

# **Explaining Foreign Ownership By Comparative and Competitive Advantage: Empirical Evidence<sup>1</sup>**

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## **Abstract**

This paper provides empirical evidence on the determinants of foreign ownership in manufacturing industries. Foreign ownership, according to the theory of international production, is the result of the combination of comparative and competitive advantage. An adequate examination of the ownership structure of an industry requires the ability to establish empirically the extent to which international competitiveness of firms rests on comparative and competitive advantage. Analysis is based on a sample of the 30 largest manufacturing firms in Austria. The distinction and definition of comparative and competitive advantage as used in this paper and following from it the conclusions about the ownership structure are consistent with the empirical evidence about the share of employees in foreign-owned firms on the industry level. In particular, the classification of firms as foreign- or domestically-owned is in line with the revealed performance differences between foreign and domestic firms.

JEL classification: *F1, F23, L2, L60*

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## Introduction

Research on ownership and Multinational Enterprises (MNEs) asks two related questions: The first relates to the ownership structure of industries, i.e. the share of foreign-owned MNEs. Foreign ownership of firms frequently raises concern among politicians for reasons of loss of sovereignty (Vernon 1971). Moran (1996) mentions that under imperfect competition, "... firms have a measure of choice where and how to conduct their operations, and they have rents (as well as promises and threats) [...] The nationality of owners and managers becomes potentially significant. [...] about the impact of TNCs on national power and national autonomy, in particular in small and medium-sized countries." (Moran, 1996, p. 418)

The second relates to the ownership structure of single ventures of firms and assesses the determination of ownership share in foreign production. Here, the relevance of ownership lies in the fact that it is often used to control residual rights in international corporations under conditions of incomplete contracts (for a survey see Nakamura, M. and Xie, J., 1998).

Despite a clear distinction of the underlying factors in the theoretical literature (e.g. OLI-paradigm, Dunning 1990) which views FDI as the matching of (internalisable) firm-specific advantages with location-specific advantages, empirical testing on the first issue remains limited. An adequate examination of the ownership structure of an industry requires the ability to establish empirically the extent to which international competitiveness rests on comparative and competitive advantage. The lack of empirical distinction of the underlying advantages has restricted our understanding of ownership issues. This paper seeks to provide empirical evidence on the determinants of the ownership structure of industries. Ownership structure of industries is closely related to international competitiveness of firms and countries, which have recently been the focus of considerable attention within the literature.

As a small country, Austria is a good example for a long tradition of a mixed ownership structure of manufacturing industries with foreign domination in some industries. Figures already from the 1950s suggest that about 10% of total nominal capital was owned by foreigners on average (WIFO 1960, p. 312), higher shares were reached in the petroleum (50%), paper & printing (48%) and electronics industry (35%). Since that time, foreign ownership has increased on average (see Bellak 1997, 1998a for a review and Table 1).

Table 1. Percentage Share of Foreign-owned Firms in Employment of Manufacturing Sector

Industries	1975	1980	1985	1990	1995
Metals, vehicles*)	17	16	19	26	24
Electrical engineering	44	58	54	57	46
Petroleum, chemicals	41	24	36	35	41
Paper, wood	25	20	19	16	17
Textiles, clothing, leather	24	29	25	25	22
Food, beverages, tobacco	20	27	25	14	22
Construction and allied industries	21	36	34	47	-
Other	n.a.	25	22	10	-
Total	25	26	27	30	29

Source: updated from Glatz, Moser 1989, p. 87. (1995 = domestic industries: BS 68; FDI: ÖNACE) from Statistische Übersichten 7/96; OeNB FDI-Survey

\*) This is a conglomerate industry ranging from base metals to machinery etc.

There is an increasing tendency in the literature to distinguish between the two types of advantages by various measures based on the common definition of comparative advantage in trade theory, yet for competitive advantage most authors use FDI as a proxy (Nachum et al. 1998; Buckley and Casson 1998; Patel and Vega 1997; Rugman 1996; Hirsch and Czerniawsky 1997). This paper connects firm and country characteristics and follows the conceptual scheme developed and proposed by the latter authors. The way ownership structure is conceptualised requires a careful distinction of competitive advantage and comparative advantage in empirical work.

The purpose of this research is fivefold:

To fill the lacunae of empirical advantage-type distinction.

To apply measures developed previously in order to explain the ownership structure of industries and to compare the results to those of other countries now becoming available.

To add to the discussion on (performance) differences between domestic and foreign firms.

To show, whether predictions of industrial organisation theory on FDI as proxy of ownership of industries are confirmed.

To provide a step towards further incorporating micro-level analysis (firm-specific advantages) into the field of macro-level analysis (country-specific advantages), in order to better understand the joint determinants of the ownership structure.

We shall show that:

The distinction and definition of comparative and competitive advantage as used in this paper and following from it the conclusions about the ownership structure is consistent with the empirical evidence about the share of employees in foreign-owned firms on the industry level. In particular, the classification of firms is in line with the revealed performance differences between the firms.

The likelihood of ownership change increases with a change in the two types of underlying advantages.

Differences of performance between firms classified by ownership exist and that evolutionary theory provides explanations for this.

Results are in line with those established in two other countries.

Differences between the 30 largest firms and industry average concerning the classification of industries exist.

Hypotheses about intra-industry FDI on the basis of the two types of advantage are confirmed.

The paper is organised as follows: The first section includes a short review of theory and the need for a distinction between competitive advantage and comparative advantage. The second section presents a conceptual distinction of comparative and competitive advantage. The sample and methodology are described in section three. Section four presents the results and provides a discussion.

## Literature Review and a Formal Definition

Neoclassical theory of perfect competition regards firms as independent actors, i.e. the decisions of firm A does not influence the decisions of firm B. Ownership does not matter and MNEs do not exist. The firms perceive a certain environment and react to it in the same way, i.e. there is a single optimum decision. The distinction between comparative and competitive advantage is meaningless (Abd-el-Rahmen 1991). When we relax neoclassical assumptions, ownership of firms becomes an important subject matter. The actions of one firm influence the actions of other firms as economies of agglomeration, oligopolistic competition (Knickerbocker 1973) and joint-input situations (especially of knowledge-based assets, Markusen 1998a, p. 84 and 1998b) become important. Another important factor is product differentiation (Caves 1971), which in the context of ownership may result in a "division of labour" between foreign and domestic firms specialising in different products. As Dunning (1991, p. 41) puts it: "Transnationality does confer its unique characteristics and bring about a distinctive impact on resource allocation and usage." As a result, the interactions of domestically- and foreign-owned firms under imperfect competition are important, since with it mixed ownership structures of industries emerge.

Empirically, the ownership structure of industries may range from purely domestic, mixed (domestic and foreign) to purely foreign ownership.<sup>2</sup> Established theory suggests that the ownership structure is determined by a combination of competitive and comparative advantage (e.g. Abd-el-Rahmen, 1991; Dunning, 1990). Once it is possible to measure these two types of advantages empirically, as will be demonstrated as one of the central themes of this paper, the ownership structure of industries as well as variations of ownership between industries can be explained.

The FDI pattern (inward and outward) of a country is a result of the combined effects of the two sources of advantage. Yet, in themselves they contain no information about the individual sources of the perceived market performance. (Hirsch and Cherniawski 1997) Conceptually, this can be shown in the combination of comparative advantage and competitive advantage (see Figure 1). As Kravis (1985) points out, there is a specific relationship between comparative and competitive advantage and the multinationality of firms: "Country-specific advantages [...] may also determine the nature of the firm-specific advantage (FSA) that enables the MNE to produce competitively in a foreign country." (p. 61)<sup>3</sup> The two types of advantages are defined as follows:

### *Comparative Advantage*

According to Maskus and Webster (1994) there are two types of comparative advantage: "Ricardian type", which is linked to the home country and comprises differences in technology and managerial efficiency, which are exactly the same elements likely to give rise to differences in labour productivities. Productivity differences are related to outward FDI:

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<sup>2</sup> The lack of domestic firms in an industry, does, however, not imply that foreign firms step in automatically - an argument found frequently in the literature. *Inter alia*, the existence of comparative advantage, the absence of domestic competitors and the existence of entry barriers (protected markets) will favour entry, if foreign firms have a competitive advantage. As a consequence the actual ownership structure of an industry may only be established empirically.

<sup>3</sup> See Dunning (1990, p. 45, Table 1) for links between selected ownership-specific advantages of firms and country-specific characteristics likely to generate and sustain them.

”Investment arises precisely because profit maximising firms are better able to exploit this type of advantage through investment rather than exporting.” (p. 2)

”HOS-type”, which are linked to the host country (inward FDI) and determine the optimal location of investment (where opportunity costs are lowest).

Sleuwaegen (1990, p. 154) in a similar argument, terms ”country competitiveness” as conditions, stimulating the technological and dynamic competitiveness of the companies (first type)<sup>4</sup>; and according to prevailing location conditions within their territories (second type). It follows that empirical studies concerning the relationship between a country’s competitiveness and the ownership structure of industries must consider the effects of these two types of advantages.

In this analysis the elements of comparative advantage must satisfy two conditions, namely

They affect firms in an indiscriminate manner. Using Porter’s terminology firms located in country A face identical ”Factor Conditions”.

They are internationally immobile.

Examples are the physical infrastructure of a country, the National Innovation System or the Institutional Environment.

### *Competitive Advantage*<sup>5</sup>

Dunning (1991), quoting from Amit and Schoemaker, defines competitive advantage by distinguishing between resources and capabilities: ”Resources consist of proprietary know-how (e.g. patents and trade secrets), financial or physical assets (e.g. property, plant and equipment), human capital, government licenses etc. Capabilities, in contrast, are tangible or intangible (invisible) assets that are firm-specific and are created over time through complex interactions among the firm’s resources. They can be thought of as ‘intermediate goods’ generated by the firm to provide enhanced productivity of its resources as well as flexibility and protection for its final product or service. Capabilities are based on developing, carrying, and exchanging information through the firm’s human capital.” (p. 2, FN3; see also Kummerle 1997)

Again there are two types of competitive advantage, namely industry / country-based and firm based advantages: ”Industry characteristics include the nature of the production technology and are fairly self evident. Firm-specific characteristics may relate to the firm’s size, its product strategy and to its possession of a particular technology or brand name. Country-specific advantages relate to particular factor endowments required for the generation of the ownership

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<sup>4</sup> Among these factors are: the availability of good educational and training facilities coupled with the supply of skilled manpower, technicians and managerial manpower; good and reliable capital markets; government provided investment – R&D incentives and industrial policy; and high per capita incomes coupled with high income elasticities of demand.

<sup>5</sup> Other terms are ”firm-specific advantages”, ”monopolistic advantages”, ”ownership advantages” (Erramilli et al. 1997, p. 736). Recently, the term competitive advantage has been used also with respect to countries and nations.

advantages.” (Norman and Dunning 1984, p. 524) Yet, the distinction between comparative and competitive advantage becomes difficult once we turn to the empirical side, since under a given FDI pattern we observe a combination of both.

Here, the elements of competitive advantage must satisfy two conditions, namely They are immobile between firms. They can, in other words, be denied to outsiders by the firm which controls them (Markusen 1998a).

They are internationally mobile between units of the firm (i.e. subsidiaries abroad) which controls them.<sup>6</sup>

Thus ownership structure is the result of two kinds of advantage, namely comparative and competitive advantage. In particular, domestic ownership is expected in industries, where competitive advantage of domestically-owned firms and comparative advantage exist, while foreign ownership will be found in industries where comparative advantage exists in Austria and foreign firms transfer their mobile resources to combine them with the comparative advantage of Austria. The extent of foreign ownership can, however, only be established empirically. The remainder of this paper discusses the results of an empirical assessment of this hypothesis.

Figure 1. The determination of location and of ownership

+	IPG I Output produced in country A by firm "a"	IPG II Output produced in country B by firm "a"	
-			
	IPG III Output produced in country A by firm "b"	IPG IV Output produced in country B by firm "b"	
	+ -- <b>Comparative Advantage</b>		

Source: Hirsch and Cherniawski 1997, p. 6.

<sup>6</sup> Dunning (1990) distinguishes location-bound and transferable competitive advantages.

## Sample and Methodology

Data refer to 1994<sup>7</sup>. The sample consists of three different data sets. (i) Data on the 30 largest Austrian manufacturing firms ranked by total employment which have been collected by the author and confirmed by the firms. The criteria for classification as a manufacturing firm are that more than 50 percent of employees of the firm are in manufacturing, i.e. less than 50 percent in services. (ii) Data on *exports*<sup>8</sup> are taken from the survey of the Austrian statistical office ÖSTAT. The classification of industries follows the "BS68" classification and had to be reclassified from SITC by a key obtained from WIFO in order to be matched with *sales* data included in the "Industriestatistik" of ÖSTAT. Here, the unit of analysis is the plant rather than the firm level. (iii) In order to check the plausibility of the results, first they have been compared to Finish and Israeli data on their 30 largest firms, which have been collected on a comparable basis. Second, they have been compared to intra-industry FDI stocks, data taken from the Austrian National Bank (OeNB). Compared to the first and second data set, the OeNB data follow the "Fachverbandsgliederung" instead of BS68, which is, however not very different.

The degree of representation shows clearly that the 30 largest firms cover a substantial part of the manufacturing sector (cf. Table 2). The combined analysis of firms and industry data provides a step toward the integration of the meso- and the micro-level used in the theoretical literature quoted above.

Table 2. Degree of representation measured by employment (numbers and percentage shares)

	1992	1994
Total Employees of Manufacturing Sector (1)	522,800	472,400
Employment Abroad (in outward FDI) of Manufacturing Sector (2)	72,818	94,400
Domestic Employment 30 largest (3)	157,217	114,411
Total Employment 30 largest (4)	199,981	155,684
Employment Abroad 30 largest (5)	42.764	41.273
Degree of Representation Domestic (3) / (1) * 100	30.1	24.2
Degree of Representation Total (4) / (1) * 100	38.3	33.0
Degree of Representation Foreign (5) / (2) * 100	58.7	43.7

Source: (1) var. *Beilagen zu WIFO Monatsberichte* (average values); (2) var. OeNB (3), (4), (5) SMOPEC Databank

Figures 2 and 3 (see Appendix) show the degree of internationalisation of the 30 largest firms measured by sales and employment for the sample total and divided between domestic and foreign-owned firms. Within the group of *domestically-owned* firms the state-owned "ÖIAG" has been excluded, since it was privatised during the period 1992-1996 and thus followed an exceptional trajectory of growth. With domestically-owned firms the increase in employment

<sup>7</sup> Panel data for the period 1992-1998 are in preparation and will allow dynamic analysis of ownership structure of industries.

<sup>8</sup> Exports, a frequently used variable, turns out to cause firms problems in stating the right value. Some firms state gross exports, some net-exports, i.e. excluding intra-firm exports, some include foreign production or value-added etc. However, in this particular analysis export data of the 30 largest firms were not used.



abroad was paralleled by a reduction of domestic employment (Figures 2d, 2e) while the increase in sales abroad was followed by a reduction of domestic sales. Differences of the development of the two groups of firms are obvious.

The expansion of domestic sales and employment of *foreign-owned* firms (Figures 2e, 3e) may have been prompted by an improvement of their competitive advantage vis-à-vis domestic firms and / or a change in the comparative advantage, inducing a decision by the foreign mother company to expand in Austria. The reduction of domestic sales and employment of *domestically-owned firms* (Figures 2d, 3d) could have been associated with a deterioration of the comparative advantage in Austria, stimulating expansion abroad etc. In order to analyse these aspects in greater detail we proceed with an operationalisation of the two types of advantages.

*Operationalisation of the two types of advantages is as follows:*

Comparative Advantage (Balassa 1965):  $CA_i = F_i / \Sigma F_i \div S_i / \Sigma S_i$

Where:  $i$  is an industry index

$F_i / \Sigma F_i$  is the ratio of industry  $i$  exports to total industrial exports

$S_i / \Sigma S_i$  is the ratio of industry  $i$  sales to total industrial sales

Competitive Advantage:  $ca_i = f_i / \Sigma f_i \div s_i / \Sigma s_i$

Where:  $i$  is an industry index

$f_i / \Sigma f_i$  is the ratio of foreign sales of the firms in industry  $i$  to total foreign sales of all firms in all industries

$s_i / \Sigma s_i$  is the ratio of total sales of the firms in industry  $i$  to total sales of all firms in all industries

Table 3 contains the results for the two types of advantage. The figures represent the composite ratio (CA and ca) and may vary between zero and infinity. "The analytically interesting value in this case is unity." (Hirsch and Cherniawski 1997, p. 6) Consequently we refer to an industry with an index larger than 1 as enjoying a comparative (competitive) advantage and to an industry with an index smaller than 1 as exhibiting a comparative (competitive) disadvantage.

## **Results and Discussion**

This subsection tackles five related issues, namely (i) the classification of industries by comparative and competitive advantage, (ii) the differences of classification according to ownership, (iii) performance differences according to ownership and evolutionary theory, (iv) comparison of our results with those of other countries, and (v) the comparison of results based on the 30 largest firms with the distribution of FDI stocks and intra-industry FDI of the manufacturing sector total.

The *first issue* is the classification of industries into the international performance groups and divided by ownership. Several industries will be highlighted, which either confirm or contradict our expectations.

Table 3. International performance groups: Classifying Industries by Comparative and Competitive Advantage

Code	Industry	Domestic-owned firms:			Foreign-owned firms:			30 largest firms total:		
		Indu- stry	Firms	IPG	Indu- stry	Firms	IPG	Industry	Firms	IPG
31	Food	-7.24	-1.17	IV	-7.39	-	-	-6.27	-0.68	IV
32	Drink, Tobacco	-5.37	-4.28	IV	-4.77	-	-	-4.64	-2.54	IV
33,34	Textiles, Clothing	2.74	-	-	3.31	0.57	III	2.46	0.29	III
41	Pulp, Paper	1.48	3.92	I	0.21	2.79	III	1.23	3.43	I
44	Rubber, Plastics	2.67	-	-	1.19	0.58	I	0.79	0.36	IV
45	Chemicals	0.90	2.15	I	-0.47	-	-	0.71	0.85	I
47	Non-metallic mineral	-2.76	4.67	II	-4.58	-	-	-2.40	2.35	II
51	Ferrous& non-ferrous metals	-0.71	-7.00	IV	-0.37	-	-	-0.66	-4.80	IV
52	Metal products	0.08	0.97	IV	0.17	-	-	0.05	0.97	IV
54,55	Machinery & Equipment	6.95	0.47	III	8.00	2.62	I	6.22	1.51	I
56,57	Electrical Machinery	-3.13	-0.06	IV	-2.32	-8.62	IV	-2.43	-2.94	IV
58	Transport Equipment	6.41	-0.52	III	8.96	2.06	I	6.85	-1.25	III

Note: International Performance Groups I ... Comparative and Competitive Advantages; II ... Competitive Advantage Dominated; III ... Comparative Advantage Dominated; IV ... Comparative and Competitive Disadvantage

BS68-Code 62 is excluded because no data were available on the industry level

The *30 largest firms total* (cf. Figure 4a) are spread over all IPGs. Some characteristics which apply to all industries are that sales per employee as well as the foreign-sales ratio are lower for domestically-owned firms than for foreign-owned firms; and total foreign sales of domestically-owned firms are lower than foreign sales of foreign-owned firms, with the exception of the paper industry. The most interesting group is IPG I which includes the pulp&paper and machinery&equipment industries. In the pulp&paper industry, there is no difference between the domestically-owned and foreign-owned firms' foreign sales ratio, its productivity is clearly above the 30 largest firms' average, the foreign-owned firms productivity being twice that of the domestically-owned firms. In the machinery&equipment industry, the foreign-owned firms have contributed to the overall position in IPG I, overriding the domestically-owned firms. This is consistent with the fact that domestically-owned firms reach only 70 per cent of the productivity (sales per employee) of foreign-owned firms. The transport equipment industry<sup>9</sup>

<sup>9</sup> Today the Austrian car industry consists of a lot of small and medium-sized suppliers (manufacturing and services), primarily for the German automobile industry, and larger subsidiaries of major foreign car producers. The government introduced subsidies in 1976 and 1977 to support the Austrian automotive supplier industry in order to balance car imports. This measure proved to be very successful. The coverage ratio (defined as exports over imports) was about 11% in 1977, 24.2% in 1980 and 90% in 1992 with automotive exports growing tenfold from 1980. In 1996, output of the automotive supplier industry was ATS 51.3 bn (1977: ATS 2.3 bn; 1990: ATS 37.3 bn). The coverage of auto imports was 106 %, not including the 100.000 passenger cars and a number of trucks produced in Austria in foreign affiliates. 12.8 per cent of total employment is related to the automotive sector (i.e. approximately 55.000 - 60.000 jobs). Locations for the larger inward FDI are Steyr (BMW, MAN) and Graz (Chrysler, Jeep, Puch, Mercedes). BMW invested ATS 20 bn since 1979 (according to *tm magazine*) and employs about 200 employees in its R&D-centre. The province of Styria more or less has managed to create an automobile cluster with the participation of foreign MNCs, which helped to overcome

turns out to be foreign-dominated as it is positioned in IPG III. Domestically-owned firms in this industry clearly have a competitive disadvantage as their productivity reaches only 40 per cent of that of foreign-owned firms. The other interesting feature within the 30 largest total is the large number of firms in IPG IV, showing a comparative and competitive disadvantage. With the exception of electrical machinery and rubber&plastics, all firms in these industries are domestically-owned. Their productivity is well below the average. In the food, drink and ferrous&non-ferrous metals industry there is a very low degree of internationalisation of firms and high entry-barriers existed in 1994. In the electrical machinery and metal products industry the foreign-sales ratio is still above 50 percent, which points to the fact that over time, the competitive and comparative advantage might have been lost. In other words, while the products are still competitive, the way they are produced as well as the location are not competitive anymore.

The *domestically-owned firms* (cf. Figure 4b) have only one industry in IPG I, namely pulp&paper, with an above average productivity, yet their total foreign sales volume is only 34 percent higher than that of the foreign-owned firms in the sample. The chemical industry shows a competitive advantage combined with a small comparative disadvantage (coefficient: 0.9). Thus, despite sales per employee are still at the average level for domestically-owned firms, relocation pressure may build up. Production abroad may become more attractive, which is consistent with IPG II.

The *foreign-owned firms* are highly competitive in the machinery and the transport industry (both industries overriding the domestically-owned firms; cf. Figure 4c). Transport equipment shows exceptionally high sales per employee (ATS 4.2 mn compared to average of foreign-owned firms of ATS 2.5 mn and to an average of 30 largest firms total of ATS 2.1 mn). Domestically-owned firms reach only 40 percent of the productivity of foreign-owned firms in this industry and the foreign-sales ratio of foreign-owned firms is clearly higher than that of domestically-owned firms (68% vs. 51%). This reflects the high level of re-exports of intermediate products rather than production abroad and confirms the comparative advantage of Austria for this industry. The electrical machinery industry is positioned in IPG IV. The large presence of foreign-owned firms suggests that a shift of advantages has occurred over time. Despite the higher productivity of foreign-owned firms compared to domestically-owned firms, it remains still below the 30 largest firms' average. The relocation pressure is high as new competitor locations emerged for light industries.

According to Table 1, foreign ownership varies considerably between industries. It is highest in the electrical engineering and the petroleum/chemicals sector. The electrical machinery sector in our analysis is ranked in IPG IV, which is consistent with the fact that in 1995 foreign ownership is back to the level where it was 20 years ago, after a peak in the 1980s. The reduction of the share resulted from a decreased activity of foreign-owned firms rather than from increases in domestically-owned firms. In the petroleum/chemicals sector, the petroleum industry is foreign-owned, an industry not included in our analysis. The paper sector shows the lowest share of foreign ownership, which is in compliance with the results shown in Figure 4b

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some of the negative effects from structural change in other industries (iron, textile, paper etc.). The cluster provides information and initiates exchange of information between relevant firms; supports upgrading of firms by establishing co-operation with university and non-university research institutions; and helps to reap synergies between firms on various levels of the value-added chain. The cluster comprises about 120 firms of different size in 1997 (*Der Standard*, 28 May 1998, p. 17). Direct employment in the automobile industry in Styria is about 6.500, the supplier industry contributes another 11.000 jobs. The cluster activities are co-ordinated by a cluster council.

and Table 3, i.e. domestic firms having a strong competitive advantage. The metals/vehicles sector also shows a below-average foreign ownership (24%). This is, however, a very broad category, including industries like machinery, metals transport and other industries. Our analysis suggested the transport equipment and machinery sector to be classified as foreign-dominated (IPG III), while in the metal products and ferrous&non-ferrous metals industries primarily domestically-owned firms – with a low competitiveness - are present. These "old sectors" were mainly included in the state-owned ÖIAG (see above) that underwent a very slow restructuring process based on public subsidies. There is no further decomposition of this industry available, but the large size of ÖIAG back in 1994 when compared to the other firms included in the sample explains the low share of foreign ownership (Table 1) and thus also is consistent with our results.

Figure 4a-4c. International Performance Groups

Figure 4a. The determination of location and of ownership: 30 largest firms

<p style="text-align: right;">+</p> <p><b>Competitive Advantage</b></p> <p style="text-align: right;">-</p>	<p>IPG I: Output produced in country A by firm "a"</p> <p><b>Pulp/Paper</b></p> <p><b>Machinery and equipment</b></p>	<p>IPG II: Output produced in country B by firm "a"</p> <p><b>Non-metallic mineral products</b></p>	
	<p>IPG III: Output produced in country A by firm "b"</p> <p><b>Textiles/Clothing</b></p> <p><b>Transport equipment</b></p>	<p>IPG IV: Output produced in country B by firm "b"</p> <p><b>Food</b></p> <p><b>Drink</b></p> <p><b>Ferrous and non-ferrous metals</b></p> <p><b>Electrical machinery</b></p> <p><b>Chemicals</b></p> <p><b>Rubber/Plastics</b></p> <p><b>Metal products</b></p>	
	<p>+</p> <p><b>Comparative Advantage</b></p>		<p>--</p>

Figure 4b. The determination of location and of ownership: domestically-owned firms

Competitive Advantage	+	IPG I: Output produced in country A by firm "a" <b>Pulp/paper</b>	IPG II: Output produced in country B by firm "a" <b>Non-metallic mineral products</b> <b>Chemicals</b>
	-		
		IPG III: Output produced in country A by firm "b" <b>Transport equipment</b> <b>Machinery and equipment</b>	IPG IV: Output produced in country B by firm "b" Food <b>Drink</b> <b>Ferrous and non-ferrous metals</b> <b>Electrical machinery</b> <b>Metal products</b>
		+ <i>Ricardian type</i> <b>Comparative Advantage</b> --	

Figure 4c. The determination of location and of ownership: foreign-owned firms

Competitive Advantage	+	IPG I: Output produced in country A by firm "a" <b>Machinery and equipment</b> <b>Transport Equipment</b>	IPG II: Output produced in country B by firm "a" <b>Pulp/Paper</b>
	-		
		IPG III: Output produced in country A by firm "b" <b>Textiles/Clothing</b> <b>Rubber/Plastics</b>	IPG IV: Output produced in country B by firm "b" <b>Electrical machinery</b>
		+ <i>HOS type</i> <b>Comparative Advantage</b> --	

Source: SMOPEC Databank

A *second issue* is the shift of industries between IPGs, in other words, if foreign-owned or domestically-owned firms are dominating the composition of the two advantages when taken together. The industries in question are transport equipment and machinery. While the first industry stays in IPG III (cf. Figure 4a) when the foreign-owned firms (cf. Figure 4c) are added to the domestically-owned firms (cf. Figure 4b), the latter industry moves from IPG III (cf. Figure 4b) up to IPG I (cf. Figure 4a) when foreign-owned firms are added (cf. Figure 4c). Given the likelihood of systematic performance differences by ownership (see below), the aggregated figures given in Figure 4a hide valuable information about the origin of the competitive advantage.

An interesting question in this respect is to what extent are the firm-specific advantages of the foreign MNEs contingent on the characteristics of the Austrian location. In other words, are firm-specific advantages location-specific too? Erramilli et al. (1997) summarise this strand of theory and suggest that a given firm characteristic or resource may represent an advantage to the firm only in the context of a particular host location. A thorough empirical assessment of this question is clearly beyond the scope of the present paper. Yet, with respect to e.g. the transport sector, the existence of research and development infrastructure, the Austrian National Innovation System (NIS) etc. may be factors that make this location unique for foreign producers. With respect to the relocation of activities, a strong location-specificity of the competitive advantages of the foreign MNEs limits the danger of relocation and is thus of particular relevance for industrial policy.

Another dynamic aspect of ownership structure of industries needs to be discussed, that is, ownership change. Moden (1998) mentions three groups of theories, namely Darwinist models, managerial approaches and the job-matching theory. According to the latter approach, a take-over of a domestic firm by a foreign firm should improve a previously poor productivity performance afterwards. In terms of our analysis, given a combination of comparative advantage and competitive disadvantage, a foreign take-over of a domestic firm (and vice versa) may help to impute a new competitive advantage (a shift from IPG III to IPG I). Such aspects cannot be tested with the sample at hand, but would warrant a long-term study of the firms. Productivity may even deteriorate over time and improve only gradually. During the period 1992-96 for which data exist, several domestic firms were taken over by foreign firms, but it is too early to quantify and evaluate the effect on productivity. What is important here is that the likelihood of a takeover of a weak domestic firm by a strong foreign firm is highest in IPG III, in this case the transport and machinery firms. The current distribution of firms into IPGs may thus serve as an important leading indicator to further increase of foreign ownership in an industry.

A *third issue* are performance differences between domestically- and foreign-owned firms. We have shown certain differences between the firms of the sample above and here we refer to other surveys with a broader coverage (OeNB, var.; see Table 4). How to explain the performance differences between domestic and foreign firms is beyond the scope of this paper. It is clear that ownership *per se* does not account for the differences in performance. Factors like the different position of domestic headquarter and foreign subsidiary (principal – agent), as well as between subsidiaries within the international division of labour of an MNE; the relatively higher degree of specialisation of subsidiaries (economies of scale and scope); and the degree of multinationality (domestically-owned firms are less internationalised via FDI than most foreign-owned) etc. account for performance differences.

Table 4. Performance comparison of inward FDI (MNEs) and manufacturing sector total (1992 and 1993) – number of firms in brackets

	1992	1993
Rentability (Profits / Turnover) %		
Manufacturing Sector (1.538 / 1.610)		
Median	2.25	1.74
Upper Quartile	5.90	5.95
Lower Quartile	-0.40	-1.00
Inward FDI (543 / 563)		
Median	1.20	1.20
Upper Quartile	4.60	4.00

Lower Quartile	-1.50	-1.60
Productivity (Sales / Employee) ATS mn		
Manufacturing Sector (1.538 / 1610)		
Median	1.41	1.45
Upper Quartile	2.06	2.09
Lower Quartile	1.01	1.03
Inward FDI (543 / 563)		
Median	1.60	1.70
Upper Quartile	2.40	2.50
Lower Quartile	1.10	1.20

Source: Manufacturing Sector: OeNB (Ed.) Jahresabschlußkennzahlen österreichischer Unternehmen der Sachgütererzeugung und des Bauwesens von 1992-1995, *Statistisches Monatsheft* 12/96, Tab. 1, p. 9f.

Inward FDI: Neudorfer (1995), p. 80

Note: Inward FDI firms are included in the Manufacturing sector.

The evolutionary approach provides an explanation since it attributes an essential autonomous quality to firm differences: "A basic premise of evolutionary theory is that the world is too complicated for a firm to comprehend in the sense that a firm understands its world in neoclassical theory. ... diversity of firms is just what one would expect under evolutionary theory." (Nelson 1991, p. 69) Given a certain environment, some firms (e.g. domestic) may not even be aware of possibilities being considered by others (e.g. foreign). Therefore, while ownership *per se* does not constitute performance differences, it may well be that there is a systematic bias in favour of foreign firms to reap certain opportunities thus resulting in a better performance. This may for example include a superior efficiency of foreign firms to transfer knowledge across borders (Kogut and Zander 1993). Performance differences must, of course, also be expected across the two ownership groups. Abd-el-Rahmen (1991) suggests that under a given comparative advantage, firm performance with identical products will differ resulting from a firm-based, individual, differentiated exploitation of conditions of imperfect competition.

A *fourth issue* is the comparison of our results with those of other countries, namely Finland and Israel (cf. Hirsch and Cherniawski 1997). While the overall picture found with respect to Austria is also discernible in the two other countries, namely the fact that comparative and competitive advantage tend to go together (by number of industries in IPGs I and IV), the picture becomes more mixed upon differentiation by ownership. This may, however, be an effect of the admittedly small sample of firms in each ownership group, which does not contain firms in each industry as Table 3 clearly shows.

A *fifth related issue* is the relation of the results on the basis of the 30 largest firms with the industry total (cf. Figure 5). According to a model suggested by Sleuwaegen, the FDI pattern of industries is an indirect indication of the relation between the two types of advantages. A high rate of intra-industry FDI suggests the combination of a comparative advantage with domestic as well as foreign firms' competitive advantages within the same industry (Figure 5, IPG 1) etc. Since the connexion between the ownership structure of the industry and FDI is low when measured by number of firms, as domestic and foreign firms differ by size, using FDI stocks as a proxy for output gives a better indication of the foreign control and ownership in the industry.

Figure 5. Advantage types, level of inward and outward FDI, and intra-industry FDI

High	<p>IPG1</p> <p>High outward FDI High inward FDI (high mixed domestic and foreign ownership of output)</p> <p>high intra-industry FDI</p>	<p>IPG2</p> <p>High outward FDI Low inward FDI (domestic ownership of output dominates)</p> <p>low intra-industry FDI</p>
Country's Entrepreneurial Competitiveness		
Low	<p>IPG3</p> <p>Low outward FDI High inward FDI (foreign ownership of output dominates)</p> <p>Low intra-industry FDI</p>	<p>IPG4</p> <p>Low outward FDI Low inward FDI (low mixed domestic and foreign ownership of output)</p> <p>high or low intra-industry FDI</p>
	High	Low
	Locational Competitiveness	

Source: adapted from Sleuwaegen 1988, p. 155

Note: The IPGs of industries are numbered by 1-4 to distinguish them from your IPGs of firms I-IV.

Three *caveats* must be emphasised: First, intra-industry FDI are only measured in a very crude way here, which is a problem of the high level of aggregation of the data available. Second, inward and outward FDI stocks are hardly comparable due to differences of age and price indices (Cantwell and Bellak 1998, Bellak 1998a), therefore we use employment figures as well. Third, a serious limitation to Sleuwaegen's model is the fact of indirect FDI: a high level of outward FDI does not necessarily imply competitive firms under domestic ownership. Subsidiaries themselves may be outward investors and the competitive advantages they transfer may indeed have been supplied by the foreign mother company. For example in Austria, a large share of outward FDI (40% in EU, 28% overall, cf. Neudorfer 1995) is undertaken by foreign subsidiaries in Austria (so-called "indirect FDI"). Therefore, the connex between domestic ownership and high outward FDI becomes blurred and this again emphasizes the need to distinguish between domestic and foreign-owned firms as done in the present paper.



In order to classify the industries, we ranked them by FDI stocks and by employment in subsidiaries as higher or lower than the median value. In addition, we checked, if the intra-industry FDI coefficient was as suggested in Figure 5. Table 5 presents the results on the level of FDI measured by book values as well as IIFDI coefficients. The distribution of industries between the IPGs differs with the two measures. The 30 largest firms divided by ownership are present in the same industries (with the exception of food and metal products where only domestic firms are present), which is also reflected in high IIFDI coefficients on the industry level. The IIFDI coefficients meet the levels established in Figure 5 only partly. The high IIFDI coefficients by capital stocks in the electronics and food sector are put into question by their low levels when measured by employment. Since capital can also be raised locally, employment figures could be a better proxy for mixed ownership of output here. The metals/vehicles industry shows the highest IIFDI coefficient by capital, which is consistent with its position in Figures 4a-4c and its mixed ownership structure revealed in Table 1. The pulp and paper industry also shows a high IIFDI coefficient both by capital and employment. It is ranked in IPG 2 of Figure 5 (by book values) and IPG 4 of Figure 5 (by employment). This is the result of the high capital intensity and the low labour-intensity of this industry.

Table 5. Manufacturing Industry's FDI in 1994

Industry	Level of FDI stocks (ATS bn)		IIFDI +) by	
	Outward	Inward	Book values	Employees*)
Metal, vehicles	9,03	12,47	0.84	0.40
Electronics	4,06	6,25	0.79	0.25
(Petro-)Chemicals	9,39	21,04	0.62	0.54
Wood, paper	5,28	3,28	0.77	0.80
Textiles, Clothing	0,99	2,77	0.53	0.66
Food	3,83	3,89	0.99	0.27
Ceramics, Construction	8,50	5,29	0.77	0.95
Others	27,87	31,73	0.94	0.75
Total	68,95	86,72		
Median (excl. Others)	5,28	5,29	0.77	0.54

\*) inward FDI include direct and indirect participations

+) calculated as  $[(O+I) - (O-I)] / (O+I)$

The broad categories considered here do not enable us to draw any conclusions on the underlying causes of IIFDI, namely either as the result of the combination of the two types of advantages or as the result of oligopolistic reaction (Graham 1985). The small market in Austria and the information derived from the 30 largest firms indicate that the firms have divided their activities between different segments (supplying differentiated products) of an industry (complementary investment), rather than compete fiercely in the same segments. E.g. Norman and Dunning (1984, p. 530) point to the fact that a high rate of IIFDI is found in industries, where "ownership advantages accruing to firms in the industry are neither likely to be country specific – e.g. based on access to a particular specialised and localised resource or to a particular market – nor of a kind that gives any one MNE exclusive control of the industry. Rather they are likely to be product or firm specific, and of a kind that may be enjoyed by several MNEs."<sup>10</sup>

In general, the distribution of firms among the IPGs (see Figure 5 and Table 5) is not consistent with the pattern revealed in Figures 4a-4c. This indicates either that FDI figures are

<sup>10</sup> See also the various contributions on IIFDI in Erdelik (1985).

not a useful indicator for conclusions about the two types of underlying advantages; or that the structure, conduct and performance of the 30 largest firms is not representative for the whole industry. In particular, this seems to be the case in the electronics industry. We found, however, a consistent pattern of IIFDI on the industry level, with our results – yet with several exceptions. Due to the shortcomings of FDI capital stock figures (see e.g. Cantwell and Bellak 1998), employment figures seem to be a more reliable proxy for output and IIFDI.

Let us now recapitulate on the main thesis of the paper: The large share of foreign ownership in Austrian manufacturing industries is determined by differences in the competitive advantage of domestically- and foreign-owned firms, given a comparative advantage of Austria. Empirical evidence confirms the model stating that domestic (or foreign) ownership depends on the existence of a competitive advantage of domestic (or foreign) firms in an industry. Thus the method applied here is useful to examine the underlying factors (advantages) of the ownership structure of an industry. Alternatively, the degree of cross-hauling of FDI in a particular industry provides an imperfect indication of ownership structure.

Several limitations of neoclassical theory are apparent as under imperfect competition ownership of and differences between firms become important. With respect to the frequent call for policies on ownership the results of this study point to the need of a "competitive advantage enhancing" industrial policy rather than protectionist measures<sup>11</sup>, which are forbidden under the strict EU competition laws and the liberalisation under WTO rules (cf. Lloyd 1998 for a recent survey on globalisation and competition policy).

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<sup>11</sup> The four groups of policies (e.g. Safarian 1993, p. 443) are: discrimination against foreign-owned firms; sector specific policies with respect to natural resources and / or high-tech; sectoral restrictions; and firm-related policies.

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## APPENDIX

Figures 2a-2e.

Figure 2a.

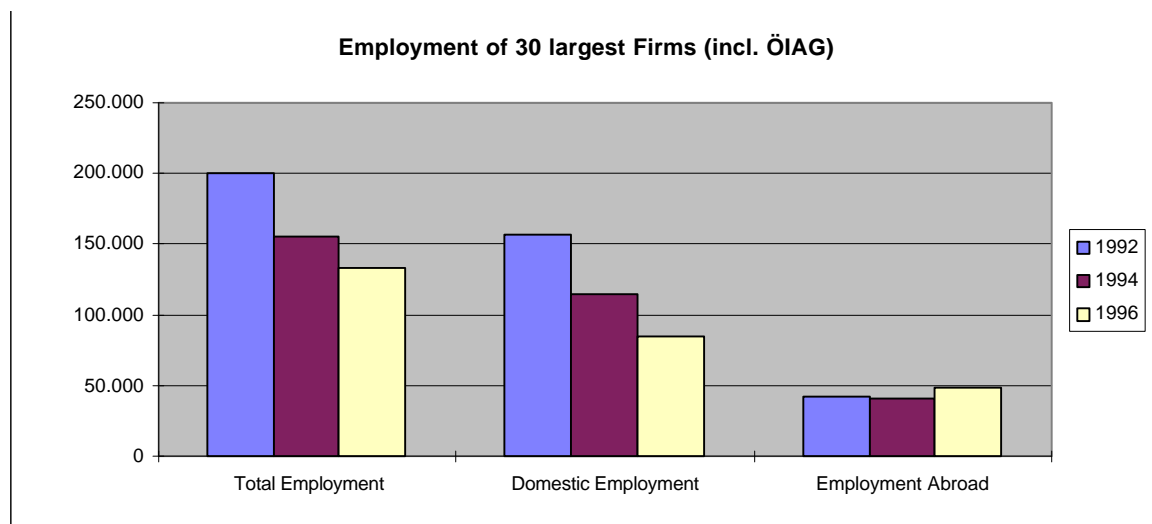
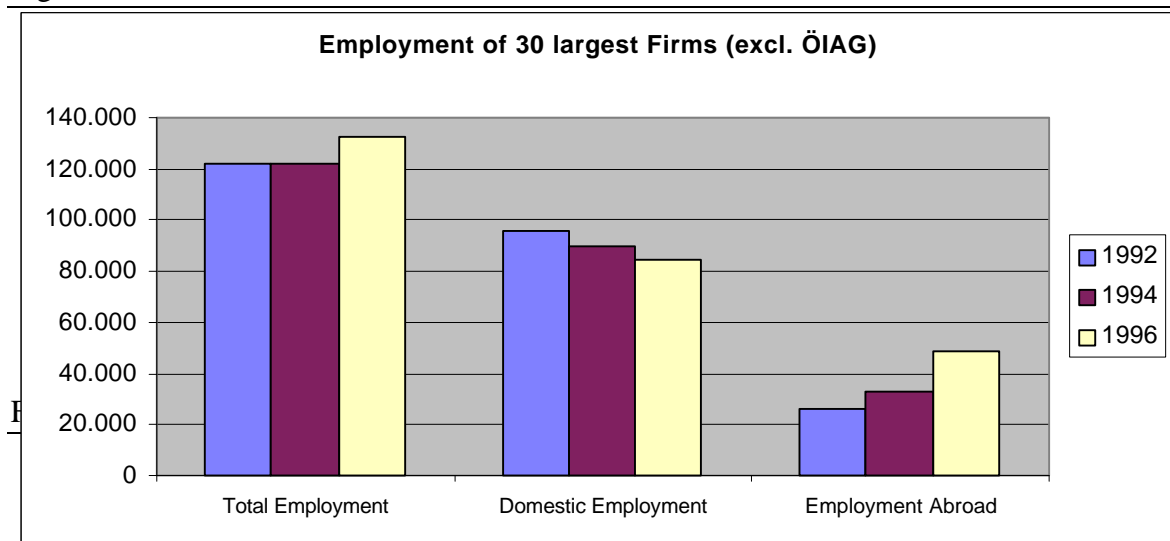


Figure 2b.



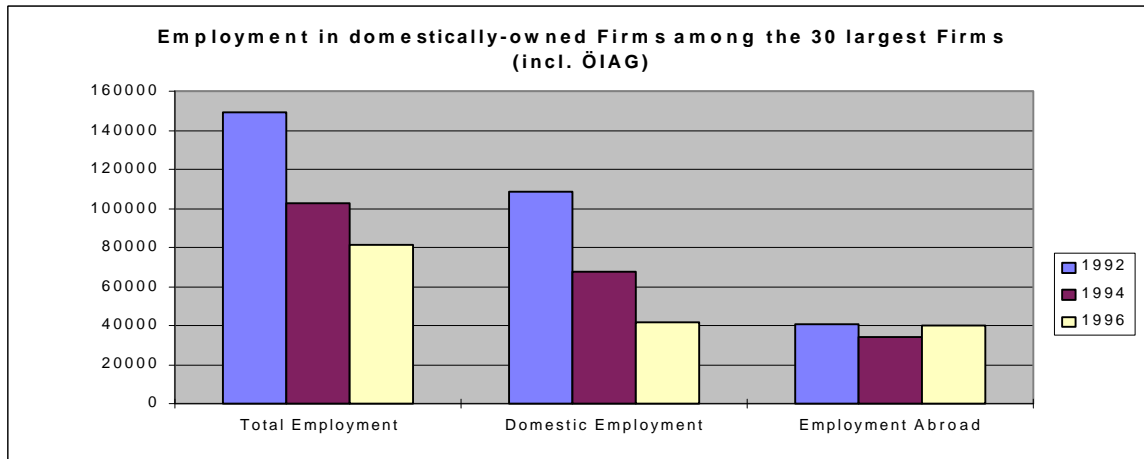


Figure 2d.

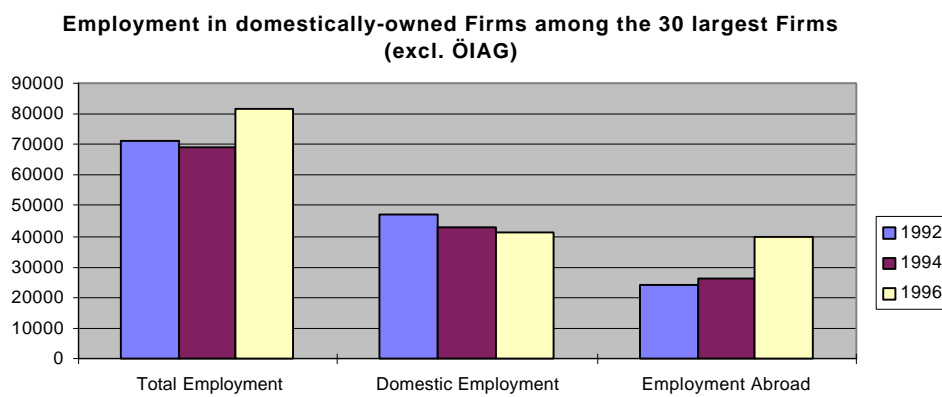
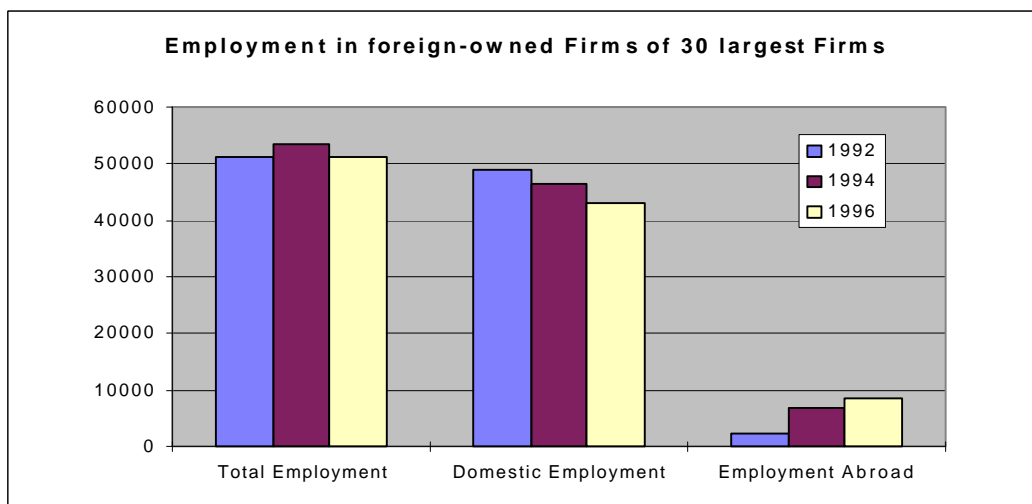


Figure 2e.



Figures 3a-3e.

Figure 3a.

**Sales of 30 largest Firms (incl. ÖIAG)**

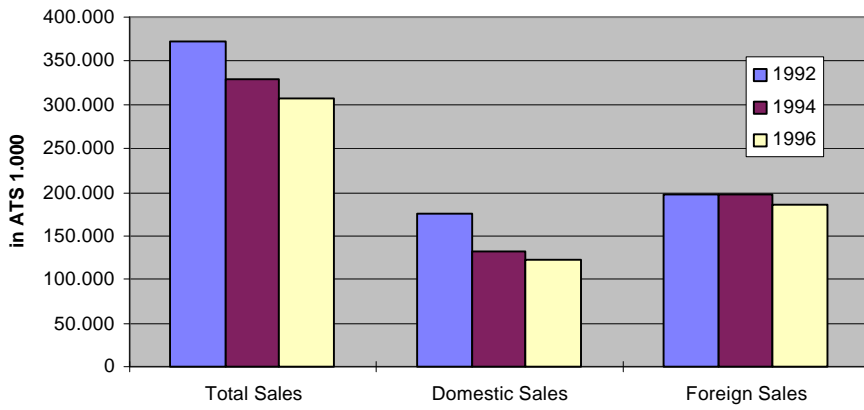


Figure 3b.

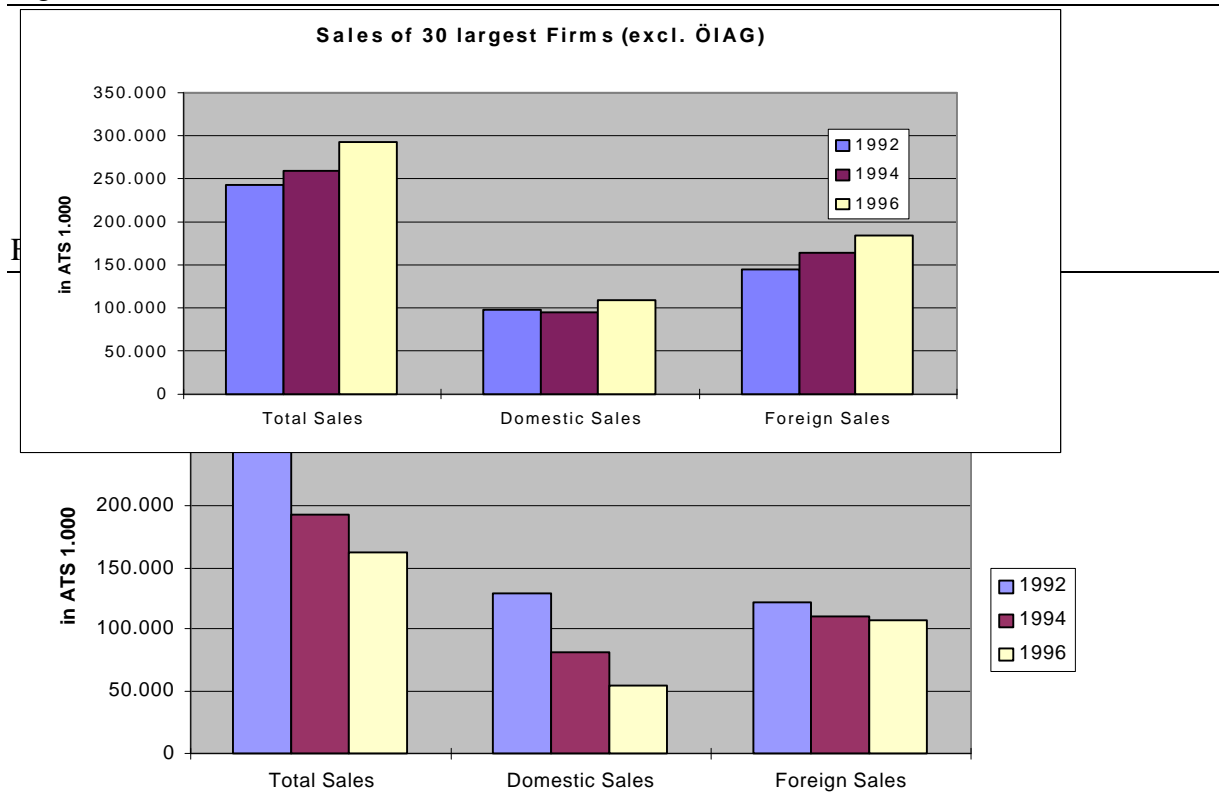


Figure 3d.

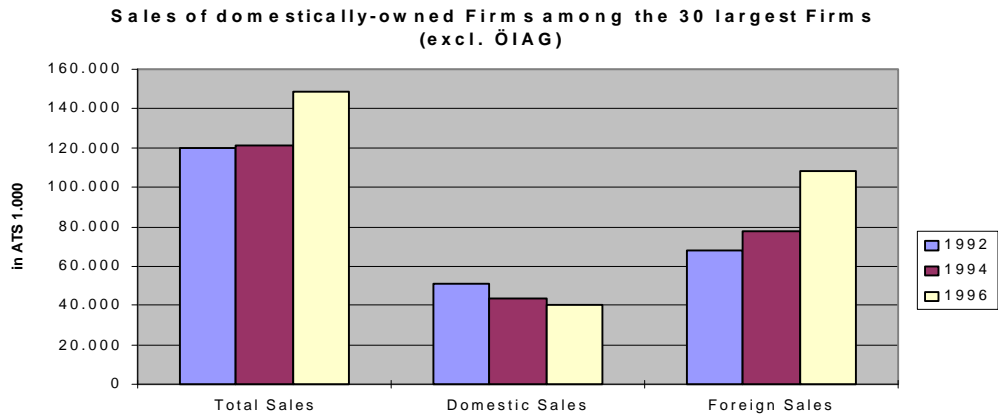


Figure 3e.

