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**INDUSTRIAL ORGANIZATION AND
COMPARATIVE ADVANTAGE IN MEXICO'S
MANUFACTURING TRADE**

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ABSTRACT

This paper examines some features of Mexico's foreign trade in manufactures from the perspective of recent developments in international trade theory, while bringing some characteristics of Mexico's industrial organization into the analysis. After a brief review of the applied literature on Mexico's foreign trade, the paper develops a taxonomy of manufacturing industries, according to the nature and volume of its foreign trade. This exercise, which relies primarily on the distinction between intra- and inter-industry trade, provides a framework for an analysis of the relationships between trade flows, economies of scale, and market structure conditions. This analysis is based on Industrial Census data for 1975 and 1980, and on foreign trade data for the 1978-1983 period. The final section summarizes the main research findings and conclusions, and an appendix explains in detail the methods and data sources.

RESUMEN

Este trabajo examina algunas facetas del comercio exterior de manufacturas de México desde la perspectiva de los recientes desarrollos en la teoría del comercio internacional, e introduce al análisis algunas características de la organización industrial de México. Después de una breve reseña en la primera sección, sobre la literatura aplicada al comercio exterior de México, la segunda sección desarrolla una taxonomía de las industrias manufactureras, de acuerdo a la naturaleza y al volúmen de su comercio exterior. Este ejercicio se basa principalmente en la distinción del comercio intra- e interindustrial y provee un marco de análisis, en la tercera y cuarta sección, sobre las relaciones entre los flujos comerciales, las economías de escala, y las condiciones estructurales del mercado. Este análisis está basado en datos del Censo Industrial de 1975 y 1980 y en datos del comercio exterior del período 1978-1983. La quinta sección resume los logros y las conclusiones principales y un apéndice explica en detalle la método y las fuentes de datos.

Traditional trade theory has generally ignored industrial organization studies in its explanation of the volume and composition of international trade. A major reason for this is the central role that perfectly competitive conditions and constant returns to scale play in traditional theory and its predictions. Under those assumptions—and once institutional barriers to free trade and to full equilibrium in all markets have been taken into account—trade flows may be fully explained in terms of comparative advantages resulting from international differences in resource endowments.

Such an explanation of international trade suggests that trade volumes will be inversely related to national similarities, and will involve essentially inter-industry flows, i.e. the exchange of goods from different industries and factor intensities. However, as many authors have repeatedly pointed out, these implications are at variance with some of the most salient trends and features of international trade. A high and increasing share of world trade takes place amongst industrial countries with very similar relative factor endowments. Trade patterns have become increasingly dominated by intra-industry exchanges, involving products with similar factor intensities, as well as by intra-firm transactions which, accompanying the development of multinational corporations, have come to play a prominent role in international trade.

These puzzles have stimulated the emergence of trade models that center on increasing returns to scale as an alternative explanation of international trade. The consideration of static and dynamic economies of scale has always been central to non-neoclassical models, such as Vernon's product cycle theory and Kaldor's writing on inter-regional trade and industrial growth (Kaldor, 1967, 1970). Linder (1961) is another earlier and important non-neoclassical view, which anticipated the role of similarities in consumption patterns and income levels as a determinant of international trade. The emphasis on increasing returns is also a characteristic of recent theoretical models of intra-industry trade. (See Helpman and Krugman, 1985, for a synthesis of recent models). The focus on increasing returns arises from the fact that it provides a simple and plausible explanation of intra-industry specialization and of non-traditional comparative advantages resulting from the exploitation of economies of scale. In turn, the introduction of increasing returns into the analysis has left no room for the assumption of perfect competition, thus opening the door for an increasing integration of international trade theory and industrial organization studies.

This paper examines some features of Mexico's foreign trade in manufactures from the perspective of recent developments in international trade theory, while bringing some characteristics of Mexico's industrial organization into the analysis. After a brief review, in section I, of the applied literature on Mexico's foreign trade, section II develops a taxonomy of manufacturing industries, according to the nature and volume of its foreign trade. This exercise,

which relies primarily on the distinction between intra- and inter-industry trade, provides a framework for the analysis, in sections III and IV, of the relationships between trade flows, economies of scale, and market structure conditions. This analysis is based on Industrial Census data for 1975 and 1980, and on foreign trade data for the period 1978-1983. Section V summarizes the main research findings and conclusions, and an appendix explains in detail our methods and data sources.

I. A Review of the Applied Literature on Mexico's Foreign Trade and Industrial Organization

Empirical research on Mexico's foreign trade yields some interesting analogies with the difficulties of traditional theory in accounting for the trends of world trade. Hufbauer (1970), and others following him (Levy, 1982; Clavijo and Valdivieso, 1983), examined the factor content of Mexico's trade pattern and found that Mexican exports—in complete opposition to the expectations of traditional trade theory—were more capital intensive than imports. Given Mexico's relative factor endowments with respect to its main trading partner, the United States, these findings represented, indeed, a sort of "Leontieff paradox" for the Mexican case.[1]

Moreover, Clavijo and Valdivieso's research revealed that the factor content of foreign trade, both for all goods and manufactures, became increasingly capital intensive over the period 1950-1978. And they found the origin of this trend in the increasing share in foreign trade, of capital intensive manufacturing exports, thus confirming Boatler's (1974) findings.

Four main explanations of these puzzles can be derived from the literature. A first and popular one relies on traditional theory itself and is fully consistent with its normative implications. Since specialization according to Heckscher-Ohlin comparative advantage, requires free trade, and Mexico's protectionist policies violate this assumption, the distortions in the trade pattern are simply the result of those policies. In spite of its popularity, remarkably little empirical evidence has been provided in support of this view which, to be taken seriously, would have to show how the structure of protection, and the distortions thereby induced, have produced a trade pattern so diametrically opposed to theoretical predictions. The only, and very weak, support for this hypothesis comes from Clavijo, Saez and Scheuer (1978), which showed that inter-industry

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[1] These three studies refer to various years and periods: 1965 and 1970 for Hufbauer and Levy, respectively; and the period from 1950 to the late 1970s for Clavijo and Valdivieso. They also followed different methodologies. Hufbauer, in contrast to the others, relied on the United States input-output table, rather than Mexico's, in the estimation of factor intensities. And while Levy's measurement of labor intensity was based on the share of wages in gross output, Clavijo and Valdivieso relied on employment per unit of value added. These differences may explain why Clavijo and Valdivieso found empirical support for the paradox only for the period after 1977.

differences in export-output ratios were, other factors given, negatively correlated to the level of protection of the home market, or rather to their questionable proxy variable, the inverse of the import coefficient by sector of origin.[2]

A second answer focused on the different technologies adopted by Mexican and U.S. industries and, thus, abandoned the traditional assumption of identical production functions in all countries. Boatler's (1974) analysis of the structure of manufacturing exports over the 1950-1969 period illustrates this approach. Following Nelson's (1968) diffusion model of international productivity differences, he offered a non-neoclassical comparative cost advantage explanation by showing that "completely modernized" industries—those with a small productivity gap with respect to the United States—were rapidly increasing their share of manufacturing exports at the expense of the "craft" industries employing backward technologies which, although labor intensive, lagged well behind those adopted by similar U.S. industries. And industries with average productivity gaps, in the process of adopting modern technologies, were holding their share of manufacturing exports.[3]

Other approaches focused on elements which are largely complementary with Boatler's explanation. Ros and Vazquez (1980) and Brailovsky (1981) emphasized the role of increasing returns to scale and, thus, the nonlinearity of the production functions of traditional theory. These studies found a close correlation across manufacturing industries between the long-term rates of growth of exports and production for the domestic market, and identified a sequential process of imports, local production, and exports in the development of domestic industries, which revealed the changing structure of international competitiveness. Following Kaldor (1967, 1970), these studies focused on the central role of dynamic economies of scale and cumulative causation mechanisms in the explanation of these processes.[4]

Ramirez de la O (1981) introduced the role of firms' conduct and, in particular, that of the strategies of multinational corporations. His study of multinationals' trade performance showed the latter to be strongly influenced by industrial organization conditions in different industries. In

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[2] Their model of export coefficients also considers the share of foreign investment, which turned to be inversely correlated with export propensity, and market size which, through a return to scale effect, had a positive effect on export ratios.

[3] Boatler has also an interesting critical discussion of other possible explanations based on complementarities between capital and raw materials, or on the consideration of human capital.

[4] Ros and Vazquez examined the long term behavior of exports and imports by manufacturing industry (at the two digit level) for the 1950-1977 period. Brailovsky also considered the industries' trade balances (as a share of industry's overall trade) and emphasized their long term positive correlation with the rate of growth of industry's output. CEPAL (1976) and Clavijo, Saez and Scheuer (1978) also mentioned returns to scale effects on export performance (see footnote 3). And CEPAL (1976) suggested the implications of these effects in terms of the resulting complementarities between domestic market growth and long term export performance.

engineering industries, with strong economies of scale and "technological differentiation," multinational corporations find it advantageous to specialize their subsidiaries in a narrow range of products and models. Integration between the parent company and the subsidiary leads to high import coefficients but, simultaneously, specialization also induces and makes possible the development of significant export volumes. Hence the presence of high export ratios in many capital intensive, largely foreign owned industries, and of a positive correlation in these sectors between import and export volumes by firm.

In contrast, in sectors of product and publicity differentiation, multinationals show a poor export performance. Firms do not specialize, and tend to produce the whole range of products and models of the parent company, in order to take advantage of economies of scale in publicity and previous investments in research and development. And in industries of non-differentiated products, but without strong economies of scale in production, subsidiaries' exports are mainly determined by plant size and do not depend on the importation of parts, since the latter are standardized materials easily found in the domestic market.

Other studies also oriented their research to the comparative trade performance of national and foreign firms, and focused on other more specific determinants. Fajnzylber and Martinez Tarrago (1976) attributed the highly dynamic exports from multinationals in some industries (automobiles and transport equipment) to industry specific policies such as "fabrication programs" having export commitments—dependent on the volume of imports realized—made by firms in exchange for the protection of the domestic market. This study presented also an estimate—based on general information on intra-firm trade transactions by U.S. corporations—of intra-firm imports by manufacturing subsidiaries. Their estimate for 1972 establishes that intra-firm transactions accounted for 21.8% of total industrial imports and 77.2% of total multinationals' imports. Unger's (1985) study of a sample of national and foreign manufacturing firms is also worth mentioning, as his results are largely consistent with those of Ramirez de la O.

II. Foreign Trade and Industrial Structure: A Taxonomy of Manufacturing Sectors

This section presents a taxonomy of industries according to the nature and volume of its foreign trade, which takes into consideration 184 manufacturing industries (defined at the four digit level of the standard industrial classification). The basic data used refers to export and import coefficients by industry of origin for the 1978-1983 period on average.

Intra- and Inter-industry Trade

Our taxonomy combines the distinction between intra and inter-industry trade with that between exportable, importable, and non-tradable goods. In an analogous way to Tornell (1986), the share of intra-industry in overall foreign trade in industry j (I_j) may be defined as:

$$I_j = 1 - (|X_j - M_j|)/(X_j + M_j),$$

X_j and M_j being respectively the value of exports and imports of industry j products.[5] The value of I_j varies between 0 and 1. When all of the industry's foreign trade has an inter-industry character, so that the country considered exports without importing (or imports without exporting) the products of industry j, the value of I_j is equal to 0. And as the products of industry j are exported and imported simultaneously, the share of intra-industry trade increases and the index I_j approaches unity.

The measurement of intra-industry trade has several practical problems. A first difficulty is that the index estimated value is likely to be affected by fluctuations in the level of domestic economic activity. Indeed, given the counter-cyclical behavior of the trade balance, the share of intra-industry trade during booms will appear to be abnormally low in the net importing sectors (and abnormally high in the net exporting industries), and the contrary will occur during recessions. This problem, however, is not likely to severely distort our estimates since our trade data refer approximately to the average of a complete economic cycle. The period 1978-1983 includes two years, 1978 and 1979, of fast economic growth but with normal levels of capacity utilization and import coefficients; two years, 1980 and 1981, of intense boom with abnormally high imports and capacity use; and two years, 1982 and 1983, of severe recession with strongly repressed imports and massive excess capacity.

A second difficulty is that the estimated index of intra-industry trade by sector is sensitive to the level of industry disaggregation adopted. The lower the level of disaggregation, the higher the share of inter-industry trade (the exchange, for example, of milk products for vegetable oils

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[5] Alternatively, the index $I_j' = \dfrac{|X_j - M_j|}{X_j + M_j} = 1 - I_j$ represents the share of inter-industry trade in the overall trade of industry j. In Tornell (1986), the index considered (I_j, rs) refers to the share of intra-industry trade in the bilateral trade of industry j between countries r and s. Our index, in contrast, refers to the share of intra-industry trade in the overall trade of industry j between Mexico and the rest of the world. The contrast with Tornell arises from the different, but complementary, objectives pursued. Tornell examines the relation between the share of intra-industry trade among countries and their degree of similarity, while we are interested in the relation between the nature of trade and the industrial organization characteristics of different industries, specifically market structure and technological conditions.

within the food industry) that will appear in the index as intra-industry trade. And at high levels of disaggregation the opposite may occur: some intra-industry trade involving the exchange of goods resulting from similar productive processes (for example, different intermediate goods for the automobile industry) would appear in the estimates as inter-industry trade. This problem is closely related to that of selecting a critical value for the index I_j in order to discriminate between industries according to the nature of its foreign trade. Given the inverse relationship between the estimated value of the index and the level of disaggregation adopted, it seems clear that the lower the latter the higher should be the chosen critical value of I_j, above which an industry may be classified as a sector where intra-industry trade predominates.

The level of disaggregation adopted in our study (four digits in the standard industrial classification) is very high and, in most cases, a very good approximation to the definition of an industry as a homogeneous productive process, which is the appropriate one for the distinction between intra- and inter-industry trade. Consistently, we selected the value of 1/2—the mean value of the interval of variation of the index—as the critical value of I_j for the classification of industries.[6]

Besides the nature of trade, its overall volume was also considered in our taxonomy. A large set of industries within Mexico's manufacturing sector would show values for the index I_j suggesting high levels of intra-industry trade (or of inter-industry trade), although its main characteristic is the very reduced amount of foreign trade undertaken. It is appropriate to distinguish this subset of manufacturing industries—essentially oriented towards the domestic market and self sufficient in its production—from both those sectors of inter-industry trade where Mexico is a significant net exporter (or net importer) and those sectors of intra-industry trade where the latter has not only a high share in the industry's overall foreign trade but also a significant participation in the industry's production activity. It is also convenient to discriminate, within that subset of industries with a low (or nil) share of trade in production, between those that present relatively high transport costs—which we shall refer to as non-tradable sectors—and the rest—which we may call sectors of non-traded goods—where the low volume of foreign trade is determined by factors other than transport costs.

Finally, in those sectors where inter-industry trade predominates—and where, by its very nature, foreign trade is strongly unbalanced—it is convenient to distinguish the net importing industries, which we shall refer to as producing traditional importable goods, from the net

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[6] It may be worth noting that values of I_j lower than 1/2 imply that, among net exporting sectors, exports are more than three times larger than imports, and vice versa in the case of net importing sectors. Even considering the high level of disaggregation adopted, it seems appropriate to classify those industries showing values of I_j lower than 1/2 as sectors where inter-industry trade predominates.

exporting sectors, producing traditional exportable goods. This distinction is omitted in the case of sectors of intra-industry trade, since the high value of the index of intra-industry specialization in these sectors implies a relatively balanced trade.

A Taxonomy of Manufacturing Sectors

Our discussion so far, has led us to a five-fold taxonomy of industries according to the following set of criteria:[7]

Table 1

Sectors of:	I_j	$\dfrac{X_j + M_j}{Q_j^*}$	$X_j - M_j$	Transport costs
Intra-industry trade	≥ 0.5	≥ 0.05	--	--
Traditional importable	< 0.5	≥ 0.05	< 0	--
Traditional exportable	< 0.5	≥ 0.05	> 0	--
Non-traded	--	< 0.05	--	< 0.6
Non-tradable	--	< 0.05	--	≥ 0.6

*Q_j being the gross output of industry j.

Let us now examine some characteristics of these sectors, and begin with its importance in manufacturing's production and trade. A first feature that emerges from Table 2 is the prominence of inter-industry trade, which shows a share of over 60% in overall manufacturing trade. The importance of inter-industry trade—which confirms the results of Tornell's (1986) analysis of the nature and country composition of Mexico's foreign trade—is quite consistent with new theories of international trade, since Mexico's trade is undertaken to a large extent with developed countries, primarily the United States. Indeed, the new theories of intra-industry trade predict that it will be established among countries at similar stages of economic development,

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[7] The only exception to these criteria was the classification of automobile engines (a net exporting industry with a low estimated value of intra-industry trade) as a sector of intra-industry specialization, together with the production of automobiles and its parts,since these industries belong to a larger complex led by the same firms and showing as a whole a high index of intra-industry trade.

while inter-industry trade, arising from traditional comparative advantage, will tend to dominate the exchanges between developed and developing countries, given the wide differences among them in resource endowments.

Table 2

The Nature of Trade and Industrial Structure

		Shares in Total (%):			
Sectors of:	Number of Industries	Value Added [*]	Foreign Trade [**]	Exports [**]	Imports [*]
Intra-Industry Trade	34	22.5	35.7	51.4	30.6
Traditional Importable	53	28.1	53.1	8.7	67.3
Traditional Exportable	20	6.6	9.1	36.4	0.4
Non-Traded	50	20.4	1.4	1.5	1.4
Non-Tradable	27	22.5	0.7	2.1	0.2
Total	184	100.0	100.0	100.0	100.0

Notes: [*] 1980.
[**] Average share for the period 1978 to 1983.

The previous conclusion is, however, in need of qualification. Intra-industry trade has not only reached a significant share in overall manufacturing trade (of the order of 35%),[8] but it also dominates manufacturing exports with a share (51.4%) significantly larger than that of inter-industry exports (36.4%). The overall importance of inter-industry trade has, thus, to be attributed to inter-industry imports, which represent almost 70% of manufacturing imports and account for Mexico's structural trade deficit in manufactures.

Table 2 also shows the importance of non-traded and non-tradable goods in manufacturing production. Together, these sectors account for 43% of manufacturing value

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[8] This share, however, is probably much larger than that of intra-industry trade in Mexico's *overall* foreign trade, given the inter-industry nature of trade in primary products, which dominate Mexico's exports (especially oil and agricultural products).

added, half of which corresponds to non-traded goods and cannot be explained by high transport costs. This feature is in sharp contrast with the very limited importance of traditional exportable goods (accounting for only 6/6% of value added), and both reflect, as we shall discuss in more detail below, the prominent role that the domestic market has played in Mexico's industrial development.

Table 3 shows the commodity composition of each sector. Since the relative shares of each type of good in manufacturing are very different—non-durable consumer goods and basic inputs showing large shares and, at the other end, capital goods having little significance—it will be convenient to discuss the composition of each sector relative to that of manufacturing as a whole.   The composition of intra-industry trade sectors is heavily biased towards modern consumer durable and capital goods, with a substantial share of basic inputs (although lower than the corresponding to manufacturing as a whole).   Automobiles and auxiliary industries stand among the former, while capital goods and basic inputs comprise business machines, basic chemicals, non-ferrous metals and non-metallic minerals. The presence, in these sectors, of consumer non-durable and traditional durable goods is limited to some alcoholic beverages, textiles, and printing.

Table 3

Commodity Composition by Sector
Shares in Total Value Added (%) - 1980

Sector of:	Consumer Goods			Capital Inputs	Goods	Total
	Traditional Non-Durable	Modern Durable	Basic Durable			
Intra-Industry Trade	12.4	10.9	37.1	24.3	15.4	100.0
Traditional Importable	9.5	10.5	8.6	49.0	22.4	100.0
Traditional Exportable	52.8	20.6	0.0	15.6	11.0	100.0
Non-Traded	45.2	18.9	8.3	27.6	0.1	100.0
Non-Tradable	60.5	20.3	1.9	13.2	4.0	100.0
Total	31.8	15.2	12.8	28.8	11.4	100.0

When we consider traditional tradable goods, a sharp contrast stands between the composition of importable—dominated by capital goods and basic inputs—and of exportable, strongly biased towards consumer non-durable and traditional durable goods. Among the importing sectors, capital goods are, indeed, of major importance. As much as 55% of capital goods production is generated in those sectors, and when the latter are considered together with intra-industry trade sectors, they comprise more than 80% of the capital goods industries. On the other hand, almost half of the production of basic inputs originates in those importing sectors. The paper industry and a large proportion of the steel and aluminum metallurgy stand as the major ones among them. The presence of consumer goods in these sectors is limited to some final products of the industries just mentioned, as well as to some basic products (powdered milk and sugar) that Mexico had to import in large amounts during the period considered.

In contrast, traditional exportable goods include essentially natural resource intensive activities, the processing (or, sometimes simply packing) of some of the main exportable agricultural inputs (fish and shellfish, cotton, fruits, coffee, and tobacco) as well as some wood products, porcelain, and marble. The composition of non-traded and, especially, of non-tradable goods is also strongly biased towards consumer non-durable and traditional durable goods. The main difference between these two sectors is the relatively higher share among the former of basic inputs and modern consumer durable. But, besides this, both of these sectors are by and large constituted by the bulk of the food, textiles, and clothing industries, as well as by the final products of the wood, chemical, and household appliances industries.

In summary, Mexico's industrial structure is heavily biased towards the production of consumer goods (excluding modern durable) and basic inputs, with capital goods showing a very limited presence. The former (consumer non-durable and traditional durable goods) tend to show very low ratios of foreign trade to production (67% of its value added is generated in non-tradable and non-traded sectors), the main exceptions being the processing of some agricultural inputs that constitute the bulk of traditional exporting sectors. This feature of traditional consumer goods is linked to the prominent role that the domestic market has played in Mexico's industrial development, but is also related, most probably, to the large differences in the structure of consumption and per capita income levels between Mexico and its main trading partner, the United States. The fact that modern consumer durables, in contrast to the rest of consumer goods, tend to show high ratios of foreign trade to output, supports this hypothesis.

In contrast to most consumer goods, basic inputs and capital goods are sectors with high ratios of trade to output. However, since Mexico has structural trade deficits in these products, these activities tend to be heavy net importers and constitute the bulk of traditional importable goods. Thus, intra-industry trade sectors only predominate among modern consumer durable goods, the leading and most dynamic industries over the 1960s and 70s.

III. The Role of Traditional Comparative Advantage and Industrial Organization Conditions in the Explanation of Trade Flows

Let us now consider the distinctive features of each sector in terms of the prevailing technological and market structure conditions. Table 4 shows, for each of them, the mean values, relative to the manufacturing averages, of a number of technology indicators. These include an estimate of minimum efficient plant size, reflecting the importance of economies of scale, and three variables that may be assumed to be inversely related to traditional comparative advantage: 1) royalties (as a percentage of output), reflecting the technological intensity of productive processes; 2) the capital-labor ratio, reflecting the capital intensity of the adopted technology but, also, the presence of economies of scale; and 3) the relative inefficiency of an industry with respect to the same activity abroad (obtained from the IMCE study on effective protection in Mexico, see Appendix) which measures, approximately, the inverse of total factor productivity, with outputs and inputs (excluding labor) valued at foreign prices. The table also includes our index of transport costs.[9]

Table 5 presents the market structure conditions prevailing in the different sectors, together with an indicator of export profitability, determined by both the industry's relative efficiency and the effects of trade policies on the relative profitability of domestic and export markets. Among the market structure characteristics we have included the market concentration ratio (given by the market share of four largest firms), publicity expenditures (as a % of production), and the market shares of foreign owned enterprises, as well as medium size and large firms.[10] It also includes the concentration ratios of the corresponding industries in the United States.

The tables suggest a number of remarks, some of which will be considered in more detail and submitted to regression analysis in a later section of this paper. A first striking feature is the close and positive relationship between the volume of foreign trade and the presence of increasing returns, which emerges from Table 4. This relation is made clear by the importance of economies of scale among sectors of intra-industry trade and traditional importable—sectors which concentrate 90% of all manufacturing foreign trade (see Table 2)—together with its relative

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[9] See the appendix for the definition and sources of each of these variables.

[10] Foreign owned firms are those with 15% or more of total capital owned by foreigners. Medium and large firms are, respectively, those having between 100 and 250 employees, and more than 250 employees. Strictly, this set includes all public and foreign owned enterprises even when, in exceptional cases, the latter employ less than 100 workers.

absence in the production of non-tradable goods. The main disturbing element in this close relationship is the rather minor importance of economies of scale among traditional exportable goods, an anomaly that can be explained by the very nature of these processing industries, exporting goods intensive in abundant natural resources.

The importance of increasing returns is most striking in sectors in intra-industry trade, where it appears to be the main explanatory factor of trade flows. Indeed, foreign trade in these industries does not seem to be related to traditional comparative advantage: its technological and capital intensities, together with its "relative inefficiency," are well above the manufacturing averages, and in the case of the two last indicators, even above the traditional importable goods' averages. And they are also larger than among traditional exportable goods, in spite of the fact that the latter's share in manufacturing exports is lower than that of intra-industry trade sectors (as was pointed out in section II). These features confirm the difficulties faced when trying to explain intra-industry trade flows on the basis of traditional comparative advantage, but are quite consistent with new theories of international trade and its emphasis on increasing returns as a source of comparative advantages related to intra-industry specialization.

Table 5 shows another prominent feature of intra-industry trade sectors, the large share of medium and large firms, and especially of foreign owned enterprises (or, more loosely, since it largely coincides with it, of multinational corporations).   The latter, being almost twice the manufacturing average and well above that of any of the other sectors, suggests that multinationals' intra-firm transactions may be a major element in Mexico's intra-industry trade flows. A rough estimate indicates, in fact, that intra-firm transactions may represent around 41% of intra-industry trade flows;[11] a share that is well above that of intra-firm transactions in overall manufacturing trade (of the order of 22% according to Fajnzylber and Martinez Tarrago, 1976).

Relatively small publicity expenditures, suggesting a low degree of product differentiation, are another characteristic of these industries. Together with the presence of important economies of scale and the prominence of multinational corporations and intra-firm trade, these features outline a picture very similar to that depicted by Ramirez de la O (1981, see this paper's section I). These are industries of intensive engineering where multinationals follow a strategy of intra-industry specialization designed to exploit and take advantage of large economies of scale in production. Intra-industry specialization leads, then, to the coexistence of large export and import ratios so characteristic of these sectors. The process of intra-industry specialization may also have been intensified by industrial policy measures, such as fabrication

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[11] This estimate follows from two main assumptions: 1) intra-firm transactions represent 77.2% of multinationals' overall trade, according to Fajnzylber and Martinez Tarrago's estimate [see section I]; 2) multinationals' share in intra-industry trade is equal to their share in intra-industry tradable production.

programs (see section I), which appear to have played a relevant role in the development of exports from the automobile sector and some capital goods industries.

In contrast, and at least in a first approximation, the characteristics of inter-industry trade sectors fit better within traditional comparative advantage theory. This is clearly the case for inter-industry exports which, as already suggested, are a classical example of natural comparative advantage rather than specialization based on the exploitation of economies of scale. And traditional importable goods are typically more "inefficient," and more intensive in capital and technology, than traditional exportable sectors.

However, traditional importable goods present a striking feature.   These are sectors whose technical conditions of production, specifically their technological intensity and economies of scale, as well as their low degree of product differentiation, suggest a large potential for intra-industry trade and specialization, which is nevertheless wasted to a large extent since these industries are heavy net importers and show a very low degree of local development. The origin of this lack of intra-industry specialization is not, or not exclusively, the presence of excessively large economies of scale or the capital intensity in these industries; for these, as we have already seen, are lower than in the intra-industry trade sectors.   Moreover, some market structure conditions prevailing in these industries suggest a hypothesis, to be explored in further detail in section IV, that provides an alternative explanation to the one based on traditional comparative advantage for the lack of domestic development of these industries.

Indeed, as Table 5 shows, the presence of multinational corporations, as well as that of large and medium size enterprises, is relatively high in these importable sectors (following only in importance that of intra-industry trade sectors), suggesting that these industries present important relative advantages for large firms, and especially for multinational corporations, with high entry barriers for small enterprises as a result of their technological and capital intensities. Side by side, however, these industries show relatively low concentration ratios in the United States—lower than any other category with the exception of non-tradable sectors—suggesting, together with their very small degree of product differentiation, a low propensity on the part of the firms leading these industries abroad to develop multinational production activities.[12]   This combination of circumstances would explain the underdevelopment of these industries in the domestic market: in contrast to traditional exportable and non-tradable sectors, the presence of high capital and technological barriers inhibits the entry of private national firms; and in contrast to

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[12] The "propensity" to develop multinational production activities has been shown to be positively correlated with market concentration in the country of origin and the degree of product differentiation. The latter provides marketing advantages that, especially in the presence of large economies of scale in publicity, will stimulate the development of multinational corporations. See, on this subject, Marquez (1988).

intra-industry trade and non-traded sectors, the low degrees of product differentiation and market concentration abroad prevent the development of multinational corporations. Thus, in the absence of industrial policies aimed at the deliberate promotion of these sectors, no economic agent undertakes its domestic development.

Besides traditional exportable goods, high levels of "relative efficiency" are to be found, paradoxically, among non-tradable and non-traded sectors. In these industries, the exploitation of traditional comparative advantage must thus have been inhibited by several factors, a major one being the relative absence of economies of scale itself, which accounts, to a large extent, for the presence of high transport costs among non-tradable sectors. In this respect, one may note the interesting comparison between traditional exportable and non-tradable goods that have above average levels of relative efficiency, but show substantial differences in the importance of economies of scale. Other institutional, market structure, and policy factors must play a role, however, in explaining the lack of traditional comparative advantage specialization in non-traded sectors that enjoy high levels of relative efficiency, low transport costs, and significant economies of scale. We shall comment upon those in what follows.

In our last three categories of sectors, entry barriers are relatively low, and private local firms tend to predominate, especially among traditional exportable and non-tradable goods. The latter also show very low concentration ratios and a large share of small firms, both of these features being consistent with the technical conditions of production prevailing in these industries. The presence of multinational firms is only significant in non-traded sectors, where it reaches levels similar to those of traditional importable sectors (and much larger as a share of the domestic market rather than production). The simultaneous and significant presence of product differentiation (the highest of all sectors) evokes Ramirez de la O's (1981) hypotheses and results (see section I). These are sectors where, in contrast to intra-industry trade industries, product differentiation and marketing advantages induce multinational corporations to produce locally the whole range of products and models in order to exploit economies of scale in publicity, thus preventing a significant development of intra-industry trade. The fact that this is a feature of non-traded sectors as a whole, and not only of its multinational firms, suggests a generalization of this hypothesis to private national firms. To the role of product differentiation, one may add the effects of protection policies on export profitability, which in these sectors are, significantly enough, negative and much lower than among traditional exportable sectors (see Table 5). It is interesting to observe, however, that the anti-export bias is much smaller than among sectors of intra-industry trade, a feature that again stresses the primary importance of technological and market structure conditions, as well as of industrial policies other than protection, in the explanation of trade performance.

IV. A Cross Section Regression Analysis of Export Performance and Import Flows

The analysis in the two previous sections has suggested a number of hypotheses on the determinants of trade flows in different manufacturing industries. This section will continue to explore these hypotheses and present the results of a cross industry regression analysis of trade flows. For both exports and imports, the models to be estimated include as determining factors, variables referring to industrial organization conditions, traditional comparative advantage, and the effects of protection policies on export profitability or international competitiveness. First, we shall discuss the model for exports in detail and then, in a much more succinct presentation since the hypotheses are to a large extent analogous, the model for imports.

Exports, Economies of Scale, and Comparative Advantage

The model aims to explain inter-industry differences in export volumes and has the following general forms:

$$(1) \ln X = a + a*\ln Q + a*\ln DIF + a*(L/K) + a*PX$$

$$(2) \ln X = a + a*\ln Q + a*\ln DIF + a*(1/IR) + a*PX,$$

where X is the industry's average value of exports for the period 1978-83;
Q is the industry's gross output (1980);
DIF is publicity expenditures as a share of gross output (1970);
L/K is the labor-capital ratio (1975);
IR is relative inefficiency (1984); and
PX is export profitability (1984).

The gross output, or market size, variable has a dual role in the model. First, it normalizes export volumes for the overall economic size of each industry, in such way that the other variables influence the industry's export-output ratio rather than its absolute export volume. On the other hand, it allows us to evaluate the influence of increasing returns, and the exploitation of economies of scale, in export performance. Thus, for example, the hypothesis that increasing returns play a more important role in intra-industry than in inter-industry trade would lead us to expect, among intra-industry tradable goods, a larger and more significant regression coefficient than among traditional exportable goods. In order to explore more fully the effects of increasing returns, we estimated also the following equation:

$$(3) \ln X = a + a*(MEPS*\ln Q)$$

In this equation, MEPS is the minimum efficient plant size which indicates the intensity of economies of scale. A positive and significant regression coefficient (a) would suggest that the positive effects of market size on export volumes increase with the presence and intensity of economies of scale.[13]

Publicity expenditures are included in the model in order to submit to a formal statistical test the hypotheses suggested in previous sections, and derived in its original form from the work of Ramirez de la O on the specialization strategies of multinational corporations. As already suggested, his approach may be applied to national as well as multinational firms, and in this more general form it may be formulated as follows.

Consider a multi-product firm within an industry whose production and marketing processes have the following characteristics: on the one hand, the presence of economies of specialization, given by the fact that direct unit costs of production fall the greater the firm's specialization in a small number of products. These economies have their origin in the presence of economies of scale in production. On the other hand, marketing processes show economies of diversification, in the sense that, for a given volume of publicity expenditures, publicity costs per unit of sales fall the larger (up to a certain point) the range of goods and models produced. These economies have their origin in the exploitation of trademarks well established in the market, and in the presence of sunk costs involved in the design of the differentiated goods the firm is able to produce. In the case of multinational subsidiaries, these expenditures in design and differentiation have already been made by the parent company, so that its exploitation by the subsidiary does not involve significant additional costs. It is in this respect that multinationals may enjoy larger economies of diversification than national firms.

The firm's decision as to the range of differentiated goods to be produced will be guided by the relative profitability of specialization and diversification, which, in turn, will be determined by the relative importance of economies of scale in production and marketing. The larger the relative advantages of the latter the more the firm's strategy will be oriented towards diversification. However, to the extent that economies of diversification are a microeconomic phenomenon rather than a sectorial or a macroeconomic one, if all the firms in the industry follow the same strategy, the exploitation of economies of diversification for the industry as a whole will be very limited and the main result of competition would be a waste of potential economies of scale in production.

It is in this respect that the presence of a strong competition through product differentiation may inhibit the development of exports, i.e. through its negative effects both on

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[13] Problems of simultaneous causality have scant relevance in the context of Mexico's manufacturing sector, given the generalized presence of relatively small export-output ratios (of the order of 5% on average) and the overwhelming importance of the domestic market in explaining inter-industry differences in market size.

the profitability of intra-industry specialization, relative to that of a strategy of diversification, and on the exploitation of economies of scale in production which, in turn, will tend to reduce the foreign competitiveness of domestic production.[14]

The models presented in equations (1) and (2) also include variables referring to traditional comparative advantage: labor-capital intensity in equation (1), and relative inefficiency in equation (2). Also, both models include an indicator of export profitability which, as already pointed out, reflects the joint effects of relative inefficiency and of trade protection on the relative profitability of export and domestic markets.

According to new international trade theories, the most general hypothesis with respect to these variables is that their explanatory power, in contrast to that of industrial organization conditions, is greater in the case of inter-industry trade flows than in intra-industry trade. The effects of these variables (relative efficiency or export profitability, for example) on export volumes are likely to be strong when exports are small and to decrease in intensity as exports become larger. Hence, the logarithmic reciprocal transformation considered as the appropriate functional form for the relationship between exports and these variables.

Equations (1) to (3) were estimated, in a cross section regression analysis and by ordinary least squares, for the two groups of exporting industries of our taxonomy: the sectors of intra-industry trade and the traditional (or inter-industry) exportable trade, which together represent almost 90% of all manufacturing exports. The results, presented in Table 6, largely support our hypotheses. The general model (equations 1 and 2) shows a high explanatory power, especially among intra-industry trade sectors. The effect of market size on exports is positive in both sectors, the size and significance of the regression coefficient being remarkably higher among intra-industry trade sectors. The estimates for equation (3) also show that increasing returns effects are positive for both types of exports, but are clearly statistically significant only for intra-industry exports. All this tends to confirm the importance of economies of scale in international trade, and especially in the development of intra-industry trade flows.

Publicity expenditures have a negative and clearly significant effect on both types of exports, the size of the regression coefficient being larger for inter-industry exports. On the other hand, the regression coefficients for export profitability and comparative advantage variables show a very low statistical significance, although the signs of the coefficients are, generally, the expected ones. The exception in this respect is the coefficient for labor-capital intensity which shows a negative value in the equation for inter-industry exports. This result evokes the paradox

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[14] The traditional association in economic theory between imperfect competition and product differentiation has led the latter to play a central role in the development of recent theories of intra-industry trade (see, for example, Helpman and Krugman, 1985). This is somewhat curious and paradoxical given the negative effects that product differentiation may have on intra-industry trade specialization.

reviewed in section I to the extent that it indicates that the highest export-output ratios may show up in industries that are relatively capital intensive. Moreover, when the positive correlation between economies of scale and capital intensity is taken into account, the result suggests that the highest export-output ratios are present in industries that combine the mutually reinforcing effects of economies of scale and traditional comparative advantage.

Finally, the size of the regression coefficients for export profitability, although not statistically significant, suggests that the direct, or immediate, anti-export effects of protection are larger in the traditional exportable sectors than among intra-industry trade sectors. And, in view of this, the latter may well have been compensated by the development of the domestic market, and its positive effects on exports, that protection has indirectly made possible.

Imports, Comparative Advantage, and Market Structure Conditions

We now present the results of an analogous exercise for imports, considering the two importing sectors of our taxonomy (i.e., for intra-industry and inter-industry imports, which together represent 98% of all manufacturing imports). The general model is presented in equations (1) and (2) of Table 7, and includes the same variables as the model for exports, with two main exceptions. First, gross output is replaced by domestic demand (D)—defined as gross output minus exports plus imports by sector of origin—which normalizes imports by the size of each industry in the domestic market. Second, export profitability is replaced by the industry's price competitiveness (PCPT), defined as the percentage by which foreign prices exceed domestic prices of similar products (see Appendix).

The variables included correspond to the same general hypotheses presented in the analysis of export performance, although reinterpreted now for the case of imports. The expected signs of the regression coefficients are positive for the size of the domestic market—given the positive influence of economies of scale on intra-industry specialization—as well as for the capital intensity and relative inefficiency variables, given the role of traditional comparative advantage in inter-industry specialization. The expected signs are negative for publicity expenditures—given the inhibiting effects of product differentiation on intra-industry specialization—and, for obvious reasons, in the case of the industry's price competitiveness.

Table 7 presents the regression equation estimates. The model's explanatory power is again substantial for both types of imports. In the equation for inter-industry importing sectors, which concentrate almost 70% of all manufacturing imports, all the coefficients show the expected signs, and those that show the highest statistical significance are the size of the domestic market, the industry's price competitiveness (in equation 1), and relative inefficiency (in equation 2').

In the equation for intra-industry trade sectors, the coefficients that stand for its significance and sign, are those for the size of the domestic market and publicity expenditures. In

contrast, comparative advantage variables and price competitiveness have non-significant coefficients and, in the case of the former, show signs contrary to those expected by traditional trade theory. These results are thus in striking contrast to those obtained in the case of inter-industry imports, but are in agreement with our general views on the differential role that traditional comparative advantage plays in the explanation of intra- and inter-industry trade flows.

Table 8 shows the results of a correlation analysis between import penetration ratios by industry (the share of imports in domestic demand) and the nature of firms present in each industry. In this respect, we consider the presence of firms as a share both of the industry's gross output and of the industry's overall domestic market.

Let us focus on the correlation coefficients for the traditional importable sectors which, as already pointed out, are those where most manufacturing imports are concentrated.   In this respect, the table's most striking feature is that, in contrast to what happens in most of the cases for other types of firms and for the rest of the sectors, the import penetration ratios in these traditional importable sectors are positively correlated with the share of multinational corporations in the industry's gross output but negatively correlated with the share of these same firms in the industry's domestic market. Thefollowing regression equation, estimated for a cross section of this group of industries, reveals the same phenomenon:

$$M/D = 26.56 + 1.24 * MC\%Q - 1.66 * MC\%D \qquad R = 0.58$$
$$(7.82) \quad (7.92) \qquad (-8.07) \qquad\qquad R = 0.56$$
$$n = 53$$

where, M/D is the import penetration ratio; MC%Q and MC%D are, respectively, the shares of multinational corporations in gross output and the domestic market; n is the number of observations; and t ratios are shown in parentheses.

These results indicate that the highest import penetration ratios are to be found among industries that show simultaneously a relatively high share of multinational firms in the industry's gross output and a relatively low share of these corporations in the domestic market. Since the former strongly suggests the presence of significant relative advantages for multinationals and high entry barriers for other type of firms, to the extent that the latter indicate a low propensity of large firms abroad to establish production activities in the domestic market, these results tend to support the interpretation given in section III, of the low degree of domestic development of these traditional importable sectors.   The fact that, among the other type of firms, the same phenomenon—of correlation coefficients with opposite signs—appears in the case of public enterprises, and only in this case, simply stresses the implications of that view: in the absence of a deliberate government effort, no economic agent undertakes a significant development of these industries.

V. Conclusions

In summary, by the early 1980s intra-industry trade had reached a significant share (of the order of 35%) in Mexico's manufacturing trade, and its presence was especially relevant among manufacturing exports (with a share of over 50%). These intra-industry exports, in contrast to traditional, natural resource intensive, inter-industry exports, did not obey the laws of traditional comparative advantage. Their main determinants lay, rather, in the nature of industrial organization conditions, specifically: the presence of increasing returns to scale as a primary condition for intra-industry trade flows; the development of intra-firm trade on the part of multinational corporations; and as negative factors, inhibiting the exploitation of intra-industry specialization advantages, the role of competition through product and publicity differentiation together with the presence economies of scale in marketing. It should also be pointed out that in some sectors, the simultaneous presence of traditional comparative advantage and large economies of scale in production may mutually reinforce each other, giving rise to some of the highest export-output ratios within the manufacturing industries.

In contrast, most manufacturing imports, the bulk of them being capital and intermediate goods, are inter-industry trade flows. The corresponding importable sectors show factor intensities that are, indeed, at variance with domestic resource endowments, but this feature did not appear to be the only, perhaps not even the main, obstacle for the domestic development of these industries. In fact, in terms of economies of scale and capital intensity, the development effort is easier than in sectors of intra-industry trade, sectors that have been able to develop a comparative advantage that in the past was only a potential one. The analysis of the relationships between foreign trade and market structure conditions provided, instead, an alternative interpretation: the origin of the domestic underdevelopment of these traditional importable sectors would lie in the coexistence of high technological barriers to entry for private national firms, together with a low propensity of the firms leading these industries abroad to develop multinational production activities. Thus, in the absence of deliberate promotion policies, this particular combination of circumstances induces a wasteful lack of exploitation of that remarkable potential for intra-industry specialization and trade which is a most striking feature of these industries.

Another important characteristic of Mexico's manufacturing sector is the high share of non-traded and non-tradable sectors (of the order of 43% taken together). This feature is partly a reflection of the prominent role that inward oriented policies have played in Mexico's industrial development and, to this extent, it is also the counterpart of the lack of a substantially developed traditional exportable sector. But, again, this traditional interpretation does not provide a full

explanation. Mexico's industrial structure continues to be heavily biased towards the production of traditional consumer goods and its specific inputs, which in a large proportion have its foreign trade potential limited by several factors: the existence of high transport costs in sectors that represent about a fifth of total manufacturing output; a limited presence of economies of scale and, as a consequence, of specialization advantages; important economies of diversification that, in an analogous way to high transport costs in the non-tradable sectors, hinder the development of intra-industry specialization in sectors with strong competition through product and publicity differentiation; and, finally, the existence of wide differences, determined by per capita incomes, in the structure of consumption between Mexico and the United States, its main trading partner.

Finally, our research findings suggest a simple explanation of the puzzles regarding Mexico's trade pattern, and reviewed in our brief survey of the literature in section I. Indeed, the ever increasingly "distorted" factor content of Mexico's foreign trade, given its relative endowments of productive factors and the fast growing share of capital-intensive manufacturing exports in overall trade, would appear to have its origin in the very rapid growth process, which took place from the late fifties to the early years of the present decade, in the domestic production and trade flows of sectors of intra-industry trade. This development was triggered by industrial policy measures, fostered by the dynamic interactions between increasing returns, intra-industry specialization, and a fast growing domestic market, and it finally blurred the importance of traditional inter-industry exports.

Appendix: Data Sources and Definitions

The original data employed in this study comprise two main sets of information: 1) foreign trade data provided by the study on effective protection in Mexico, carried out by the Instituto Mexicano de Comercio Exterior (IMCE, 1984); and 2) industrial data, provided by ILET's project on industrial organization in Mexico and based on National Accounts data and the Industrial Censuses for 1970, 1975, and 1980 (forthcoming).

These two sets of information were made mutually consistent as explained in ILET (1987a). The resulting trade and industry data bank refers to 184 manufacturing industries defined, approximately, at the four digit level of the Standard Industrial Classification.   ILET (1987b) explains, in turn, the classification by type of good employed in Table 3 in the text.

The IMCE (1984) study provided the data for the following variables:

1) Export and import coefficients defined as ratios to gross output by industry of origin, for the average of the period 1978 to 1983.

2) Three variables, specially constructed for that study, which refer to the year 1984:

    a) the industry's inefficiency relative to the same activity abroad, which is based on estimates of domestic resource content and measures, approximately, the inverse of total factor productivity (relative to the same activity abroad), with outputs and inputs (excluding labor) valued at foreign prices;

    b) the industry's export profitability, based on measures of the profitability of sales in export markets relative to domestic sales; and

    c) the industry's price competitiveness, measured as the percentage by which foreign prices exceeded domestic prices of similar products.

Industrial organization data refer, first, to the 1970 and 1975 Industrial Censuses and the following variables:

1) Publicity expenditures as a proportion of gross output (1970).

2) Minimum efficient plant size, measured as the average size (in terms of employment) of the stratum of smaller plants within those accounting for the first half of the industry's gross output (1975).

3) Capital-labor ratio, measured as the ratio of fixed assets valued at historic cost to the total number of employees (1975).

4) Index of transport costs, measured as the ratio of the number of states where the industry is in existence to the total (potential) number of states (1975).

Access to unpublished information from the 1980 Industrial Census provided the data on shares in gross output by type of firm. The latter refers, first, to market concentration ratios, i.e. the share in gross output of the four largest firms. In the case of U.S. industries, this variable was obtained from the 1977 U.S. Census of Manufactures. The rest of the variables refer to shares in gross output of the following categories of firms:

1) Multinational corporations, defined as those firms with foreign ownership of 15% or more of capital.

2) Public enterprises, defined as firms with state participation except for those already defined as multinationals.

3) Private national firms, which are in turn distinguished by size: a) large (250 employees and over); b) medium (between 100 and 250 employees); and c) small (less than 100 employees).

4) Large and medium size firms refer to multinational and public corporations plus private national firms with 100 employees and over.

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Table 4

Nature of Trade and Technological Conditions
(Ratio of the Mean Value by Sector to the Mean Value of All Industries)

Sectors of:	Minimum Efficient Plant Size	Royalties[*]	Capital-Labor Ratio	Relative Inefficiency	Index of Transport Costs	
Intra-Industry Trade	1.85	1.23	1.31	1.10	0.82	
Traditional Importable	1.00	1.38	1.01	1.08	1.01	
Traditional Exportable	0.64	0.83	0.85	0.86	0.97	
Non-Traded	0.94	0.87	1.04	0.93	0.72	
Non-Tradable	0.37	0.36	0.56	0.94	1.77	
All Industries	1.0	1.0	1.0	1.0	1.0	

Notes: [*] Ratio of royalties to the industry's gross output.

Table 5

Nature of Trade and Market Structure Conditions

Sectors of:	Average Share in Gross Output (%):			Market Concentration[**]		
	Multinational Corporations	Large and Medium Size Firms	Publicity Expenditures[*]	Mexico	U.S.	Export Profitability
Intra-Industry Trade	53.3	83.5	1.15	58.5	50.0[a]	-64.7
Traditional Importable	29.5	75.3	0.84	55.4	40.9[b]	-54.3
Traditional Exportable	10.2	55.9	0.69	45.0	42.5[c]	12.3
Non-Traded	29.6	73.9	1.35	51.2	48.6[d]	-10.1
Non-Tradable	7.9	36.0	0.78	21.5	30.8[e]	-0.8
All Industries	28.8	66.8	1.0	48.7	43.1[f]	-29.1

Notes: [*] As a proportion of industry's gross output. Ratio of the mean value by sector to the mean value of all industries.
[**] Concentration ratio (4 largest firms).

Due to the absence of data for all industries, in some cases the average values refer to a number of industries smaller than the numbers presented in Table 2. These cases are indicated in the table, and the corresponding number of industries are:
a) 32   b) 49   c) 16   d) 45   e) 26   f) 168

Table 8

Correlation Analysis of Import Ratios and Presence of Firms by Sector
(Correlation Coefficients)

Shares in Gross Output (Q) and Domestic Market (D) by Type of Firm		Import Penetration Ratios by Sector				
		Intra-Industry Trade	Traditional Importable	Traditional Exportable	Non-Traded	Total[*]
Multinational Corporations	Q	-0.263	0.155	-0.278	0.204	0.164
	D	-0.334	-0.208	-0.023	0.163	-0.062
Public Enterprises	Q	0.072	0.054	0.161	-0.003	0.128
	D	0.017	-0.126	0.276	-0.004	0.041
Private National Firms: Large	Q	-0.144	-0.127	-0.230	-0.059	-0.095
	D	-0.228	-0.298	-0.087	-0.077	-0.196
Medium	Q	-0.021	-0.211	0.655	0.133	-0.002
	D	-0.146	-0.410	0.758	0.110	0.047
Small	Q	0.229	-0.426	0.103	-0.207	-0.076
	D	0.229	-0.426	0.103	-0.207	-0.076

Notes: [*] All industries (tradable and non-tradable)

Table 6

Regression Analysis of Manufacturing Exports

Equations:
(1) $\ln X = a_0 + a_1 (MEPS \cdot \ln Q)$
(2) $\ln X = a_0 + a_1 \ln Q + a_2 \cdot \ln DIF + a_3 (L/K) + a_4 \cdot PX$
(3) $\ln X = a_0 + a_1 \ln Q + a_2 \cdot \ln DIF + a_3 (1/IR) + a_4 \cdot PX$

Sectors of:	Equation	Constant	$(MEPS \cdot \ln Q)$	$\ln Q$	$\ln DIF$	(L/K)	$1/IR$	PX	R^2	$\bar{R}^2$	Number of Industries
	(1)	5.475	0.000106						.183	.158	34
		(15.27)	(2.68)								
Intra-Industry	(2)	-3.836		1.119	-0.200	0.0046		0.0014	.756	.722	34
Trade		(-2.56)		(6.77)	(-2.48)	(0.49)		(1.14)			
	(3)	-3.539		1.066	-0.213		0.195	0.00096	.755	.721	34
		(-2.74)		(7.85)	(-2.57)		(0.30)	(0.59)			
	(1)	6.427	0.000054						.009	-.046	20
		(13.54)	(0.40)								
Traditional	(2)	0.424		0.705	-0.462	-0.0092		0.00361	.690	.607	20
Exportable		(0.21)		(3.00)		(-0.84)		(-0.65)			
	(3)	-0.714		0.815	-0.432		0.552	0.00293	.676	.589	20

Table 7

Regression Analysis of Manufacturing Imports

vEquations: (1) $\ln M = a_0 + a_1 \ln D + a_2 \ln DIF + a_3 (K/L) + a_4 PCPT$
(2) $\ln M = a_0 + a_1 \ln D + a_2 \ln DIF + a_3 IR + a_4 PCPT$
(2') $\ln M = a_0 + a_1 \ln D + a_2 \ln DIF + a_3 IR$

Sectors of:	Equation	Constant	lnD	lnDIF	(K/L)	IR	PCPT	R^2	$\overline{R}^2$	Number of Industries
	(1)	-4.557	1.256	-0.251	-0.794		-0.00375	.831	.807	33
Intra-Industry		(-4.13)	(9.44)	(-2.35)	(-0.52)		(-0.51)			
Trade	(2)	-3.385	1.251	-0.274		-1.220	-0.01709	.839	.816	33
		(-2.63)	(10.66)	(-2.59)		(-1.27)	(-1.37)			
	(1)	-2.198	1.056	-0.075	0.837		-0.0147	.799	.782	53
		(-2.94)	(12.02)	(-1.14)	(0.62)		(-2.96)			
Traditional	(2)	-3.641	1.089	-0.100		1.234	-0.0029	.808	.792	53
Importable		(-3.33)	(13.38)	(-1.55)		(1.66)	(-0.35)			
	(2)	-3.891	1.093	-0.103		1.447		.808	.796	53
		(-4.75)	(13.72)	(-1.62)		(3.41)				