed VW to cover much of its fixed costs. More good news came in the form of VW's progressive success in attracting German suppliers to set up shop in Mexico increasing the local content of the Puebla vehicles and improving their quality.

The bad news was that, the major investment program aimed at lifting passenger capacity to 450,000, increasing engine size and otherwise improving the competitive situation of the Golf/Jetta export

drive, was not working out.²¹ Attempts to promote more flexible working practices provoked a strike which cost the company \$100 million in lost production as well as missed export commitments (Latin America Economy and Business, 1992, p. 4; The Economist, 1992c, p. 33). The decision of the labor tribunal, while favorable for VW (it could dismiss the unionized work force), was considered very arbitrary.

Table 16 provides pertinent statistical information. During the 1978-1982 period, VW's sales were about split between national (the Caribe, the Atlantic and the Brasilia) and dual models (the Beetle sedan and the Safari). The Beetle was by far the main export item. The 1983-1987 period witnessed the continued split of VW production between national and dual models, however, sales magnitudes fell perilously in spite of the introduction of new models (the Corsar and Variant, within the national category), and the Golf and Jetta in the dual category) and export sales all but disappeared in 1981-1982. The 1988-1992 period brought to a close VW's production exclusively for the domestic market coupled with the recuperation of export sales, although not to the degree desired by VW for its Golf and Jetta models, for the reasons already mentioned. VW did not have export models. In 1992, VW's sales were \$1.1 billion (down from \$2.1 billion the previous year) and its 1993 exports reached \$836 million (up from \$145 million in 1985 and \$127 million in 1980). Fortunately, 1993 brought a strong recovery to sales of sedans and exports of its Jetta and Golf models.

Within the Volkswagen corporate framework, the Mexican operations were originally used to squeeze a few more sales out of outmoded models in the final phase of their life cycle, as the example of the Beetle demonstrates. That strategy changed in the 1980s when VW shut down its US plants and transferred them to Mexico with the idea that Mexico would supply the US market with the Golf and Jetta models. That marked the new specialization of the Puebla operations. Being a non-US producer meant that neither the in-bond plants nor the northern Mexico focus to investment in assembly operations held as much significance for VW as it had for the US Big Three. NAFTA, however, makes it all the more necessary to increase the local (actually, North American) content of VW's vehicles from the 25 percent level (60 percent for the export models) to the 62.5 percent NAFTA level (Expansión, 1991a, p. 45 and 1993b, p. 57). The arrival to Mexico of German suppliers will help meet that goal as well as increase the quality of VW's vehicles. Mexico is now critical to Volkswagen's presence in North America.

Nissan played a significant role in the Japanese challenge which swept the international automobile industry. Its particular contribution to the heightened international competitiveness of Japanese carmakers was clearest in the application of automation technologies, especially automatically-guided vehicles and robots, to computer-integrated manufacturing. It used computers to control all aspects of production, including the operation of flexible automation technologies, production scheduling, components ordering and in-plant "just-in-time" (UNCTC, 1990b, p. 33). The unique feature of this system of production control is that it involves extensive and intensive use of computer interfacing between assembly plants and suppliers, between the production plants and the head office host computer, and among the computer-based systems used within the plants themselves. The Nissan system is designed to streamline production of computer-integrated manufacture and produce directly to orders from customers (Hoffman and Kaplinsky, 1988, pp. 146-147). The application of "voluntary export restraints" on the part of the US Government, obliged Nissan and other Japanese automobile exporters to the US

²¹ "VW has delayed the US rollout of newly designed Golf IIIs and Jetta IIIs for nearly a year because the cars aren't good enough to sell. VW blames production snafus and quality glitches at its plant in Puebla, Mexico, the main source for its cars in North America", Fortune, 1993a, p. 66; The Economist, 1994c, p. 72).

market to invest in US plants in order to maintain or increase their market share there. Nissan was the only Japanese producer of automobiles in the US which also possessed production facilities in Mexico.

Nissan was a relative latecomer to Mexico, setting up its Cuernavaca facility (capacity: 80,000 cars and 50,000 trucks) around 1970. Other facilities included an engine plant (original capacity: 84,000) in Toluca and iron foundry in Lerma. An interesting aspect of the first Nissan strategy for passenger cars in Mexico was that it competed in only one market segment (subcompacts) with just one model (the Tsuru). Coupled with a policy emphasizing continuous quality improvement and low prices (Moreno, 1988, p. 30), Nissan increased its market share in the subcompact market from 25 percent in 1977 to 38 percent in 1985, when Renault pulled out. Nissan remained the least export-oriented of the major producers. In terms of engines, it accounted for only 3 percent of those exported during the 1982-1990 interim, and with respect to vehicles its exports ranked last among the major producers, although it was one of only two (with Chrysler) truck exporters.

The mid-80s brought the implementation of a new more export-oriented strategy. The most concrete manifestation of such was the modern new Aguascalientes complex. It consisted of a new engine plant (capacity: 350,000 units) of which 80 percent was destined for export, a casting plant, facilities for components, such as transaxles, and vehicle assembly (capacity: 100,000). During the early 1990s, once the implications of NAFTA became more evident, Nissan undertook a five year, \$1.5 billion investment program to update, modernize and expand its Mexican facilities both in Cuernavaca and (primarily) in Aguascalientes. In the latter, assembly capacity for the Sentra (Tsuru) model was increased to 200,000 most of which was to be exported to the North American market, but also Japan (Business Latin America, 1992, p.7). A modern plant (capacity: 192,000) for the new multivalve engine was constructed and the expansion of the transaxles plant (capacity: 150,000) permitted closer component coordination with the Nissan plant in Smyrna, Tennessee (USA) (de Marfa y Campos, 1992, p. 178). This massive investment allows Nissan to raise the level of national integration of its vehicles from a lowly 23 percent to closer to the NAFTA requirements (62.5 percent),²² in part by being able to convince Japanese suppliers to invest in Mexican operations (Expansión, 1993b, p. 57), as well as to better coordinate its overall North American facilities. While its recent attempt to introduce a new domestic model did not do well, in general, Nissan has been very successful in the domestic market and promises to do so in the export market.

The statistics on Nissan sales over the 1978-1992 period, found in Table 17, indicate that Nissan alone among major producers was able to continually increase sales from the 40,000 per year level during 1978-1982 to the 50,000 per year level in 1983-1987 to the 80,000 level for 1988-1992, before topping 120,000 in 1993. Annual exports rose from virtually nothing during the first interim to about the 5,000 unit level during the second before blossoming to the 20,000 level in 1988-1992 and surpassing 37,000 in 1993. Nissan was not only able to weather the recession during 1983-1988 but to increase its market share in the subcompact market segment at the same time. Originally, Nissan's exports went to Central and South America, as well as Spain; however, Nissan's new export strategy was to integrate the Mexican operations more closely into the North American ones, exporting the Sentra model, engines and components to the North American market. In 1992, the sales of Nissan's Mexican subsidiary reached \$ 1.6 billion and export were \$450 millions (up from \$90 millions in 1985 and \$20 million in 1980).

²² According to one President and Director General of Nissan's Mexican subsidiary, Nissan suggested that the most convenient level of 'regional' integration would be 50 percent, with a 5-7 year implementation period (Expansión, 1992a, p.11).

Table 16

VOLKSWAGEN: PASSENGER CAR SALES IN MEXICO AND
EXPORTS FROM MEXICO, 1978-1993
(units)

		1978		1979	1980	1981	1982	Total
1. National models:	Total	30 375		45 336	61 375	74 049	67 720	278 855
Brasilia		3 030		7 039	10 917	9 249	1 931	32 166
Caribe		27 345		38 297	50 458	50 282	45 301	211 683
Atlantic		-		-	-	14 518	20 488	35 006
2. Dual models:	Total	52 257		56 349	46 687	48 201	55 910	259 404
	Mexico	33 954		37 275	33 552	38 999	42 332	186 112
	Export	18 303		19 074	13 135	9 202	13 578	73 292
Safari	Total	2 987		2 152	528	31	2	5 700
	Mexico	926		1 453	514	31	2	2 926
	Export	2 061		699	14	-	-	2 774
Sedan	Total	49 270		54 197	46 159	48 170	55 908	253 704
	Mexico	33 028		35 822	33 038	38 968	42 330	183 186
	Export	16 242		18 375	13 121	9 202	13 578	70 518
3. Export models		-		-	-	-	-	-
VOLKSWAGEN	Total	82 632		101 685	108 062	122 250	123 630	538 259
	Mexico	64 329		82 611	94 927	113 048	110 052	464 967
	Export	18 303		19 074	13 135	9 202	13 578	73 292

		1983		1984	1985	1986	1987	Total
1. National models:	Total	38 106		42 878	49 337	39 514	16 273	186 108
Brasilia		134		88	-	-	-	222
Caribe		19 089	a/	19 718	21 016	16 603	2 780	79 206
Atlantic		18 883	b/	15 045	17 342	11 768	4 670	67 708
Corsar		-		8 027	10 979	8 677	6 781	34 464
Variant		-		-	-	2 466	2 042	4 508
2. Dual models:	Total	43 533		49 749	30 177	17 895	36 465	177 819
	Mexico	26 779		34 630	27 027	17 817	36 391	142 644
	Export	16 754		15 119	3 150	78	74	35 175
Sedan	Total	43 532		49 749	30 177	17 895	17 593	158 946
	Mexico	26 779		34 630	27 027	17 817	17 532	123 785
	Export	16 753		15 119	3 150	78	61	35 161
Jetta	Total	-		-	-	-	6 261	6 261
	Mexico	-		-	-	-	6 250	6 250
	Export	-		-	-	-	11	11
Golf	Total	-		-	-	-	12 611	12 611
	Mexico	-		-	-	-	12 609	12 609
	Export	-		-	-	-	2	2
3. Export models		-		-	-	-	-	-
VOLKSWAGEN	Total	81 639		92 627	79 514	57 409	52 738	363 927
	Mexico	64 885		77 508	76 364	57 331	52 664	328 752
	Export	16 754		15 119	3 150	78	74	35 175

Table 16 (concl.)

		1988	1989	1990	1991	1992	Total
1. National models:	Total	5 172	520	111	12	-	5 815
Caribe		631	123	23	-	-	777
Atlantic		546	112	39	4	-	701
Corsar		3 996	285	49	8	-	4 338
2. Dual models:	Total	48 990	99 558	179 815	199 006	175 512	702 881
	Mexico	48 629	76 501	133 583	148 574	142 239	549 526
	Export	361	23 057	46 232	50 432	33 273	153 355
Sedan	Total	19 399	32 604	84 328	86 592	86 454	309 377
	Mexico	19 348	32 545	84 245	86 353	85 989	308 480
	Export	51	59	83	239	465	897
Jetta	Total	12 317	26 479	38 464	45 122	53 230	175 612
	Mexico	12 293	18 757	21 390	23 736	28 932	105 108
	Export	24	7 722	17 074	21 386	24 298	70 504
Golf	Total	17 274	40 475	57 023	67 292	35 828	217 892
	Mexico	16 988	25 199	27 948	38 485	27 318	135 938
	Export	286	15 276	29 075	28 807	8 510	81 954
3. Export models		-	-	-	-	-	-
VOLKSWAGEN	Total	54 162	100 078	179 926	199 018	175 512	708 696
	Mexico	53 801	77 021	133 694	148 586	142 239	555 341
	Export	361	23 057	46 232	50 432	33 273	153 355
		1993					Total
1. National models:	Total	-					-
Caribe		-					-
Atlantic		-					-
Corsar		-					-
2. Dual models:	Total	229 152					229 152
	Mexico	151 681					151 681
	Export	77 472					77 472
Sedan	Total	98 299					98 299
	Mexico	97 539					97 539
	Export	760					760
Jetta	Total	80 274					80 274
	Mexico	31 680					31 680
	Export	48 594					48 594
Golf	Total	50 580					50 580
	Mexico	22 462					22 462
	Export	28 118					28 118
3. Export models		-					-
VOLKSWAGEN	Total	229 152					229 152
	Mexico	151 681					151 681
	Export	79 472					79 472

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

a/ 567 units exported in 1983.

b/ 1 123 units of this model exported in 1983.

Table 17
NISSAN: PASSENGER CAR SALES IN MEXICO AND EXPORTS
FROM MEXICO, 1978-1993
 (units)

		1978	1979	1980	1981	1982	Total
<u>NISSAN</u>	<u>Total</u>	<u>28 309</u>	<u>35 290</u>	<u>36 094</u>	<u>47 340</u>	<u>47 829</u>	<u>194 862</u>
Tsuru	Mexico	28 309	35 289	36 093	47 340	47 828	194 859
	Exports	-	1	1	-	1	3
		1983	1984	1985	1986	1987	Total
<u>NISSAN</u>	<u>Total</u>	<u>41 828</u>	<u>44 973</u>	<u>55 302</u>	<u>49 256</u>	<u>59 389</u>	<u>250 748</u>
Tsuru	Mexico	41 743	44 281	51 493	43 291	49 064	229 962
	Exports	85	692	3 809	5 965	10 325	20 876
		1988	1989	1990	1991	1992	Total
<u>NISSAN</u>	<u>Total</u>	<u>72 566</u>	<u>87 083</u>	<u>98 682</u>	<u>100 984</u>	<u>122 739</u>	<u>482 054</u>
Tsuru	Mexico	60 247	69 855	79 945	77 686	95 780	383 513
	Exports	12 319	17 228	18 737	23 298	26 959	98 841
1993							Total
<u>NISSAN</u>	<u>Total</u>	<u>120 527</u>					<u>120 527</u>
Tsuru	Mexico	83 145					83 145
	Exports	37 382					37 382

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

Nissan has demonstrated a very clear change of strategy with regard to the role of its Mexican operations. Originally viewed as a means of attaining a domestic market share for subcompacts, Nissan established its original plant close to Mexico City, and concentrated on extending its domestic market share by way of quality improvements and low prices. That strategy paid dividends by forcing Renault from the subcompact market segment and rewarding Nissan with most of what was Renault's market share. The new strategy involved modern production facilities in northern Mexico for the purpose of integrating the North American component of Nissan's international production system²³ and even exporting to Japan. Specialization in a single model has been common to both the original and recent Nissan strategy.

It is of considerable interest to note that Nissan, world-renown for its application of computer technology to automate factories in terms of production and supply networks, has had great difficulty advancing in these areas in Mexico. One President and Director General of Nissan's Mexican operations complained that it was very difficult to apply Japanese methods in Mexico in good part because there was an extreme shortage of qualified laborers, which translated into a high degree of rejected production. He cited the example that in a 5,000 man plant in Japan there are 100 inspectors, whereas in Mexico a similar plant required 800 inspectors. Thus, the Mexican plant needs to stock at least a week's supply of auto parts whereas the Japanese plant maintains only 4-6 hours supply of such (*Expansión*, 1992a, p. 11). In spite of the fact that the scarcity of skilled labor has limited the levels of automation and the nature of the supply network which can be implemented, the Aguascalientes complex is set to become the first foreign Nissan plant to supply the demanding Japanese market with passenger cars (*Expansión*, 1993c, p. 94). It would appear that this Japanese producer can achieve Japanese results without the same initial conditions.

The other two passenger car producers were originally majority-owned by the Mexican Government in which **Renault** (France) and **American Motors** (US) were the foreign partners. Both foreign partners had been shaken by severe crises even before the Mexican automobile industry was restructured. Renault (owned by the French Government) had a disastrous experience in the US market with its Alliance model and eventually purchased ailing American Motors, which further destabilized Renault.

In Mexico, the impact of the debt crisis on Government finances produced the need to withdraw from numerous state enterprises in 1983, including those in the automotive sector involving Renault (DINA) and American Motors (VAM). Renault bought out the Government share in both companies (Moreno, 1988, p. 28). That arrangement left it with the Ciudad Sahagun plant for subcompact passenger cars (capacity: 40,000) and 4 cylinder engines (capacity: 40,000), which translated into a 16 percent market share for subcompacts, and the VAM facilities of American Motors which corresponded to over a 20 percent market share for compacts during 1977-1980, however, it quickly folded after Renault took over (Table 18). Unfazed, Renault embarked on a major investment in a new, highly automated plant for 6 cylinder engines (capacity: 350,000) for export in Gómez Palacio, northern Mexico. This investment was part of a new specialization for Renault, these engines were for its Clio, 19, 21 and Traffic models as well as the 440 and 480 models of Volvo (*Expansión*, 1992b, p. 61).

²³ About 15 percent of Nissan's estimated sales of sentra in the US market in 1995 will come from Mexico (*Business Week*, 1994g, p. 27; *Business Latin America*, 1994b, p. 8).

Table 18

PASSENGER CAR MANUFACTURES WHICH NO LONGER PRODUCE
PASSENGER CARS IN MEXICO 1978-1992
(units)

		1978	1979	1980	1981	1982		Total
RENAULT	Total	14 611	15 879	21 616	19 552	22 103		93 761
R-12	Mexico	14 611	15 879	21 460	19 460	22 048		93 458
	Exports	-	-	156	92	55	a/	303
AMERICAN MOTORS								
(Vam) b/	Total	19 329	20 971	20 900	23 071	8 126		92 397
Pacer		838	619	-	-	-		1457
Gremlin		5 910	6 474	4 858	4 301	1 597		23 140
American		12 581	13 878	15 566	14 267	5 263		61 555
Lerma		-	-	476	1 853	714		3 043
Rally		-	-	-	2 650	552		3 202
		1983	1984	1985	1986	1987		Total
RENAULT	Total	19 833	19 212	18 611	3 967	25		61 648
R-12	Mexico	19 803	19 212	18 611	3 967	25		61 618
	Exports	30	-	-	-	-		30
AMERICAN MOTORS								
(VAM) b/	Total	1 230	216	-	-	-		1 446
Pacer		-	-	-	-	-		-
Gremlin		149	78	-	-	-		227
American		915	46	-	-	-		961
Lerma		5	-	-	-	-		5
Rally		161	92	-	-	-		253
Lerma		5	-	-	-	-		5
Rally		161	92	-	-	-		253

Source: On the basis of data provided by the Mexican Automobile Industry Association (AMIA).

a/ R-18 Model.

b/ All national models.

Renault decided in 1985 to close out what remained of its R-12 model production facilities and it withdrew from passenger vehicle production in Mexico, remaining as a producer of engines only (Table 18). In the subcompact car market Renault was the high cost producer during the debt crisis compared to VW and Nissan due to the fact that its model incorporated a higher level of imported components. In spite of the low level of subsequent investments in Mexico,²⁴ Renault (Mexico) was still the 37th largest company by sales in Mexico, according to *Expansión* in 1990, with sales of \$232 million (all for export), up from export sales of 10.6 million in 1985 and \$1.5 million in 1980. The Renault strategy in Mexico changed from that of a major but increasingly uncompetitive passenger vehicle producer in both the subcompact and compact markets to a specialized producer of certain motors for the international production of Renault (and Volvo) vehicles.

Finally, one should mention that the strategies of **new entrants** are also relevant. A general observation is that the most technologically-advanced and commercially dynamic producers of passenger cars, that is, the other major Japanese manufacturers (Toyota, Honda, Mitsubishi, Subaru, etc.), and the new Korean producers (Hyundai, Daewoo, Kia and, perhaps Samsung) (*The Economist*, 1994d, p. 74) did not seem to possess plans to include Mexico in their international production systems. However, during the last year or so, Honda and Daewoo have made concrete commitments to begin production there (*The Nikkei Weekly*, 1994). Some of the dynamic or advanced companies, primarily from Europe, have also done so. For example, Daimler Benz has announced plans to invest \$325 millions in Mexico to double truck production and, more importantly, to assemble luxury cars for export (Scheinman, 1993, pp. 346-347; *Expansión*, 1991c, p. 50) and BMW has also demonstrated interest in Mexico, promising to construct its fifth foreign factory there (*Expansión*, 1992b, p. 61). Thus, due to the fact that the Mexican automobile industry has undergone a thorough restructuring during the 1980s and today represents one of the more cost efficient points of entry to the North American market, new entrants are increasingly making plans to produce there as part of their global strategy to implement an international system of integrated production.

In summary, corporate strategies are important elements in the explanation of the transformation of the Mexican automotive industry. In the context of the evolving competitive situation in the international market, the new macroeconomic setting in Mexico offered passenger car manufacturers a partial solution to existing problems, or a new opportunity. In distinct manners, these companies began to redefine the role of Mexico in the context of their production systems. In the case of the US Big Three, that is, Ford, General Motors and Chrysler, Mexico provided a partial solution to the Japanese challenge in the US market, most particularly in the 4 cylinder, front-wheel drive small car market segment. For Volkswagen, it provided the possibility of reorganizing its troubled North American operations by transferring its US-based plants to Mexico in order to source the US market. For Nissan, it represented an opportunity to better integrate its Mexican and US plants in the context of NAFTA. For Renault, it enabled the firm to rationalize its North American activities, while creating a global sourcing point for 6 cylinder engines. Thus, each of these automobile manufacturers sought a way of using Mexico's altered competitive advantages in the context of the international automobile market.

²⁴ Generally, Renault tended to rationalize its investments in Latin America rather than to undertake large investment projects. In 1992, it invested about \$30 million in Gómez Palacio in order to introduce a fuel injection engine model (*América Economía*, 1990, p. 39; and *Expansión*, 1992b, p. 61).

The central aspect of the new competitive situation in the automobile market was increased **specialization** and that feature was also central to the transformation of the Mexican automobile industry from one dependent on niches or back-up facilities to a specialized producer in its own right. That was clear in the case of engines, for example, as Ford relied on Mexico as one of its key global sourcing points for the modern Zeta model used in its world car, the Mondeo. Renault also sourced from Mexico new engines for its Clio, 19, 21, and Traffic models, as well as Volvo's 440 and 480 models. With regard to passenger cars, specialization was also a central feature. Ford was the leader here, establishing world class facilities for its Tracer/Escort model. GM focussed on the Century and Cavalier models, Chrysler on the Phantom, Volkswagen on the Golf and Jetta, and Nissan on the Tsuru. Nonetheless, it must be pointed out that none of these export models came close to the scale (150,000-200,000 units/yr.) generally considered necessary to secure the highest level of production efficiency.

The strategies differed according to the relative importance given to national, regional and international aspects. Ford concentrated more on international aspects by establishing world class engine and passenger car facilities in Mexico. The sourcing of Zeta engines for the Mondeo vehicle and the export of Tracers and Escorts were significant elements of its international production system. In the case of the other passenger car producers in Mexico, regional aspects in the form of the integration of the North American production system were more evident. In the case of passenger car assemblers which gave priority to the national (Mexican) industry, such as DINA-Renault and VAM, their errors in corporate strategy led to their expulsion from the Mexican automobile industry as producers of passenger vehicles.

The transformation of the Mexican automobile industry directly involved the corporate strategies of the auto TNCs operating in Mexico because it was based on large new investments in new and modern production facilities, usually geographically-removed from the existing facilities close to Mexico City. The restructuring of the Mexican automobile industry was not simply an example of market switching on behalf of local managers, that is, exporting existing production when the domestic market collapsed, rather it was the conscious decision-making on the part of high level officials at corporate headquarters which determined the new role of Mexico within the global corporate framework. Again, Ford is probably the best example in respect of engines and passenger cars. The response of General Motors also included a significant auto parts initiative, especially in so far as in-bond production was concerned.

3. National automotive industry policy

National policy used to be the central factor in defining the local industrialization process and that was particularly the case in the automotive industry. The process of opening up the Mexican economy produced the consequence that other groups of factors, such as international market situations and corporate strategies, exerted a growing influence on the local industrialization process and the automotive sector was no exception.

In general terms it might be maintained that the history of the implementation of national policy in the automotive sector in Mexico consisted of three phases: 1962-1976, 1977-1982 and 1983-present. The first period witnessed a strong sectoral policy based primarily on import-substituting industrialization considerations. The second one represented a transition in which the original and fundamental goals of national automotive policy came under fire. The final one encompasses the establishment of new and distinct goals for national policy in the automotive sector.

While these phases can be understood in terms of the shifting emphasis of national policy makers, it should be mentioned that there existed a certain amount of zigzagging in the definition and implementation of national policy in this sector which produced considerable ambiguity (Bennett and Sharpe, 1979; World Politics, 1979) and that conflicting interests were more than apparent (Scheinman, 1993, p. 334). Two recurrent themes which reflect this ambiguity and these conflicting interests were the national aim of substituting industrial imports in the automotive industry and the balance of payments costs that this caused, on the one hand, and the national goal of securing a solid participation in the industry for majority-owned Mexican companies and the efficiency costs that this produced, on the other hand.

The import-substituting phase of the development of the Mexican automotive industry, roughly 1962-1980, resulted in the creation of a significant but not to be exaggerated production capacity (which increased from 50,000 to 600,000 units). The consolidation of the industry consisted in the marked reduction in the number of vehicle assemblers (from 19 to 7) and product diversification (from 45 makes and 117 models to 19 makes and 47 models) (Holmes, 1993, pp. 41 and 47). Still, this industry, which has been described as "one of the most heavily-protected industries in the economy" (Business Latin America, 1990, p. 3), suffered from severe problems in respect of inefficiencies due to the reduced scale of production and the use of outdated technologies, inflated prices (measured by international standards),²⁵ and an extremely weak export performance. The transformation of the automotive industry coincided with the new industrial policy evident in Mexico during the 1980s and thereafter, one in which greater emphasis was placed on a "new culture based on productivity, quality and creativity" (de Marfá y Campos, 1992, p. 16). A review of the five basic Decrees which structured the industry and a reference to the effect of NAFTA allows one to appreciate the intent and limits of national policy in this industry.

a) The 1962 Decree

Passenger cars had been assembled from completely-knocked-down (CKD) kits in Mexico since the 1920s. The new Decree of 23 August 1962 represented the government's first attempt to structure the industry according to national priorities, that is, to substitute industrial imports in the sector. The heavy hand of Government intervention was very evident in the establishment of new rules for the industry.

The central rules included the following: the prohibition of imports of finished vehicles, the establishment of production quotas for terminal assemblers, the implementation of price controls on vehicle sales, the definition of a list of obligatory components which had to be produced in Mexico and incorporated into locally-assembled vehicles (engines, transmissions, shock absorbers, radiators, batteries, rear axles and drive shafts), the requirement that locally-assembled vehicles contain 60 percent local content (measured by direct production costs), the requirement that import permits be used for all foreign components, and the requirement that manufacturers of auto parts be majority-owned (60 percent) by Mexican nationals. While this list of basic rules might appear extense and exhaustive, it represents only a part of the original aims of the Mexican government. In the bargaining process with the Mexican officials, the principal automobile assemblers succeeded in avoiding further restrictions, such as a limit on the number of producers, the standardization of certain parts, the freezing of models and limiting vehicle assembly to companies in which Mexicans owned the majority of the share capital (Bennett and Sharpe, 1979, pp. 71-72 and 88).

²⁵ Passenger vehicles assembled in Mexico carried a 20 to 40 percent premium (Business Latin America, 1990, p. 3; López-de-Silanes, 1992, p. 110).

In spite of the heavy intervention on the part of the government, an explosion of growth followed this original structuring of the industry. During the 1962-1971 period about \$500 million in foreign direct investment entered the sector, vehicle sales jumped from 65,000 to 236,000 units, employment blossomed from 8,000 to 30,000, and purchases of nationally-assembled components increased from \$17 to \$320 million (de María y Campos, 1992, p. 53). The accelerated growth of the industry did not hide from view the central problems inherent to vehicle assembly in the conditions described. It became apparent that problems of scale, price, quality, and foreign exchange availability were plaguing the industry and that a fissure had developed between foreign-owned vehicle assemblers and Mexican-owned manufacturers of auto parts. Moreover, by the early 1970s low earnings or losses were registered by most vehicle assemblers. Facing these problems, the first major action on the part of the government was to alter the regulations in 1969²⁶, however, a more far reaching initiative was the new decree of 1972.

b) The 1972 Decree

This decree of 24 October 1972 attempted to resolve some of the problems facing the sector. With regard to the balance of payments deficit for the industry, the decree formalized the 1969 change in regulations which incorporated a new instrument which related higher production quotas for vehicle assemblers to their export performance; however, it raised **import offset requirements** to 30 percent for 1973 and 60 percent by 1976. Furthermore, it obliged assemblers to include auto parts from Mexican suppliers to a degree of 40 percent of total exports. In this regard, the authorities clearly sided with the Mexican auto part industry in its dispute with foreign-owned assemblers. In terms of other problems, an incentive scheme was established for domestic sales, and attempts were made to rationalize vehicle assembly by limiting the number of product lines (four) and makes (three) in the subcompact sector.

Over the next five years the industry continued to expand, sales reached 299,000, employment expanded to 40,800, and auto part exports jumped to \$117.9 million. From the early 1960s until the balance of payments crisis of the mid-1970s the automotive industry had expanded at more than double the rate of the manufacturing sector as a whole. It came to represent 7 percent of the value of the production of the manufacturing sector. However, the industry was becoming a heavy foreign exchange drain on the balance of payments and, in spite of the improved export performances on the part of vehicle assemblers, they were unable to meet their export commitments during 1974-1975. A severe balance of payments crisis ensued in 1976. A new decree was issued to attempt to deal with the persistent problems in the automotive industry.

c) The 1977 Decree

This decree, issued on 20 June 1977, represented a fundamental revision to the import substitution focus of the promotion of the automotive industry and the "Mexicanization" of the auto parts industry; nevertheless, it sent mixed signals to producers. The new element was to establish **annual foreign exchange budgets** for vehicle assemblers. These budgets were relatively sophisticated taking into account the imported elements of purchases from Mexican suppliers, the royalty and interest payments to external sources on the part of the assemblers, etc. Assemblers were required to produce balanced foreign

²⁶ The principal aim was to improve the balance of payments situation of the sector by promising assemblers higher production quotas if they began to offset their import bill through new exports. The goal for 1970 was a 5 percent offset, to be raised to 15 percent in 1971. Exports need not be finished vehicles, assemblers could export components produced by Mexican manufacturers. One unintended effect of this change in regulations was that Chrysler felt it necessary to buy out its local partner in order to assume export commitments (Bennett and Sharpe, 1979, pp. 188 and 192).

exchange budgets by 1981 and to increase the proportion of Mexican auto parts in their exports to 50 percent in the process.

Other aspects of the new decree included the constitution of a new Intersecretariat Commission to oversee the industry; the elimination of price controls; a new system for measuring local content (based on the cost of new parts rather than direct production costs); and, the loosening of limits on the number of lines and models permitted. Thus, the decree was a mixture of carrots and sticks which produced mixed results.

Though the 1977-1982 period was later to be considered the golden era for domestic market sales, it did have an important down side in at least two ways. The export performance of the sector for the most part stagnated at the \$400 million level and significant efficiency losses were associated with the new proliferation in the number of lines (from 15 to 19) and makes (from 36 to 47). The surge in domestic demand for consumer durables which resulted from the petroleum boom in Mexico evidently had a strong influence here.

The golden age for domestic automobile sales (which reached 585,000 units) also included an accelerated expansion in employment (from 40,800 to 94,300); however, the most important development was the huge inflow of foreign direct investment destined to **new engine plants** in northern Mexico constructed by the principal assemblers in order to export to the North American market (Moreno 1988, p.29). Engine exports reached over \$200 million by 1982. One year later, Mexico was exporting 708,000 engines and the automotive sector trade balance was showing a surplus. This was the first stage in the incorporation of the Mexican automotive industry into the North American one and the 1977 Decree, by way of the new foreign exchange budget mechanism, was an important element in the decision-making process by the vehicle assemblers operating in Mexico to make the necessary investment and to take Mexico into consideration.

The international debt crisis began in August of 1981 when Mexico informed its foreign creditors that it was not in a position to meet existing external commitments. Domestic automobile sales dropped vertically from 571,013 in 1981 to 272,815 units in 1983. Vehicle assemblers accumulated over \$1,500 million in losses during the following five years. A new decree was proclaimed to deal with the bottom falling out of the domestic automotive market.

d) The 1983 Decree

The new decree, enacted on 15 September 1983, was a first consequential attempt by Mexican authorities to assist vehicle assemblers to integrate their Mexican operations into their international production system. The principal novelty of the new decree was the use of **additional production lines** to internationalize domestic production in terms of destination and to introduce international standards in the national industry (de Marfa y Campos, 1992, pp. 63-73). Vehicle assemblers were permitted to begin production in new lines for export (a maximum of 20 percent of production could be sold in the domestic market) if and only if the new lines were totally self-sufficient in foreign exchange (by 1987) and maintained a minimum local content of 30 percent, according to the cost of parts method of calculation. Assemblers were also given the option of improving the trade deficit situation of regular production lines by way of a sliding scale relating the degree of local content to the level of export sales. At the same time, the local content requirements for regular makes increased from 50 percent in 1984-1985 to 60 percent in 1987. Assemblers thereby were given a very strong incentive to begin production of additional export makes.

Other significant aspects of the 1983 decree were the establishment of the Consultative Committee for the Automotive Sector which brought assemblers —as participants— into the decision-making process related to the industry; a reduction in the number of regular product lines (from 3 makes and 7 models to 1 make and 5 models); a requirement that 25 percent of passenger cars for the domestic market be "austere",²⁷ that is, cheaper models that offered no optional equipment; the prohibition of V-8 engines for domestic consumption and limits on the importation of certain luxury equipment. This decree again sent mixed signals to producers by incentivating both increased exports and higher local content at the same time. The difference now was that the vehicle assemblers themselves were given greater flexibility by which they could adapt to the new government requirements. For the first time the importance of corporate strategies was recognized (Unger, 1985, p. 443) and there was a clear attempt to accommodate national policy to the goals of auto TNC corporate strategies.

The implementation of this decree coincided with major investments in **new plant and equipment for vehicle assembly**, mostly in northern Mexico, in order to introduce additional production lines for export, as the examples of Ford (Tracer and Escort),²⁸ General Motors (Century), Chrysler (Phantom) and Volkswagen (Jetta and Golf) suggest. Between 1983 and 1989, the automotive industry thrived while the domestic economy shrivelled. Installed capacity reached almost 1 million units, sales shot from 295,000 to 641,900 units, employment jumped from 94,000 to 176,000, engine exports went from 708,000 to 1,500,000 units (reaching a value of \$1,366 millions in 1989), vehicle exports went from 22,456 to 195,999 units (reaching a value of \$1,567 millions in 1989) and the trade surplus for the sector exceeded \$1,700 millions. Although it had little to do with the automotive decree of 1983, it might be mentioned that maquiladora exports of auto parts exploded during the 1980s as a consequence of the sharp devaluations of the Mexican peso.

On the negative side, the automotive decree of 1983 did not resolve the problems associated with the high levels of local content required for domestic passenger car models and a two-tiered automotive industry developed. Level one consisted mainly of the old plant and equipment found in the Mexico City area where relatively large and obsolete models were produced for the domestic market. The increase in local content requirements contained in the 1983 Decree represented an increase in costs in the order of 8-25 percent for these already overpriced vehicles during the recession (López-de Silanes, 1992, p. 110). Level two consisted of the new plant and equipment found mainly in northern Mexico where the new and modern export models were assembled to be shipped primarily to the North American market. Thus, to a certain extent, the contradictions implicit in the 1983 Decree were creating two distinct segments within the same automotive industry.

The success of the 1977 and 1983 Decrees in stimulating huge foreign direct investments in engine and vehicle assembly plants in northern Mexico, which was the backbone of the process of transformation of the Mexican automotive industry, provided national decision-makers with the confidence to make more flexible the rules for the industry without the need of a crisis to justify it in 1989.

²⁷ Later, in August of 1989, this concern was translated into a 'popular' car policy which consisted of providing tax free treatment and tariff free importation of components for vehicles which reached a 40,000 level of production and were offered for sale at \$5,000. Only the Volkswagen Sedan (Beetle) qualified for the program. In 1990, such popular car sales reached 84,245 units equivalent to about 25 percent of all passenger car sales (de Maria y Campos, 1992, pp. 171-172).

²⁸ Shapiro maintains that Ford's much-heralded Hermosillo plant resulted mainly from the companies need to fulfil the government's foreign exchange requirements (Shapiro, 1993, p. 125).

e) The 1989 Decree

According to one industry commentator, the new decree of 11 December 1989 "displayed the adeptness of the new Mexican government at negotiating with some of the world's most powerful multinational corporations" (Scheinman, 1993, p. 336). In essence, Mexican officials demonstrated their willingness to deregulate and modernize the industry, introducing much greater flexibility into the operations of the vehicle assemblers, in the name of achieving fuller international competitiveness for the sector. Import substitution priorities and the staunch defence of the Mexican auto part makers were sacrificed in the process.

The major innovation of this decree was to rely more on carrots than sticks, granting vehicle assemblers much more liberty in adapting to national goals for the sector. The principal new instrument concerned allowing established vehicle assemblers to **import finished vehicles** under certain conditions. Assemblers with positive trade balances (a wider concept than that of the foreign exchange budget because up to 30 percent of foreign direct investments could be included) were allowed to import finished vehicles, initially to the equivalent of 15 percent of domestic sales. For every dollar value of imported new cars, the assembler had to export \$2.50 for 1991, \$2.00 for 1992-1993 and \$1.75 for 1994. This allowed the auto TNCs operating in Mexico to consolidate the role of Mexico in their corporate strategy not only by sourcing entry level vehicles from Mexico but by supplying the Mexican automobile market with North American-produced vehicles.²⁹

Deregulation was a principal characteristic of the 1989 decree (Centro de Análisis e Investigación Económica, A.C., 1989, pp. 14-16). The local content requirement was drastically reduced to 36 percent for regular lines (export lines continued with a 30 percent minimum local content). The list of obligatory nationally-produced components was eliminated and assemblers were free to select their own suppliers, national or foreign. The limits on the number of makes and models was also eliminated. In other words, international competitiveness definitively replaced the import-substitution and Mexicanization goals which had figured explicitly or implicitly in the previous automotive decrees.

The response of the industry could be appreciated in the number and magnitude of new foreign investment projects (about \$5,000 billion) realized by established assemblers. Passenger vehicles sales surpassed the 800 thousand unit mark in 1993 and vehicle exports exceeded 424,000 units (reaching almost \$4 billion in 1991). Vehicle imports were only in the order of 6,000 units in 1992 (mainly Nissan models: Maxima, Sentra and 300ZX). A tendency toward increased specialization was evident.

These very positive results in the automotive industry had to be tempered by certain preoccupations. First, in spite of the low level of vehicle imports, a new trade deficit was registered in the sector as of 1991. Second, what appeared to be a process of denationalization of the Mexican companies operating in the auto parts industry was perceived (Scheinman, 1993, p. 344). Third, and perhaps the most important preoccupation was the fact that in spite of all the new investment and strong tendencies toward specialization, the typical scales of production of export lines in the new more modern and competitive automotive industry still did not exceed 100,000 units a year, except for the case of Nissan's Sentra (Tsuru) model.³⁰

²⁹ In order to protect the \$1-1.5 billion investments announced separately by Volkswagen and Nissan, the importation of subcompacts was prohibited until 1993, when those investments were to come on-stream.

³⁰ The 1992 figures are found in AMIA (1993).

While it does not fall directly under the purview of "national" policy, the North American Free trade Agreement (NAFTA), which came into effect on 1 January 1994, has clear consequences for the Mexican automotive industry. First, over a period of 15 years the Mexican automotive industry will become even more fully integrated into the North American industry, making national policy even less important in respect of the implementation of corporate strategies. Second, during this period the regional market is reserved to existing companies presently operating in Mexico, thereby consolidating a strong advantage for the Big Three US automobile producers vis-a-vis any possible newcomers. Third, the regional content requirement (eventually 62.5 percent) provides a strong advantage for the US Big Three vis-a-vis other non-US vehicle assemblers operating in the Mexican market, that is, Volkswagen and Nissan.³¹ Taken in association with the 1989 Decree, NAFTA guarantees that the US Big Three will get the lion's share of the growth in the Mexican automotive market (Olea, 1993, pp. 357 and 360) and presents a sharp challenge to Mexican auto parts manufacturers to become associated with the TNC owners of modern technology or disappear (*Expansión*, 1992c, p.62). Trade flows now result more from considerations of corporate strategies than the demands of national policy (Mattar and Schatan, 1993, p. 123). In other words, the corporate strategies of the auto TNCs operating in Mexico have become the central elements defining the nature of the industry, national automotive industry policy has become more of a contextual factor.

In summary, the national automotive policy consisted of three phases in which the original import substitution and Mexicanization priorities of the authorities were gradually and continuously replaced by new considerations related to balance of payments, efficiency and international competitiveness concerns. National automotive policy in this sense was transformed from a set of rigid regulations which attempted to oblige auto TNCs to perform according to the instructions of Mexican authorities into a contextual factor which allowed auto TNCs to incorporate their Mexican operations into their international production system in a relatively flexible manner. To the extent that government policy accommodated the corporate strategies of the auto TNCs operating in Mexico in facing up to the problems of the Japanese challenge in the international market, greater was the reliance of those same TNCs on their Mexican operations, as the subsequent flows of foreign direct investment and trade in vehicles and auto parts makes manifest. The result was the transformation of the Mexican automotive industry, the best example of the restructuring of a TNC-dominated industry in Latin America since the debt crisis of the 1980s.

III. LESSONS AND CONCLUSIONS

Much of Latin America's industry can be classified as "sitting ducks" in the sense that the nature of the import-substituting industrialization process created many inefficient and technologically-obsolete industries which were not able to survive in the face of international competition without very high levels of tariff protection or preferences on the part of national economic policy. Moreover, the ISI process reached its limits during the 1970s in Latin America and its demise was signalled by its "exhaustion", which reached crisis proportions when measured by the foreign exchange deficit generated by the same process. While the dead-end of ISI could be postponed by recourse to ever-increasing foreign bank credits to fill the foreign exchange gap, it could not be postponed indefinitely. In this sense, the international debt crisis of the early 1980s also signalled the death knell for ISI, even in its postponed version.

³¹ The US Big Three carefully orchestrated their policy of separating 'insiders' from 'outsiders' in the eyes of US policy makers (Transnational Corporations, 1993). This had direct relevance for the NAFTA scheme.

It became commonplace to refer to Latin American industry, particularly State enterprises, as inefficient and uncompetitive, yet only rarely were such terms applied to foreign-owned manufacturing operations (Newfarmer, 1985), as they were thought to embody new capital contributions, modern technology and best-practice manufacturing practices. Even where national policy makers succeeded in enforcing strict performance requirements on the operations of foreign-owned companies, the result was more often than not the decline in investment flows rather than the improvement in international competitiveness (Mortimore, 1985a and 1985b; ECLAC, 1986). In many cases, the foreign-owned industry was in as dire a need of industrial restructuring as was national industry in order to make it internationally competitive. It was necessary to transform foreign-owned sitting ducks into flying geese.

Clearly, the pattern of industrialization in Latin America has not followed the same virtuous path apparent in much of developing Asia, where there is an evident interrelationship among the transfer of foreign technology, flows of foreign direct investment and currents of international trade which has produced the highly-competitive flying geese of that region. The Asian NICs, the ASEAN 4 and China, in distinct degrees, seem to be successfully emulating the international conquests of their Asian mentor, Japan, in such industries as electronic equipment and electrical machinery, as well as the automotive industry, by generating national competitors for the transnational corporations which dominate these industries. Government policy backed local winners.³²

The automotive industry in Latin America was one of the most obvious examples of a foreign-dominated import-substituting industry in which US and European TNCs had created sitting ducks behind high import protection and where exports were scarce, measured as a proportion of local production. The advent of the debt crisis, the need for structural adjustment and the strong tendency toward trade liberalization produced a powerful challenge for resident foreign-owned TNCs in Latin America to sell out, or to adopt a defensive strategy by rationalizing (reducing costs of) the local operations in order to remain competitive in the local market, or to restructure their existing operations within the context of the international production system of their headquarters company so as to make them internationally competitive. The experience of the Mexican automotive industry is the best example in Latin America of this third option, that is, to transform a foreign-owned sitting duck into a flying goose.

It must be emphasized that the successful example of the Mexican automotive industry does not represent a "first best" in the sense that it is the internationalization of a national industry, led by national firms conquering foreign markets (as might be considered the Korean automotive industry, for example), rather it represents the successful incorporation of the Mexican operations of primarily US (not Japanese) auto TNCs into their international or regional production systems by way of intrafirm investment and trade. It was not that Mexican policymakers consciously altered the structural nature of their integration into the international production system through national policy implementation rather it was more a case of the national government facilitating decisions taken by the TNCs themselves in terms of restructuring their corporate international production system so as to better compete in the international market.

As a "second best" arrangement, it has been subjected to numerous criticisms. It has been charged that the restructuring of the industry has resulted in the shift from manufacturing passenger cars and auto parts to an auto maquiladora operation due to the severe decrease in the level of national value-added in the automotive exports (Carrillo, 1990, pp. 67-113). It is said that the restructuring process consisted of

³² This theme can be appreciated in World Bank (1993); and the reaction it provoked in World Development (1994) and UNCTAD (1994).

the replacement not the reconversion of the Mexican automotive industry given that the new export industry in northern Mexico was created far from the existing local market-oriented industry close to Mexico City (Acevedo, 1990, pp. 173-203). The dual industry which was created is thought to exemplify the contradiction between high skills and low wages that faces the North American automotive industry (Herzenberg, 1993, pp. 303-327). The new arrangements undoubtedly mean the destruction of Mexican auto part producers incapable of associating themselves with the TNC owners of competitive technology and/or unable to carry out the massive investments needed to specialize in internationally competitive activities (*Expansión*, 1992c, pp. 62-65). Finally, the modern and competitive automotive industry in Mexico is criticized because its most advanced plant (Hermosillo) is controlled from Detroit not Mexico City (Shaiken, 1990, p. 21, note 59) and because even a competitive auto TNC, such as Nissan, cannot make its vaunted production practices (such as low defects and automated just-in-time) function well in Mexico (*Expansión*, 1992a, pp. 7-11; Womack, 1990, pp. 19-34).

These criticisms all contain an element of truth, however they do not diminish the fact that the restructuring of the Mexican automotive industry represents a **great improvement** of that industry in which best practice technology (or a hybrid version of such) was successfully transferred to Mexico (Shaiken and Herzenberg, 1987, p. 119; Ramírez, 1993, p. 63; Shapiro, 1993) and by which it becomes the principal beneficiary of the configuration of a regional scheme for the North American automotive industry (US Congress, 1992, pp. 133-150; Hunter, Markusen and Rutherford, 1992, p. 80). There is no doubt that the Mexican automobile industry has been transformed from a sitting duck into a flying goose, albeit in a slower flock.³³

The analysis contained in this study has demonstrated with some considerable detail that a plethora of factors has influenced this outcome. Among the principal groups of factors are the competitive situation in international automotive markets, the corporate strategies of the principal auto TNCs, and Mexican automotive policy. Change in the competitive situation in international markets, most evidently the Japanese challenge in the US market, led the US Big Three to react and part of that reaction concerned the search for low cost producers of entry-level passenger cars in developing countries. That reaction on the part of the US auto TNCs set the stage for the transformation of the Mexican automotive industry when Mexican automotive policy was adjusted to accommodate the shake-out taking place in the international automotive industry. The comprehension of how and why the transformation of the Mexican automotive industry took place is as important as the recognition of that transformation itself.

The successful transformation of the Mexican automotive industry, from sitting duck to flying goose, is part of a process not an established fact. It still faces important challenges. One such challenge is to increase the scale of production of export models of passenger cars to the 100-150,000 units per year range so as to heighten its international competitiveness. Another strong challenge is to develop a network of world class suppliers to the terminal assemblers (Olea, 1993, pp. 353-369),³⁴ such that when these assemblers no longer are required to locally produce passenger cars in order to import finished vehicles into the Mexican market, according to NAFTA rules, the industry will not be converted into a permanent source of major foreign exchange deficits.

³³ Moreno's article is relevant here. One might also consult Ozawa (1994).

³⁴ For an appreciation of Chrysler's advances in this regard, see *Business Latin America* (1994a, p. 6).

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