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GLOBALISATION AND INTRA-FIRM TRADE: AN EMPIRICAL NOTE

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CONTENTS

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INTRODUCTION

Products which are traded internationally, but which stay within the ambit of a multinational enterprise (MNE), represent a significant portion of foreign trade for several OECD countries. This type of trade is called *intra-firm trade* as opposed to international trade among unrelated parties, also called arm's length trade. Intra-firm trade is an important part of the process of globalisation, by which is meant the increasing interdependence of markets and production in different countries through trade in goods and services, cross-border flows of capital, and exchanges of technology.

The phenomenon of intra-firm trade is of interest to trade policy makers, as well as to competition and tax authorities. The use of transfer pricing in intra-firm trade may introduce an element of uncertainty into the value of a fairly large part of international trade and into customs valuation needed for the application of tariffs or similar measures. Competition and tax issues may also arise from intra-firm trade to the extent that the latter may facilitate the dissimulation of real transaction prices between the parent company and its affiliates.

A surge in foreign direct investment (FDI) during the **1980s'** has been cited as evidence in favour of globalisation; it is argued that MNEs have played a central role in globalisation by extending their corporate networks beyond national boundaries through the establishment of foreign branches and subsidiaries. It is often assumed that intra-firm trade reflects these foreign production activities by MNEs, as they transfer their factors of production from one country to another.

Little attention has been paid so far to the phenomenon of intra-firm trade. The literature on the subject is still relatively limited and recent.[2] This is partly because most international trade statistics do not distinguish between intra-firm trade and arm's length trade. This paper aims to throw some empirical light on the phenomenon by analysing the available data on intra-firm trade for two major OECD countries, the United States and Japan.[3]

The paper begins by examining some conceptual issues relating to intra-firm trade and intra-industry trade (Section I). Section II briefly explains the nature and limitation of the data used, while Section III contains an empirical analysis of recent developments in intra-firm trade in the United States and Japan. The final section presents some concluding remarks.

I. INTRA-FIRM TRADE AND INTRA-INDUSTRY TRADE

In considering the interrelationship between globalisation and international trade, it is conceptually useful to distinguish between four types of international trade: (A) intra-industry, intra-firm trade; (B) intra-industry, arm's-length trade; (C) inter-industry, intra-firm trade; and (D) inter-industry, arm's-length trade.

Intra-industry trade is defined as the mutual exchange of similar goods within the same product category (Grubel and Lloyd, 1975, and Greenaway and Milner, 1986). Intra-industry trade is generally a function of product differentiation and may or may not involve intra-firm trade. If motor vehicles produced in France are exported to the United States and U.S.-built motor vehicles are exported to France, the two countries are said to be involved in intra-industry trade even though such trade is not necessarily intra-firm trade.

Intra-industry trade can be readily calculated for any given product category, as only the traditional bilateral trade statistics for that product category are needed.[4] Intra-firm trade is harder to quantify, since knowledge of the relationship between the firms involved in the transactions is necessary. Data on intra-firm trade are available only through firm surveys, involving the preparation of questionnaires by national authorities. (The data sources on intra-firm trade are discussed in the next section.)

Most trade in manufactured goods among OECD countries is of the intra-industry type. Intra-industry trade is particularly important within Europe, and to a lesser extent, in North America, accounting for roughly 60 to 70 per cent of total trade in manufactures.[5] This trade generally concerns differentiated products exchanged between countries that are similar in terms of per capita income and relative factor endowments. It has also been argued that economies of scale play an important role in explaining the industry pattern of intra-industry trade. On the other hand, trade between developed and developing countries ("North-South") is mostly of the inter-industry type, reflecting large differences in relative factor endowments between the two groups of countries. Inter-industry trade among unrelated parties (type D) – *e.g.* international exchange of cotton cloth produced by northern manufacturers for wine produced by southern farmers – is the type of trade which international trade textbooks traditionally deal with.

Trade in manufactured goods between developed countries is predominantly of the intra-industry type and often takes the form of intra-firm trade. An important example of intra-industry, intra-firm trade (Type A) is United States-Canada-Mexico automobile trade. Intra-firm trade is also the dominant pattern of U.S. exports to Canada and Europe in the case of non-electrical machinery and chemicals.

Another example is trade in manufactured goods between Pacific Asian economies. These economies have seen a rapid increase in intra-industry trade as a proportion of their total trade over the last decade. Such increase in intra-industry trade in Pacific Asian economies can be primarily attributed to the globalisation of corporate activities by U.S. and Japanese firms and, more recently, by other Asian firms. This involves assembly-line production based on imported parts and components in different countries in East and South East Asia (Fukasaku, 1992; Gross, 1986).

To the extent that international sourcing of parts and components by "Northern" firms takes the form of non-equity, subcontracting arrangements with "Southern" counterparts, this trade is classified as intra-industry and arm's-length trade (Type B). Some argue that non-equity forms of corporate networking are of importance for the recent development of Pacific Asian economies based on outward-oriented industrialisation (Oman, 1989).

Japanese and other countries' trading firms in East Asia are believed to be heavily involved in intra-firm trade of an inter-industry character (Type C). Japanese trading firms are both intermediary and organiser of global chains of production and marketing operations handling various primary commodities and manufactured goods. In the latter case, they usually involve small- and medium-scale manufacturers in various industries at home and abroad.

II. DATA SOURCES ON INTRA-FIRM TRADE

Data sources on intra-firm trade are available only through firm surveys, involving the preparation of questionnaires by national authorities. The U.S. Department of Commerce publishes data concerning "related-party',' trade between U.S. affiliates and their foreign parents, and between foreign affiliates and their U.S. parents. Data on trade of foreign affiliates with Japanese parents are also available from Japan's Ministry of International Trade and Industry (MITI).[6] A few other OECD countries have also reported collecting data on intra-firm trade, but these data appear to be either partial (Canada, Sweden) or limited to service transactions such as royalties and similar payments (United Kingdom). Some limited information is also available from private sources.[7] Given the limitations of other sources, the present study is based only on data from the U.S. Department of Commerce and MITI.

The Department of Commerce has published three recent benchmark surveys (1977, 1982 and 1989) with data for foreign affiliates of U.S. companies, and two recent benchmark surveys (1980, 1987) with data for U.S. affiliates of foreign companies. These data can be disaggregated into approximately 30 manufacturing categories. The nationality of parent and affiliate companies is also available. Besides the benchmark surveys, annual surveys are also available, although they are more limited in coverage – for instance, only majority-owned foreign affiliates are covered. In those studies, the Department of Commerce provides the "universe" estimates on an annual basis.

MITI has published data from four benchmark surveys (for fiscal years 1980, 1983, 1986 and 1989) of foreign affiliates of Japanese companies. The survey data published by MITI are less detailed than those published by the Department of Commerce, but useful comparisons can be made between the two sources. Data are available for affiliates, without distinction between majority and non-majority owned. However, MITI does not provide the "universe figures" estimated on the basis of its survey data, which makes it difficult to compare data on intra-firm trade in different years.[8] In the following section, data from the latest benchmark survey – fiscal year 1989 – are used.

Most studies of intra-firm trade use the data from the sources described above. A few attempts have been made at improving the "quality" of the data provided by the Department of Commerce, but the results are not considerably different and do not show a significant change in the magnitude of intra-firm trade flows.[9]

Given all the complex arrangements through which firms co-operate, any empirical analysis needs to define what constitutes "a firm." An ideal definition would involve an estimate of the level of control and ownership, but this would be practical only on a case-by-case basis. The 10 per cent ownership cut-off point used in both the Japanese and the U.S. sources defining an affiliate – and thus a firm – presents no significant problems.[10] The OECD benchmark definition of foreign direct investment recommends the same hurdle in determining whether a direct investment relationship exists. Most double-taxation agreements also use this cut-off point to determine differential withholding tax rates.

The interpretation of the data collected poses more serious problems. To the extent that transfer pricing occurs, the data on trade flows may reflect the under-invoicing or over-invoicing of intra-firm transactions. Also, the problem of classification of data between sectors can considerably change the results. For instance, in the data published by the U.S. Department of Commerce, all investment by an enterprise is classified by the principal activity of that enterprise even if it operates in different sectors. This presents obvious problems with highly-diversified conglomerates, but it is also significant in more numerous cases where a manufacturing firm invests in distribution activities. Lastly, there are serious limitations in the data due to confidentiality problems, as firm-specific data are not disclosed.[11]

III. EVIDENCE FROM THE UNITED STATES AND JAPAN

The tables below give an overview of the relative importance of intra-firm trade for the United States and Japan. Several points are worth highlighting. First, a high proportion – more than one third – of U.S. merchandise trade is intra-firm (Table 1).

Second, the overall share of intra-firm trade in total U.S. trade has not significantly increased between 1977 and 1989.[12] An exception is U.S. affiliates' imports from their foreign parents, which rose steadily from 19 per cent of total U.S. merchandise imports in 1977 to 26 per cent in 1989. Most of this increase was accounted for by firms from Japan and "others" – mostly South Korea. The share of Canadian and European firms both decreased between 1977 and 1989 (Table 2).

Third, U.S. intra-firm trade, both exports and imports, is mostly concentrated in industries which are intensive in technology and human capital such as machinery, electric/electronic equipment and transportation equipment industries (Table 3). On the other hand, fuels and minerals represent a large but decreasing share of U.S. imports shipped by foreign affiliates to their US. parents.[13]

It is worth stressing that, in contrast to the rest of U.S. intra-firm trade, most imports by U.S. affiliates from their foreign parents are related to distribution, especially in the motor vehicle and equipment industries. Distribution accounted for nearly 80 per cent of

Table 1. **U.S. intra-firm trade'**

1977-89

Year	Intra-firm exports								Intra-firm imports							
	Exports shipped to U.S. parents by foreign affiliates (billion dollars)		Exports shipped by U.S. affiliates to foreign parent (billion dollars)	Total of (A) + (C)	As a percentage of total U.S. merchandise exports (per cent)				Imports shipped to U.S. parents by foreign affiliates (billion dollars)		Imports shipped to U.S. affiliates by foreign parent (billion dollars)	Total of (E) + (G)	As a percentage of total U.S. merchandise imports (per cent)			
	Total (A)	MOFAs[2] only (B)	(C)	(D)	(A)	(B)	(C)	(D)	Total (E)	MOFAs[2] only (F)	(G)	(H)	(E)	(F)	(G)	(H)
1977	32.4	29.3	11.7	44.1	26.3	23.8	9.5	35.8	32.6	30.9	30.9	63.5	20.3	19.3	19.2	39.6
1978	–	–	16.6	–	–	–	11.4	–	–	–	39.5	–	–	–	21.2	–
1979	–	–	22.1	–	–	–	11.8	–	–	–	45.3	–	–	–	20.4	–
1980	–	–	21.0	–	–	–	9.3	–	–	–	47.0	–	–	–	18.3	–
1981	–	–	26.9	–	–	–	11.3	–	–	–	52.2	–	–	–	19.1	–
1982	46.6	44.3	25.0	71.6	21.5	20.5	11.6	33.1	41.6	38.5	51.9	93.5	16.3	15.1	20.4	36.7
1983	..	45.1	22.6	–	–	21.9	11.0	–	–	41.6	54.8	–	–	15.4	20.3	–
1984	..	52.7	27.1	–	–	23.5	12.1	–	–	49.3	70.5	–	–	14.2	20.3	–
1985	..	57.6	25.9	–	–	26.3	11.8	–	–	51.8	81.7	–	–	14.7	23.2	–
1986	..	58.9	21.9	–	–	25.9	9.6	–	–	50.0	93.4	–	–	13.1	24.4	–
1987	–	65.2	19.1	–	–	25.7	7.5	–	–	55.9	108.2	–	–	13.2	25.5	–
1988	.	78.2	26.4	–	–	24.3	8.2	–	–	62.5	118.4	–	–	14.2	25.8	–
1989	89.2	85.6	32.8	121.9	24.5	23.5	9.0	33.5	76.0	72.4	128.0	204.0	15.4	14.7	26.0	41.4

1. The above data refers to non-bank US. parents and affiliates.
2. **MOFAs** stand for majority-owned foreign affiliates.

Sources: U.S. Department of Commerce, U.S. Direct *Investment* Abroad *1977; 1982* Benchmark Survey Data; Revised *Estimates, 1983-88;* and *1989* Benchmark Survey, Preliminary Results; Survey of Current Business, September *1986,* June *1987,* June *1988.* June *1989,* June *1990* and October *1991.*
IMF, *International* Financial Statistics Yearbook *1991.*
U.S. Department of Commerce, Foreign Direct *Investment* in the United States, Operations of *U.S.* Affiliates, *1977-80;* Revised *Estimates, 1981-86* and *1988; 1987* Benchmark Survey, *Final* Results; Preliminary *1989* Estimates; and Survey of Current Business. November *1983,* December *1984,* November *1985.* October *1986,* May *1987,* May *1988,* July 1990 and July *1991.*

Table 2. U.S. affiliates' imports from foreign parents by country of parent
As a percentage of total intra-firm imports by U.S. affiliates

	Canada	Europe	Japan	All others	Total
1977	10.7	41.6	44.6	3.1	100.0
1982	8.1	30.4	51.9	9.6	100.0
1989	5.7	30.9	53.5	10.0	100.0

Source: See Table 1

total U.S. affiliates' purchases from their foreign parents, with wholesale trade in motor vehicles and equipment accounting for almost 40 per cent of total. By contrast, all manufacturing activities together were responsible for only 16 per cent of total intra-firm sales from foreign parents to U.S. affiliates. This clearly attests to the importance of direct investment in foreign distribution activities as a means of promoting exports. For example, Yamawaki (1991) argues that the success of Japanese manufacturing firms in exporting to the U.S. is strongly associated with their commitments of resources to local distributional activities.

In fact, the data on all U.S. imports shipped to U.S. affiliates – not only by their foreign parents, but also by unaffiliated foreign companies – confirm the relative importance of wholesale trade for Japanese companies. Almost 95 per cent of imports by U.S. affiliates of Japanese parents were classified as wholesale trade in 1989. This contrasts with 48 per cent for affiliates of European parents, 31 per cent for affiliates of Canadian parents and 17 per cent for affiliates of "other countries"' parents.

As noted above, care needs to be exercised in interpreting these results. As each intra-firm transaction is classified under the principal sector of economic activity in which the firm is engaged, the activity of trading firms or of U.S. affiliates engaged mainly in distributional activities may have significantly influenced the aggregate figures.

Lastly, intra-firm trade between the United States and other OECD countries is mostly composed of parents' sales to affiliates rather than the other way around (Table 4). On the other hand, U.S. firms established in non-OECD countries tend to buy more from their affiliates than the latter sell to them. Exceptions to this rule are U.S. firms established in Canada, which buy as much as they sell to their affiliates.

Turning to the Japanese case, it should be stressed that the data from the MITI survey are more difficult to interpret, as its coverage is relatively limited. It is, for example, impossible to determine the share of intra-firm trade in total Japanese trade, given the official published data. What can be determined is the share of intra-firm trade in total foreign trade involving the companies covered by the survey.

Table 5 shows that wholesale trade represents a large percentage of Japanese firms' intra-firm trade, especially on the import side. This reflects the significance of corporate networks established by Japanese trading firms in foreign trade activities. This predominance of wholesale activities could also be explained by the fact that Japanese foreign direct investment is relatively recent. It has been argued that a higher

Table 3. **Trade between U.S. parents and their majority-owned foreign affiliates (MOFAs) in selected years**

As a percentage of total U.S. merchandise trade

Country of affiliate	Year	Total products	Food Beverages Tobacco	Crude materials	Fuels	Chemicals	Machinery (ex trans equip.)	Road Vehicles	Metal Manuf.	Other Manuf.
				A. Exports shipped by U.S. parents *to* MOFAs *of which:*						
All countries	1977	100.0	5.3	3.1	1.5	11.6	31.1	29.5	3.0	14.0
	1982	100.0	4.5	3.0	2.2	11.7	41.0	24.3	2.9	9.3
	1989	100.0	3.0	1.1	1.7	13.0	40.2	27.1	1.9	11.0
Canada	1977	42.9	1.0	0.5	0.3	2.2	9.1	24.7	0.9	3.9
	1982	34.9	0.7	0.3	n.a.	2.0	8.3	20.0	0.6	n.a.
	1989	37.4	n.a.	0.1	n.a.	2.6	7.6	22.4	0.6	3.0
Mexico	1977	2.5	0.0	0.0	0.0	0.2	0.8	1.1	0.1	0.3
	1982	4.7	0.0	0.0	n.a.	0.2	2.2	1.7	n.a.	0.4
	1989	7.0	0.0	0.0	n.a.	0.2	2.7	3.4	0.0	0.6
Europe	1977	32.3	3.5	2.3	0.3	5.2	12.1	1.0	1.2	6.4
	1982	34.2	2.9	2.2	0.7	5.2	16.4	n.a.	1.3	4.5
	1989	31.5	1.4	0.4	0.6	5.5	16.8	0.9	0.9	4.4
Japan	1977	2.4	0.0	0.1	n.a.	0.8	1.0	n.a.	0.0	0.2
	1982	3.3	0.0	0.0	0.0	0.9	1.9	n.a.	0.1	n.a.
	1989	7.1	n.a.	n.a.	n.a.	1.1	3.7	0.0	0.1	1.3
Other areas	1977	19.9	0.7	0.3	n.a.	3.2	8.0	n.a.	0.8	3.3
	1982	22.8	0.8	0.4	n.a.	3.4	12.3	n.a.	n.a.	n.a.
	1989	17.0	n.a.	n.a.	n.a.	3.6	9.5	0.4	0.2	1.8
				B. imports shipped to U.S. parents by MOFAs *of which:*						
All countries	1977	100.0	2.3	3.8	44.0	2.2	15.1	24.2	2.3	n.a.
	1982	100.0	3.1	3.8	32.3	3.5	22.1	27.4	2.7	4.4
	1989	100.0	2.1	1.6	11.2	4.6	32.3	36.2	1.6	8.9
Canada	1977	35.5	0.6	2.1	2.9	0.6	4.3	22.2	0.7	n.a.
	1982	43.0	0.2	1.6	n.a.	n.a.	4.3	25.6	0.6	1.8
	1989	44.9	0.3	0.6	n.a.	1.5	3.8	29.8	0.9	2.4
Mexico	1977	1.3	n.a.	0.0	0.0	n.a.	0.8	n.a.	0.0	n.a.
	1982	4.0	0.0	0.0	n.a.	0.1	n.a.	n.a.	n.a.	0.3
	1989	8.9	n.a.	0.0	0.0	0.1	3.6	4.3	n.a.	0.7
Europe	1977	10.8	0.5	n.a.	3.0	0.8	3.0	n.a.	0.7	n.a.
	1982	10.2	n.a.	0.2	n.a.	1.6	3.3	0.4	1.0	1.1
	1989	18.0	0.5	0.3	n.a.	2.0	8.5	1.7	0.5	2.2
Japan	1977	1.1	0.0	n.a.	n.a.	0.0	n.a.	0.0	n.a.	n.a.
	1982	2.0	n.a.	0.0	0.0	0.0	n.a.	0.0	n.a.	0.2
	1989	2.7	0.0	0.0	0.0	0.1	2.3	0.0	0.0	0.3
Other areas	1977	51.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	1982	40.8	n.a.	2.0	n.a.	n.a.	n.a.	n.a.	n.a.	1.1
	1989	25.6	n.a.	0.7	n.a.	0.9	14.1	0.4	n.a.	3.2

n.a.= The data in the cell are suppressed to avoid disclosure of data of individual firms.
Note: See Table 1 for notes and sources.

Table 4. Trade between parents and affiliates by country of parent and country of affiliate

Data are in US$ billion and refer to 1989

	Sales from parents to affiliates (A)	Sales from affiliates to parents (B)	Sales ratio (A)/(B)
U.S. firms in Japan	6.0	2.0	3.1
Japanese firms in the United States	68.4	17.9	3.8
U.S. firms in Europe	27.0	13.0	2.1
European firms in the United States	39.5	10.0	3.9
U.S. firms in Canada	32.1	32.5	1.0
Canadian firms in the United States	7.2	1.4	**5.1**
U.S. firms in other countries	20.4	24.9	0.8
Other nations' firms in the United States	12.8	3.5	3.6

Source: See Table 1.

import propensity is to be expected in the early stages of foreign direct investment (Broadman, 1991). As of fiscal year 1991, the average ratio of foreign sales relative to domestic sales for Japanese manufacturing industry was estimated at about 7 per cent, which was far lower than the corresponding U.S. figure for 1989 (24 per cent).[14]

As for manufacturing, Japanese intra-firm trade is largely concentrated in certain industries, notably transportation equipment and electrical machinery. This type of intra-firm trade involves exports of parts and components from Japanese parent firms to their foreign affiliates for assembly production within a vertically integrated international production structure. On the import side, Japanese manufacturing intra-firm trade is concentrated on petroleum and coal products. The fact that intra-firm imports into Japan of transportation equipment and electrical machinery are of minor significance suggests that final products assembled by foreign affiliates in these industries are either sold in local markets or shipped to unrelated buyers in third-country markets.

It can also be seen from Table 5 that Japan's intra-firm import ratios tend to be lower than its export ratios, especially for manufacturing. The only manufacturing industries for which import ratios are larger than export ratios are resource or labour-intensive industries such as petroleum and coal products, textiles, and wood and paper products.

Table 5. Japanese intra-firm trade

Fiscal year 1989

Industry of parents	(A) Exports shipped by Japanese parents to foreign affiliates		(B) Intra-firm export ratio (per cent)	(C) Imports shipped to Japanese parents by foreign affiliates		(D) Intra-firm import ratio[1] (per cent)
	(Billion Yen)	(Percentage share)		(Billion Yen)	(Percentage share)	
All industries	15 533	100.0	32.7	11 128	100.0	28.7
All manufacturing	9 912	63.8	41.1	3 037	27.3	30.9
of which:						
Food and beverages	12	0.1	19.0	77	0.7	14.7
Textiles	4	0.0	3.3	24	0.2	15.1
Wood and paper prod.	5	0.0	4.8	75	0.7	22.9
Chemicals	220	1.4	21.9	46	0.4	9.8
Iron and steel	22	0.1	1.4	5	0.0	0.5
Non-ferrous metals	57	0.4	19.3	35	0.3	5.7
Machinery						
General machinery	597	3.8	43.8	31	0.3	33.7
Electrical machinery	4 008	25.8	50.9	779	7.0	35.8
Transport equipment	3 639	23.4	41.1	610	5.5	36.0
Precision instruments	544	3.5	52.8	37	0.3	38.1
Petroleum/coal prod.	45	0.3	36.3	1 223	11.0	51.8
Other manufactures	759	4.9	43.8	94	0.8	25.1
Wholesale and retail trade	5 596	36.0	24.4	8 061	72.4	28.3

1. Intra-firm trade ratio (exports and imports) is defined as the value of trade between Japanese parents and their foreign affiliates as a percentage of total trade of Japanese parents.

Source: MITI (1991), Dai 4 Kai Kaigai Jigyo Katsudo Kihon Chosa (The Fourth Benchmark Survey of Foreign Business Activities, Fiscal Year 1989).

IV. CONCLUDING REMARKS

There is evidence that intra-firm trade represents an important part of overall trade for both the United States and Japan in the case of machinery and transport equipment industries. On the other hand, the hypothesis that the trend towards globalisation in the 1980s, characterised by a foreign direct investment boom, would increase significantly the relative importance of intra-firm trade in a country's foreign trade, does not seem to be borne out by the U.S. experience.

The share of U.S. intra-firm trade in total trade was roughly stable at around 35 to 40 per cent in the latter half of the 1980s. One explanation for this stability would be that U.S. parent firms might have preferred to rely more intensively on contractual arrangements with unrelated parties with respect to the use of firm-specific assets. Casual observation suggests that there has been an increasing use of OEM (original equipment manufacturing) operations in the case of various consumer electronic products as well as of other contractual arrangements between unrelated parties, including franchising operations in the case of consumer goods and services with a strong brand identity. Another possible explanation would be that U.S. MNEs started the globalisation of their operations earlier – in the 1960s and 1970s – and that U.S. outward direct investment in the 1980s might have been somehow different in nature compared with the previous two decades. But this is just speculation and further data and analysis are needed to explain trends in intra-firm trade.

The example of Japanese companies in the United States and elsewhere attests to the importance of investment in wholesale or distributional activities in the promotion of exports. This result seems to validate the recent attention paid to the removal of structural barriers to trade and investment, including the US.-Japan Structural Impediments Initiative. There may also be a link between increasing investment in wholesale activities and the growing tendency of "customising" final products, as the former allows the gathering of information on final consumers' tastes and needs.

Intra-firm trade raises a number of implications for trade policy. Important questions remain unanswered, however, given the limitations of the data. For instance, it is not yet possible to tell whether or how the effectiveness of certain trade policy tools – such as tariffs, safeguards, anti-dumping and countervailing duties – are increased or hampered by the existence of intra-firm trade.

NOTES

1. The annual average of U.S. direct investment flows abroad increased from US$9.6 billion in 1980-84 to US$22.8 billion in 1985-89. Similarly, the annual average of direct investment in the United States jumped from US$18.6 billion to US$48.2 billion during the same period (BIS 1992, p. 93). See also Julius (1990).
2. See UNIDO (1981) for a concise survey of earlier studies on intra-firm trade.
3. In the case of other OECD countries, there are virtually no data available with respect to intra-firm trade.
4. There is an aggregation problem with respect to the calculation of intra-industry trade indices. The interpretation of such indices depends on the definition of product categories, as the Choice of the classification system (product based or process based) and the level of aggregation of the data may strongly influence the results.
5. However, intra-industry trade is of less importance for Australia, Japan and New Zealand, where its share of total trade in manufactures ranges between 30 and 40 per cent (Fukasaku, 1992).
6. In addition, MITI conducts annual surveys of majority-owned Japanese firms with foreign parents. However, the relative importance of such firms in Japan's foreign trade is still very small and therefore such firms were excluded from the present study. In fiscal year 1989, intra-firm trade of majority-owned Japanese firms with foreign parents accounted for roughly 4 per cent of total Japanese merchandise trade (exports and imports).
7. A survey of intra-firm trade across the Canada-U.S. border has been conducted by the International Business Centre of the Canadian Conference Board. The results of this survey are examined in a paper by Krajewski (1992). It covers bilateral US.-Canada intra-firm trade for the period between 1985 and 1990.
8. The response ratio for the benchmark survey in fiscal year 1989 was 47 per cent, compared with 33 per cent in 1986. For 1989, MITI estimated that the firms responding to the survey accounted for 24 per cent of total domestic sales.
9. See for example, Hipple (1990) regarding the U.S. data on intra-firm trade
10. In Japan and the United States, a company is defined as an affiliate if the "parent" company owns 10 per cent or more of its voting stock. If the parent company owns more than 50 per cent of the voting stock, the affiliate company is considered a subsidiary of the parent company and is called a majority-owned foreign affiliate (MOFA).
11. There may exist some duplication between the two data sets on US. intra-firm trade (one on trade between U.S. parents and their foreign affiliates and the other on trade between U.S. affiliates and their foreign parents). This duplication is probably very small, however, as it would only exist when trade occurred between U.S. and foreign companies that had mutual ownership of 10 per cent or more in each other.
12. The share of intra-firm exports between the U.S. parents and their foreign affiliates relative to total U.S. merchandise trade seems to have decreased between 1977 and 1982, followed by a temporary recovery in 1982-85 and subsequent decline afterwards. This U-shaped phe-

nomenon observed in the 1980s might have been related to exchange-rate fluctuations over the period; intra-firm trade may be less responsive to exchange-rate movements than arm's length trade. For a discussion of the relative responsiveness of intra-firm trade to exchange-rate fluctuations, see Goldsbrough (1981), Julius (1990), Broadman (1991) and Encarnation (1992).

13. The exclusion of oil and minerals from the data does not significantly alter the results described above. Excluding oil and minerals, U.S. firms' purchases from their foreign affiliates decreased from 14.9 per cent of total U.S. merchandise imports in 1977 to 13.4 per cent in 1982, but then recovered to 14.9 per cent in 1989.
14. See MITI (1992, p. 17).

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