

AN ANALYSIS OF MEXICO-US INTRA-FIRM AND INTRA-INDUSTRY TRADE IN AUTOMOBILES*

Per Strömberg

I. INTRODUCTION

Intra-firm trade (IFT) is an important part of the process of globalization (Bonturi & Fukasaku, 1993:7), which usually is related to transnational corporations' (TNC) worldwide strategies and networks. Today, some 40 percent of US foreign trade is IFT. Overall, it influences prices, volumes and direction of trade. For instance, Baumann (1995:32) states that IFT is the main reason behind the Japanese trade surplus in Japan-US trade. As for the TNCs, they tend to operate in imperfectly competitive markets with a limited number of companies owing to economies of scale and scope; often in sectors which are R&D-intensive and complex due to the importance of innovation and product differentiation in competition. This underscores the need of having close links with suppliers and customers but also the importance of market access and presence (OECD 1995:13), which statistically express itself in increasing foreign direct investment (FDI)¹. IFT has become a natural step to meet these needs, especially within TNCs involved in transport equipment and machinery. In those industries, IFT is likely to occur because of location-specific cost advantages related to economies of scale and scope as well as the importance of vertically differentiated goods where quality is a function of relative capital input. This is for instance the case of IFT between developed and undeveloped countries, when TNCs parents in capital-abundant countries produce high-quality varieties of a product whilst their affiliates in labor-abundant countries produce low-quality varieties (Greenaway & Hyclak 1989:52). This kind of IFT, however, poses a dilemma for the host government. It can be expressed by the desire for obtaining FDIs (in capital and technology), but at the same

* This is an abridged version of a longer report on the same subject. The author wishes to thank the Editor of this journal for detailed comments and suggestions which have contributed to sharpening the analysis and improving the exposition of this article.

time restrict transfer price manipulation connected with IFT as this lowers tariff and tax incomes (Helleiner 1981:4, 14). Moreover, since IFT is characterized by relatively low short-run price elasticity, it can lead to inflexible trade flows and reduce the effectiveness of exchange rate policies (Zejan 1989:815).

In this study I try to throw light on factors behind the Mexico-US trade in automobiles. Special emphasis is put on the role of IFT and the influence of policy factors on that trade. Accordingly, the empirical part of the study focuses on the 1990-1997 period when the institution of the North American Free Trade Agreement (NAFTA) and the economic crisis were changing radically the economic environment and the conditions for market access in Mexico. A collateral issue in the study is about the relationship between IFT and intra-industry trade (IIT) in a context of bilateral trade liberalization. As shown by several authors, IIT is extensive in world auto trade – in trade between European countries, for example. I intend to explore the issue in the case of Mexico-US trade as well as the link with IFT. The study is based on both statistical sources and interviews.

II. SOME THEORETICAL ISSUES

Types of Trade

One way to define different types of international trade is to distinguish between inter-industry trade as opposed to intra-industry trade, and arm's length trade as opposed to intra-firm trade. Inter-industry trade is the conventional trade performed in accordance to classic trade theory, i.e. trade in different products (Portugal exports wine to England and England exports cotton to Portugal), while IIT is trade in the same product category (England exports as well as imports cotton) (Bonturi & Fukasaku, 1993:15). Most trade in manufactured goods within OECD is of the IIT type, while North-South total trade normally is of the inter-industry type (Ibid.:5). Arm's length trade, in turn, is defined as the trade conducted between unrelated parties, while IFT is defined as the trade performed within the same firm. A more distinct definition of IFT is found in Siddharthan and Kumar (1990:581): "The intra-firm trade ... represents essentially the replacement of the market by the internal organization of the firm". According to these authors, IFT transfers TNC's factors of production, or final goods, from one country to another. Seen from this perspective, factor movements and trade in the form of IFT appear as complementary instead of substitutive – as is the case in Heckscher-Ohlin

theory – with the TNC as the vehicle of transfer. The latter would engage in FDI in order to specialize in different varieties and production – processes in different countries.

IFT has also been called ‘related-party trade’ meaning that the related firm can be a minority-owned related firm or a majority-owned foreign asset (MOFA). A further distinction made in the literature is that between IFT for resale or rental or for input into a vertically integrated TNC (Helleiner, 1981:34). The former is the distributional form of IFT. Lall, (1978:210) found that in 1970, 53 percent of all US intra-firm exports was channeled through manufacturing affiliates, and 47 percent by distributive affiliates.² However, half of the value of the intra-firm exports to manufacturing affiliates were aimed for direct resale without further manufacturing, and only 36 percent of the same value were goods for further processing or assembly.

Internalization Approach

The internalization approach to IFT focuses on two main factors, namely, technology transfer and vertical integration. With regard to technology transfer, it is apparent that the alternative of IFT is to transfer technology to an unrelated firm located in the host-country, by sale, or by royalties or licensing. However, by internalizing trade, the firm avoids certain difficulties in the sale or licensing of know-how such as problems in learning out the new technology as well as pricing and property rights problems. The second factor leading to the internalization of trade is vertical integration by which the firm avoids the risk for higher prices for inputs because of potentially monopolistic downstream agents. Further, it may better secure just-in-time deliveries and avoidance of price fluctuations etc. (Krugman & Obstfeld, 1991:166-7). By internalizing former purchases from suppliers the firm also internalizes the supplier’s profit margins (Lall, 1978:213) and eliminates host country joint-owners’ share of profits (Helleiner, 1981:54). Other authors have added transfer price manipulation to the internalization incentives. As stated by Zejan (1989:814); “A transfer price...[is]...the price used for internal sales of goods and services between the divisions of a business enterprise.” By disguising capital transfers as expenditure flows TNCs may hide the real transaction prices between the parent company and its affiliates, reduce tariff costs, move profits internationally to low tax countries and avoid exchange controls. Focussing on the United States TNCs, Bonturi and Fukasaku (1993:30) pointed out that the lower the tax rates of host countries, the higher is the value of exports shipped by US parents to

foreign affiliates, and thus the greater is the incentive for profit shifting through transfer pricing. Other internalization incentives connected to vertical integration include high transaction costs of search and negotiation and uncertainty reduction of the economic environment. Furthermore, internalization also implies the minimization of problems connected to exchange rate fluctuations (Ibid.:8) and provides a means of exploiting more favorable environmental laws in host countries (Helleiner, 1981:14, 54).

Some authors have criticized the internalization explanation of IFT. They mean that the incentives mentioned before are more or less the same factors that explain vertical integration in contexts other than IFT. For example, Benvignati's study (1990:481) based on econometric analysis of US arm's length compared with intra-firm exports, finds weak support for internalization theory as explaining IFT better than it explains arm's length trade.

Empirical Evidence on Internalization

Empirical research on IFT suffers from data constraints resulting in limited and mostly relatively old periods investigated, as well as a small degree of industry details. As a consequence most literature treats the IFT in total trade, or only briefly industry-wise.³

Table 1 - Factors Behind IFT, Econometric Results by Various Authors.

Author	Period	Region and trade direction	Result ^a
Bonturi & Fukasaku [1993]	1977, 82,89	U.S. imports and exports, specific countries	R&D (+), Human capital intensity (+)
Helleiner [1981]	1975-77	U.S. imports from: 1) OECD 2) Third World	1) R&D (+), Skill intensity (+), Firm size (+) 2) R&D (+), Advertising (-)
Lall [1978]	1970	U.S. exports	R&D (+), FDI (+), After-sale activity (+), Divisibility of production processes (+)
Siddharthan & Kumar [1990]	1982	U.S. imports and exports	R&D (+), selling expenses (+), pollution Intensity (+)
Zejan [1989]	1978	Foreign MOFA's imports from Swedish mother companies	R&D (+), multinationality (-)

^a The variable which got a significant coefficient.

Source: Bonturi & Fukasaku (1993:29), Helleiner (1981:62), Lall (1978:219), Siddharthan & Kumar (1990:587), Zejan (1989:819).

As seen in Table 1, econometric analysis often verifies the assumptions of the internalization approach to IFT, particularly by showing a positive correlation between IFT and technology intensity as

measured by expenditures in research and development (R&D). Technology intensity is here taken as a proxy for the technology transfer argument.

However, Lall (1978:221) found that firms with extreme values of R&D conducted less IFT, which he explains referring to the 'product cycle theory' as well as the presence of economies of scale. First, Lall relates extreme R&D costs in the mother company to a situation where the firm's product portfolio is in the initiation phase, and thereby not sold abroad by IFT or by arm's length trade. Second, the author argues that high R&D may be connected with high levels of economies of scale, thereby making production diversion abroad to plants potentially uneconomical. I argue that this connection is weak, as large TNCs normally have products in different stages of maturity at the same time, and with divisible production processes with separate potential for economies of scale.

Two studies by Helleiner (1981) positively correlated human capital intensity/skills with United States IFT. The author's explanation is that this variable possesses certain advantages that are a potential source of quasi rent, hence beneficial to internalize (Ibid.:62). I also regard this variable to be a good proxy for know-how intensity and thereby for the technology transfer argument stated above. Another interpretation found in the literature is that, in the case of terminal products, technology intensity normally induces a high need for after sales service which motivates internalization. In the case of intermediate products, high technology intensity means complicated as well as possibly strategically sensitive production processes less suitable for handing over to agents etc. The author found US intra-firm imports from the Third World to be negatively correlated with advertising expenditures, possibly explained by the fact that these imports to a great extent consist of intermediate – or standardized goods (Ibid.:62). He further notes that TNCs are likely to internalize when: a) intermediate products are highly specific to the firm regarding quality, specifications, technology etc.; b) the risk is high for intermediate input supply disruptions or price alterations; c) there are substantial marketing or after sales requirements; and d) the tax or exchange control is weak (Ibid.:54). Moreover TNCs will seek to divert activity to affiliates when there exist scale economies in different production phases (Ibid.:54, 55), which is another incentive connected to vertical integration; or alternatively, in the presence of close vertical cross-border integration. Finally, Lall (1978:219) confirmed that FDI and intra-

firm exports had a positive relation and also found a positive relation between "divisibility" of production processes and IFT.

To conclude, the literature summarizes the internalization incentives in the broad categories of technology transfer, vertical integration and transfer pricing. However, I would like to highlight the impact of policy factors such as changes in trade-barriers, domestic regulations and incentives, which by affecting market access may have differential impacts on IFT and arm's length trade.

Intra-Industry Trade and IFT

As defined by Grubel and Lloyd (1975, p.1) IIT is "the simultaneous export and import of goods from the same industry". The commonly cited conditions for IIT are product differentiation, as stimulated by market imperfections such as economies of scale, overlapping demand and preference diversity as well as factor movements and similar factor endowments (Greenaway et.al, 1989:32).

Economies of scale are easier to exploit in a context of trade liberalization and liberal investment regulations, and the econometric evidence on the trade liberalization-IIT link show a strong bias towards a positive relationship (Ibid.:35). Preference diversity in turn stems from the fragmentation of taste, which normally depends on high per capita income (Ibid.:32). According to this, IIT is more likely to occur between developed nations than between the latter and developing countries. As industrial countries have become increasingly similar in their levels of technology and resources (availability of capital and skilled labor), specialized production resulting in IIT has gained increasing significance in world trade at the expense of trade based on conventional comparative advantage factors (Krugman & Obstfeld, 1991:139)

No conclusive evidence on the connection between IFT and IIT has been found (Becuwe & Mathieu, 1992:49), nor between trade liberalization and IFT (Helleiner, 1981:7). Nevertheless, Greenaway (1989:31) found some evidence on the IFT-IIT-link in the context of the European Community where the IIT conditions stated above also were present. Following trade liberalization, foreign FDI surged (see also Grubert, 1991:290) which resulted in higher intra-firm trade (see also Benvignati, 1990:481), recorded as intra-industry trade. Greenaway refers to a customs union, but since the binding factor in his model is trade liberalization the conclusions drawn could be applicable on a free-trade agreement (FTA) such as NAFTA as well. The model builds on the assumption that trade liberalization combined with increasing FDI allows

the firm to exploit the rents from firm specific advantages, as well as satisfying the need for reconnaissance of new markets with the result of growing IFT and IIT. In the case of vertical integration, the TNC may "peel off" parts of the production process to take advantage of the division of labor etc. offered in a large market. Whether this process results in IFT or not depends, however, on the required ownership-location-internalization (OLI) precondition (Greenaway et.al, 1989:49). The bearing factors in OLI are the same as for the internalization approach described in the earlier section on 'internationalization approach'. It is probable, however, that for a given set of OLI advantages the probability of the FDI-IFT-IIT link is higher in an integrated than in a non-integrated market. This is due to the facilitation of capital movements in an integrated market.

III. THE MEXICAN PASSENGER CAR INDUSTRY

Kol and Rayment (1989:58) argued that; "the world car strategy is based explicitly upon transnationally integrated production between the overseas affiliates of the parent company". Mexico is a good illustration of this. The car manufacturers present in the Mexican market are the US "Big Three" - that is General Motors (GM), Ford and Chrysler; three German firms, namely Volkswagen (VW), Mercedes-Benz/Freightleiner⁴ and BMW; and the Japanese Nissan and Honda. Mercedes-Benz/Freightleiner, BMW and Honda are excluded from this study due to their very limited participation in Mexican car production and sales.

The Mexico-US automotive industry is a highly integrated one, vertically and across the borders with wide nets of closely connected upstream suppliers and domestic distribution (Jenkins, 1987:119). Historically, US auto firms operating in Mexico have been engaged in the production of vehicles for the local market and of parts to be used as inputs in domestic and US production. The result has been a complex web of Mexican maquiladora assembling⁵ of parts, and non-maquiladora production and assembling of parts as well as vehicles. This production is dependent on flows of intermediary and capital goods provided by the own corporation. Taken together, this trade gives rise to IFT as well as to IIT flows (further described in sections 4 through 7).

Competition in the Mexican auto industry can be described as monopolistic. On the one hand, there are only five large companies present in the market, all conducting production of goods that are good substitutes for each other (Krugman & Obstfeld, 1991:127). On the other hand, there is the fact that the relevant market is subject to considerable barriers to

entry, arising from both institutional factors such as limited market access (see 'Market Access' in section V) and industry-specific factors such as economies of scale. The latter are an essential consideration in world auto production and trade (Koi & Rayment, 1989:58). Wide and costly product ranges and large investments in capital goods and fabrics call for the need to spread out the sunken costs on a maximum of produced units. Romero (1991:253) argues that the Mexican motor equipment industry is not subject to such significant economies of scale. This may be true in the autoparts industry which consists of many small firms, but not in the terminal sector. Besides, there is the fact that Romero's observations were made before the 1980s, that is prior to the date when the US Big Three began implementing their new strategies oriented towards narrow product ranges in order to gain economies of scale advantages. The background to this change in corporate strategy was the surging global competition from cost efficient Japanese cars. In order to meet this challenge, Ford restricted its Mexican product range to only two models and increased its Mexican production of Ford Escort from an annual of 20 000 to 100 000 units in the 1988-92 period (BID 1998:72). This was a key factor behind the increased Mexico-US auto trade in that period.⁶ Certainly, the US-based firms operating in Mexico needed to compensate themselves for the narrowed local product range by increasing their imports from the US-plants (OECD 1998:72) while expanding their exports of the locally produced varieties to the US market. A strategy that was facilitated by the export-subsidies instituted by the Mexican authorities (Mercado & Taniura, 1991:849). The introduction of such subsidies occurred in the wake of the 1982 Mexican crisis when the Mexican government saw the need for a new auto industry export orientation (Ibid.:848). In this context, Mexico to a growing extent came to take the shape of an export platform for foreign TNCs. A reference can also be made to Bonturi and Fukasaku (1993:12) who have noted that IFT under some circumstances influences trade liberalization. In the present case, the United States TNCs and the Mexican economy achieved more efficient car production and access to export markets, but had to pay the price of increased complementing imports.

The Mexican government has also attempted to increase the benefits of local production by restricting the number of companies and thereby stimulating investments on scale.⁷ The instruments used to achieve this objective have been increasing import tariff, restricting entry and limiting the degree of horizontal differentiation (i.e. the number of models). In the past, the government used tax incentives to encourage the production of

small cars. Today, direct subsidies are used to promote small car production. An example of this is the production of VW-Beetle and GM-Chevy. Other types of economies, which are extensive in the automotive sector, are economies of scope with large potential gains in the sharing of knowledge and marketing expenditures etc. within the corporation, and external economies. The latter are present for example in the Mexican auto production belt located in the center of the country (between the cities of Guadalajara, Toluca, Mexico City and Puebla). Krugman and Obstfeld (1991:147) argue that strong external economies tend to confirm existing patterns of trade and that large producers within an industry therefore tend to remain large. Only large foreign TNCs are present in the Mexican automobile market.

As suggested before, FDI is one measure of the presence of TNCs and IFT in Mexico (Benvignati, 1990:481). Bancomext (1999) reports FDI in Mexican auto industry to have reached USD 2.6 billion in the 1994-1996 period, of which US contributed with 73 percent, Germany with 9 percent and Japan with 5 percent. The lions share of this FDI was directed to manufacturing of combustion engines followed by motor vehicle production. As seen in Table 2, the evolution of auto FDI follows one of overall manufacturing FDI, albeit with a more volatile pattern.

Table 2 - Foreign Investment in the Mexican Automotive Industry and the Manufacturing Sector, 1990-1995 (USD millions and yearly percentage change)

Year	Automotive investments	% growth	Manufacturing investments	% growth
1995	412	-86	3.885	-48
1994	2.860	78	7.432	67
1993	1.608	203	4.460	45
1992	531	-44	3.068	-4
1991	956	253	3.191	49
1990	271	---	2.148	---

Source: OECD 1998.

The varied pattern is likely to reflect industry specific characteristics such as the need of long-term substantial but irregular investments in plants which is not always possible to coordinate with economic trends. However, the FDI pattern has followed rather well the tendency of Mexican auto production and imports.⁸ The strong 1994 figures are likely to be caused by the optimism during the Mexican 1990s economic boom. GM, for example, planned to set up six maquiladora plants for assembling of parts beginning in 1994 (Mattar & Schatan, 1993:113). Furthermore, the

substantial 1995 drop is probably due to the Mexican economic crisis and occurred in spite of that GM as well as Ford built new plants that year.

IV. MEXICO-US AUTO INTRA-FIRM TRADE IN THE 1988-1997 PERIOD

Most of Mexico-US automobile trade is IFT in the distributional form (Mercado & Tanuira, 1991:849)⁹, and the two factors which most affected that trade in the 1988-1997 period were changes in market access and in the macroeconomic environment (interviews Gómez, Körte). I shall come to that shortly. But let me first present some empirical evidence on Mexico-US IFT in passenger cars. The data are taken from Secofi (Mexican Department of Foreign Commerce), and DataIntal which use the Harmonized System (HS) industry classification for presentation of trade statistics. These databases receive the trade statistics from the respective country's customs service.

Table 3 shows that Mexican car production and imports evolved in a similar way between 1988 and 1997. Both increased continuously until the year 1995 when they experienced a sharp drop. After this year, they grew again reaching record figures in 1997. Note that production and trade figures are expressed in volumes and values, respectively¹⁰. More adequate comparisons are performed in section V further on in this paper, where these statistics are broken down to "small" and "large" passenger cars.

Table 3 - Mexican Production of and Trade with US in Passenger Cars (HS 8703)^a, 1988-97 (1000 units, yearly percentage changes and USD millions)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Production (Volume)		332	601	718	853	836	887	705	802	858
Percentage change			48	19	19	-2	6	-21	14	7
Exports to U.S. (Value)	886	1.206	2.465	3.372	2.824	3.241	3.868	5.852	7.573	8.052
Imports from U.S. (Value)	60	82	219	271	333	366	1.048	356	779	1.298

^a "Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, exclusive motor vehicles for the transport of \geq 10 persons incl. driver". Passenger cars constitute some 95 percent of this category.

Source: Inegi (1998), Secofi (1998), DataIntal (1999).

As the table shows, the Mexican-US trade in passenger cars increased dramatically in the 1990-1997 period. This trend is opposed to the one observed in the 1980s – when intra-firm exports to US parent companies showed smaller figures. As a matter of fact, the assertion that

US parent companies tend to buy more from their affiliates in the LCD's than they sell to them (Bonturi & Fukasaku, 1993:8), seems to be valid even in the period under analysis. It shall be noted, however, that the Mexican governments trade balance rule on trade flows may have influenced the trend in the sense that, according to this rule all exporting companies must show a trade surplus. In the case of the auto industry this rule is applied to total production without discriminating parts from cars. Since I have no access to firm-specific trade in parts, I have not been able to isolate the effect of the rule on trade in cars. Finally, Tables 4 and 5 confirm the general pattern of redirection from local sales to exports in the 1992-1996 period by presenting trade and production figures by TNC.

Table 4 - Mexican Production of Passenger Cars per Firm, and the Share of Exports of the Total Production, 1991-96 (1000 units)

	Chrysler		Ford		GM		Nissan		VW		Total		The Big Three	
	Tot.	%exp.	Tot.	%exp.	Tot.	%exp.	Tot.	%exp.	Tot.	%exp.	Tot.	%exp.	Tot.	%exp.
1996	144	86	169	92	143	71	108	70	231	77	795	80	456	83
1995	80	81	207	95	140	89	83	66	189	82	698	85	427	91
1994	165	72	192	86	112	63	144	36	243	41	856	59	469	75
1993	159	64	175	67	141	64	138	28	227	43	840	53	475	65
1992	155	46	214	61	129	61	122	21	175	25	794	44	497	56
1991	132	51	177	63	126	69	98	22	197	28	730	47	435	61

Source: AAMA, 1992-97.

Table 5 - Mexico Exports Passenger Cars and Commercial Vehicles to the US by Firm, 1990-96 (units and yearly % growth)

	Chrysler		Ford		GM		Nissan		VW		Total	
	units	%	units	%	units	%	units	%	units	%	units	%
1996	309	83	180	-16	199	21	33	112	104	-4	825	23
1995	169	19	214	21	164	207	16	---	108	66	670	53
1994	141	10	177	51	53	-6	2	---	65	29	437	24
1993	129	37	117	-11	57	78	0	---	50	101	353	25
1992	94	22	132	18	32	-17	0	---	25	-27	283	8
1991	77	5	112	26	38	-7	0	---	34	-3	261	10
1990	73	---	89	---	41	---	0	---	36	---	238	---

Source: AAMA, 1992-97.

V. FACTORS BEHIND INTRA-FIRM TRADE

Internalization Incentives

The technology transfer argument seems to have some backup in the Mexico-US case. Grimwade (1989:191) generally classifies the auto

industry as "medium" R&D intensive as well as human capital-intensive, giving potential gains from internalizing the trade and thereby avoiding problems connected to sale and installation assistance of capital goods and fabrics etc. Note that this assertion refers to parent companies and therefore it could also be applied without further specification to US-Mexican IFT. As for the plant-size argument it also applies to Mexico, where large TNCs and large plants prevail in the auto industry and the after-sale activity is relatively high which highlights a need for a greater degree of market presence (interview, Suárez).

The Mexico-US cross-border vertical integration seems to have a substantial impact on the Mexico-US trade pattern, with the Big Three's dominance in exports despite VW's greater domestic production (Tables 4 and 5). The Mexico-US integration has been enhanced by factors such as closeness, low cost of labor¹¹ and low cost in some material inputs (Mercado & Taniura, 1991:849). The same authors state varying quality level, unstable prices and access and low quality of raw materials as Mexican disadvantage which also provide internalization incentive (Mercado & Taniura, 1991:851). A further factor is the divisibility of the production processes in the automotive industry which, for example, Ford in Europe has exploited by producing specific varieties of vehicles in different countries in order to gain economies of scale advantages (Krugman & Obstfeld, 1991:140). This has also been the case in Mexico. In an interview with the director of Mercedes-Benz/Freightliner in Mexico, Federico Körte, vertical integration was presented as a means of securing quality as well as just-in-time deliveries. Other internalization incentives such as environmental and property rights aspects were also mentioned.

Jenkins (1987:19, 150) notes that TNCs in Mexico earlier used transfer price manipulation at least on automotive parts in order to restrict demand on local parts production by dumping TNC prices on parts to artificially low levels. In this way, the TNCs achieved greater total production runs and thereby economies of scale in the parent company, which integrates further the economies of scale issue in the IFT discussion. The high Mexican pre-liberalization tariffs have also been mentioned as a main factor providing incentives for transfer price manipulation and IFT (Zejan, 1989:822). However, according to a representative of the auto industry, the IFT incentive of weak tax/exchange control can not be considered to be especially valid in the Mexican case (interview, Suárez). It should be mentioned here that due to the sensitive nature of the issue for

the firms involved, I have not obtained detailed information about the current presence of transfer price manipulation.

Market Access

Over the last three decades, the Mexican government has protected the domestic automotive industry by means of import prohibition rules, local content requirements, high tariffs and tax incentives for local production. At the same time, the Mexican Government promoted the export of automotive goods, especially during the 1980s. In 1990, GATT pressures contributed to the elimination of the import prohibition rule (Decreto de Automotriz in 1990).¹² A new trade balance rule was instituted allowing firms with a positive trade balance to import. Simultaneously, a minimum local content of 30 percent became a requirement (Mercado & Tinuari, 1991:849). The free trade agreement of NAFTA is the latest trade liberalization step - came into force in January 1994 and includes Mexico, US and Canada. This treaty is to be viewed against the background of the US-Canadian FTA in 1989, which by facilitating trade between these two countries put the Mexican auto exports under pressure¹³. According to the NAFTA agreement, the trade balance rule was to be eliminated while tariffs were to be phased out during a ten-period, which start in 1994. The Mexican local content rule, in turn, was to be exchanged by a regional content rule requiring 56 percent inter-NAFTA value added of traded goods in order to be subject to the new preferential tariff treatment¹⁴ (European Commission 1997). Following tariff cuts and the liberalization of FDI, automotive trade between Mexico and the US came to experience sharp growth.¹⁵ Table 6 shows that in spite of higher Mexican pre-NAFTA import tariffs than the US tariffs, the phasing-out of the former tariffs led to almost the same increase in the growth rate of Mexican imports from the US as in the US imports from Mexico (which were immediately tariff liberated).

In the crisis years starting in 1995, VW and Nissan took after the Big Three's strategy of strong export orientation. In spite of the increased national production, the proportion of imported goods in local sales increased between 1993-97, especially for the NAFTA-based Three Big (Table 7).

Table 6 - Growth Rates and Customs Tariffs on Passenger Cars (HS 8703) Traded Between Mexico and the US

Trade flow	Simple Average Annual growth rate 1990-93	Simple Average Annual growth rate 1993-97	Simple average import tariff before NAFTA ^b	Phase-out
Imports from U.S.	22%	72%	20%	10 years, and ^a
Exports to U.S.	11%	37%	2.5%	Immediately

^a To be eliminated in 10 phases; to 10% ad valorem first of January 1994 and thereafter, for each following year, to 8.8%, 7.7%, 6.6%, 5.5%, 4.4%, 3.3%, 2.2%, 1.1% and, first of January 2003, tariff free.

Source: Secofi 1998.

Table 7 - Proportions of Imported Vehicles (Passenger Cars and Light Trucks) in Mexican Total Sales, per Firm, 1993 and 1997 (percentage).

	Chrysler	GM	Ford	Nissan	VW
Imports 1997	22.9	37.1	53.6	6.2	8.2
Imports 1993	0	1.6	1.8	0.2	5.2

Source: AMIA, 1997.

Among the five large producers, only the two US manufacturers (GM and Ford) showed larger domestic sales in 1997 compared to 1993, but there does not seem to exist any relationship between NAFTA-based producers and the degree of vehicle imports to Mexico. The growth of Mexican exports to US resulted in a more than doubled market share in the US market from 1993 to 1996 - 6.5 to 13.4 percent (BID, 1998:71), of which the source gives the NAFTA treaty the credit. However, I argue that the complex context of the 1990, with the elimination of the import prohibition and the Mexican economic boom followed by the deep recession (and devaluations) makes it difficult to evaluate the impact of NAFTA tariff cuts on trade. In my interviews with Federico Körte and Volkswagens director of international trade agreements, Fausto López Aguilar, they informed that their companies' short-run trade and investment decisions had not been influenced by the NAFTA treaty. This was mainly due to the relatively low pre-NAFTA tariffs and long NAFTA phasing out periods. Both these companies fulfil NAFTA's local content requirements and are thereby subject to the preferential tariff treatment on the same terms as the US Big Three. A survey among the car manufacturers present in Mexico confirms the relatively low importance of protection issues (Mercado & Taniura, 1991:851).

Changes in Product Orientation

The increased market access of the 1990s had effects on product orientation. Table 8 shows that 4-cylinder car production grew at the expense of 6-cylinder cars.

Table 8 - Mexican Production of 4- and 6-Cylinder Passenger Cars, 1988-1997 (1000 units and yearly % changes)

Product	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
4-cylinders	288	344	521	616	729	737	805	680	779	824
% change	---	19	51	18	18	1	9	-16	15	6
6-cylinders	44	62	80	102	124	99	82	25	23	34
% change	---	41	29	28	22	-20	-18	-70	-6	47

Source: Inegi, 1998.

In order to see whether this change in production orientation is reflected in trade flows, the trade figures from the HS 6-digit level codes¹⁶ have been sorted into small and large cars. This analysis is made in Table 9. In the table, motor volume is the regrouping criteria: cars with less than 2500 cc. are classified as small (with 4-cylinders), and cars with more than 2500 cc. are classified as large (with 6 cylinders or more).¹⁷ The HS nomenclature also includes a 1500-3000 cc. class without specifying the number of cylinders. This class is presented on its own in the table but note that this may include both small and large cars, that is with less as well as more than 2500 cc.

Table 9 - Mexico-US Trade in Passenger Cars of Different Motor Volume, 1988-1997 (USD millions)^a

Product	Trade direction	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<2500 cc.	Exports to U.S.	90	227	382	1 045	1 097	988	1 467	1 635	1 242	280
	Imports from U.S.	15	25	27	24	33	24	7	1	1	2
>2500 cc.	Exports to U.S.	248	90	123	31	43	15	2	756	2 284	2 358
	Imports from U.S.	12	17	118	113	194	241	763	261	590	1 006
1500-3000 cc.	Exports to U.S.	367	799	1 960	1 702	1 684	2 237	2 400	3 460	4 047	5 415
	Imports from U.S.		3	7							
	U.S.	28	9	3	130	100	94	271	91	185	285

^a See note "c" in table above.

Source: Secofi 1998, DataIntal 1999.

Small car exports followed the growth pattern of production until the mid-1990s when both production and exports experienced temporary drops, the former in 1995 (see Table 8) and the latter in 1996 and 1997 (see Table 9) - a likely reflection of growing domestic demand. Regarding

large cars, exports increased in the late 1990s despite dropping production (see ensuing discussion). Note that discrepancies between the criteria applied in the statistics sources used make it hard to conciliate the substantial exports recorded in the 1500-3000 cc. category with the figures corresponding to the other two categories, particularly with regard to exports. It appears as the strategy of narrowing product range and the government's management of market access (by promoting small car sales in the Mexican market), have resulted in Mexican self-sufficiency in small cars and complementary imports of large cars.

Macroeconomic Factors

A booming US economy between 1990 and 1997 resulted in high US demand throughout this period. These general favorable conditions for Mexican exports were in part reinforced by the Mexican crisis triggered in 1994. It favored the Mexico-US IFT to a wide extent, both through the devaluations of the Mexican peso and a drastic drop in Mexican domestic demand. The peso devaluations lowered Mexican export prices and raised import prices. Mexican goods became more competitive abroad and U.S. demand for Mexican-made cars further increased. Simultaneously, Mexican domestic demand dropped as a result of increasing unemployment and more expensive imports. Taken together, the industry was hit by over capacity that forced it to redirect sales from the Mexican to, in the first hand, the US market. I argue that this was made easier through the newly competitive position given by the product range narrowing. The effect these changes had on the car trade balance and the domestic production depended on two factors: whether the increase in exports to US was sufficient to compensate for the drop in Mexican imports (regarding the trade balance) and the drop in Mexican demand (regarding the production). As seen in Table 3, the Mexican trade balance with US increased its strong surplus after 1994. It can also be seen that production did drop in 1995, but almost reached 1994 levels in 1997 as a result of the strong export growth. Large cars started to loose Mexican production shares already the year 1993. Nevertheless, the strong 1995 drop is likely to have its source in the fall in Mexican purchase power, which can be expected to have hit small cars less than more expensive large cars. This is likely to be a contributing factor to the export boom in 6-cylinder cars from 1995 and onward. Moreover, it is possible that the large 1500-3000 cc category hides substantial exports of large cars which should confirm this idea (by compensating for the strong import growth in large cars).

VI. MEXICO-US INTRA-INDUSTRY AUTO TRADE IN THE 1988-97 PERIOD

The formula used to calculate IIT corresponds to the Grubel Lloyd index (GL). It is stated as $GL = 1 - |X - M| / (X + M)$, i.e. net trade absolute value divided by gross trade and adjusted with plus one in order to get a GL index, which takes values from 0 to 1 as the extent of intra-industry trade increases. IIT is usually measured at the 3-digit level of the trade classification system SITC - Standard International Trade Classification (Balassa, 1986:221-2).

Bonturi and Fukasaku (1993:16) argue that the US-Canada-Mexico automobile trade is an important example of IIT which is not in accordance with conventional assumptions about north south trade. However, as seen in Table 10, the Mexico-US auto trade figures show a low degree of IIT. The explanation lies on the author's definition of the "automobile industry" which includes automotive parts as well. The latter were subject to strong IIT numbers throughout the 1990-1997 period¹⁸. Another explanation may be that they, although not mentioned, in fact refer to an earlier period of observation.

Table 10 - GL Index. Trade of Automotive Goods, HS 4-Digit Level, Mexico-US, 1988-1997 (bolded=above 0,5 GL index).

HS	Product	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
8703	Passenger cars	0,13	0,13	0,16	0,15	0,21	0,20	0,43	0,11	0,19	0,28
8708	Parts and accessories			0,96	0,70	0,64	0,56	0,68	0,92	0,72	0,75

Source: Own calculations based on material from Secofi 1998, DataIntal 1999.

The IIT theory emphasizes overlapping demand, differentiated tastes and economies of scale as factors influencing IIT. However, I do not find these factors as convincing in explaining the low GL index in the Mexico-US auto trade. I have already stated that overlapping demand depends on bilateral similarities in development level and income distribution pattern. Mexico does have a considerably lower GDP per capita than the US, but the fact is that the domestic Mexican market also supports substantial car imports. It must be acknowledged, however, that the factor endowments in Mexico (cheap labor) and in the US (sophisticated technology) differ, which is a negative factor for IIT. Economies of scale are likely to be abundant and growing in the Mexican auto industry and the crisis-drop in production was as well as compensated in 1997. Hence, this factor also seems to be weak in explaining the low IIT. However, it may be discussed whether economy of scale really is an IIT enhancing variable in the Mexico-US case. This argument rests on the presumption that countries

gain in economies of scale by specializing in different products and complement each other by engaging in IIT. This may be so, for example, in the smaller EU countries and in a context of local-production enforcing protection. However, I argue that the US is likely to be large enough to support its own economies of scale in different production processes, without by this reason needing to divert production to plants abroad.

VII. FACTORS BEHIND CHANGES IN INTRA-INDUSTRY TRADE

My argument here is that the institutional factors that restrict market access play a major role in the evolution of IIT. Since car imports were practically prohibited before the year 1990, the IIT volume was low. However, the tendency towards IIT is clear in the 1990-1997 period when extensive trade liberalization occurred. Buitelaar & Padilla (1997:77) also confirm a positive link between trade liberalization and IIT in Mexico's total trade during the 1990-1995 period. The Mexico-US automobile trade is partly characterized by the TNC's use of Mexico as an export platform. This has historically been the case for the almost entirely export oriented maquiladora assembling plants, but only parts and not cars are included in this occupation. However, the 1988-1997 period shows an increasing car export trend among all the five TNCs, further boosted by the Mexican 1994 crisis. The crisis increased Mexico's role as an export platform and simultaneously lowered imports to the local market, thereby diminishing the GL index. Against the background of trade liberalization and increasing factor movements (through FDI) to Mexico since the year 1990, it seems as the Greenaway model (earlier presented in section II) has good explanatory value in the scenario of increasing Mexico-US auto IFT and IIT. A comparison can be made with the effects of the North American auto pact between US and Canada. Before 1965, the TNC affiliates with local production constituted the Canadian auto industry. Tariff barriers close to eliminated trade flows with the result that the affiliates had to produce full varieties of cars for a small market. This implied poor economies of scale. The pact taken into force in 1965 liberated the US-Canadian auto trade, opening for intra-industry specialization and increased economies of scale in production that resulted in more competitive products. Although Mexico, as opposed to Canada, is a LDC, the Mexico-U.S. situation of 1989 was almost identical to the US-Canada 1964 situation.

Table 11 shows GL index in different car categories, namely, small and large car categories as well as the non-specified 1500-3000 cc.

category. As the table illustrates, large cars recorded stronger GL index compared to the two other categories for all the years except in the period's first observation (1988), and to an insignificant extent in 1994. This is probably due to the large car category's stronger import growth in the period. It also shows considerably higher GL index than the total HS code 8703 for almost the entire period and there are IIT observations over 0.5 in three years. The TNCs product range narrowing and export orientation, in combination with the eliminated import prohibition rule, increased imports of large cars and seems to be the major factor behind the increased GL index. However, the information provided by the 1500-3000 cc. class constitutes again a source of doubt.¹⁹

Table 11 - GL Index on Trade Value of Passenger Cars, HS 6-Digit Level, Regrouped by Motor Volume, Mexico-US, 1988-1997 (bolded=above 0,5 GL index)

Motor volume	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<2500 cc.	0,28	0,20	0,13	0,04	0,06	0,05	0,01	0,00	0,00	0,01
>2500 cc.	0,09	0,31	0,98	0,43	0,36	0,12	0,00	0,51	0,41	0,60
1500-3000 cc.	0,14	0,09	0,07	0,14	0,11	0,08	0,20	0,05	0,09	0,10

Source: Own calculations based on material from Secofi 1998, DataIntal 1999.

Table 12 - IIT in Passenger Cars of HS Class 8703, Mexico-US 1988-97 (bolded=above 0,5 GL index).

HS	Product	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
870310	Special vehicles	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,02
870321	<1000	0,02	0,00	^a	0,01	0,00	0,34	0,09	0,00	0,65	0,16
870322	1000-1500	0,21	0,16	0,00	0,04	0,05	0,04	0,01	0,00	0,00	0,01
870323	1500-3000	0,14	0,09	0,00	0,14	0,11	0,08	0,20	0,05	0,09	0,10
870324	>3000	0,09	0,31	0,00	0,48	0,37	0,12	0,00	0,52	0,42	0,61
870331	<1500	0,00	0,00	0,00	0,00	0,00	^a	^a	0,00	^a	^a
870332	1500-2500	0,00	0,00	^a	0,00	1,00	0,00	0,01	0,00	0,00	0,00
870333	>2500	0,00	0,00	^a	0,00	0,00	0,00	0,00	0,09	0,02	0,02
870390	"OTHER:."	0,03	0,00	0,34	0,00	0,00	0,16	0,00	0,11	0,05	0,10

^a Lack of either export or import.

Source: Own calculations based on material from Secofi 1998, DataIntal 1999.

Breaking down the data to the 6-digit level, as in Table 12, does not completely eliminate the cases of IIT. This is particularly true in the >3000 cc class. No Mexican imports occurred in HS code 870331, whereby this trade is completely inter-industrial. In late 1994, the Mexican crisis was triggered. It resulted in decreasing domestic demand and imports and thereby lower GL index. It is tempting to speculate what would be the situation if the Mexican crisis had not occurred. The year 1994 showed a

GL index of 0.41 which was the maximum ending an increasing tendency since 1990. Comparing, for example, the Mexican 1994 exports with Mexican imports three years later in 1997 - as a proxy for compensating for the drop in demand after 1994 - gives a GL value of 0,50.

VIII. CONCLUSIONS

In the 1990-1997 period, two-way Mexico-US IFT surged through complementing, not substituting, factor movements and IIT. The US-based TNCs operating in Mexico produced cars for intra-firm exports, re-imports to US and to a lesser degree to other markets, or for sale in the Mexican market. Simultaneously, the US parent companies exported cars directly to the Mexican market, thus giving rise to IFT-IIT. Thereby, the total Mexico-US transfer consists of assets (capital, real capital and property rights), traded commodities, and knowledge capital. A somewhat similar pattern is also to be seen concerning VW and Nissan.

Trade liberalization policies made imports grow rapidly until the Mexican crisis, triggered in 1994. In the year 1995, Mexican automobile industry met the fall in domestic demand by redirecting sales of local production from local to primarily the U.S. market where demand continued to grow. This redirection was possibly made easier through the NAFTA treaty taken into force in 1994, but only marginally. The export promoting effect of the 1994 Mexican crisis seems to have dominated the import increase given by market access factors, resulting in sustained strong surplus in Mexican auto trade balance. However, as taken together, the 1988-1997 period showed stronger import than export growth resulting in increasing GL index towards more IIT. In this respect the macro factors in particular are likely to have been influential, but also IFT as such. This is illustrated by the Greenaway model and the positive link it presents between trade liberalization, FDI, IFT and IIT, which have been confirmed to be an adequate explanatory frame for Mexico- US auto trade.

It is difficult to exactly describe the impact of internalization incentive and policy factors behind changes in IFT and IIT, and neither has this been the scope of this thesis. However, it is clear that cross-border vertical integration played a major role, together with other factors influenced by market access policies. However, the fact that VW for example is producing the New Beetle in Mexico for world-wide distribution suggests that domestic competitiveness is also a factor to be taken into account. Vertical integration in turn, is probably resulting from a combination of factors related to technology transfer and as integration

continued, economies of scale but also by factors such as distance, import prohibition and cheap labor which also affect arm's length trade. Macro factors have affected IFT as well as IIT. Regarding the changes in IFT and IIT, market access seems to have had a great impact, especially concerning large cars (more than 2500 cc.). However, the changes in trade policy starting in 1995 probably affected IFT more than it had affected comparable arm's length trade. The strong 1995 surge in exports may be seen as contradictory to the commonly low short-run price elasticity in IFT. I regard the explanation to be found in the force of the exchange rate drop in combination with a sharply dropping local demand. The fast redirection of production and sales flexibility given by the sales to the export market, especially to US, is to be seen against the background of the Mexico-US cross-border vertical integration which have lowered the effects of short-run macro shocks.

In 1997, some 74 percent of the Mexican production of passenger cars were exported, compared to only 30 percent before the crisis in 1993. Given the fact that first production was to a greater extent directed to local sales before 1995, as opposed to from 1995 and onward; and second, local production and imports were complementary, one could expect production and imports to be positively related after the import liberalization episode of 1990. One could also expect production and exports to be linked from 1995 and onwards. However, this relation can possibly be seen for exports, but not imports.

Furthermore, due to space constraints, the Mexico-US auto parts industry has not been treated in this study. This industry, however, plays an important role in the process of vertical cross-border integration between Mexico and the US and constitutes a field of further study.

Notes

- 1 Bonturi & Fukasaku (1993:8) notes that increasing FDI during the 1980's is a sign of TNCs extending their corporate networks
- 2 As one of the very few methodical databases on IFT is based on U.S. trade, almost all research in the area has a US approach.
- 3 I have only found one article (Mattar & Schatan, 1993) treating IFT in one industry more in detail.
- 4 Merged with Chrysler in the fall of 1998.
- 5 In-bound manufacturing of automotive parts for export, principally by the U.S. TNC's. The maquiladoras import tariff free components from U.S. assembles them in Mexico,

- and re-exports them to U.S. (with tariff only on the Mexican value added) for further assembling into vehicles, of which many are later exported to Mexico.
- 6 I argue that the productivity gains achieved might also have been needed in order to compete in the U.S. market.
- 7 Once again, this policy is an outcome of the mutual interest of foreign TNCs and Mexican authorities (anonymous source).
- 8 This is a difficult area to measure, and the FDI numbers differ depending on the source. One obstacle may be whether to include the maquiladora industry or not. One source claims that automotive FDI in Mexico reached as much as USD 10 billions in 1996 (BID:70).
- 9 Which is also the case in most world automobile trade (interview Stjerna).
- 10 I have used two sources to obtain the 1988-1997 series. All is from Secofi, except the 1988-90 export figures, and the 1988-94 import figures which are from DataIntal. The reason is that Secofi only covers the 1990-97 period, and that the 1990-94 Secofi import figures deviate, and by some reason have left out passenger car imports (HS 870321-870333) while presenting figures only for special vehicles and "other" (HS 870310 and 870390). I have chosen to let DataIntal cover this period due to that its figures correspond better to trade numbers from another source, the SITC classification "road vehicles" (which includes also other vehicles than passenger cars, but passenger cars dominates the group as measured in trade value). Further, I argue that the DataIntal better reflects the background of increased imports due to the elimination of the import prohibition rule, and the narrowed product specialization, which calls for complementing imports.
- 11 An idea about the proportion of the Mexican labor cost advantage is given by Mercado and Taniura (1991:851), which notes that Mexican average wages in terminal auto industry constitute between 10-13% of total production costs, as compared with 15% in U.S. and Canada (1988). It shall also be noted the tendency of putting labor intensive production in Mexico in order to better exploit the lower wages.
- 12 However, simultaneously with the cut tariff barriers, non-tariff barriers have in fact increased, though to a less extent.
- 13 The World Bank estimates the Mexican export loss to USD 665 millions only in one year (Romero, 1991:231, 232).
- 14 50% from the year 1994, 56% from the year 1999 and 62.5% from 2003 and onward (interview López Alcalá). NAFTA also includes reduced non-tariff barriers, which, however, will be excluded from this study due to problems of measurement.
- 15 Rules of exception explain the existence of Mexican car import before 1990.
- 16 This is the most detailed HS-level for Mexican exports. Imports 8-digit numbers have been regrouped in order to fit the 6-digit export numbers.
- 17 This is a adequate classification regarding cars from the U.S. Big Three, and an acceptable proxy for other cars (Interview Stjerna).
- 18 Code 8708 have a significant proportion of the total automotive trade. If motors are included the auto parts trade dominates the auto trade.
- 19 Buitelaar & Padilla (1997:107) came to the same conclusion, by registering a 1990-95 average GL index of 0,20 in HS code 8703.

References

- AAMA (1990 to 1997), "World Motor Vehicle Data". American Automobile Manufacturers Association.
- AMIA (1997), *Revista de AMIA*, Dec.
- Balassa, B. (1986), "The Determinants of Intra-Industry Specialization in United States Trade". *Oxford Economic Papers*, No. 38, pp. 220-233.
- Bancomext: (1999). Online. Available: http://www.bancomext.com.mx/sectoral_i/auto_i.html.
- Becuwe, S. and Mathieu, C. (1992), "The Determinants of Intra-Industry Trade: The Case of Automobile Industry". *Weltwirtschaftliches Archiv*, Vol. 128(1), pp. 34-51.
- Benvignati, A. (1990), "Industry Determinants and "Differences" in U.S. Intra-Firm and Arm's Length Exports". *The Review of Economics and Statistics*, No. 72, pp. 481-487.
- BID, (1998), *Inversion extranjera directa en America Latina: la perspectiva de los principales inversores*. Banco Interamericano de Desarrollo: Madrid.
- Bonturi, M. and Fukasaku, K. (1993), "Intra-Firm Trade". *OECD Trade Policy Issues*, 1.
- Buitelaar, R. and Padilla, R. (1997), "El comercio intraindustria de México con sus principales socios comerciales". *Estudios económicos*, 12(2), pp. 77-116.
- DataIntal. Online. Available: <http://www.database.org/intalweb/scripts/intal.exe> (select HS).
- European Commission, (1997), online copies from <http://mkaccdb.dg1.ccc/cec/mkdb/sec1.pl>, Sectoral and Trade Barriers Database. Market Access Sectoral Report.
- Greenaway, D. (1986), *The Economics of Intra-Industry Trade*. Basil Blackwell Ltd.: Oxford.
- Greenaway, D. Hyclak, T. and Thornton, R. (1989), *Economic Aspects of Regional Trading Arrangements*. Harvester Wheatsheaf: Hertfordshire.
- Grimwade, N. (1989), *International Trade: New Patterns of Trade, Production and Investment*. Routledge: London.
- Grubel, H. and Lloyd, P. (1975), *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*. The MacMillan Press Ltd.: London.
- Grubert, H. (1991), "Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making". *The Review of Economics and Statistics*, No. 73, p.285.
- Helleiner, G. (1981), *Intra-Firm Trade and the Developing Countries*. The MacMillan Press Ltd.: London.
- Inegi, (1998). Online. Available: <http://www.inegi.gob.mx>.
- Jenkins, R. (1987), *Transnational Corporations and the Latin American Automobile Industry*. The MacMillan Press Ltd.: London.
- Kol, J. and Rayment, P. (1989), "Allyn Young specialisation and Intermediate Goods in Intra-Industry Trade". In Tharakan, P.K.M, and Kol, J. (eds.), *Intra-Industry Trade: Theory, Evidence and Extensions*. The MacMillan Press Ltd.: London.
- Krugman, P. and Obstfeld, M. (1991), *International Economics: Theory and Policy*. Harper Collins Publishers Ltd.: New York.

- Lall, S. (1978), "The Pattern of Intra-Firm Exports by U.S. MNC's". *Oxford Bulletin of Economics and Statistics*, No. 40, pp. 209-222.
- Mattar, J. and Schatan, C. (1993), "El comercio intraindustrial e intrafirma México-Estados Unidos: Autopartes, electrónicos y peroquímicos". *Comercio Exterior* (Bancomext), 43(2), pp. 103-114.
- Mercado, A. and Taniura, T. (1991), "Las exportaciones automovilísticas de México: Factores favorables, obstáculos y necesidades de política", *Comercio exterior* (Bancomext), 41(9), pp. 846-852.
- OECD (1995), *New Dimensions of Market Access in a Globalising World Economy*. OECD: Paris.
- _____ (1998), *International Foreign Direct Investment Yearbook, 1997*. OECD: Paris.
- Romero, J. (1991), "La teoría de la unión aduanera y su relevancia para México ante el Acuerdo de Libre Comercio con Estados Unidos y Canadá". *Estudios Económicos*, 6(2), pp. 231-270.
- SECOFI, (1998), *Trade statistics from Secretaria de Comercio y fomento industrial*. Mexico.
- Siddharthan, N. S. and Kumar, N. (1990), "The Determinants of Inter-Industry Variations in the Proportion of Intra-Firm Trade: The Behaviour of U.S. Multinationals". *Weltwirtschaftliches Archiv*, 126(3), pp. 580-591.
- Zejan, M. (1989), "Intra-Firm Trade and Swedish Multinationals". *Weltwirtschaftliches Archiv*, 125(4), pp. 814-833.

Interviews

- Gómez, J. President, AMIA (Asociación Mexicana de la Industria de Automotriz). December 6, 1998.
- Körte, F. President, Mercedes-Benz/Freightliner Mexico. March 9, 1998.
- López, P. Analyst AMDA (Asociación Mexicana de Distribuidores de Automotores, A.C.). August 26, 1998.
- López Aguilar, F. Government Affairs and International Trade Agreements, Volkswagen de México. July 27, 1998.
- Mattsson, L. President, Volvo de México. March 12, 1998.
- Stjerna, M. (Telephone interview) Motor reporter, Teknikens Värld. September 1, 1999.
- Suárez, R. Economic analyst at INA (Industria Nacional de Automotriz). August 28, 1998.