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**INTRAFIRM TRADE OF CANADIAN-BASED  
FOREIGN TRANSNATIONAL COMPANIES**

*Working Paper Number 26  
December 1998*

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# **INTRAFIRM TRADE OF CANADIAN-BASED FOREIGN TRANSNATIONAL COMPANIES**

*By Richard A. Cameron,  
Industry Canada*

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## EXECUTIVE SUMMARY

This paper was written to fill a void in our knowledge about the trade activity of foreign subsidiaries in Canada. The paper is split into two parts: the first presents an overview of foreign subsidiaries operating in Canada; the second concentrates on their trade activity, especially intrafirm trade.

Foreign-affiliated companies account for about 25 to 30 percent of total sales in Canada. They are disproportionately located in Central Canada, though not well represented in Quebec. Their activities seem more focussed on the high value-added manufacturing and resource-based sectors. Foreign subsidiaries have stronger trade-to-sales ratios than do domestic companies. Four countries — the United States, the United Kingdom, Japan, and Germany — make up the lion's share of foreign investors in Canada. The Canadian subsidiaries of these four countries of control which export their products represent about 2 percent of all exporters, yet they account for roughly 44 percent of exports. U.S.-affiliated companies account for approximately 90 percent of exports by foreign subsidiaries.

Foreign-controlled companies are also responsible for about one-half of total Canadian imports, the bulk of which is concentrated in the following sectors: transportation equipment, electrical and electronic products, chemicals and textiles, and machinery and equipment. Imports from affiliates outweigh imports from non-related parties for each country of control (except British-controlled companies) and showed a rise over 1990-92. The study finds that there is a strong link between the parent country of control and the source of intrafirm imports. After the parent country of control, the United States is the next most important source of intrafirm imports. Geographical proximity to the parent country of control is not found to be a factor in sourcing intrafirm imports.

Intrafirm export data is only available for trade with the United States and, not surprisingly, U.S. subsidiaries dominate these trade statistics. Despite declines in intrafirm export shares to the United States by non-U.S. affiliated companies, the overall share of foreign-affiliated intrafirm exports to the United States rose from 63 to 71 percent of foreign-controlled exports to the United States over 1990-92. Increased intrafirm exports by U.S.-affiliated companies were the principal reason for this overall jump in intrafirm exports to the United States, led by advances in key sectors such as chemicals and textiles, electrical and electronic products and, especially, transportation equipment.





## 1. INTRODUCTION

In almost every year over the past four decades the volume of international trade has grown faster than the volume of world production. As a consequence, the degree of inter-dependence in the world economy has risen markedly. A large share of this rapid growth in international trade has been achieved under the control of transnational corporations (TNCs), and a good proportion of TNC exports and imports consists of intrafirm or intracorporate trade (UNCTC, 1998). Trade has always been an important aspect of Canada's economic development and there has been an increasing emphasis on trade as a mechanism for promoting economic growth (for example, the FTA, NAFTA, and the free trade pacts with Israel and Chile). The purpose of this paper is to present new information on the role of foreign transnational companies in Canada's international trade, with special consideration given to intrafirm trade.

The literature on intrafirm trade is relatively limited and fairly recent (see Bonturi and Fukasaku, 1993, for more on this point). Data sources are available only through firm surveys, usually involving the preparation of questionnaires by national statistical agencies. The United States Department of Commerce publishes periodic benchmark survey results on related trade between U.S. affiliates and their foreign parents and on trade between U.S. parents and their foreign affiliates. As well, Japan's Ministry of International Trade and Industry (MITI) publishes data from similar benchmark surveys for Japanese firms.

In Canada, there is no official statistical release on related party trade (Rugman, 1990*a*). Nonetheless, the Conference Board of Canada, a private, applied-research institution, has published results from two recent surveys conducted by the organization — Krajewski (1992) and Warda (1994). However, Krajewski's study was restricted to Canada-U.S. trade. Of 1,000 firms surveyed, results are reported for a maximum of 91 firms exporting to and 73 firms importing from the United States. Although Warda has a somewhat better response rate — 81 responses to 202 questionnaires — the coverage of his survey is not very wide, and the focus of his study is more concerned with the relationship between Canadian subsidiaries and their foreign parents.

Corvari and Wisner (1993) presented results suggesting that about 75 percent of manufacturing exports and around 88 percent of manufacturing imports in Canada were attributable to foreign multinational enterprises (MNEs). These results are based on a sample of "larger-than-average establishments" and made no attempt to account for the remainder of establishments not meeting their selection criterion. Consequently, the Corvari and Wisner estimates can be considered severely biased upward (Cochrane, 1977). Additionally, the Corvari and Wisner estimates are also based on the rather narrow definition of "manufactured goods" as opposed to the broader definition of "goods" used in this paper.

In light of the lack of reliable statistics, Statistics Canada was approached about developing data to help explain the phenomenon of intrafirm trade in Canada. A pilot project was undertaken that entailed linking U.S., U.K., Japanese, and German foreign-controlled firms to the importer and exporter databases (see Appendix A for details).

The estimates of total and intrafirm trade conducted by foreign-controlled companies in this paper are developed from this linkage of databases. Since the foreign-control and trade databases represent their respective universes, it is assumed, by Statistics Canada, that the data represent the total trade activity of these firms. The data cover the period 1990-92 and delineate trade between affiliated and non-affiliated partners for imports from all countries of origin, while for exports they are only available for

transactions with the United States. The base year for the data is 1991, and all data refer to the companies that existed in that year.

Against this background, our study addresses four issues:

- How important are Canadian-based subsidiaries of foreign multinationals in the overall Canadian trade picture?
- Do foreign-controlled firms operate differently from domestic firms with respect to trade?
- How does the geographic and industrial structure of intrafirm imports of foreign-controlled firms vary by country of control?
- How much of the trade of foreign subsidiaries is internalized, intrafirm trade?

The rest of the paper focuses on the trade activity of foreign-controlled transnational companies (FTNCs) operating in Canada's international trade. It starts with a review of the theory of multinationals. Section 3 provides an overview of the relative importance of the FTNCs in our overall trading activity. This is followed by a closer look at the foreign-controlled imports and exports database (by country of control and by industry) prepared for Industry Canada. The last section of the paper contains the conclusions and policy implications of our analysis.

## 2. THEORY

The structure of many industries has been and is being transformed through a process of globalization of production. In a globalized industry, different tasks or processes associated with the production of goods and services are carried out in different plants across regions and in different countries. This has led to more trade in components, parts, semi-finished goods and business services, and has tended to result in greater intracorporate trade as transnational corporations (TNCs) move components and semi-finished goods across borders from facilities in one country to facilities in another. Globalization has also led to increased foreign investment in certain industries, while in others it has fostered greater specialization of production facilities located in different countries.

As a starting point, transactions cost analysis explains the TNC as a displacer of arm's-length transactions among unaffiliated buyers and sellers with internal coordination. For corporate parents, intrafirm trade ensures greater control over both upstream supplies and downstream markets than do arm's-length market transactions. Intrafirm trade also substantially lowers the high costs that arm's-length transactions would normally impose on cross-border exchanges of technological, marketing, and organization assets necessary to compete via foreign production and overseas distribution (Encarnation, 1993). Thus, relationships resulting from ownership and managerial control, rather than those based primarily on relative prices, can be expected to determine patterns of intrafirm trade. The choice between exporting or international production depends on a firm's assessment of its competitive advantages, the gains to be made from a particular location, and the potential gains from internalizing cross-border exchanges within the TNC. Other factors influencing this choice include transportation costs, the degree and nature of trade barriers, and host country policies and conditions (UNCTAD, 1993).

The role of the World Product Mandate is another possible factor in promoting intrafirm trade. There are several reasons why a transnational might choose this route, including exploiting spare or unexhausted capacity, and scale economies where processes can economically be divided. Alternatively, the policies of foreign governments, especially those in the area of intellectual property (IP) rights, may influence the decision to locate a world product mandate high-technology component in a country with stringent IP rights as opposed to one with lax IP rights.

Caves (1982) has proposed alternative ways for firms to organize their international operations. Horizontal integration refers to foreign subsidiaries involved in production activities similar to those of the parent company. Competitiveness derives from firm-specific intangible assets, such as intellectual property or superior technology. Production processes are standardized and are unrelated to country-specific inputs, and foreign production benefits from proximity to customers. There are not enough economies of scale at the plant level to justify concentrating international operations in a limited number of locations. Each foreign affiliate produces primarily for the local market, and there is little trade between units in separate countries.

With vertical integration there is a further distinction between forward and backward integration. The former is associated with the distribution of intermediate goods, and the latter with securing access to materials. Both indicate international specialization, since the production facilities in affiliates complement rather than reproduce those of the parent. Vertical integration becomes more favorable the greater the economies of scale at the plant level (Casson and Associates, 1986) and the more divisible is the value-added chain. For production in certain locations to be preferable, the efficiency gains must outweigh the costs of transporting intermediate goods back and forth.

Thus, although international production should generally lead to greater market share, it does not necessarily imply more trade between the parent and host country (or countries). Whereas vertical integration implies complementarity between affiliates and the parent, horizontal expansion substitutes for production in the parent country without necessarily giving rise to greater trade in intermediate products. Overall, horizontal integration should generally be associated with a modest amount of goods trade, while vertical integration should result in a relatively high propensity to trade.

The reasons for carrying out individual tasks in certain countries differ from industry to industry. For certain tasks, labor costs or an abundant supply of workers with desired skill sets are the determining factors. For other tasks, deciding factors might include proximity to key markets, the costs of locally available natural resources (such as energy or water), or an adequate infrastructure to receive, process, and ship goods. In other instances, a concentration of related research or production activities (such as key inputs) may create the necessary conditions for synergies of production (Porter, 1985).

Whatever the particular reasons determining the allocation of production activities, two factors have greatly affected the international specialization of production. First, advances in the way we communicate and compute have made it possible for managers to coordinate widely dispersed production activities rather efficiently. And second, market fragmentation is exerting pressure to customize manufactured goods. Products ranging from steel to parts to machinery are being tailored to the specifications of individual industrial customers while other products, such as credit cards and telephone services, are being tailored to specific market segments of the consuming public.

This, in turn, is altering the relationship between trade and investment. Traditionally, trade and foreign direct investment have been thought of as competing means by which a foreign producer could penetrate a national market. Customization creates advantages to producers who locate design facilities, sales offices, or finishing facilities close to their principal customers. Thus, trade and investment have increasingly become key elements of companies' international strategies for achieving greater production efficiencies (by carrying out each separable production function in the most advantageous location, whether it is the home facility or an offshore affiliate).

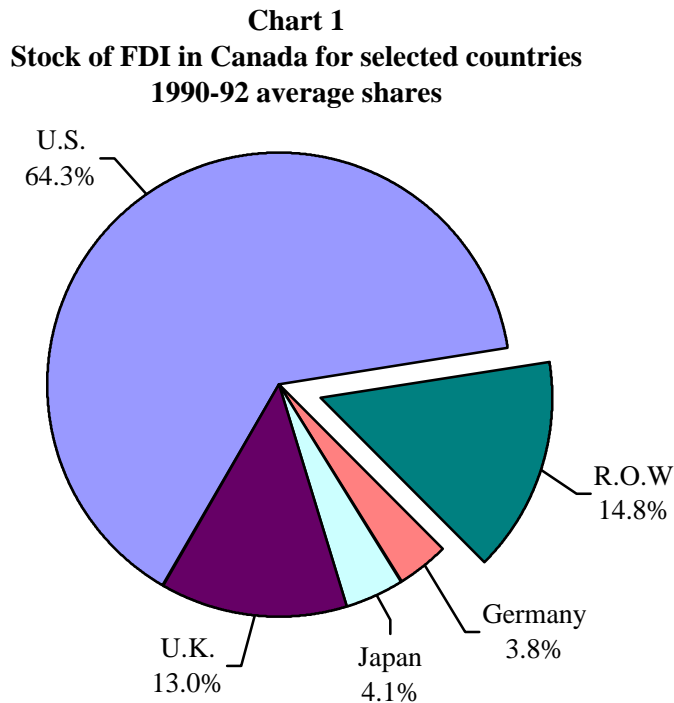
The complementary relationship between trade and investment is also reflected in the growing proportion of international trade that takes place within transnational firms.

### 3. FOREIGN-CONTROLLED FIRMS IN CANADA: OVERVIEW

This section brings together various disparate data on foreign firms operating in Canada with the purpose of assessing their role in Canadian business.

#### Foreign ownership is highly concentrated

Foreign direct investment (FDI) in Canada by transnational corporations (TNCs), as elsewhere in the world, plays a major role in linking Canadian-based companies with others from around the world, building an integrated international production system — the productive core of the globalized economy. In Canada, four countries account for the lion's share of foreign investment. Chart 1 shows the shares of the stock of FDI in Canada held by selected countries. These four countries — the United States, the United Kingdom, Japan, and Germany — account for about 85 percent of the total stock of FDI in Canada.<sup>1</sup>



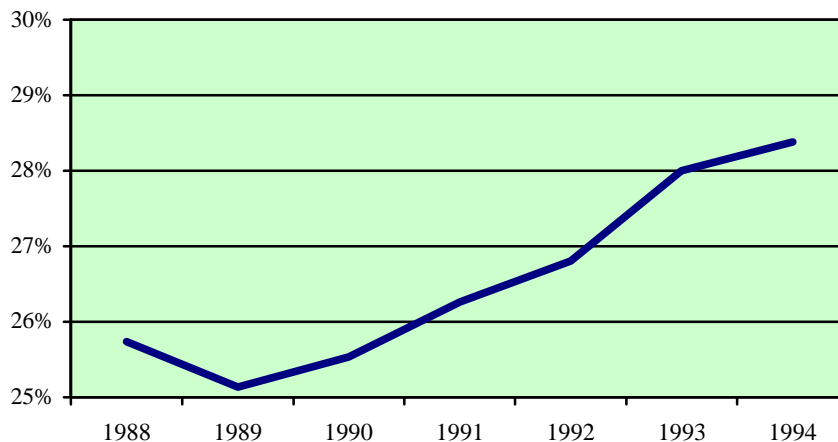
Source: Table 1.

Of the 85.2 percent of the total FDI stock held by the four largest investing countries, the United States accounted for about 75.4 percent, while the United Kingdom, Japan, and Germany account for 15.3, 4.8 and 4.5 percent, respectively (see also Chart 7).

### The market shares of foreign-controlled firms are rising

The importance of foreign firms, as measured by their share of total revenues generated by all businesses operating in Canada, has been on the rise throughout the 1990s (Chart 2). Over 1990-92, the period of interest for this study, foreign companies increased their share of total revenues by over one and one-quarter percentage points. This pace has shown no sign of slowing down since 1992.

**Chart 2**  
Share of Canadian business revenues held by  
foreign-controlled firms



Source: CANSIM matrix 3296.

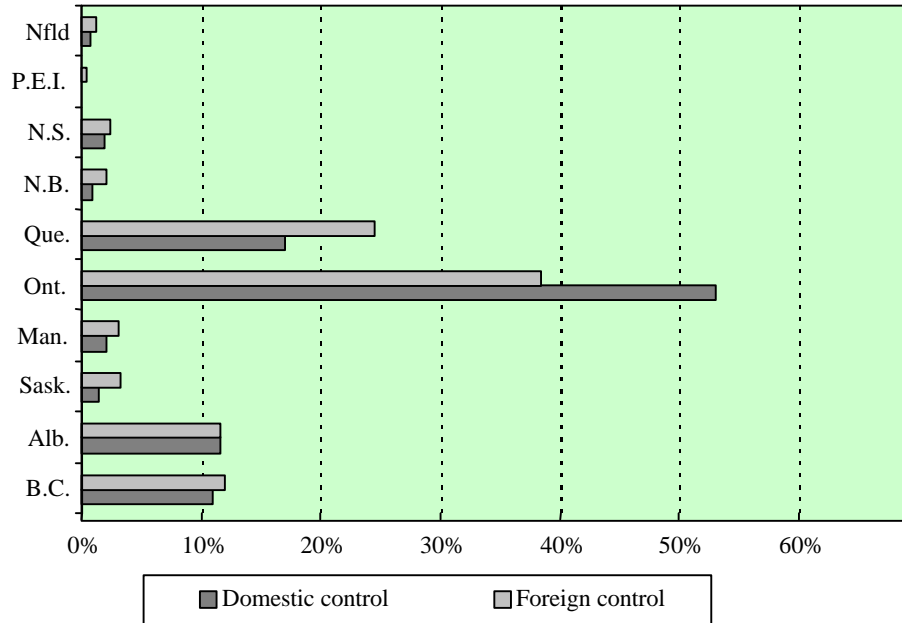
### Foreign-controlled firms are heavily concentrated in Ontario

Central Canada has long been known as the industrial heartland of the country. Foreign-controlled firms share this view too. Seven of every ten dollars of revenues earned by foreign-controlled companies are generated in Ontario and Quebec, compared to a little over six of every ten dollars of revenues for domestically controlled firms (Chart 3). However, despite a similar focus on Central Canada, there are important differences between the two groups of firms. In Ontario, over 53 percent of revenues is generated by foreign-controlled firms, compared to around 38.5 percent for domestic firms. The figures for Quebec are 17 and 24.4 percent, respectively. For the remaining provinces, in all cases, revenue shares are lower for foreign-controlled firms than for domestic firms. Thus, foreign-controlled firms are largely concentrated in Ontario at the expense of the other provinces, but particularly at the expense of Quebec.<sup>2</sup>

### The sectoral activity of foreign-controlled firms is concentrated in a few key areas

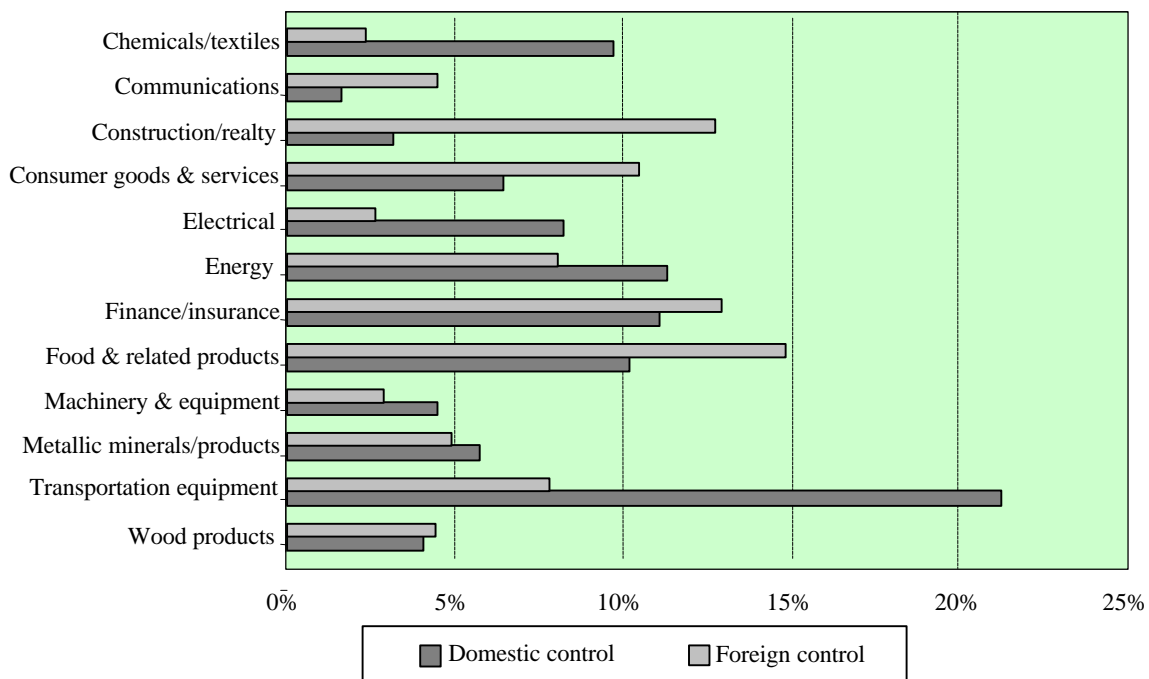
While foreign-controlled and domestic firms are in direct competition with each other, there are significant differences in the focus of their activities. Chart 4 shows the distribution of revenues across selected sectors by source of control. The bars represent average shares of revenues over 1990-92. The sectors shown account for over 88 percent of domestic companies' revenues and almost 97 percent of foreign-controlled companies' revenues. The important point to note is that foreign-controlled firms' revenues are proportionately more prevalent in the high value-added manufacturing (e.g., transportation equipment, chemicals, and electronic equipment) and resource-based (e.g., energy, and metallic minerals and metal products) sectors.

**Chart 3**  
**Provincial distribution of revenues,**  
**by source of control, 1991**



Source : Statistics Canada , Cat. No. 61-222.

**Chart 4**  
**Distribution of foreign-controlled and domestic activity**  
**by sector, 1991-92 average**



Source : Statistics Canada , Cat. No. 61-220.

The chart compares the relative distribution of revenues within each type of control; however, it says nothing about the absolute size of those revenues. Although Chart 2 suggests that foreign revenues comprise only 25 to 30 percent of total revenues, in two sectors — chemicals and textiles, and electrical and electronic products — revenues earned by foreign-controlled firms are greater than those for domestic firms, while they are approximately equal in a third sector — transportation equipment. In all other sectors, revenues earned by domestic companies exceed those of foreign-controlled companies

### **Foreign firms are more outward oriented than domestic firms**

The degree of outward orientation is another interesting point of divergence between foreign-controlled and domestic firms. Specifically, the ratios of exports-to-sales and imports-to-sales, where sales are represented by revenues, are examined. These ratios are commonly used and straightforward to interpret: the more exports make up a share of total sales — the more outward oriented is the firm or industry; or, the more imports make up sales — the more outward oriented is the firm or industry in its sourcing of inputs.

Charts 5 and 6 demonstrate clearly that foreign-controlled firms both import and export more intensively than domestic firms when measured as a share of total sales. This, by itself, is not at all surprising, given that foreign-controlled companies are by definition affiliated with a foreign (investing) parent, and so have a natural connection that extends beyond the border. What is surprising is that the outward orientation of foreign firm exports is more than double that of domestic firms (2.1 to 2.3 times, over the period 1990-92) while their import orientation record is about triple that of domestic firms (2.8 to 3.0 times, over the same period), a rather marked difference in market focus.

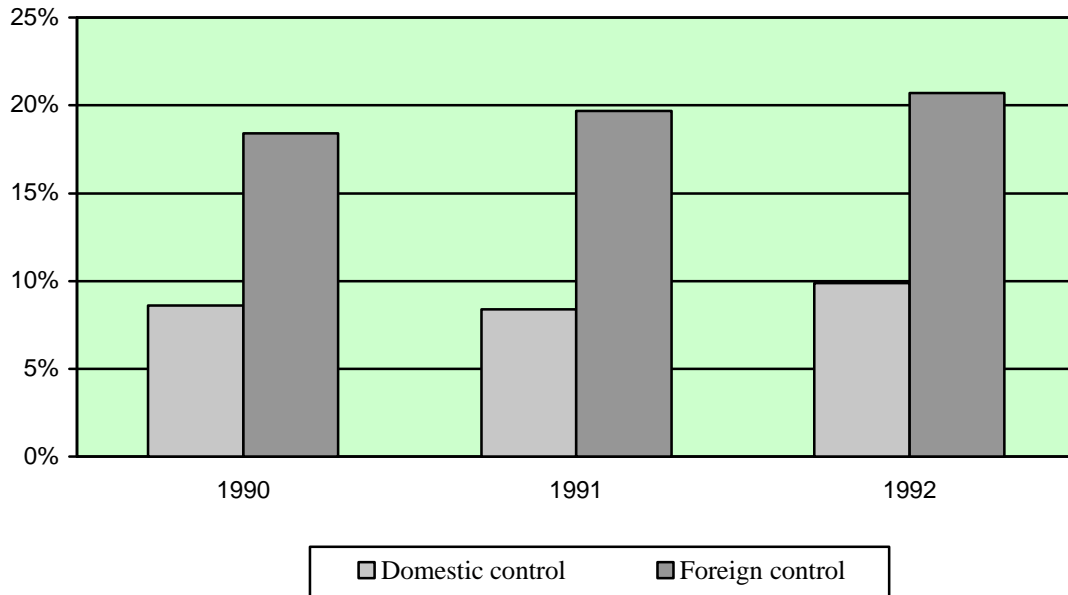
With imports representing from 20.9 to 22.7 percent of sales, while exports come in at between 18.4 and 20.7 percent of sales, it is evident that foreign-controlled companies are net importers. This contrasts with domestic firms whose exports accounted for between 8.4 and 9.9 percent of sales while imports covered only 6.9 to 8.1 percent of sales, putting them in a trade surplus position. Hepple (1990) observed a similar result for the United States concerning shipments between foreign parents and the U.S. affiliates.

Also of note from Charts 5 and 6 is that Canadian firms are “catching up” in their relations with offshore customers and sources compared to their foreign-controlled counterparts. Between 1990 and 1992, the export orientation ratio of foreign-controlled firms grew 12.5 percent compared to 15.1 percent for domestic firms. Similarly, the import orientation ratios increased by 8.6 and 17.4 percent, respectively. However, in both cases, the ratios for the foreign-controlled companies increased by a larger absolute amount.

Finally, Table 3 provides further evidence on the outward orientation of foreign-controlled firms and their importance vis-à-vis Canada’s exports. Although data for the distribution of exporters pertain to 1994, whereas the data on foreign-controlled exports relate to the average for the period 1990-92, the message from the table is clear: foreign-controlled firms are very large exporters compared to domestically controlled Canadian exporters. Foreign-controlled exporters account for about 2.1 percent of all exporters in Canada yet their average 1990-92 exports represented 29.2 percent of Canada’s 1994 merchandise exports. Furthermore, the exports of the average foreign-controlled firm (\$32.1 million) would place it in the top 500 to 1,000 exporters in Canada, or roughly in the top percentile of this group.

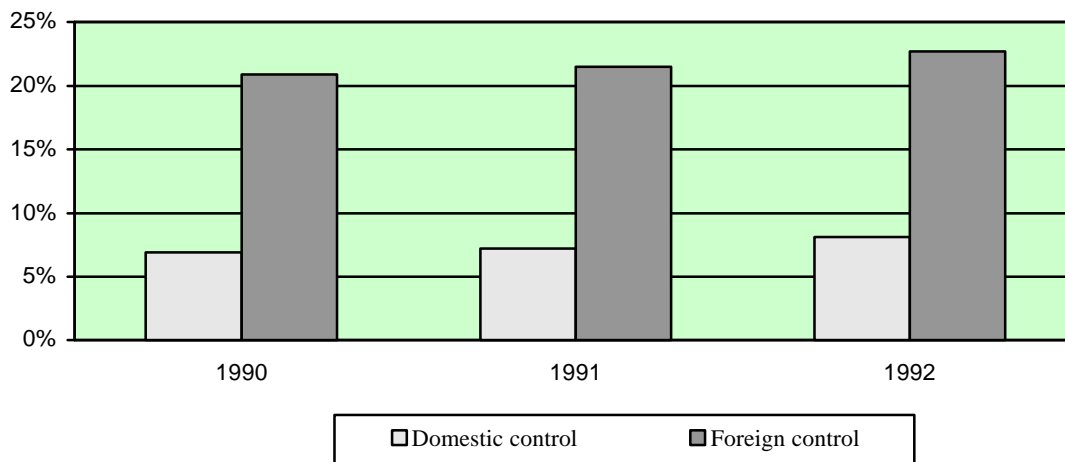


**Chart 5**  
**Degree of export orientation: Domestic vs foreign firms**



Source : Table 2.

**Chart 6**  
**Degree of import orientation: domestic vs foreign firms**



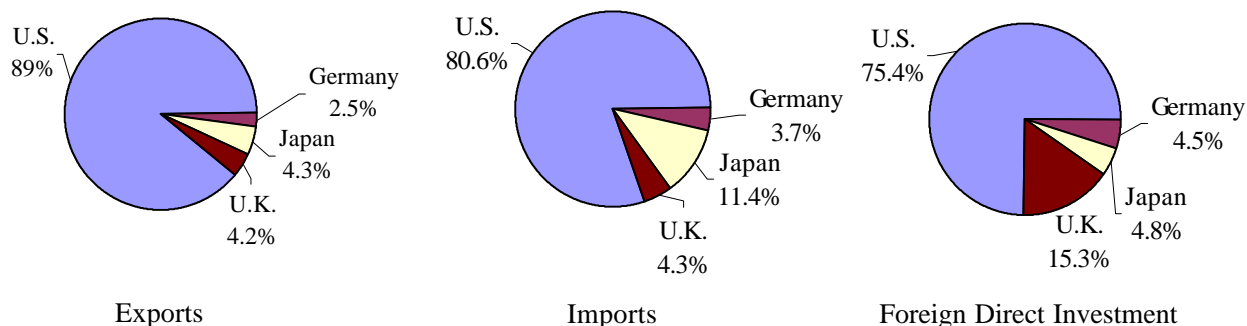
Source: Table 2.

**U.S. firms dominate trade**

Chart 7 presents the overall trade shares calculated from the Statistics Canada-generated database on exports and imports by country of control. The shares presented are averages over the 1990-92 period, and are representative of any single year — i.e., the shares were relatively stable over the period under consideration. This is the first set of data from the database described in the introductory section.

It is clear from this chart that U.S. companies dominate trade by foreign-controlled companies operating in Canada. The data also suggest that the trade performance of U.S. companies is outperforming that of their foreign counterparts. U.S. investors hold about 75 percent of the total stock of FDI in Canada by U.S., U.K., Japanese, and German investors, and they are accountable for 89 percent of exports and 81 percent of imports by such foreign-controlled firms. The trade performance of Japanese-controlled firms is also slightly outperforming its relative FDI stock share while those of German and British firms are under-performing compared to their FDI stock shares.

**Chart 7**  
**Export, import & FDI shares of foreign-controlled companies, 1990-92 averages**



## Summary

Foreign-controlled companies are important players in the Canadian market, accounting for between 25 and 30 percent of total sales. They are disproportionately located in Central Canada, especially in Ontario, and they are more prevalent in high value-added manufacturing and resource-based sectors, compared to domestic companies. The foreign-controlled companies show stronger relative trade-to-sales performance than do their domestic counterparts. The roughly 2 percent of exporters who are foreign controlled account for about 30 percent of total exports. Four countries make up the lion's share of foreign-controlled companies — the United States, the United Kingdom, Japan, and Germany — accounting for about 85 percent of the total stock of FDI in Canada. Americans control roughly three-quarters of this investment stock and between 80 percent (imports) and 89 percent (exports) of the total international commerce by this group of investors.

The paper now turns its attention to the special foreign-controlled importer and exporter database developed by Statistics Canada on the trade performance of American-, British-, Japanese-, and German-controlled companies operating in Canada. It begins with an overview of total international trade activity by sector, followed by a closer examination of the intrafirm trade performance of these companies.

**Table 1**  
**Stock of FDI in Canada: Selected countries**  
 (millions of Canadian dollars)

Year	Total	United States	United Kingdom	Japan	Germany	Rest of World
1990	131,131	84,353	18,158	5,214	5,074	18,332
1991	135,840	86,996	17,196	5,547	5,292	20,809
1992	138,696	89,115	17,524	5,899	5,144	21,014
Avg.	135,222	86,821	17,626	5,553	5,170	20,052
<b>Shares</b>						
1990	100.0	64.3	13.8	4.0	3.9	14.0
1991	100.0	64.0	12.7	4.1	3.9	15.3
1992	100.0	64.3	12.6	4.3	3.7	15.2
Avg.	100.0	64.2	13.0	4.1	3.8	14.8

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada.

**Table 2**  
**Degree of trade orientation, by source of control**

	1990	1991	1992	Avg.
<b>Foreign-controlled firms</b>				
Revenues (\$ millions)	323,150	318,885	323,140	321,725
Exports (\$'000's)	59,314	62,776	66,836	62,975
Imports (\$'000's)	67,479	68,703	73,392	69,858
Export orientation ( percent)	18.4	19.7	20.7	19.6
Import orientation ( percent)	20.9	21.5	22.7	21.7
<b>Domestic firms</b>				
Revenues (\$ millions)	942,564	895,560	881,960	906,695
Exports (\$'000's)	80,983	75,660	87,639	81,427
Imports (\$'000's)	65,060	64,137	71,680	66,959
Export orientation ( percent)	8.6	8.4	9.9	9.0
Import orientation ( percent)	6.9	7.2	8.1	7.4
<b>Ratio of foreign to domestic</b>				
Export orientation	2.1	2.3	2.1	2.2
Import orientation	3.0	3.0	2.8	2.9

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada Cat. No. 61-220-XPB, CALURA Corporations.

**Table 3**  
**Distribution of exporters, 1994**

<b>Distribution</b>	<b>% of total</b>	<b>Exports (\$ millions)</b>	<b>Average (\$ millions)</b>
1 – 50	0.1	101,861	2,037.2
51 – 100	0.1	19,287	385.7
101 – 200	0.1	18,312	183.1
201 – 500	0.3	22,266	74.2
501 – 1000	0.5	15,312	30.6
1001 - 3500	2.7	21,983	8.8
3501 – 5000	1.6	4,529	3.0
5001 – 8500	3.8	5,191	1.5
8501 – 92758	90.8	6,658	0.079
All 92758	100	215,399	2.3
<i>Less foreign-controlled exporters (1990-92 average)</i>			
1,963	2.1	62,975	32.1
<i>Equals domestic exporters activity</i>			
90,795	97.9	152,424	1.7

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada.

## 4. FOREIGN-CONTROLLED TRADE IN CANADA

### Foreign-controlled shares of trade activity

Statistics Canada does not compute import and export data by company-based industrial classification (i.e., by SIC-C), which is the basis of the trade data for foreign-controlled companies used below. Accordingly, company-based sectoral trade data had to be estimated in order to measure the importance of the trading activities of foreign-controlled firms by sector. The procedure used is outlined in Appendix A, along with a few comments about the restrictions to this procedure.

Table 4 compares the shares of total trade activity by country of control. The data shown are for exports and imports for the 1990-92 average and for the year 1992. While the following comments apply to the average share observed over 1990-92, they are equally applicable to the individual years with only the precise share calculation changing, but not the overall picture.

Over 1990-92, exports by foreign-controlled firms operating in Canada accounted for 43.6 percent of total goods exported. U.S.-controlled firms led the foreign contingent with 38.8 percent of total exports.

Exports by foreign-controlled companies dominated the transportation equipment sector (83 percent) and are significant in the electrical/electronics products (66.3 percent), construction (40.2 percent), and chemicals and textiles (33.7 percent). Several of these areas are in high value added manufacturing sectors. Foreign-controlled export shares are lowest in communications (10.1 percent), food, beverages, and tobacco (13 percent), metallic minerals and metals (17.9 percent), and consumer products (18.6 percent).

U.S.-controlled firms dominate exports by foreign-controlled companies to such an extent that in all sectors the U.S.-controlled share exceeds the sum of the German-, Japanese-, and British-controlled shares, with the possible exception of the consumer goods sector (see the 1992 data). In two sectors — transportation equipment and electrical/electronic products — U.S.-controlled companies alone are responsible for more than one-half of total sectoral exports.

Japanese-controlled companies appear to be the most focussed or concentrated, with no export presence in the construction, energy, and communications products sectors.

On the imports side, imports by foreign-controlled companies amounted to just over one-half (51.1 percent) of total goods imported over 1990-92. U.S.-controlled companies accounted for 41.2 percent of total imports, or 80.9 percent of imports by foreign-controlled companies. In distant second place, Japanese-controlled firms accounted for 5.8 percent of total imports.

In the transportation equipment sector, virtually all imports are made by foreign-controlled companies. Roughly five dollars of every six dollars of imports in this sector are made by U.S.-controlled companies. Japanese-controlled companies are the next biggest importers of transportation equipment, accounting for 13.7 percent of total transportation equipment imports, or 81.9 percent of the remainder once U.S.-controlled company imports are removed.

Other important sectors with a strong foreign-controlled import presence include electrical and electronics (56.6 percent), construction and related products (55.1 percent), chemicals and textiles (35.1 percent), and machinery and equipment (26.4 percent).

Across the board, the import share of U.S.-controlled companies is much greater than those for other foreign-controlled firms, either individually or in aggregate.

Table 5 shows the distribution of international trade for foreign-controlled firms. It also compares the distribution of trade by Canadian SIC-C industries,<sup>3</sup> once the trade by the foreign-controlled companies has been removed.

There are certain basic similarities between foreign-controlled and domestic industry trade. For example, exports in the transportation equipment industry rank first for all non-British countries of control. Canadian and Japanese companies' exports of wood products are second-largest, whereas German and British firms' exports of chemicals and textiles are second-largest. Energy products are the third-largest area of exports for British- and American-controlled companies and for Canadian companies.

As with exports, imports by the transportation equipment industry rank first for all non-British countries of control, and third for British-controlled companies. Electrical and electronics imports rank second for Japanese, American and Canadian companies, while machinery and equipment imports are third for German, Japanese and Canadian companies.

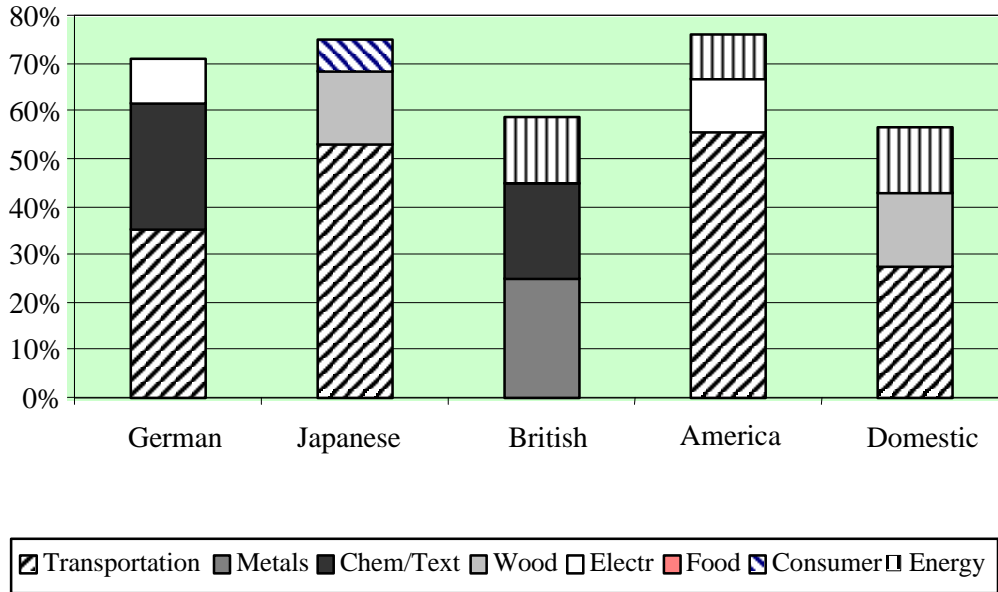
For both American- and Japanese-controlled companies, more than half of all exports and more than half of all imports are made by firms classified in the transportation equipment industry. In the case of Canada, the figure is roughly one-quarter of exports or imports. Only about 10 percent of British-controlled companies' trade is conducted in the transportation equipment industry.

British- and American-controlled firms in the electrical and electronics equipment industry are significant importers and exporters, while their Japanese counterparts are somewhat large importers but relatively small exporters in this sector.

Overall, trade performance by all countries is relatively concentrated. Trade in the top three categories of German-, Japanese-, and American-controlled companies generally amounts to between 75 and 80 percent of their total trade (almost 90 percent for Japanese-controlled company imports). For British and domestic companies, trade in their respective top three categories accounts for around 50 to 60 percent of their total trade (Charts 8 and 9).

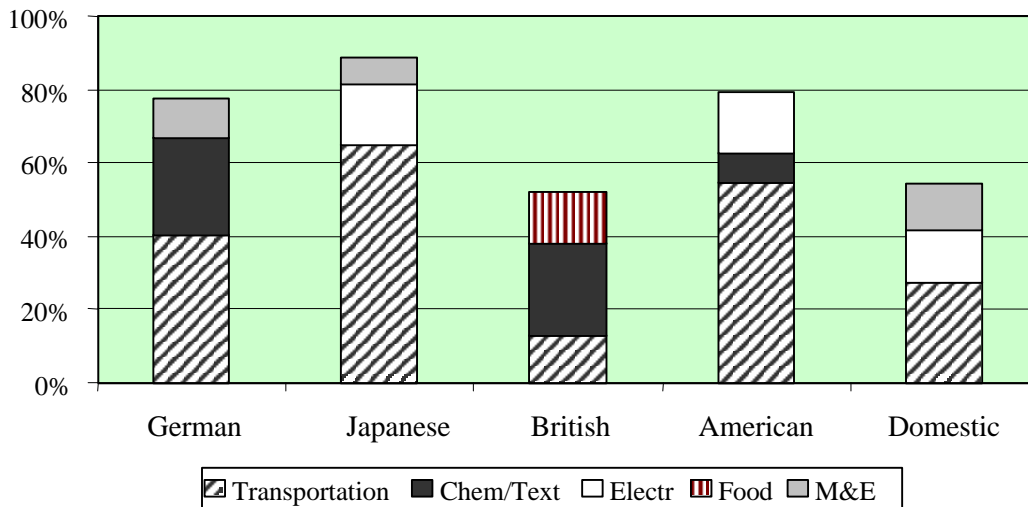
This concludes the presentation of data based on the total trade activity of foreign-controlled firms operating in Canada. The rest of the paper concentrates on trade within foreign transnationals operating out of Canada.

**Chart 8**  
**Top three exports by country of control, as a percentage of total, 1990-92 average**



Source: Statistics Canada.

**Chart 9**  
**Top three imports by country of control, as a percentage of total, 1990-92 averages**



Source: Statistics Canada.





**Table 4**  
**Total trade shares held by foreign subsidiaries, selected sectors, 1990-92 (percentage)**

	Chem	Comm	Constr	Consum	Electr	Ener	Food	M&E	Metal	Transpo	Wood	All Industries
<i>Exports, 1990-92</i>												
Germany	3.7	nil	4.1	0.7	0.1	0.2	1.0	1.7	0.8	1.4	0.1	1.1
Japan	1.0	nil	nil	7.1	1.2	nil	0.2	0.6	0.8	3.6	1.9	1.9
United Kingdom	4.6	1.6	1.6	0.7	3.2	1.9	1.9	1.4	4.4	0.6	0.2	1.8
United States	24.1	8.5	34.5	10.0	61.8	25.6	9.9	24.2	11.8	77.4	19.3	38.8
Domestic	66.7	89.9	59.8	81.4	33.7	72.4	87.0	72.0	82.1	17.0	78.5	56.4
<i>1992</i>												
Germany	3.9	nil	7.1	0.7	0.1	0.1	0.6	1.7	0.9	1.3	0.1	1.0
Japan	1.0	nil	nil	6.1	1.2	nil	0.2	0.7	0.7	4.4	2.1	2.1
United Kingdom	4.5	2.0	1.7	0.8	3.0	1.8	2.2	1.3	4.2	0.6	0.2	1.8
United States	25.1	5.2	38.3	7.3	60.6	25.4	7.9	21.6	11.4	78.5	19.2	38.3
Domestic	65.5	92.8	52.9	85.2	35.2	72.6	89.1	74.7	82.8	15.2	78.4	56.7
<i>Imports, 1990-92</i>												
Germany	4.1	nil	1.7	0.7	0.2	nil	0.9	1.7	2.0	2.8	0.9	1.9
Japan	0.7	nil	0.1	4.8	6.7	nil	0.1	3.4	2.6	13.7	1.4	5.8
United Kingdom	4.4	1.6	4.4	1.3	1.7	1.2	4.5	1.8	3.1	1.0	2.4	2.2
United States	25.9	21.1	48.9	17.1	47.9	14.0	16.3	19.6	14.6	82.4	12.7	41.2
Domestic	64.9	77.3	44.9	76.2	43.4	84.8	78.2	73.6	77.7	nil	82.6	48.9
<i>1992</i>												
Germany	3.9	nil	1.9	0.6	0.2	nil	0.7	1.6	1.7	2.4	0.8	1.7
Japan	0.6	nil	0.1	4.4	6.7	nil	0.1	3.5	2.5	14.5	1.3	6.0
United Kingdom	4.3	1.2	3.8	1.1	1.6	0.8	4.5	1.8	2.7	1.0	2.3	2.0
United States	26.0	22.5	44.1	16.0	46.7	9.6	16.7	20.0	14.0	82.3	12.5	40.8
Domestic	65.2	76.3	50.0	77.8	44.9	89.5	77.9	73.2	79.1	nil	83.1	49.4

Note: Figures in the tables may not add up to totals due to data suppression by Statistics Canada.  
Source: Statistics Canada and TIERS.

**Table 5**  
**Distribution of total trade activity by foreign subsidiaries, selected sectors, 1990- 92 (percentage)**

	Chem	Comm	Constr	Consum	Electr	Ener	Food	M&E	Metal	Transpo	Wood	All Industries
<b>Exports, 1990-92</b>												
Germany	26.5	nil	2.7	1.2	0.4	1.9	8.8	6.9	7.7	35.3	1.7	100
Japan	3.9	nil	nil	6.5	4.4	nil	1.3	1.5	4.5	53.1	15.2	100
United Kingdom	19.8	0.3	0.6	0.7	12.5	14.2	10.4	3.4	24.8	8.5	1.4	100
United States	4.9	0.1	0.6	0.4	11.3	9.0	2.5	2.7	3.1	55.6	7.7	100
Domestic	7.8	0.4	0.7	1.7	7.1	13.7	9.9	4.3	10.2	27.8	15.4	100
<b>1992</b>												
Germany	30.0	nil	4.5	1.3	0.5	1.7	5.8	6.9	8.8	35.6	1.9	100
Japan	3.8	nil	nil	0.5	4.1	nil	1.0	1.5	3.2	58.4	14.9	100
United Kingdom	19.4	0.5	0.6	0.8	11.6	13.6	12.3	3.1	22.5	8.8	1.4	100
United States	5.2	0.1	0.6	0.4	11.4	8.9	2.1	2.4	2.9	57.0	7.6	100
Domestic	7.9	0.4	0.6	1.9	7.2	13.5	10.2	4.3	9.8	27.8	15.1	100
<b>Imports, 1990-92</b>												
Germany	26.7	nil	0.7	2.3	1.7	0.1	3.1	10.9	8.0	40.2	1.3	100
Japan	1.4	nil	nil	5.3	16.7	nil	0.2	7.3	3.4	64.9	0.7	100
United Kingdom	25.2	1.2	1.6	3.7	11.3	3.0	14.2	10.6	10.8	12.8	3.0	100
United States	7.8	0.8	0.9	2.7	16.8	1.9	2.7	6.0	2.7	54.8	0.9	100
Domestic	12.5	1.6	0.8	6.4	14.4	5.7	6.8	12.6	7.6	27.4	2.8	100
<b>1992</b>												
Germany	29.2	nil	0.8	2.5	1.8	0.1	2.9	10.9	7.3	38.0	1.2	100
Japan	1.3	nil	nil	4.8	16.7	nil	0.1	7.0	3.1	66.2	0.6	100
United Kingdom	27.2	1.0	1.4	3.7	11.4	2.0	15.2	10.3	9.6	12.8	3.2	100
United States	8.2	0.9	0.8	2.6	17.1	1.1	2.8	5.9	2.5	55.2	0.9	100
Domestic	12.9	1.6	0.7	6.6	14.9	4.8	6.9	12.0	7.3	27.4	2.8	100

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada and TIERS.

## **Imports from affiliates**

Earlier in the paper, data were provided indicating that imports by foreign-controlled companies amounted to just over one-half of total goods imported over the period 1990-92. This section examines the portion of total imports of foreign-controlled firms that originates from offshore affiliates.

Table 6 shows the import shares from affiliates by country of control and industry for each of the years 1990 through 1992, as well as the weighted averages of the import shares from affiliates for this period. A number of broad observations are immediately evident. First, there is no uniform rate for imports from affiliates as a percentage of total imports. For example, on average, German-controlled companies in the finance and insurance industry received less than 2 percent of their total imports from affiliated parties, whereas German companies in the chemicals and textiles sector received nearly 72 percent of their total imports from affiliates.

Second, even within the same industry, there is no uniform rate of imports from affiliates across different countries of control. Again using the finance and insurance industry as an example, the German-controlled-companies' share of imports from affiliates was less than 2 percent, while for American-controlled companies in the same industry, the share of imports from affiliates was nearly 57 percent.

Third, across the four countries of control, there are significant differences in the aggregate share of imports from affiliates. British-controlled companies in Canada do the least relative amount of importing from affiliated parties (40.3 percent), whereas Japanese-controlled companies do the most (80.2 percent of their total imports). German-controlled and American-controlled companies, at 62.7 and 64.4 percent respectively, are near but slightly below the average share of imports from affiliates for companies under the control of the four major direct-investment countries in Canada (65.1 percent).

A few specific observations can be made concerning table 6 and Chart 10. For the chemicals/textiles and communications sectors, over one-half of imports by foreign-controlled companies are sourced from affiliates. For the transportation equipment, electrical and electronic products, and machinery and equipment sectors (the first-, second- and fourth-largest import categories and three high value-added sectors), over two-thirds of imports by non-British foreign-controlled companies are intracorporate imports. Thus, the sectors with the largest foreign-controlled company imports — transportation equipment, electrical/electronics, chemicals/textiles, and machinery and equipment — are associated with high levels of intrafirm trade, generally in excess of two-thirds of total foreign-controlled company imports.

There is also a certain amount of similarity in the propensity to import from affiliated sources amongst the foreign-controlled companies. The five sectors with the highest aggregate shares of intrafirm trade also placed in the top five or six sectors with the highest shares of intrafirm trade for individual countries, with the exception of British-controlled firms in the electronics sector. Similarly, the next five sectors, ranked according to aggregate share of intrafirm trade, generally fell in the middle rankings by individual countries (except for British wood imports, which is the number one ranked sector for U.K.-controlled firms, and British finance, ranked 14th). Generally, service sectors (such as transportation services, education, health and social services, and accommodation, restaurants and recreational services) have the lowest shares of intrafirm imports.

Of the four countries of control, only Japanese-controlled companies have more than 50 percent of intrafirm imports in more than one-half of the industries where they operate (six of nine industries). Intrafirm imports exceed 50 percent of total imports in five of 11 industries for German-controlled firms, in six of 16 industries for American-controlled companies, and in four of 14 industries for British-controlled firms.

**Table 6**  
**Intrafirm imports as a percentage of total imports by foreign affiliates**  
**(percentage)**

	1990	1991	1992	Average
<b><i>German affiliates</i></b>				
Chemicals/textiles	70.2	71.6	73.6	71.9
Construction materials	65.5	59.2	41.1	53.6
Consumer goods	36.6	45.0	41.3	40.9
Electrical/electronics	61.0	67.1	65.1	64.3
Energy	52.5	44.6	50.4	49.0
Finance & insurance	nil	3.1	0.7	1.7
Food, beverages & tobacco	37.7	30.6	39.3	36.0
Machinery & equipment	71.2	72.4	67.8	70.5
Metallic minerals/metals	43.2	44.9	43.3	43.8
Transportation equipment	65.0	62.2	74.7	67.0
Wood & paper	20.3	36.1	29.9	28.1
ALL INDUSTRIES	61.6	61.0	65.6	62.7
<b><i>Japanese affiliates</i></b>				
Accommodation, restaurant & recreation	68.3	15.7	8.3	32.5
Chemicals/textiles	51.4	53.8	50.1	51.8
Consumer goods	68.8	66.8	66.0	67.2
Electrical/electronics	82.6	80.9	82.6	82.0
Finance & insurance	7.4	n.a.	n.a.	n.a.
Food, beverages & tobacco	16.2	18.9	20.6	18.4
Machinery & equipment	78.8	81.6	85.9	82.2
Metallic minerals/metals	75.8	74.7	68.4	73.0
Transportation equipment	88.9	78.4	80.9	82.4
Wood & paper	30.0	26.8	27.1	28.1
ALL INDUSTRIES	84.1	77.4	79.5	80.2
<b><i>U.K. affiliates</i></b>				
Accommodation, restaurant & recreation	31.6	30.9	35.1	32.4
Chemicals/textiles	49.0	47.8	53.1	50.1
Communications	62.0	74.6	68.3	68.0
Construction materials	32.4	30.1	24.6	29.5
Consumer goods	36.9	48.7	39.6	42.0
Electrical/electronics	30.6	27.2	27.6	28.4
Energy	16.4	25.1	11.1	18.4
Finance & insurance	5.0	6.7	3.6	5.2
Food, beverages & tobacco	28.3	31.7	27.6	29.1
General services to business	64.7	44.4	n.a.	62.1
Machinery & equipment	46.7	43.9	39.0	43.4
Metallic minerals/metals	32.6	30.2	35.7	32.7
Transportation equipment	49.0	47.5	49.4	48.6
Transportation services	9.9	n.a.	n.a.	n.a.
Wood & paper	66.4	76.8	75.0	72.9
ALL INDUSTRIES	39.7	40.3	40.8	40.3

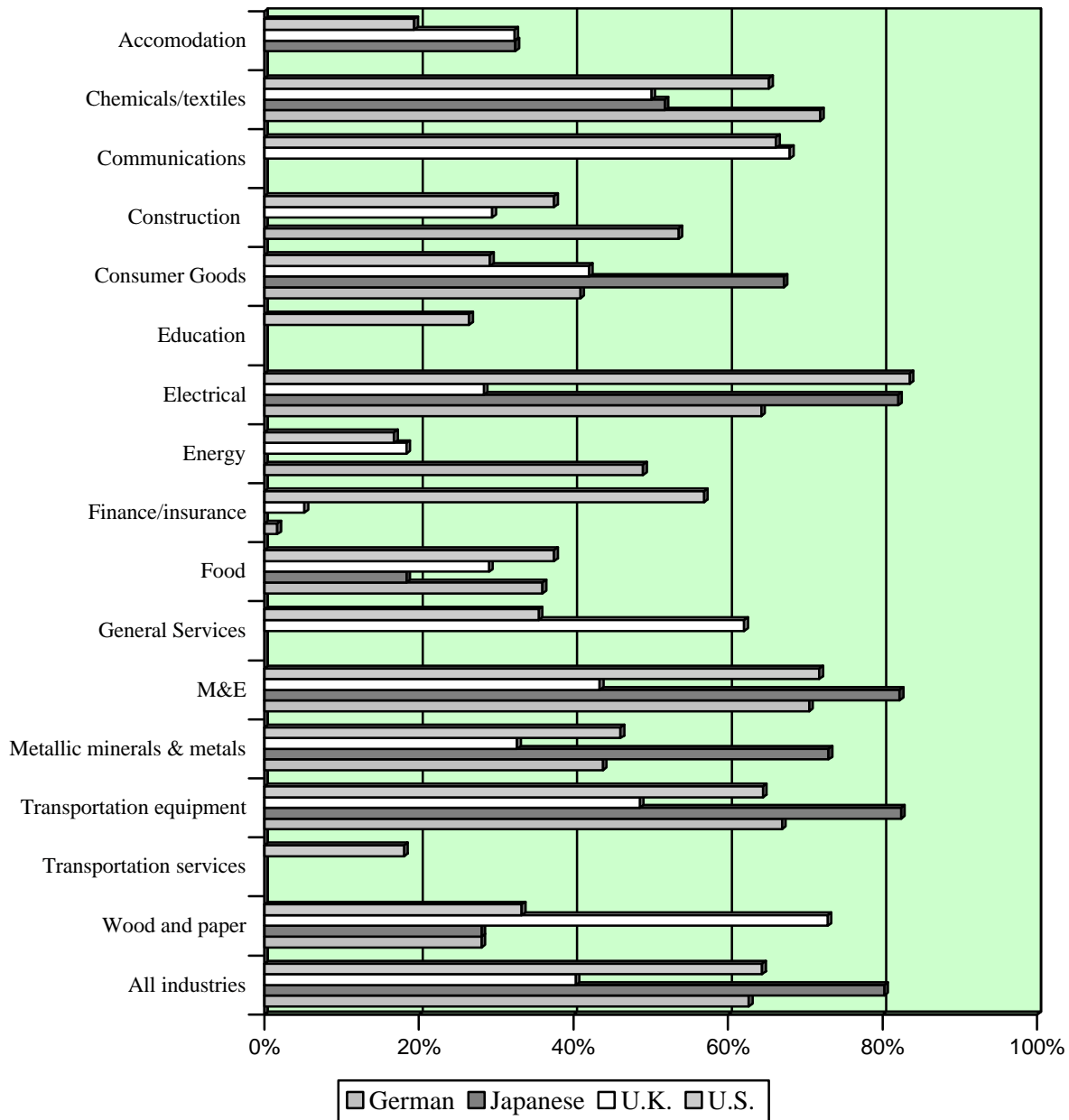
Table 6 (cont'd)

<i>U.S. affiliates</i>				
Accommodation, restaurant & recreation	21.9	19.9	16.4	19.4
Chemicals/textiles	66.1	65.0	64.8	65.3
Communications	67.7	63.0	67.8	66.2
Construction materials	36.2	35.2	41.9	37.5
Consumer goods	28.0	28.9	30.7	29.2
Education, health & social services	26.5	74.2	n.a.	26.5
Electrical/electronics	83.6	83.1	83.9	83.5
Energy	12.8	18.5	24.5	16.8
Finance & insurance	56.3	56.6	57.7	56.9
Food, beverages & tobacco	34.9	39.0	38.4	37.5
General services to business	33.1	37.6	35.4	35.5
Machinery & equipment	71.0	71.6	72.7	71.8
Metallic minerals/metals	45.7	47.8	44.7	46.1
Transportation equipment	60.9	65.5	66.8	64.5
Transportation services	27.7	13.7	11.6	18.1
Wood & paper	27.1	34.7	37.6	33.3
ALL INDUSTRIES	61.5	65.0	66.5	64.4
<i>All foreign affiliates</i>				
Accommodation, restaurant & recreation	28.9	22.8	19.6	23.9
Chemicals/textiles	64.1	63.4	64.1	63.9
Communications	67.6	63.8	67.9	66.3
Construction materials	36.4	35.7	40.5	37.4
Consumer goods	36.7	38.6	38.4	37.9
Education, health & social services	26.5	74.2	n.a.	26.5
Electrical/electronics	81.7	81.1	82.0	81.6
Energy	13.1	19.2	23.5	17.0
Finance & insurance	51.6	51.9	53.2	52.2
Food, beverages & tobacco	33.4	37.1	36.2	35.6
General services to business	37.2	37.7	35.0	36.7
Machinery & equipment	70.1	71.1	71.9	71.0
Metallic minerals/metals	47.0	48.1	46.3	47.1
Transportation equipment	64.4	67.0	68.9	66.9
Transportation services	26.3	13.2	11.3	17.6
Wood & paper	32.1	40.2	41.6	38.1
ALL INDUSTRIES	62.9	65.3	66.9	65.1

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

The regression results reported in Appendix B support these observations. First, the magnitude of the constant for the regressions on the shares of total intrafirm imports varies widely by country of control, ranging from a low of 0.298 for British firms to a high of 0.711 for Japanese subsidiaries. Second, the high-technology sectors, which include the four sectors mentioned above — transportation equipment, electrical/electronics, chemicals/textiles, and machinery and equipment — have positive and oftentimes large impacts on intrafirm imports and their shares of total imports, boosting the expected intrafirm trade shares by 11 to 33 percentage points over their expected base.

**Chart 10**  
**Shares of intrafirm imports of foreign-controlled firms, by industry**  
**1990-92 averages**



Also of note is that, generally speaking, the sectoral intrafirm trade intensity of British-controlled companies runs counter to that of the other three foreign countries of control. In other words, for most industries, the British share (or intensity) of intrafirm trade is either the highest or the lowest of the four countries of control, so that when the British-controlled firms have high levels of intrafirm trade, the others have low (or lower) levels and vice versa. The exact reason for this observation is beyond the scope of this paper, but it may be an archaism from Canada's days as a British colony.

At the sectoral level, German shares of imports from affiliates are up as there were slight gains in chemicals, electronics and transportation equipment, and a slight decline in machinery and equipment. Intrafirm import shares for Japanese-controlled firms were mixed, with chemical and electronic shares remaining steady over 1990-92 while machinery and equipment share advanced and the transportation equipment share fell. Overall, the share of intrafirm imports from the United States fell for Japanese-controlled companies. Conversely, the overall British intrafirm share of U.S. imports rose as gains were posted in communications and chemicals and declines were recorded in electronics and machinery and equipment. The shares for transportation equipment were fairly steady. The U.S. intrafirm import shares of U.S.-controlled firms were fairly stable in key sectors with the exception of transportation which recorded a strong increase. Overall, the share of intrafirm imports from the United States rose for U.S.-controlled companies operating in Canada.

### **Intrafirm exports to U.S.-based affiliates**

The United States is Canada's largest trading partner, responsible for over 75 percent of total Canadian merchandise exports during the 1990-92 period. Because the database for affiliated and non-affiliated exports is only available for transactions with the United States, it is to be expected that exports to U.S.-based affiliates of German-, Japanese-, British-, and American-controlled companies operating in Canada would be highly skewed in favor of American-controlled companies. The reason for this is quite simple: by definition every U.S.-controlled company operating in Canada has at least one affiliate in the United States<sup>4</sup> — the parent company — whereas this is not necessarily the case for any of the other foreign-controlled companies in Canada.

The data strongly support this expectation. For total intracorporate exports to the United States, U.S.-controlled companies are responsible for 95.9 percent of the trade. Japanese-controlled companies are next at 2.1 percent, followed by British-controlled firms at 1.0 percent and German-controlled firms at 0.9 percent. At the industry level, U.S. intrafirm export shares drop below 95 percent in only four industries — chemicals/textiles (84.8 percent), consumer goods (85.3 percent), food products (85.4 percent) and metallic minerals and metals (85.8 percent). Furthermore, with the exception of British-controlled exports of food products, no non-U.S.-controlled firm managed a 10 percent intracorporate export share by industry.

Consequently, any comparison of affiliated exports to the United States between U.S. and non-U.S. subsidiaries is not likely to be very relevant. This can be seen from the following example: transportation equipment — the second-largest sector for German intrafirm exports to the United States — accounts for roughly one-third of all German intrafirm exports to the United States (Table 8), yet the share of German-controlled intrafirm transportation exports in the total intrafirm exports of transportation equipment is slightly less than one-half of one percent.

Nonetheless, the data from Table 7 suggest that, on average over 1990-92, 68 percent of foreign-controlled exports to the United States were shipped to intracorporate affiliates. This share has grown considerably over the period, largely on the strength of the performance of U.S.-controlled companies. Between 1990 and 1991, the aggregate share of foreign-controlled intrafirm exports to the United States jumped from 63.1 to 69.7 percent of total foreign-controlled exports to the United States. The proportion

further increased nearly a full percentage point between 1991 and 1992. However, the impressive rise in the United States and aggregate share levels is in contrast with the performance of the other foreign-controlled companies. The intrafirm export shares for British-controlled companies declined steadily over 1990-92. Both German- and Japanese-controlled companies experienced an increase in their intrafirm export share over 1990-91, followed by a substantial decline the following year.

The U.S. intrafirm export activity of U.S. subsidiaries is very concentrated. Four sectors — transportation equipment, electrical/electronics, energy, and chemicals — accounted for 89.8 percent of U.S. intrafirm exports by U.S. subsidiaries (Table 8). The regression results for intrafirm exports to the United States support the observation that the high-tech sectors are leading exports by U.S. subsidiaries to U.S.-based affiliates (Appendix B). The value of exports by U.S. subsidiaries to the United States rose sharply (\$9.6 billion) over 1990-92, led by advances in transportation equipment, electrical/electronics and chemicals. These were the same sectors with high intrafirm import shares. Food, energy, metals and metallic minerals, and wood also recorded slight increases. Declines were registered primarily in finance and insurance, machinery and equipment, consumer goods, and communications.

The overall intrafirm trade balance of U.S. subsidiaries between intrafirm exports and intrafirm imports with U.S. subsidiaries averaged a \$4.5 billion surplus over 1990-92. Sectors with intrafirm trade surpluses were transportation equipment (\$5.7 billion), energy (\$1.5 billion), wood (\$600 million), finance and insurance (\$340 million) and metals and metallic minerals (\$18 million), a group largely concentrated in the resources sector. The sectors with the largest affiliated trade deficits with the United States were machinery and equipment (\$1.3 billion) chemicals (\$1.1 billion), communications (\$270 million) and consumer goods (\$220 million).

Intrafirm exports to the United States by non-U.S. subsidiaries are also relatively concentrated among a few industrial sectors (Table 8). The top three sectors for German-, Japanese- and U.K.-controlled firms accounted for 87.4, 93.3, and 63.3 percent of their respective total intrafirm exports to the United States. For Japanese-controlled companies, intrafirm exports in the transportation equipment sector alone accounted for four-fifths of the total intracorporate exports to the United States (81.6 percent).

The intracorporate trade balance with U.S. affiliates for non-U.S. subsidiaries is negative. The 1990-92 average German, Japanese, and U.K. subsidiary trade deficits with their U.S. affiliates amounted to \$155 million, \$286 million, and \$193 million, respectively. Most sectoral balances are also negative, although there are exceptions (most notably in transportation and metals/minerals for German-controlled firms, in finance and insurance, metals/minerals and electrical/electronics for British-controlled companies, and in wood and chemicals/textiles for Japanese-controlled firms). While these trade deficits do not appear to be high, especially compared to the U.S. subsidiary surplus of \$4.5 billion, they are proportionately very important. The three trade deficits amount to 44.9, 35.5, and 48.6 percent of their respective average exports to their U.S. affiliates. Outsourcing appears to be a substantial problem here.

### **Sources of intrafirm imports**

So far, the study has looked at intrafirm imports at the aggregate industry level and at intrafirm trade with the United States. However, the analysis has said nothing about the location of these affiliates, except of course those in the United States. Because the database for exports is restricted to affiliates in the United States, it is not possible to examine the flow of intrafirm exports to non-U.S. locations. However, it is possible to examine the regional distribution of imports from affiliates. This is done in Table 9.



**Table 7**  
**Intrafirm export shares to the United States by foreign affiliates (percentage)**

	1990	1991	1992	Average
<i>German affiliates</i>				
Chemicals/textiles	60.4	56.2	52.8	55.9
Consumer goods	20.0	42.7	33.0	32.0
Electrical/electronics	44.5	44.0	34.1	39.8
Energy	23.2	28.4	0.4	18.3
Food, beverages & tobacco	47.2	33.9	4.8	28.4
General services to business	n.a.	n.a.	93.5	32.5
Machinery & equipment	19.9	21.7	17.8	19.7
Metallic minerals/metals	54.5	56.2	45.8	51.7
Transportation equipment	31.8	30.4	12.2	24.9
Wood & paper	2.1	10.0	5.1	5.1
ALL INDUSTRIES	35.0	35.7	26.0	32.0
<i>Japanese affiliates</i>				
Chemicals/textiles	11.4	7.5	13.4	11.0
Consumer goods	75.2	43.7	53.5	57.0
Electrical/electronics	80.2	84.2	79.1	81.0
Food, beverages & tobacco	n.a.	n.a.	0.2	n.a.
Machinery & equipment	67.3	61.9	49.8	58.6
Metallic minerals/metals	19.3	14.5	7.3	13.3
Transportation equipment	55.1	58.0	32.7	46.3
Wood & paper	30.0	24.5	0.6	18.4
ALL INDUSTRIES	43.9	49.0	29.4	39.6
<i>U.K. affiliates</i>				
Chemicals/textiles	30.3	31.3	22.6	27.8
Communications	13.0	18.7	8.7	13.2
Construction materials	4.5	2.0	8.8	4.5
Consumer goods	72.7	59.0	30.5	49.9
Electrical/electronics	33.7	24.6	29.0	29.1
Energy	1.6	0.7	1.1	1.1
Finance & insurance	35.8	39.6	42.8	41.2
Food, beverages & tobacco	28.1	31.4	27.3	28.9
Machinery & equipment	41.0	31.1	36.3	36.3
Metallic minerals/metals	19.1	21.9	17.1	19.2
Transportation equipment	17.0	8.8	6.5	10.3
Transportation services	27.6	n.a.	n.a.	n.a.
ALL INDUSTRIES	24.1	23.0	20.3	22.3

Table 7 (cont'd)

<i>U.S. affiliates</i>				
Accommodation, restaurant & recreational	n.a.	1.7	17.4	10.9
Chemicals/textiles	68.7	69.5	69.3	69.2
Communications	80.2	57.9	65.4	69.2
Construction materials	25.7	28.4	20.6	24.8
Consumer goods	62.9	55.4	47.0	55.3
Electrical/electronics	85.0	90.2	90.0	88.5
Energy	40.7	26.3	36.5	34.3
Finance & insurance	82.7	90.5	63.0	82.7
Food, beverages & tobacco	55.2	50.3	43.7	49.2
General services to business	28.7	n.a.	54.9	29.5
Machinery & equipment	66.5	68.8	64.3	66.5
Metallic minerals/metals	44.0	52.1	52.5	49.6
Transportation equipment	72.2	84.7	88.3	82.1
Transportation services	21.6	23.8	42.7	29.1
Wood & paper	22.2	22.9	21.8	22.2
ALL INDUSTRIES	65.7	72.8	75.3	71.5
<i>All foreign affiliates</i>				
Accommodation, restaurant & recreational	n.a.	1.7	17.4	10.9
Chemicals/textiles	59.6	61.1	59.6	60.1
Communications	75.1	51.8	51.1	60.8
Construction materials	25.1	27.2	20.3	24.1
Consumer goods	61.2	54.3	45.1	53.6
Electrical/electronics	83.0	87.8	87.8	86.3
Energy	39.1	25.3	34.6	32.8
Finance & insurance	81.5	88.2	58.7	79.4
Food, beverages & tobacco	50.5	45.8	39.1	44.5
General services to business	n.a.	n.a.	56.2	29.6
Machinery & equipment	62.9	64.1	59.7	62.2
Metallic minerals/metals	38.9	46.8	45.0	43.5
Transportation equipment.	70.8	82.3	83.9	79.3
Transportation services	22.1	n.a.	n.a.	n.a.
Wood & paper	22.4	22.9	20.6	21.9
ALL INDUSTRIES	63.1	69.7	70.6	68.0

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada.

**Table 8**  
**Distribution of intrafirm trade activity with the United States by foreign subsidiaries, selected sectors, 1990-92 (percentage)**

	<b>Chem</b>	<b>Comm</b>	<b>Constr</b>	<b>Consumer</b>	<b>Electrical</b>	<b>Energy</b>	<b>Food</b>	<b>M&amp;E</b>	<b>Metal</b>	<b>Transport</b>	<b>Wood</b>
<i><b>Exports, 1990-92</b></i>											
Germany	41.6	nil	nil	1.7	0.7	1.6	1.4	4.8	12.3	33.5	0.4
Japan	1.4	nil	nil	1.1	7.6	nil	nil	2.4	0.3	81.6	4.1
United Kingdom	31.5	0.3	0.1	1.8	15.3	0.6	14.2	6.9	16.5	3.9	nil
United States	4.3	0.1	0.2	0.3	14.1	4.5	1.0	2.4	1.8	66.9	2.1
<i><b>Imports, 1990-92</b></i>											
Germany	57.9	nil	nil	2.6	0.8	0.2	4.3	8.2	3.3	14.2	nil
Japan	0.8	Nil	nil	2.6	11.5	nil	0.1	4.0	2.2	78.5	0.1
United Kingdom	33.8	3.1	2.3	2.1	7.5	1.7	18.2	13.2	3.6	2.6	7.2
United States	8.2	1.0	0.6	1.1	17.7	0.5	1.5	6.8	2.0	58.5	0.5

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada.

**Table 9**  
**Distribution of intrafirm imports by foreign affiliates, by industry (percentage)**

<b>Affiliation and regional source</b>									
<b>Industry</b>	<b>Germany</b>	<b>Japan</b>	<b>United Kingdom</b>	<b>United States</b>	<b>Mexico</b>	<b>Other EC</b>	<b>Other PacRim</b>	<b>Other countries</b>	<b>Share of affiliated imports</b>
<i><b>Chemicals and textiles</b></i>									
Germany	35.6	0.7	2.6	57.9	0.0	1.7	1.0	0.4	<b>13.1</b>
Japan	0.0	79.4	0.0	15.5	0.0	0.4	1.6	0.3	<b>1.5</b>
United Kingdom	0.3	0.6	34.4	53.2	0.0	4.3	6.3	0.8	<b>9.8</b>
United States	0.9	0.4	1.4	90.9	0.2	5.1	0.4	0.6	<b>75.5</b>
<i><b>Construction</b></i>									
Germany	27.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>4.5</b>
United Kingdom	0.0	0.0	0.0	97.9	0.0	0.0	0.0	0.0	<b>6.3</b>
United States	0.2	3.3	0.3	93.9	0.2	0.6	0.8	0.4	<b>89.2</b>
<i><b>Consumer goods</b></i>									
Germany	30.2	0.1	1.6	52.6	0.0	11.4	1.5	2.3	<b>3.2</b>
Japan	0.2	82.6	0.2	10.0	0.4	0.4	5.4	0.4	<b>35.9</b>
United Kingdom	0.7	0.1	68.6	27.0	0.0	2.2	0.9	0.6	<b>5.8</b>
United States	0.5	1.0	0.4	78.4	2.1	2.7	12.6	2.2	<b>55.2</b>
<i><b>Electrical and electronic goods</b></i>									
Germany	81.5	0.0	0.8	13.5	0.0	0.0	0.0	3.6	<b>0.3</b>
Japan	0.0	67.2	0.1	11.5	1.4	0.0	19.7	0.1	<b>11.9</b>
United Kingdom	0.1	0.9	38.8	46.6	0.0	2.8	4.0	6.7	<b>1.0</b>
United States	2.0	6.0	1.1	71.0	1.9	2.3	2.8	12.8	<b>86.7</b>

Table 9 (cont'd)

<b>Affiliation and regional source</b>									
<b>Industry</b>	<b>Germany</b>	<b>Japan</b>	<b>United Kingdom</b>	<b>United States</b>	<b>Mexico</b>	<b>Other EC</b>	<b>Other PacRim</b>	<b>Other countries</b>	<b>Share of affiliated imports</b>
<i><b>Energy products</b></i>									
Germany	0.0	0.0	0.0	64.5	0.0	0.0	0.0	0.0	<b>0.9</b>
United Kingdom	0.0	0.0	9.3	60.2	0.0	0.0	0.0	0.0	<b>8.2</b>
United States	0.0	0.0	0.1	94.7	0.0	0.0	0.6	4.2	<b>91.0</b>
<i><b>Finance and insurance</b></i>									
Germany	95.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.1</b>
United Kingdom	0.0	0.0	29.2	25.3	0.0	0.0	0.0	0.0	<b>0.5</b>
United States	0.9	1.3	2.1	92.4	0.2	1.6	0.3	1.2	<b>99.4</b>
<i><b>Food, beverages and tobacco</b></i>									
Germany	5.2	0.0	0.0	75.3	0.0	0.0	0.0	16.4	<b>4.0</b>
Japan	0.0	12.8	0.0	47.3	0.0	0.0	0.0	0.0	<b>0.3</b>
United Kingdom	0.0	0.0	5.0	87.1	0.0	2.7	0.8	3.9	<b>17.0</b>
United States	0.3	0.4	1.9	81.1	1.5	2.3	3.3	9.2	<b>78.7</b>
<i><b>General services to business</b></i>									
United Kingdom	0.0	0.0	0.0	99.9	0.0	0.0	0.0	0.0	<b>8.6</b>
United States	0.0	0.7	0.6	94.3	0.0	1.5	0.6	1.3	<b>91.4</b>
<i><b>Machinery and equipment</b></i>									
Germany	58.7	1.4	0.4	20.4	0.0	15.2	0.4	3.4	<b>6.2</b>
Japan	0.1	85.6	0.3	9.2	0.0	0.2	4.3	0.2	<b>14.7</b>
United Kingdom	0.5	13.2	25.2	56.6	1.3	0.7	0.7	1.8	<b>4.2</b>
United States	1.9	3.8	1.1	89.1	0.4	2.0	0.9	0.8	<b>74.9</b>

Table 9 (cont'd)

<b>Affiliation and regional source</b>									
<b>Industry</b>	<b>Germany</b>	<b>Japan</b>	<b>United Kingdom</b>	<b>United States</b>	<b>Mexico</b>	<b>Other EC</b>	<b>Other PacRim</b>	<b>Other countries</b>	<b>Share of affiliated imports</b>
<i><b>Metallic minerals and metals</b></i>									
Germany	62.4	0.0	0.1	18.2	0.0	2.9	0.0	12.1	<b>8.4</b>
Japan	0.0	86.0	0.0	12.3	0.0	0.0	1.6	0.1	<b>18.0</b>
United Kingdom	0.3	0.1	76.2	20.2	0.0	1.5	1.2	0.6	<b>9.7</b>
United States	0.7	1.0	1.0	92.7	0.1	0.5	1.1	2.9	<b>63.9</b>
<i><b>Transportation equipment</b></i>									
Germany	77.1	0.1	0.0	10.1	0.0	0.5	0.0	1.8	<b>2.8</b>
Japan	0.0	79.1	0.0	20.2	0.4	0.1	0.1	0.1	<b>16.9</b>
United Kingdom	0.0	0.0	86.4	8.3	0.0	2.5	0.0	2.6	<b>0.7</b>
United States	0.3	1.5	0.3	93.4	3.6	0.2	0.2	0.5	<b>79.5</b>
<i><b>Transportation services</b></i>									
United Kingdom	0.0	0.0	0.0	9.6	0.0	0.0	0.0	0.0	<b>1.8</b>
United States	0.0	0.3	0.0	93.8	0.0	0.0	0.2	5.5	<b>98.2</b>
<i><b>Wood and paper products</b></i>									
Germany	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>3.8</b>
Japan	60.3	0.0	0.0	9.1	0.0	0.0	0.0	0.0	<b>6.1</b>
United Kingdom	0.0	0.0	0.0	64.3	0.0	0.0	0.0	0.0	<b>26.3</b>
United States	0.0	0.1	0.7	96.3	0.0	0.3	0.1	2.3	<b>63.8</b>
<i><b>All industries</b></i>									
Germany	57.5	0.4	0.9	30.6	4.4	3.0	0.7	2.5	<b>3.6</b>
Japan	0.1	77.9	0.0	17.1	0.6	0.1	4.1	0.1	<b>14.0</b>
United Kingdom	0.3	1.8	40.9	49.2	0.2	2.9	2.7	2.0	<b>2.6</b>
United States	0.8	2.5	0.7	87.7	2.5	1.3	1.1	3.5	<b>79.8</b>

Note: Figures in the table may not add up to totals due to data suppression by Statistics Canada.

Source: Statistics Canada.

Table 9 provides two sets of data. The first is the regional sourcing pattern of intrafirm imports while the other is the share of total intrafirm imports by country of control. Thus, for example, 75.5 percent of total intrafirm imports of chemicals and textiles is conducted by U.S.-controlled companies. Of this 75.5 percent share, 90.9 percent is imported from U.S.-based affiliates and a further 5.1 percent is imported from affiliates located in other parts of Western Europe, and so on.

There are a number of key points to underline in Table 9. First and foremost, there is a strong relationship between the parent country and the source of intrafirm imports. The relationship is strongest for American- and Japanese-controlled companies (87.7 and 77.9 percent of total intrafirm imports, respectively) and somewhat weaker for German- and British-controlled companies (57.5 and 40.9 percent, respectively).

The importance of the parent country is illustrated by the following observations by country of control: for German firms, imports from affiliates located in Germany accounted for more than one-half of total intrafirm imports in five of 11 sectors; for Japanese firms, intrafirm imports from Japanese sources exceeded 50 percent of total intrafirm imports in six of eight sectors; for British firms, imports from affiliates in the United Kingdom accounted for at least one-half of total intrafirm imports in three of 13 industrial sectors and were largest in one other sector; and, finally, for U.S.-controlled firms, imports from affiliates located in the United States captured more than one-half of total intrafirm imports in all 13 sectors observed. The second set of regressions on the imports side in Appendix B suggests that, in the case of U.S.-controlled firms, about 93 percent of total imports from affiliates originates from affiliates in the United States.

Second, after the parent country, the United States is the second most important source of intrafirm imports. (U.S.-controlled firms on the other hand displayed no particular pattern of sourcing intrafirm imports once the parent country had been removed). For British-controlled companies, aggregate intrafirm imports from U.S.-based affiliates are actually greater than aggregate intrafirm imports from the United Kingdom (49.2 versus 40.9 percent). The jump in magnitude of the constant term between the second (parent share) and third (U.S.-based) sets of import regressions for the British-controlled subsidiaries (in Appendix B) strongly supports this observation.

With the exception of German wood products imported from affiliates of Japanese-controlled companies, imports from affiliates located in the United States accounted for more than one-half of total intrafirm imports in the remaining sectors. Sectors where the United States is the most important source of intrafirm trade include: energy; food, beverages and tobacco; construction materials; general services to business; accommodation, restaurants and recreation services; communications; chemicals; and textiles.

Third, with very few exceptions, geographical proximity to the parent country is not a factor in intrafirm imports. In other words, intrafirm imports from areas geographically close to the parent country (and presumably where other affiliates would most likely be found (Caves, 1995) are not that large. For example, U.S.-controlled intrafirm imports from Mexico do not appear to exceed 3.6 percent of total imports from affiliates in any industry. Similar conclusions hold for Japanese intrafirm imports from the Pacific region and for German or British intrafirm imports from the EEC region. Of course, certain exceptions apply; German intrafirm imports of consumer goods and machinery and equipment are strong from the EEC region, as are Japanese intrafirm imports of electrical/electronic products from the Pacific region.

## Summary

Overall, Canadian-based subsidiaries of foreign companies account for roughly one-half of Canadian merchandise trade, 51 percent of imports and 44 percent of exports. However, the bulk of their trade activity is concentrated in a handful of key industries — transportation equipment, electrical and electronic products, chemicals and textiles, and machinery and equipment — in what constitutes much of the high technology/high value-added sectors of Canadian manufacturing. Among the four countries of control, the activities of U.S.-controlled companies dominate.

Regarding intrafirm trade, there are few hard and fast rules. For example, there are no uniform shares of imports from affiliates either across countries of control or across industries, although sectoral rankings across countries are broadly similar. This is consistent with individual firms seeking to maximize their productive efficiency along the lines of the particular mix of technologies, costs and locations of affiliates in their global production facilities.

Imports from affiliates outweigh imports from non-related parties for each country of control, except for British-controlled companies for which related party imports amount to about 40 percent of total imports. Overall, intracorporate imports have been on the rise over 1990-92, with the possible exception of Japanese intrafirm imports. The Japanese subsidiaries are the most reliant on intrafirm imports, averaging over 80 percent of their total imports. However, Japanese-affiliated factories in Canada were making conscious efforts to raise their local content ratios around this time (Japan External Trade Organization, 1993), which may explain the decline in their intrafirm import shares.

The study finds that there is a strong intrafirm import relationship between the parent country of control and the source of intrafirm imports. After the parent country, the United States is the next most important source of intrafirm imports. On the other hand, geographical proximity to the parent country is not found to be a factor in the source of intrafirm imports.

Intrafirm export data are available only for trade with the United States. U.S. subsidiaries are found to dominate this trade. The overall foreign-controlled intrafirm export share to the United States rose from 63.1 percent in 1990 to 70.6 percent in 1992, despite declines by all non-U.S. subsidiaries. Intrafirm exports by U.S.-affiliated companies were on the rise in key sectors such as chemicals and textiles, electrical and electronic products and, especially, transportation equipment. Overall, the United States trade balance for affiliated trade is positive for U.S. subsidiaries and negative for non-U.S. subsidiaries.





## 5. CONCLUSIONS

### Summary

The main objective of this study has been to examine the role of related party trade in Canada. Four questions have been specifically addressed:

- i) How important are Canadian-based subsidiaries of foreign transnationals in the overall Canadian trade picture?
- ii) Do foreign-controlled firms operate differently from domestic firms with respect to trade?
- iii) How does the geographic and industrial structure of intrafirm imports of foreign-controlled firms vary by country of control?
- iv) How much of their trade is internalized, intrafirm trade?

The analysis of foreign transnationals' activities reveals that they are an important segment of the business population. Foreign-controlled companies account for between 25 and 30 percent of total sales. Foreign subsidiaries are disproportionately located in Central Canada and are more prevalent in high value added manufacturing and resource-based sectors. Additionally, they are much more outward oriented than their domestic counterparts. As has been shown, the relatively small coterie of foreign subsidiaries is responsible for a little more than half of total imports and a little less than half of total exports.

The issue of foreign-controlled firms operating differently from domestic firms with respect to trade has also been examined. Overall, similarities were observed and trade performance by all countries of control was found to be relatively concentrated among a handful of sectors.

On a broad basis, the structures of intrafirm imports by foreign-controlled firms have several similarities. The high-technology sectors have high levels of intrafirm imports. Service sectors generally have low levels of intrafirm imports. Intrafirm imports are highest from the parent country, followed by imports from U.S.-based affiliates. The parent country and the United States make up the bulk of intrafirm imports. Similarities end, however, when the intensity of intrafirm trade is compared; the ranking of sectors is comparable, while the magnitude of the shares is not.

With respect to arm's-length trade, the evidence suggests that nearly two-thirds of imports by foreign-controlled transnationals are intrafirm imports, while just over two-thirds of the subsidiaries' exports to the United States are to related parties. Of course, differences occur between countries of control as might be expected. Japanese-controlled firms, long known for their fastidious quality control and impenetrable vertical relations with suppliers and sellers (i.e., the *kieretsu*), sourced nearly four-fifths of their imports from related parties, much of this from related parties situated in Japan. German- and American-controlled subsidiaries fall near the average for intrafirm imports, while British subsidiaries rely the least on non-arm's length imports. Regarding exports to the United States, the aggregate results are skewed to the U.S. subsidiary results, since the United States is also the parent country. Nonetheless, the relative proportions of the remaining non-U.S. subsidiaries are roughly comparable to the results found for intrafirm imports. That is to say, Japanese subsidiaries have higher levels than German and British subsidiaries, being about one-third higher than the German share of intrafirm exports to the United States, and about twice the British share.

## Implications

The analysis of foreign-owned firms operating in Canada reveals strong linkages between FDI and trade. The two are complementary. To further benefit from the potential for growth that TNCs and globalization offer, FDI in Canada should be actively encouraged.

Recent evidence suggests that the Canadian industrial structure is moving towards a high-knowledge, high-technology position offering more secure, better paying jobs (Gera and Massé, 1996), albeit from a small base. The pace of this structural shift could be accelerated by developing policies that channel FDI into the knowledge-based sectors of the economy. Such a strategy could help to stimulate technological and product innovation and secure high value-added jobs.

However, the growing 'footlooseness' of TNCs in conjunction with FTA/NAFTA could actually worsen the performance of the Canadian economy if Canada does not manage to meet the challenges of increasing global competition for FDI. Outsourcing from the United States is a continuing risk. Policies and programs aimed at improving the investment climate in Canada, especially vis-à-vis the United States, are crucial to retaining and attracting FDI. Thus, policies aimed at elevating the competitiveness of the Canadian economy should be promoted, with the usual list of prescriptions, including regulatory reform, competitive tax rates, access to low-cost capital, commercial and market framework policies, maintaining a stable and healthy macro-economic climate, nurturing flexible and adaptable labor markets, and facilitating the development of human capital.

## NOTES

1. Three other countries — France, the Netherlands, and Switzerland — comprise roughly half of the remaining total FDI stock not yet accounted for.
2. For the case of Japanese investment, Rugman (1990*b*) also found Quebec to be not well represented.
3. To be technically correct, this residual also includes the exports of all other foreign-controlled companies along with the exports of purely domestic companies.
4. And perhaps several other affiliates.



## APPENDIX A

### Principal data source

Statistics Canada has provided data covering the trading activities of American-, British-, Japanese-, and German foreign-controlled firms operating in Canada over the 1988-92 period. These four countries were chosen because together they account for about two thirds of the total world stock of outward direct investment (Dunning, 1993), and are the four largest foreign investors in Canada. The base year for the data is 1991, and all data refer to the companies that existed in 1991.

The data are derived from two Statistics Canada databases: the International Trade Division (ITD) Importer and Exporter database, and the Industrial Organization and Finance Division (IOFD) database. Intrafirm trade statistics were generated by attaching an affiliation flag to the ITD database. By combining the databases, the resulting data provide trade information by country of control at the legal entity level.

As the data are grouped at the company level, the appropriate industrial classification is the Standard Industrial Classification of Enterprises and Companies SIC-C classification. Since both the IOFD and ITD data represent the respective universes, Statistics Canada has assumed that the data represent the total trade of American-, British-, Japanese-, and German-controlled firms.

Intrafirm trade statistics are based upon the relationship indicator as defined by Canada Customs. For import data, this relationship indicator is available for all countries of origin while for export data it is only available for transactions with the United States. Where blank code is encountered and for all export data to non-U.S. destinations, trade is assumed to be non-affiliated. As a result, the values for intrafirm trade are minimums.

Two series of data were created based on the 1991 frame data carried through time. The first consists of those foreign-controlled firms that were in “continuous operations” in Canada over the entire five-year period. (These data are essentially a subset of the larger second data set and are not discussed in this paper). The second set captures the annual trading activity of all foreign-controlled firms operating in Canada that existed in 1991, regardless of whether they were in continuous operation for the entire period. The years 1988 and 1989 were dropped from the total FTNC data since the match rate was not high enough to make the data reliable. It should also be pointed out that the total FTNC data do not capture the trade activity of other FTNCs that were active in the other years, except for 1991.

### Other data sources

The International Trade Division of Statistics Canada does not carry the SIC-C code in its database. The SIC-C code for the intrafirm trade data was obtained from the IOFD when the data were linked and therefore is only present for the linked data. To place the import and export activity of the foreign-controlled firms in the context of total trade by industry required the construction of a concordance between trade data and the SIC-C. Unfortunately, no direct concordance exists. However, a concordance between the traditional SIC-E (industry-establishment) configuration and the SIC-C industry definition exists. Using Statistics Canada’s trade-by-industry data then allows one to relate trade data to the SIC-C industries. The TIERS trade database has been used for this special concordance. In cases where a SIC-E industry is partially related to two or more SIC-C industries, the SIC-E trade data were proportioned equally among the SIC-C industries. This approach suffers from one major drawback — the TIERS database only carries merchandise trade statistics whereas the SIC-C industries include a non-

merchandise (or services) component. The resulting total Canadian trade-by-SIC-C calculations provide an approximate yardstick against which the relative trading activity of the FTNCs can be measured.

This approach does not present much of a problem for most of the predominately goods-oriented industries. However, the lack of a non-merchandise component is apparent in the transportation equipment industry in which imports by the FTNCs slightly exceed the merchandise-based TIERS calculation of total imports.

The trading activity of the predominately non-merchandise sectors — general services to business, finance and insurance, accommodation, restaurants and recreation services, education, health and social services, and transportation services — has not been measured against a TIERS-generated yardstick, for obvious reasons.

## APPENDIX B

### Regression results

#### *Intrafirm imports*

Pooled cross-sectional and time series data were arranged and estimated using the procedure outlined in the *SHAZAM Users Reference Manual Version 7.0* (pages 245-251). The data set contains three years of data covering between six (Japan) and 15 (United States) industries by country of control.

Rather simple regressions were performed on three different dependent variables: the share of total imports from affiliates from all sources in total imports (i.e., the share of intrafirm imports), the share of imports from affiliates located in the parent country in total imports (or the parent share of intrafirm imports), and the share of intrafirm imports from U.S.-based affiliates (for non-U.S.-controlled companies only). Since the available data set is limited to affiliated and total imports, an approach using dummy variables was used. A dummy variable representing high-technology sectors was created to examine the possibility of differences between the high-tech and other sectors. Five industries are classified as high-technology: chemicals and textiles, machinery and equipment, transportation equipment, electrical and electronics, and communications. The first four of these high-tech industries are common to all four countries of control while the fifth is only observed for U.S.-controlled company data. Dummies for the years 1990 and 1991 were tested for differences over the three years of observations but were not found to be significant and so were dropped.

Estimates were produced for each of the four countries of control, using pooled regression techniques. Since the number of cross-sections is greater than the number of time periods, or  $N > T$ , the full cross-sectionally correlated and time-wise auto-regressive model option is unavailable. Estimations using the sample correlation coefficient between  $e_{i,t}$  and  $e_{i,t-1}$  as the auto-regressive parameter (or correlation coefficient option) were attempted and the results are reported below.



Country of control	Type	High-tech	Constant	R <sup>2</sup> (observed-predicted)
<i>Intrafirm imports</i>				
German	Pooled	0.263 (12.57)	0.412 (31.15)	.9757
British	Pooled	0.142 (7.67)	0.298 (120.4)	.9982
Japanese	Pooled	0.113 (2.11)*	0.711 (25.68)	.9713
American	Pooled	0.327 (10.06)	0.347 (24.74)	.9406
<i>Parent Share of intrafirm imports</i>				
German	Pooled	0.346 (4.73)	0.310 (7.94)	.8354
British	Pooled	0.131 (0.65)**	0.259 (1.35)**	.6233
Japanese	Pooled	-0.049 (-2.15)*	0.844 (47.58)	.9934
American	Pooled	-0.04 (-2.99)	0.932 (112.1)	.9966
<i>U.S.-based affiliates' shares of intrafirm imports</i>				
German	Pooled	-0.321 (-5.05)	0.516 (10.72)	.5094
British	Pooled	-0.063 (-0.31)**	0.588 (3.66)	.4162
Japanese	Pooled	0.03 (1.90)**	0.106 (15.28)	.9107

Note: Unless otherwise indicated, all coefficients are significant at the 1 percent level.

\* indicates that the coefficient is significant at the 5 percent level.

\*\* indicates that the coefficient is not significant at the 5 percent level or above.

From the first set of results, on total intrafirm imports, it is clear that high-technology industries are associated with higher shares of total intrafirm imports as this variable is positive and generally highly significant. For high-tech U.S.-controlled companies, imports from affiliates rise by almost one-third of total imports compared to non-high-tech sectors. High-tech presence adds over a one-quarter share for the German-controlled companies and about half that amount for the British-controlled and the Japanese-controlled companies. These findings are consistent with the results reported in Table 6, where it is clear that higher intrafirm imports in the high-technology sectors are pulling up the averages calculated for all industries.

Broadly speaking, presence in high-tech industries does not contribute to increased intrafirm imports from the parent country, and may even reduce the share of imports from affiliates in the United States and Japan in the case of their Canadian subsidiaries. The exception to this is German-controlled firms where high-tech presence raises intrafirm imports. Strong German intrafirm imports in machinery

and equipment and in transportation, and to a lesser extent in electronics and in chemicals, are responsible for this observation (Table 9 in conjunction with Table 8).

The exact reasons for the observations concerning the Japanese- and American-controlled firms are beyond the scope of this paper. However, lower rates of intrafirm imports in the electronics sector may be the root cause of the slight drag on intrafirm imports caused by high-technology sectors for these two countries of control. Also of note is the jump in the magnitude of the constant between the total intrafirm import regressions and the parent share intrafirm regressions for the Japanese and American subsidiaries. As these two countries are Canada's major suppliers of imports, the jump in the constant from total intrafirm imports to parent country intrafirm imports reinforces the remarks made throughout this paper concerning the importance of the parent country as a source of intrafirm imports.

Earlier analysis pointed out that, after the parent country, the United States was the next most important source of intrafirm imports. The third set of regressions examines this relationship for the three non-U.S. countries of control. For German subsidiaries, high-tech presence is a considerable drag on intrafirm imports. This is consistent with the highly significant presence of German affiliates in the high-technology sectors observed in the second set of regressions. For British subsidiaries, the United States is a very important source of intrafirm imports, as evidenced by the jump in the magnitude of the constant. This observation is in line with the observation in Table 9 that the United States is in fact a larger supplier of intrafirm imports to British subsidiaries located in Canada than is the parent country, the United Kingdom. High-tech presence is not a factor for the British subsidiaries. Finally, since about 80 percent of intrafirm imports by Japanese subsidiaries is sourced from Japan (Table 9), the small magnitude of the estimates for the U.S.-based affiliates' shares of intrafirm imports is not that surprising.

### **Intrafirm exports to U.S.-based affiliates**

As pointed out earlier, data on exports to affiliates are only available for exports to affiliates located in the United States. Consequently, only one set of regressions is possible. The dependent variable is the share of intrafirm exports to U.S.-based affiliates in total exports. The procedure is the same as that provided in intrafirm imports above. The export data set covers from seven industries in the case of Japanese-controlled firms to 13 industries for American-controlled firms. The results are reported below:

Country of control	Type	High-tech	Constant	R <sup>2</sup> (observed-predicted)
<i>Intrafirm Exports to U.S. based affiliates</i>				
German	Pooled	0.114 (1.63)**	0.258 (6.17)	.7222
British	Pooled	0.149 (0.95)**	0.249 (8.97)	.6765
Japanese	Pooled	-0.069 (-0.30)**	0.580 (2.59)*	.8763
American	Pooled	0.293 (5.18)	0.411 (9.20)	.8799

Notes: Unless otherwise indicated, all coefficients are significant at the 1 percent level.

\* indicates that the coefficient is significant at the 5 percent level.

\*\* indicates that the coefficient is not significant at the 5 percent level or above.

From this set of results, the evidence for the non-U.S.-controlled firms points to no relationship between trade in the high-technology industries and increased intrafirm exports to U.S.-based affiliates — the high-tech variables are not statistically different from zero. Exports to U.S.-based affiliates account for roughly one-quarter of total exports by British and German subsidiaries, and nearly 60 percent for Japanese subsidiaries, though this latter estimate seems to be somewhat higher than the shares reported in Table 7.

For the U.S.-controlled companies, intrafirm exports to the United States represent exports back to the parent as well as to sibling companies. Thus, for U.S. subsidiaries, intrafirm export shares (to the United States) are expected to be fairly high. Moreover, since Table 7 presented evidence that the high-technology sector was actually pulling up the aggregate industrial share, it is expected that presence in the high-technology sector should be positively related to an increased share of intrafirm exports. The regression results bear out these expectations: presence in the high-technology sector is significantly and positively related to intrafirm exports to affiliates based in the United States, adding nearly a 30-point increase to the estimated share.

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