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Intrafirm trade with ASEAN countries by Japanese and US multinational corporations

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Intrafirm Trade with ASEAN Countries
by Japanese and US Multinational Corporations*

by

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Intrafirm Trade with ASEAN Countries by Japanese and US Multinational Corporations*

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1. Introduction

During the last decade, the role of multinational corporations in international trade has received a steadily increasing attention. In a wide sense, multinational corporations are reported to manage an increasing share of international trade thereby bridging the gap between production for local and foreign markets and intensifying the international division of labour. In a narrow sense, trade between parent companies and their overseas affiliates (so called intrafirm trade) has provoked attention because this trade may challenge - by its very nature - conventional understanding of determinants of international trade and the impact of trade policies. The evidence on intrafirm trade is scant at best, however, and is almost exclusively related to the US. Therefore this paper tries to update and improve the empirical basis on intrafirm trade by giving answers to the following questions:

- Which role does intrafirm trade play in international trade of home-countries other than the US?
- Is intrafirm trade of major home countries region-specific and/or industry-specific and if so what are the specific characteristics of regions and industries where intrafirm trade is relatively important?
- How has intrafirm trade developed over time?
- Does the structural pattern of intrafirm trade conform to that of the underlying activity, that is foreign direct investment?

The four questions are primarily tackled in a comparative analysis of US and Japanese multinationals' intrafirm trade. Apart from this comparison, some sporadic information on UK intrafirm

trade as well as data from the Dunning/Pearce report on the world's largest industrial enterprises are taken into consideration. Chapter 2 briefly reviews the discussion about theoretical issues in intrafirm trade. After having updated previous results on world intrafirm trade (chapter 3), and with developing countries in particular (chapter 4), the analysis is narrowed on trade with the fast-growing countries of the Association of Southeast Asian Nations (ASEAN). The fifth chapter deals with the export side of US and Japanese trade with ASEAN countries, whereas the next chapter in turn addresses the intrafirm imports of these two home countries from the region under consideration. Major results are summarized in chapter 7.

2. The State of the Art

Several arguments have been advanced claiming that intrafirm trade has a "distinct nature" and thus reacts differently to changes in the factors determining size, direction and product composition of international trade. First, it is argued that intrafirm trade faces lower price elasticities than conventional, unaffiliated trade because firms would smoothen fluctuations of external market prices by transforming them into internal accounting in transfer prices similar to the conduct of centrally planned economies (Helleiner, 1979a: 391). Such price setting would have important consequences for the flexibility of a country's trade with respect to changes in economic activity and relative competitiveness (Goldsbrough, 1981: 579). Furthermore it has been argued that the extra-firm part of international trade is rendered riskier, because of the reduced basis left to the residual market which in turn implies a higher volatility and uncertainty (Helleiner, 1979b: 78). Second, intrafirm trade is

expected to improve the capabilities of firms to control markets against penetration by outsiders (Helleiner, 1981: 5). Third, intrafirm trade is hypothesized to challenge traditional approaches to explain both direction and structure of international trade. According to this line of argument, trade structures would be subjected to firm-specific targets rather than to the comparative advantages of the trading countries (Helleiner, 1979c: 160). Fourth, protectionist trade policies of home countries are assumed to be challenged by multinational enterprises if intrafirm imports of parent companies from their subsidiaries become indispensable for the competitiveness of local production. Trade barriers such as customs duties, administrative requirements, and other regulatory mechanisms hamper the multinational corporation in exploiting the gains from internalized transactions (Helleiner, 1981: 78; Stein, 1984b: 94).

Though such hypotheses signal far-reaching implications of intrafirm trade for both trade theory and trade policies, the empirical evidence of intrafirm trade has remained scanty (e.g. Lall, 1978; Stein, 1984b: 65-70). Such discrepancy between hypotheses and evidence can be explained by various factors. First, and most importantly, the statistical basis on the amount of intrafirm trade is weak and biased in the sense that it does not form a representative cross section of the operations of all multinational firms, irrespective of their home countries. The pioneering work of Helleiner (1973; 1979a; 1979b; 1979c; 1981) on intrafirm trade is exclusively confined to intrafirm imports of US multinationals during the period 1970-1977. Therefore, these studies cannot claim to be representative for total world trade as US companies effect only part of it. Most of the other research on

intrafirm trade followed this line of analysis (e.g. Lall, 1978; Casson, 1986). Some previous work relied on total imports of home countries from overseas affiliates[1] without presenting evidence on the actual intrafirm proportion of that trade (Hill and Johns, 1985: 375-377). Second, "market" prices in unaffiliated trade are usually hard to come by. Even less so are "accounting" prices in affiliated trade. Actual or assumed differences between both prices can therefore not be analyzed empirically[2]. Third, little information exists on the ways and success of multinational enterprises influencing trade policies of their home countries (Stein, 1984b: 94). While the two latter aspects are still difficult to handle, more evidence exists on the first aspect, the role of intrafirm trade in international trade.

3. Empirical Evidence

a. Evidence in Other Studies

The importance of intrafirm trade in world trade has been assessed previously in other research based exclusively on US trade which has yielded the following results:

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[1] This trade includes also shipments of overseas affiliates to independent buyers in the home country. In another concept, party-related trade, all trade is included, in which the exporter is linked by ownership of at least 5 per cent of the voting stock to the importer.

[2] Unit values usually have only limited value as approximations to market prices (Kravis and Lipsey, 1971:4). Correspondingsly, the same limitations apply to unit values of party-related trade as approximations to transfer prices (Helleiner, 1979c: 176). This drawback applies also to the econometric estimation of price elasticities in affiliated trade by Goldsbrough (1981: 596) who found a downward bias in the price responsiveness of trade with affiliates (p. 587).

- The share of US intrafirm exports of manufactured goods to total US manufactured exports has been growing from 19 percent (1966) to about 22 per cent (1970); (Lall, 1973: 183; Goldsbrough, 1981: 575)[1].
- The share of imports from foreign affiliates of US-based parents in total US total imports appears to be growing and amounted to about 30 per cent in 1976 (Chung, 1978: 32)[2].
- The intrafirm share in US total imports is higher for imports originating from developing countries than for imports from industrialized countries (Helleiner, 1979a: 396)[3].
- Intrafirm manufactured imports by US parents from overseas affiliates increased as a percentage of total US manufacturing imports to roughly 16 per cent in 1970 from 13 per cent four years earlier (Goldsbrough, 1981: 575).
- In contrast to total imports, the share of manufactured imports from foreign affiliates in US imports of manufactured goods from developing countries is lower than the corresponding share for imports from developed countries. Moreover, the intrafirm share is rising for the latter category, whereas it is declining for manufactured imports from developing countries (Hill and Johns, 1985: 376).

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[1] Growing importance of intrafirm exports has also been observed for UK based and Swedish multinationals (Goldsbrough, 1981: 574; Swedenborg, 1979: 271). Taking all OECD countries together, the intrafirm share in total exports has been estimated at 20 per cent (Stein, 1984b: 66).

[2] US imports qualifying for the value-added tariff provision (items 806.30 and 807.00 of the tariff) encouraging outward processing of inputs originating in the US do not necessarily constitute intrafirm trade. Helleiner reports for this trade flow an extremely rapid growth in the 1970's (Helleiner, 1979b: 77).

[3] Helleiner and Lavergne found the share of US party-related imports higher for imports from OECD-countries than from the Third World (1979: 298).

Before the detailed results can be discussed and compared to the evidence contained in other sources (see Appendix), it is useful to put the share of US intrafirm trade in total trade into perspective with the corresponding intrafirm trade shares of other home countries.

b. The Quantitative Importance of Intrafirm Exports

During the last decade exports of parent companies to their overseas affiliates continued to play an important role in total exports of several home countries. This overall result emerges from two important observations:

- Between 1974 and 1982, the share of parent company exports (intrafirm exports) amounted to approximately one quarter of total home country exports for the US[1], Japan and the UK (Table 1).
- Shares for the US and the UK seem to have followed a slightly declining trend, whereas affiliated exports of Japanese parent companies seem to have increased in relation to total Japanese exports. In general, the overall share of one quarter has remained fairly stable.

In interpreting such results it has to be considered that they are heavily influenced by trade in mineral oil products and other raw materials. It is this commodity-based trade which is reported to be dominated by affiliated rather than unaffiliated trade (Helleiner and Lavergne, 1979: 298). As a result, the share of affiliated trade may be different in the manufacturing sector

[1] The above US data refer to a wider base of affiliated and parent companies, then has been previously reported in the literature, or they include the trade of US multinational enterprises with all affiliates, not just trade with majority-owned affiliates (MOFA's) (Goldsbrough, 1981; Casson, 1986).

Table 1 - Exports of Parent Companies to Foreign Affiliates as a Proportion of Total Home Country Exports and Industry Composition of Intrafirm Manufactured Exports, in per cent

	United States			Japan			United Kingdom[1]			West Germany[2]		
	1977	1982		1974	1981		1976	1981		1977	1982	
	a	a	b	a	a	b	a	a	b	a	a	b
All industries	27.5	22.6		24.1	27.1		24.5	23.0		n.a.	n.a.	
All manufacturing industries	26.2	20.7	100	6.1	12.5	100	26.8	25.6	100	21.4	18.9	100
Food	13.2	16.0	3.6	7.8	12.3	0.9	21.9	25.6	7.3	n.a.		
Chemicals	27.1	18.2	11.9	2.3	6.9	2.6	27.9	31.7	21.5	29.1	33.5	23.4
Metals	15.0	10.0	2.7	4.0	2.8	3.5	)	)		15.8	18.1	11.2
Machinery	14.0	10.9	16.0	1.1	6.1	8.8	)20.4	)21.4	38.4	7.5	6.5	7.5
Electrical machinery	21.7	28.8	14.2	9.8	13.7	20.4	)	)		59.9	21.8	9.2
Transport equipment	52.7	41.5	37.6	9.6	20.2	46.5	49.8	38.2	17.5	35.4	42.8	48.7
Textiles	7.4[3]	10.3[3]	1.3	7.5	2.0	0.7	)	)		)	)	
Precision instruments	31.9[3]	21.9[3]	6.1	)	19.9	8.3	)14.7	)21.1	15.3	)n.a.	)n.a.	
Other manufacturing	20.8	16.0	6.6	)2.7	15.3	8.5	)	)		)	)	

a: Intrafirm exports as a proportion of total exports.

b: Industry compostion of intrafirm manufactured exports.

[1]Excluding oil companies.

[2]Calculated from a reduced sample. The actual shares thus might be higher.

[3]Including majority owned affiliates only.

Sources: OECD, Trade by Commodities, various issues; US Direct Investment Abroad, various issues; MITI, various issues; UK Department of Industry, Trade and Industry, various issues; Dunning & Pearce, various issues. - Own calculations.

which because of its dynamics as well as of its growing importance for developing countries' industrial development strategies deserves special attention[1].

At first glance, estimates of US and British manufactured intrafirm exports do not suggest differences compared to the respective intrafirm share in total exports and its trend. Both the share and the trend in manufactured exports are in the same range as in total exports[2]. Japan, however, visibly deviates from this congruence. The affiliated part of its manufactured exports is by far smaller than that of the UK and the US, albeit considerably rising from 5.5 per cent to 12.5 per cent within seven years[3].

c. Sectoral Patterns of Intrafirm Exports

Yet, the most remarkable element in shares of intrafirm trade in

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1 As intrafirm trade is reported according to the industry classification of the affiliate, but not by product categories, it had to be assumed that trade with manufacturing affiliates consisted wholly of manufactured goods. The same assumption had been extended also to single manufacturing industries.

2 The fact that the importance of intrafirm exports of the UK seems to be larger in manufactures than in total trade can largely be explained by the omission of oil trade in total trade. The petroleum industry is generally considered to rely strongly on intrafirm trade, as it is dominated by very large multinational corporations (Helleiner and Lavergne, 1979: 300). The intrafirm share in total exports of petroleum companies has been estimated at 58.8 per cent (US) and 30.0 per cent (UK) in 1977; both shares were above average (Dunning and Pearce, 1981: 132).

3 The low initial share of intrafirm exports in total Japanese exports, and its subsequent growth, was possibly due to the fact that increasingly small- and medium-sized manufacturing companies set up overseas affiliates, backed by the financial and managerial expertise of the sogo shosha (Tsurumi, 1976: 147). The share of small- and medium-sized parent companies (capital of less than 100 Mill. Yen) in the total number of sampled parents rose from 34.1 per cent (1971) to 44.1 per cent in 1976 (MITI, 1977: 34). Moreover, large manufacturers tended to internalize operations which were previously left to the sogo shosha (Tsurumi, 1976: 141-147).

manufactured exports common to all three home countries is the wide divergency in intrafirm shares between different manufacturing industries. To mention the extremes, US exports of transport equipment had an intrafirm share of more than fifty per cent in 1977 and still more than forty per cent five years later, compared to industries like metals, machinery and textiles whose affiliated part in US exports did not exceed approximately ten per cent in 1982. Similar differences between industries exist for Japan, albeit at a lower level than in the US. As far as the data base allows for a disaggregated analysis, similar differences emerge for the UK and for West Germany[1].

In all home countries intrafirm exports are most important in the automotive industry. This is essential for it indicates that this industry has some characteristics regardless of its home country origin which are conducive to affiliated trade and which other industries are obviously lacking. It also seems that dynamic stages of development in the automotive industry give rise to shifts from unaffiliated trade to affiliated trade. Such dynamics and rising intrafirm trade shares can be observed in the case of the Japanese and the West German automotive industry contrasting to the US and the UK, where this industry underwent serious adjustment processes[2].

How central the role of the transport equipment sector in world-

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1 The 1982 sample had a somewhat smaller size than the 1977 sample, so that the actual intrafirm shares in West German exports might be higher in 1982 than indicated in the table.

2 The share of the US and the UK motor vehicle industry in total OECD automotive exports declined between 1976 and 1982 from 16.9 to 11.3 per cent (US) and from 6.1 to 4.5 per cent (UK). Conversely, the respective shares of the Japanese automotive industry rose from 17.1 to 25.3 per cent, and from 21.2 to 23.5 per cent in the case of West Germany.

wide intrafirm trade is, can be shown by the weight of this sector in total US, Japanese and West German intrafirm manufactured exports (Table 1). In 1982, this sector comprised almost half of Japanese and of West German intrafirm manufactured exports and more than one third of the corresponding US exports.

All these assessments are based on the relation of intrafirm exports to total home country exports. Of course, this ratio is influenced not only by the growth rate of intrafirm exports but also by the growth of exports effected by local firms and not by multinationals. Narrowing the denominator to total parent company exports thus allows to analyse whether affiliated exports are important for those exporters who can choose between exporting to related parties or not. The results from estimates for so-called internal export ratios derived from different sources for the US and Japan support the previous findings. Intrafirm exports seem to have declined relative to unaffiliated exports in the US, the UK and West Germany and increased in Japan, however in the latter case without exceeding a threshold level of 15-17 per cent of total parent company exports (Appendix Table 1).

At the same time also the contribution of US multinationals to total US exports has declined (Appendix Table 2). On balance, both trends - less intrafirm trade in US multinationals' home country exports in the early eighties than ten years ago and a declining contribution of US multinationals to total US exports - have led to a reduction of intrafirm exports in total US exports. Thus, in 1982 US multinationals directed their exports more to unaffiliated buyers than to affiliated ones, whereas ten years ago this relation was reverse.

d. Intrafirm Imports

Turning to the import side of the home countries[1], six key facts stand out (Table 2):

- The intrafirm shares in total home country imports amounted to 16.4 per cent for the United States (1982) and 20.5 per cent for Japan (1981). Thus, intrafirm trade appears to be more important for Japanese and US exports than for their imports.
- Changes of intrafirm import shares display opposing trends over time: the Japanese economy relied to a growing extent on intrafirm trade in their imports - with one fifth as the upper ceiling -, whereas its relative importance declined in the case of the United States.
- The intrafirm part in total Japanese manufactured imports rose rapidly from 3.8 to 13.2 per cent during 1974-1981 contrary to the US where the share stagnated at the 15-17 per cent level.
- Intrafirm imports from manufacturing subsidiaries accounted for over 60 per cent of total US intrafirm imports, while this proportion amounted to only 18 per cent for Japan. This presumably reflects (as on the export side) the importance of the Japanese trading houses in Japanese import trade acting as a substitute for party-related imports of non-oil primary commodities and bulk manufactures (Eli, 1977: 116; Tsurumi, 1976: 145-146).
- As in home country exports, manufacturing industries differ widely with respect to the intrafirm trade content in their imports. In the US, the automotive industry seems to rely as much on imports from affiliates as it relies on exports to

[1] Data on the import side are only available for Japan and the US.

Table 2 - Imports of Parent Companies from Foreign Affiliates as a Proportion of Total Home Country Imports, in per cent

	United States			Japan		
	1977	1982		1974	1981	
	a	a	b	a	a	b
All industries	22.1	16.4		10.6	20.5	
All manufacturing industries	17.0	15.1	100	4.0	13.2	100
Food	3.4	2.3	1.6	1.8	0.8	1.5
Chemicals	12.6	17.7	6.8	0.3	2.1	2.5
Metals	3.9	2.5	2.0	13.3	21.8	23.3
Machinery	15.1	11.5	9.5	0.3	1.2	0,8
Electrical machinery	30.1	25.7	20.1	8.4	19.8	8.6
Transport equipment	47.2	36.8	51.1[1]	0.8	0.7	0.4
Textiles	0.6[1]	1.5[1]	0.7	3.2	3.3	2.2
Precision instruments	8.8[1]	8.9[1]	1.5[1]	) 3.8	) 52.9	) 60.7
Other manufacturing	5.1	6.0	6.7	)	)	)

a: Intrafirm imports as a proportion of total imports.

b: Industry compostion of intrafirm manufactured imports.

[1] Including majority owned affiliates only.

Source as for Table 1. - Own calculations.

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them. However, as in exports the trend in imports is declining as well. Other sophisticated industries such as the electrical machinery and recently the chemical industries display an over-proportionate intrafirm component in imports, whereas resource-based and more labour-intensive industries clearly focus on unaffiliated imports.

- In the Japanese case only two industries - apart from the catch-all sector, other manufacturing - have sizeable intrafirm components in imports, that is metals and electrical machinery.

To summarize, industry-specific factors seem to determine the structural pattern of the intrafirm trade contents in US and Japanese world exports and imports. Few industries in addition to the petroleum sector are conducive to affiliated trade, while the majority is not. Sophisticated "engineering" industries have higher intrafirm contents than the resource-based and labour-intensive ones. Trends are declining for the US and rising for Japan, albeit starting from very different initial levels: high ones for the US and low ones for Japan.

4. Intrafirm Trade with Developing Countries

Industry-specific determinants of intrafirm trade suggest that this trade has also different relevance for trade among countries at similar income levels and in trade between developing and developed countries, for sophisticated goods are predominantly traded among high-income countries. Thus one could expect intra-firm trade to be more important in North-North trade, where intra-industry specialization dominates, than in North-South trade. This hypothesis has been supported by several authors who argued

with respect to US intrafirm imports that until the mid-seventies intrafirm trade has been a phenomenon of greater importance only for the trade between developed countries (Helleiner, 1979a: 397, and 1979c: 163; Hill and Johns, 1985: 376). The results of previous research raises the following questions:

- Did this fact change since the mid-seventies?
- Can a similar pattern be observed for intrafirm exports as well?
- Does it equally apply in the case of Japan?
- Since intrafirm trade cannot take place without earlier outward direct investment, does the importance of developed countries in intrafirm trade merely reflect the geographical distribution of foreign direct investment?

First, from the evidence presented in Appendix Table 3 it can be inferred that US intrafirm imports continued to be effected more intensively with industrialized countries than with developing countries. This fact is even more pronounced in the trade of manufactured goods.

Second US exports to industrialized countries contain a higher intrafirm element than the exports to developing countries. This holds also for manufacturing exports only.

Third, nothing can be said about the intrafirm contents of Japanese total imports from industrialized or developing countries separately because of insufficient data. Instead, it is the trade with manufactures which provides insight into the regional distribution of Japanese intrafirm trade. Here, clear differences to

the US pattern appear. Both intrafirm manufactured imports and exports are relatively more important in imports and exports from developing than from developed countries. These differences between regional patterns of US and Japanese intrafirm trade may reflect a respective regional pattern of foreign direct investment.

Fourth, US total and manufactured intrafirm exports follow the regional concentration of US direct investment in developed countries. These have a far higher share in intrafirm exports and US foreign direct investment than in the respective non-related exports. The same pattern applies to US manufacturing intrafirm imports. In contrast to this, the majority of Japanese foreign direct investment in manufacturing industries is located in developing countries. Simultaneously, Japanese trade with the Third World is more intensively conducted with Japanese affiliates than this is the case in the trade with industrialized countries[1]. However, this crucial link between the direction of foreign investment and of intrafirm trade cannot be discussed thoroughly at the aggregate level of worldwide intrafirm trade with either developed or developing countries. To assess the relationship between foreign direct investment and intrafirm trade, the case of the ASEAN countries was chosen, since these countries have been developing rapidly and increasingly attracted foreign investors, both from the US and Japan.

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[1] The regional distribution of US and of Japanese foreign direct investment correlates significantly with the regional distribution of intrafirm exports by the respective home countries. The correlation has been very strong for all single manufacturing industries.

5. Intrafirm Exports to ASEAN Countries

a. Intrafirm Exports to the ASEAN Group

While the openness of ASEAN countries to the world economy presents considerable scope for an analysis of intrafirm exports and imports, there exists hardly an empirical assessment of this issue[1]. This seems to be mainly due to data constraints. However, from previously untapped or recently opened data sources, which are documented in detail in the Appendix, a few key facts emerge about the intrafirm trade between ASEAN countries and Japan as well as the US, the two major investing countries[2] (Table 3).

- In 1981/82 the US and the Japanese intrafirm manufactured exports to the total ASEAN region had a similar absolute magnitude (US: 1917 Mill. US$; Japan: 1477 Mill. US$ in 1982 and 1981 respectively). Yet, they made up sharply contrasting shares of the respective total manufactured exports: 24.4 per cent of US against 9.6 per cent of Japanese manufactured exports were intrafirm.
- With respect to past trends, the two home countries have also shown diverging tendencies in their intrafirm export shares. The intrafirm content of Japanese manufactured exports declined

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[1] See von Kirchbach (1985: 65-69). Nakajo (1980) confines his analysis to the investigation of Japanese trade with Asian Newly Industrialized Countries (NICs) and hence included only Singapore as the only ASEAN member. Therefore, Nakajo's result that the intrafirm share in exports to NIC's rose between 1972 and 1975 from 10.5 to 20.2 per cent in general trade, and from 7.9 to 13.5 per cent in manufactures trade, cannot be compared directly to work concentrating on the ASEAN countries. In addition, no industry breakdowns were given. The footnote in Table II further indicates that - as in the case of the present author - some of the data had to be estimated.

[2] The stocks of US and Japanese foreign direct investment in ASEAN countries don't differ much (8 bill. US$ of US investment book value against 10.5 bill. US$ of cumulated Japanese investment in 1982/83. However, Japanese investment in manufacturing industries is roughly three times as large as the respective US investment.

Table 3 - Intrafirm Exports to ASEAN Countries by Home Country and Industry

	Intrafirm exports (Mill.US$)	In % of all intrafirm exports	In % of total exports	Intrafirm exports (Mill.US$)	In % of all intrafirm exports	In % of total exports
			US intrafirm exports			
		1977			1982	
All manufacturing industries	D≧539	100	16.9	1917	100	24.4
Food products	7	≦1.3	6.4	D≧18	≧0.9	8.0
Chemical products	D≧13	n.a.	5.5	104	5.4	10.6
Non ferrous metals	13	≦2.4	5.7	8	0.4	2.8
Machinery	22	≦4.1	2.3	146	7.6	6.3
Electric equipment	D≧195	n.a.	50.1	1493	77.9	66.6
Transport equipment	9	≦1.7	2.8	24	1.3	2.9
Other manufacturing	D≧3	n.a.	9.1	D≧20	≧1.0	3.9
All sectors	921		14.6	2614		27.7
			Estimated[1] Japanese intrafirm exports			
		1974			1981	
All manufacturing industries	669	100	13.0	1477	100	9.6
Food products	32	4.8	58.2	4	0.3	3.1
Textiles and clothing	124	18.5	35.4	56	3.8	9.6
Wood products	3	0.4	3.0	0.2	0.0	0.1
Chemical products	39	5.8	6.2	54	3.7	4.2
Iron and Steel	73	10.9	6.3	168	11.4	6.8
Non ferrous metals	19	2.8	23.8	53	3.6	20.7
Machinery	11	1.6	0.1	81	5.5	2.4
Electric equipment	88	13.2	20.0	276	18.7	11.5
Transport equipment	158	23.6	20.7	370	25.1	12.6
Precision instruments	13	1.9	11.5	199	13.5	41.1
Other manufacturing	43	6.4	10.1	126	8.5	9.7

D denotes data not disclosed for reasons of confidentiality.

[1] See Appendix for the method of approximation.

Source: OECD Trade by Commodities, various years; US Department of Commerce, 1981 and 1985; MITI, 1975; Tran Van Tho, forthcoming.

from 13.0 to 9.6 per cent[1]. In contrast, US manufactured intrafirm export shares increased from 16.9 per cent (1977) (including only countries for which intrafirm exports were disclosed) to 24.4 per cent (1982). If the exports of all sectors are taken into account, the US intrafirm export ratio rose from 14.6 to 27.7 per cent in the time considered.

- At the industry level, two kinds of industries displayed high intrafirm export shares in 1974: First those which have been either the cornerstones of export-oriented industrialization in the ASEAN hosts (food, textiles and clothing) or recently emerged as new exporters (electrical and electronic products, precision instruments); second, resource-based industries with a high technology content (non-ferrous metals) and assembly industries with a high import content (transport equipment). Towards the eighties, however, remarkable changes have taken place: Japanese affiliates in the traditional ASEAN export industries have diversified their suppliers away from their parent companies, driving the intrafirm export ratio down. The skill-intensive precision instruments industry has shown, on the other hand, a strengthening of intrafirm vertical ties.
- The US industry pattern is characterized by intrafirm exports primarily to the manufacturers of electrical products. This fact comes clearly out first by the extremely high proportion of intrafirm exports in total electrical machinery exports and second by the dominating position of this industry in comparison to intrafirm exports of the total manufacturing sector. The dominance of electrical products in US intrafirm exports mat-

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[1] This does not mean, however, that overall import relations of the host economy with Japan weakened, as witnessed by the increasing Japanese share in ASEAN imports of manufactures (Langhammer and Hiemenz, 1985).

ches with the dominance of this industry among the US export platforms in Asian developing countries (Moxon, 1984: Tables 3 and 7) and supports the hypothesis that intrafirm trade is determined by industry-specific factors.

- US intrafirm manufactured exports are much more important for US trade relations with ASEAN countries than with the rest of the developing countries. This holds also for Japan, despite of the declining trend of the intrafirm share in its manufactured exports to ASEAN. A sectoral comparison of the intrafirm content in US and Japanese manufactured exports to ASEAN countries on the one hand and to all developing countries on the other hand reveals that especially in the electrical machinery industry Japanese as well as US exporters are operating on an intrafirm basis much more if the exports are destined for Southeast Asia, than for the other developing regions. The opposite is true for US transportation equipment, as there are virtually no intrafirm exports to ASEAN countries in contrast to their importance in the transport equipment exports to Latin America or developed countries.

b. The Link to Foreign Direct Investment

As foreign direct investment is a necessary requirement for intrafirm trade, the question arises whether the growth pattern of US and Japanese foreign direct investment in ASEAN countries can explain some of the observed growth of US and decrease of Japanese intrafirm shares in the respective home countries' exports. In this respect, it appears as if rapid investment growth has been coupled with a growing intrafirm export share. The two top growth US industries with respect to foreign direct investment in

ASEAN (i.e. non-electrical and electrical machinery) also exhibit comparatively large increases in the intrafirm export share. The metal industry with the lowest foreign direct investment growth is the only industry in which the importance of intrafirm exports decreased[1]. The same relationship holds for Japan. Her investment in the metals and machinery industries has grown overproportionately, and so did intrafirm export shares in these industries. Similarly, the Japanese investment in ASEAN countries into food processing, textiles and wood products has expanded less than average, and the intrafirm export shares of these industries show the most dramatic declines[2]. Both US and Japanese data lend support to the hypothesis that the intrafirm content in exports of an industry to ASEAN countries rises, if the industry is a dynamic investor in this region.

c. Host-Country-Specific Patterns of Intrafirm Exports

Whereas the previous part of this section focused on the ASEAN region as a whole, it is appropriate to note that single ASEAN countries were differently important as hosts to Japanese and US direct investment[3]. It can therefore be expected that for a given investing country also intrafirm trade with some ASEAN hosts is

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1 For all US manufacturing industries the relationship between investment growth and relative intrafirm export growth is well-founded. A rank correlation analysis of foreign direct investment growth with changes in the intrafirm export ratios yields a correlation coefficient of 0.62 which is significant at the 5 per cent level.

2 The growth rates of Japanese direct investment in ASEAN countries and the changes in the shares of intrafirm exports in total Japanese exports to the ASEAN region were correlated with a coefficient of 0.62 (significant at the 5 per cent level).

3 For example Indonesia hosted in 1982/83 47 per cent of Japanese and only 9 per cent of US direct investment in the manufacturing industries of all ASEAN countries (Ministry of Finance, 1983; US Dept. of Commerce, 1985).

more important than with others of them. Furthermore, there may be also variations between home countries in the direction of their intrafirm exports. These considerations warrant a short look into the US and Japanese intrafirm exports of manufactures to single ASEAN countries[1], the main results of which can be summarized briefly:

- Two groups of ASEAN countries can be distinguished by ranking them according to the intrafirm content in their manufactured imports from Japan (Appendix Table 4). In the first group which comprises Indonesia, Malaysia and Singapore, the intrafirm export share in manufactures amounts to around 15 per cent in 1974. The second group (Thailand, The Philippines) shows an intrafirm share of 6 per cent approximately. Both groups of host countries experienced in the seventies the same relative decrease in their intrafirm share in manufactured imports from Japan, but within each groups, some members switched ranks. If the same ranking is applied to US manufactured intrafirm exports in 1977, the ASEAN host countries can similarly be arranged in three groups. In the first, consisting just of Malaysia, US intrafirm exports of manufactured amounted to more than 40 per cent of total Malaysian manufacturing imports from the US (Appendix Table 5). US exports of manufactures to Singapore and Thailand, as members of the second group, consisted by 22 and by 14 per cent, respectively, of intrafirm exports, while this proportion amounted to just 10 per cent or less for the Philippines and Indonesia (third group). This order of the

[1] Manufacturing industries are mainly considered here as Japanese intrafirm trade could only be approximated for this sector (see Appendix). Some of the US intrafirm trade data had been suppressed for reasons of confidentiality, but despite these shortcomings still a rather detailed picture can be drawn.

groups has been preserved up to the early eighties, which saw in all countries except Singapore large increases in the US affiliated export ratio.

- The rankings of the ASEAN host countries according to the US and Japanese intrafirm export contents exhibit a fairly uniform pattern in the seventies (with the exception of Indonesia). This has, however, to be seen against the background of generally higher intrafirm shares in US than in Japanese manufactured exports. At the beginning of the eighties, however, the intrafirm shares changed in virtually all ASEAN countries, but most strongly in Thailand and Malaysia. A driving force behind this change seems to have been the spectacular growth in US intrafirm exports of electrical parts and components. Although the intrafirm share in Japanese exports of advanced industrial goods (chemicals, electrical and non-electrical machinery, transport equipment and instruments) increased relative to the corresponding share in total Japanese manufacturing exports[1], the growth of Japanese intrafirm exports of these products did in no way match the US growth record.
- Turning to the industry composition of intrafirm exports, Singapore emerges as a special case. Japanese as well as US intrafirm exports of manufactures to the city state have consisted in comparatively even proportions of electrical and non-electrical machinery, transport equipment and precision instruments. In other host countries, just one of either transport equipment or electrical machinery (in the case of the US: exclusively) increasingly dominates the industry pattern of Japa-

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[1] This development is in line with the structural change in the commodity composition of Japanese exports to ASEAN countries as observed by Watanabe (1980: 407).

nese or US intrafirm exports. The growing concentration of US intrafirm exports on electrical machinery has led to an increasing divergence of the US and Japanese industry structures of their manufacturing intrafirm exports to Thailand and the Philippines during the period under consideration[1,2]. This development has been backed by the fact that textiles and metals have continued to be important constituents of Japanese intrafirm exports to these two countries.

In sum, the intrafirm exports of manufactures of Japanese and US parents, while forming diverging proportions of the overall exports of the respective industries, increasingly have concentrated on different industries[3].

d. Intrafirm Exports and Shares in Host Country Export

In particular Japan, but also the US, have gained market shares in the ASEAN markets for imports of advanced industrial goods. As has been previously observed, exports (not necessarily affiliated ones) from home countries via assembly or production subsidiaries have become an important marketing channel in the ASEAN region (v. Kirchbach, 1985: 67). This raises the question how intrafirm

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1 A simple overlap measure had been calculated as an index for the similarity of the US and the Japanese industry structures of affiliated exports. The similarity index fell in the case of Thailand from 54.1 (1974/77) to 14.7 (1981/82) per cent, and in the case of the Philippines from 81.2 to 29.9 per cent (the formula of the similarity index has been adapted from Finger and Kreinin (1979: 905).

2 A parallel change can be observed for the industry structures of Japanese and US foreign direct investment in the above three host countries (Gross, 1985: 14).

3 This observation is matched also by an analysis of export overlaps in advanced industrial goods exported to the ASEAN market (Langhammer and Hiemenz, 1985: 113).

exports have contributed to the relative success of Japanese and US suppliers on ASEAN markets. Basically, intrafirm exports can both have a driving and a stabilizing function in the defense or expansion of home country trade shares in host country imports. The first would apply if changes in intrafirm exports shares run parallel to changes in trade shares and are more pronounced. If, however, intrafirm export shares grow slower than trade shares or even move into the opposite direction, the second possibility applies. In this case, intrafirm exports represent a stabilizing component of total exports.

The evidence on how changes in the intrafirm share in total exports are related to changes in market shares is not straightforward. But there appears to be some support for the hypothesis that at least for Japanese exports the intrafirm content in exports has grown simultaneously with Japanese gains in trade shares in ASEAN markets. If the export performance of a specific home country in a certain ASEAN host country market is defined as a "case", then it emerges that in about three quarters of the Japanese cases intrafirm exports showed more pronounced changes than total Japanese exports. This is a marked contrast to the role of intrafirm trade for the US economy, as in about half of the US cases, intrafirm exports changed sluggishly in relation to overall US exports. This relation does, however, hold with the same strength for intrafirm exports of advanced industrial goods as for the exports of all industrial products together. Thus the impact of intrafirm exports seems to be home country specific rather than industry specific.

6. Intrafirm Imports from ASEAN Countries

Imports of the United States and Japan from sources related by ownership have been documented more extensively than exports. Although most of the information contained in the empirical literature applies different product and country coverages when dealing with party-related imports in international trade, a short summary of the results established in previous research may serve as a guideline for further analysis.

US imports from US affiliates in developing Asia are reported to have gained in importance. Measured as a share of total US imports from this region, intrafirm imports rose from 10.5 per cent in 1967 to 21.2 per cent in 1976. Similarly, the share of Japanese imports from Asian NIC's represented by Japanese subsidiaries increased from 7.9 per cent in 1972 to 22.3 per cent in 1975. If trade in petroleum and other raw materials is excluded, this parallel trend of US and Japanese imports from their Asian subsidiaries is broken: The share of affiliated trade in US manufactured imports stagnated around 5 per cent, while in contrast to this, Japanese subsidiaries accounted for a sharply growing proportion of Japanese manufactured imports from Asian NIC's (Chung, 1977: 35 and 1978: 32; Nayyar, 1978: 65; Nakajo, 1980: 470). Thus, the dynamic part of US intrafirm imports has obviously been the primary sector including fuels[1]. The increasing importance of Japanese manufactured imports from affiliates in Asia, as measured by their share in all manufactured imports from the respective region, has also been observed by Hill and Johns

[1] This was certainly a consequence of the "first oil price shock" 1973.

(1985: 378)[1].

The empirical studies on intrafirm exports from Asian host countries leave many questions open as far as a more detailed industry and country breakdown and changes over time are concerned. The sources of information used for this paper allow to fill some of the gaps (for sources see the Appendix). The main facts on home country intrafirm imports can be summarized briefly:

- Despite of a rapid growth in absolute terms between 1977 and 1982 (Table 4), the proportion of US intrafirm imports from ASEAN countries in total US manufactured imports from this region stagnated around 37 per cent[2].
- The intrafirm share in Japanese manufactured imports from ASEAN countries declined from roughly a third (1974) to about 23 percent (1981) (Table 5). Thus US and Japanese intrafirm imports were following a diverging trend on their absolute levels as well as in their relation to overall home country imports from the ASEAN region.

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[1] A few studies deal with intrafirm exports by specific industries of single ASEAN countries. Helleiner and Lavergne (1979: 307) reported for Malaysia, the Philippines and Singapore that in 1977 US related-party imports amounted to between 47 and 88 per cent of total US manufactured imports from these countries. These percentages were higher for US imports of electrical and non-electrical machinery, while in textiles and footwear comparatively little related trade took place. However, related-party imports included also US imports of finished goods from wholesale trade subsidiaries which procured the merchandise from local producers. Therefore, this part of related trade might not at all be different from conventional trade. Stein based on a questionaire survey, found a high share of intrafirm trade in the exports of ASEAN affiliates for firms in roughly the same industries as in the above study (1984a).

[2] The absolute level, however, stands in contrast to the presumption of Hill and Johns, that intrafirm trade is relatively unimportant (1985: 378).

Table 4 - US Intrafirm Imports from ASEAN countries

	1977			1982		
	Intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports	Intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports
All manufacturing industries	D≧1031	n.a.	D≧37.6	D≧2426	n.a.	≧37.2
Food products	D	n.a.	D	D≧4	n.a.	D≧0.4
Chemical products	*	n.a.	0	32	n.a.	74.5
Non ferrous metals	2	n.a.	0.4	*	n.a.	0
Machinery	56	n.a.	(-)	D≧236	n.a.	D≧62.0
Electric equipment	D≧822	n.a.	D≧92.8	D≧2013	n.a.	D≧60.5
Transport equipment	D	n.a.	D	54	n.a.	(-)
Other manufacturing	32	n.a.	5.5	D≧28	n.a.	D≧2.0

D denotes data not disclosed for reasons of confidentiality.

* denotes values of less than 500.000 US$.

(-) denotes ratios exceeding unity.

Source: US Department of Commerce, 1981 and 1985; OECD Trade by Commodities, various issues.

Table 5 - Estimated Japanese Intrafirm Imports of Manufactures from ASEAN Countries and from Asian Countries by Industry

	1974		1981	
	Estimated intrafirm imports (Mill.US$)	In % of total imports	Estimated intrafirm imports (Mill.US$)	In % of total imports
ASEAN	338	32.1	554	22.6
Indonesia	143	86.9	172	39.3
Malaysia	60	26.1	98	20.2
Philippines	23	8.5	33	5.2
Singapore	57	72.8	198	57.1
Thailand	55	17.2	53	9.7

(-) denotes a ratio exceeding unity.

	1974			1981		
	Estimated intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports	Estimated intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports
All manufacturing industries	599	100	16.2	963	100	8.9
Food products	64	10.7	5.1	85	8.8	2.3
Textiles and clothing	200	33.4	21.0	70	7.3	2.8
Wood products	18	3.1	8.3	25	2.6	14.2
Chemical products	15	2.4	9.3	69	7.2	8.8
Iron and Steel	13	2.2	13.8	53	5.5	7.4
Non ferrous metals	8	1.3	3.1	7	0.7	1.4
Machinery	10	1.7	12.8	33	3.4	17.5
Electric equipment	195	32.6	88.9	518	53.8	75.3
Transport equipment	31	5.1	(-)	11	1.1	8.4
Precision instruments	15	2.5	44.5	39	4.0	24.6
Other manufacturing	31	5.1	7.2	54	5.6	3.8

Source: As for Table 3. - Own calculations.

Differences between the US and Japan do not only exist in the importance of manufactured intrafirm imports from ASEAN countries, but also with regard to the weight of individual industries: Japanese intrafirm imports[1] consisted in 1974 to a large degree of goods such as textiles and food, both traditional exports goods of Asian countries. However, during the second half of the seventies, it was the electrical machinery industry, which contributed significantly to Japanese intrafirm imports from ASEAN countries. Up to 1981, the share of electrical machinery in total intrafirm imports had risen to 54 per cent while the two "forerunners", textiles and food products, lost in importance. As a proportion of total Japanese imports of any product groups from Asia, intrafirm supplies were overwhelmingly represented in the imports of electrical equipment. They were also important sources for other technologically more advanced goods like precision instruments, transport equipment and non-electrical machinery. Conversely, the Japanese economy increasingly has imported more homogeneous products, such as processed food, textiles, chemicals and metals, on a party-unrelated basis, e.g. from local producers or trading companies, by-passing at the same time the sogo shosha (Lauridsen, 1985: 97).

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[1] Reasonable estimates of Japanese intrafirm imports of single product groups could only be arrived at for all Asian developing countries together. This was mainly due to the fact that the previously employed estimation method could not be used for single industries.Japanese affiliates in ASEAN countries were drastically less oriented towards exports to Japan (not necessarily to the parent company) than affiliates in some other Asian countries, in particular in Korea. The ratio of exports to Japan to total sales amounted to roughly 10 per cent for ASEAN and to 68.5 per cent for Korean affiliates in the textiles and clothing industry, and to less than 25 per cent and 48 per cent, respectively, for affiliates producing electrical machinery (MITI, 1976: 197-198).

The dominance of the electrical industry in intrafirm manufactured imports, which had been emerging only recently in Japanese imports, was a recurrent feature of US intrafirm imports from ASEAN countries in the seventies and the eighties. Besides in this industry, intrafirm imports have been of considerably size merely in non-electrical machinery, as far as can be ascertained from the disclosed trade flows. As in the case of Japan, the ratio of US intrafirm imports to overall imports from the ASEAN group is high for advanced, differentiated industrial goods, whereas standardized products like processed food and primary and fabricated metals, tend to be procured from outside the multinational enterprise[1].

As with intrafirm exports of home countries to the ASEAN region, a disaggregation by individual ASEAN countries yields a more differentiated picture of US and Japanese intrafirm imports. Japanese intrafirm imports from Indonesia makes up a proportion of total imports from Indonesia that is about ten times as large as the intrafirm proportion of Japanese imports from the Philippines, and the ratio between the largest and the smallest intrafirm share has not narrowed over time (Table 5). If host countries are ranked according to the intrafirm share of their exports to Japan, an almost identical ranking obtains as in the intrafirm share of the host countries' imports from Japan[2]. The same countries exhibit the closest intrafirm links in their ex-

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[1] The US, unlike the Japanese chemical industry showed a high intrafirm ratio in US imports, possibly due to stronger linkages to the US investment in the ASEAN petroleum industry.

[2] Only Malaysia and Singapore switched ranks for second and third place in 1974, and Thailand and the Philippines for the last two ranks in 1981.

ports to than in their imports from Japan. So while exports of Japanese firms to ASEAN countries rely considerably on sales to affiliates, sales of Japanese affiliates to their home-based companies also account for a large share in Japanese imports from ASEAN[1]. Similarly, those ASEAN countries which receive most of their imports from the US on an intrafirm basis, generally also channel the highest proportions of their exports to the United States through affiliated trade (Appendix Table 6).

While this certainly narrows the gap between home country imports from and exports to ASEAN countries, a major difference between US and Japanese intrafirm trade remains. The Japanese balance of manufactured intrafirm trade with single ASEAN countries has been positive for all countries under study, as the balance of general trade in manufactured goods. This contrasts clearly to the pronounced deficit of US intrafirm trade with the ASEAN countries, whereas unaffiliated trade shows on average a surplus in the US balance of trade with this region[2]. Therefore, the differences between the Japanese and the US balances of intrafirm trade with ASEAN countries do obviously not reflect the overall balances of trade. Rather, a different factor appears to be at work. It has been previously found that Japanese manufacturing affiliates have played a more active role than US affiliates in channeling the home country exports into the Thai market. In 1980, 51.8 per cent

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[1] Intrafirm manufactured exports from Singapore grew fastest among the ASEAN countries, as did all manufactured exports to Japan; Thailand had among these countries the lowest growth of intrafirm and of overall manufactured exports to Japan.

[2] Intrafirm trade does, however, influence the embalance of home and host country trade also indirectly through linkages to local producers.

of Japanese exports as compared to 39.0 per cent of US exports reached the Thai market through multinational corporations (von Kirchbach, 1985: Annex Table 7). The present findings, while they supplement von Kirchbach's results, suggest in addition that US manufacturing affiliates serve much more as an intermediate stage in the internal vertical division of labour between the US and the ASEAN countries, than do Japanese manufacturing affiliates[1].

The structure of US intrafirm imports of single product groups from single ASEAN countries resembles strikingly the respective structure of US intrafirm exports. The electrical industry has been dominating intrafirm exports of all single ASEAN countries to the US[2]. This is not surprising as the US affiliates producing electrical equipment in these countries are much more oriented towards exporting to the US (export platforms) than US affiliates in the other manufacturing industries which concentrate relatively more on local sales (US Department of Commerce, 1985: 227-229). Besides US intrafirm imports of electrical equipment, non-electrical products have been of quantitative importance only for the US intrafirm imports of general machinery from Singaporean affiliates.

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[1] This view is corroborated by the results of Stein's questionnaire survey, as 1981 only 35 per cent of the responding Japanese affiliates in ASEAN countries were engaged in intrafirm exports, as opposed to 57 per cent of US affiliates (Stein, 1984a: 32).

[2] This is supported by the percentage distribution by manufacturing industries of item 807.00 imports from selected ASEAN countries (Moxon, 1984: 159, 167). US tariffs of these items are assessed only on the value added abroad.

7. Summary and Conclusion

This paper has aimed at broadening the empirical basis on US and Japanese worldwide intrafirm trade, and with ASEAN countries in particular. Among the findings, the following are the most important:

- Total worldwide trade is conducted on an intrafirm basis to a greater extent than is trade in manufactured goods; this is due to the importance of affiliated trade in fuels.
- The intrafirm element in manufacturing trade of the US, the UK and West Germany has declined, whereas the opposite is true of Japanese trade. The relative involvement of the Japanese economy in intrafirm trade has been approaching that of the other three home countries.
- Intrafirm trade of all investing countries considered has been dominated by trade of transport equipment. In the British and the US automotive industries, intrafirm exports declined relative to conventional exports, and so did those countries' shares in world exports of transport equipment. Similarly, the trend in Japanese and West German automotive industries towards more intensive intrafirm trade has been coinciding with expanding world export shares.
- Intrafirm trade makes up a larger share of US and Japanese trade with ASEAN countries than of their trade with other developing countries. Generally, ASEAN countries which have a high intrafirm content in their exports to any particular home country also show a high intrafirm ratio in their imports. Malaysia and Singapore were most important for US manufactured intrafirm trade, as were Indonesia and Singapore for Japanese intrafirm trade.

- Advanced manufacturing industries like machinery and electric equipment exhibited the highest growth in intrafirm trade. The more traditional export goods of ASEAN countries, however, like food products and textiles, were increasingly traded on a conventional basis by local suppliers.
- The link of intrafirm trade to foreign direct investment in manufacturing industries of the ASEAN countries is strong. High growth rates of foreign direct investment were in the case of Japan generally coupled with a growing share of intrafirm exports in total home country exports to the ASEAN region. Moreover, manufacturing affiliates served as important marketing channels for Japanese exports, as the Japanese share in ASEAN imports from industrialized countries grew mostly in those industries, in which also the intrafirm share in Japanese exports rose.

The findings suggest the conclusion that intrafirm trade is a quantitatively important component of US and Japanese trade in manufactured goods with the ASEAN region. It even plays a determining role in the trade of electrical machinery of these home countries with some ASEAN countries (Malaysia, Singapore, Thailand), rendering conventional trade close to quantitative irrelevance. Thus, if intrafirm trade exhibits a distinct nature, this clearly has important implications for the analysis of trade relations between ASEAN countries and major investing countries.

Appendix

Main data sources and estimation procedures

United States sources report intrafirm trade sufficiently desaggregated by country and by industry for two benchmark years, 1977 and 1982 (US Department of Commerce, 1981 and 1985). The sample includes virtually all non-bank affiliates of non-bank US parents. Whereas trade statistics provide a breakdown by commodity groups, regionally disaggregated intrafirm trade was available only classified by industry of the affiliate. Therefore it was assumed that intrafirm trade with affiliates in any particular industry could be classified as belonging to the corresponding commodity group. This assumption proved also necessary for the other home countries.

With respect to Japan, the largest investor in the non-petroleum sector of ASEAN countries, intrafirm trade of Japanese affiliates can only be derived from a sample survey on the activities of overseas affiliates (MITI, various years). The most disaggregated geographical breakdown available in this sample is "Developing Countries in Asia". Since only the sales and purchase structures were recorded, the absolute volumes had to be reconstructed using the overall exports and imports of the affiliates in any region. To bring the estimates down to the ASEAN level, intrafirm exports were estimated for single ASEAN countries by assuming that within Asia and within each manufacturing industry, intrafirm exports were distributed by country as was Japanese foreign direct investment in the respective industry (see Ministry of Finance,

various years, for Japanese foreign investment). Japanese intrafirm imports were regionally disaggregated in the same fashion only for all manufacturing industries together, as the above assumption seemed unrealistic given the wide disparities between the purchases structures of ASEAN and other Asian countries in some particular industries.

The third home country publishing informations on intrafirm trade is the U.K. (Department of Industry, various years). This source provides data on related exports based on the analysis of returns from an overseas transaction inquiry. The coverage of the sample survey is rather complete, as the companies surveyed reported direct exports amounting to more than 80 percent of recorded UK exports. Most of the exports not covered by the sample appear to be unrelated, as there are certainly much more exporting UK enterprises with no overseas affiliates than registered in the survey (609 in 1981).

From a sample of the world's largest enterprises (Dunning and Pearce, 1981 and 1985), West German intrafirm exports can be reconstructed. Sectorally disaggregated sales data, export ratios and internal export ratios, based on increasingly reduced samples, can be combined such as to arrive at an estimate of intrafirm exports under the assumption of a homogeneous sample.

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Appendix Table 1 - Internal Export Ratio[a] of Multinational Enterprises, in per cent

Home country	1972	1977	1982
United States	54.8	45.5	43.1
United Kingdom	35.5	29.6	24.8
West Germany	51.1	34.8	33.2[1]
Japan	7.8	17.0	15.5[2]

a) The internal export ratio is defined as the proportion of intrafirm exports in total company exports.

[1]Europe.

[2]Other including Japan.

Source: Buckley and Pearce, 1979; Dunning and Pearce, 1981 and 1985.

Appendix Table 2 - Selected Export Ratios for US Parent Companies

	1977		1982	
	All Sectors	Manufacturing[1]	All Sectors	Manufacturing[1]
Exports irrespective of source Mill. US$	117 963	84 407	206 045	146 685
Exports of Parent Companies Mill. US$	93 456	67 454	153 225	105 202
Intrafirm Exports Mill. US$	32 397	28 260	46 559	40 092
Ratio of intrafirm Exports to Parent Exports, in per cent	34.7	41.9	30.4	38.1
Ratio of Parent Exports to Total Exports in per cent	79.2	79.2	74.4	71.7

[1]Industry of US Parent

Source: US Department of Commerce, 1977 and 1982; OECD, Trade by Commodities, 1977 and 1982. - Own calculations.

Appendix Table 3 - Share of Intrafirm Trade in Trade with Industrialized and Developing Countries, and Regional Composition of Intrafirm Trade and Foreign Direct Investment, in per cent

	United States				Japan	
	1977		1982		1974	
	Industrialized countries	Developing countries	Industrialized countries	Developing countries	Industrialized countries	Developing countries
Share of intrafirm trade						
Exports						
Total	35.7	13.9	28.9	12.9	n.a.	n.a.
Manufactured	35.8	11.7	27.5	11.3	5.8	6.6
Imports						
Total	20.2	24.2	17.0	15.7	n.a.	n.a.
Manufactured	19.2	11.9	16.0	13.0	2.3	7.7
Regional composition						
Intrafirm exports						
Total	80.4	19.6	77.0	23.0	n.a.	n.a.
Manufactured	82.3	17.7	77.1	22.9	56.8	43.2
Exports						
Total	61.8	38.2	60.3	39.7	55.0	45.0
Manufactured	60.3	39.7	58.0	42.0	59.7	40.3
Intrafirm imports						
Total	48.8	51.2	58.9	41.1	n.a.	n.a.
Manufactured	79.4	20.6	73.5	26.5	39.9	60.1
Imports						
Total	53.3	46.7	57.1	42.9	47.0	53.0
Manufactured	70.4	29.6	69.1	30.9	68.9	31.1
Foreign direct investment						
Total	76.0	24.0	75.1	24.9	46.2	53.8
Manufactured[1]	81.4	18.6	76.9	23.1	37.1	62.9

[1]Sector of affiliate.

Source: OECD, Trade by commodities, various issues; Department of Commerce, Survey of Current Business, 1981 and 1982; MITI, 1974; Sekiguchi, 1979.

Appendix Table 4 - Estimated intrafirm exports to ASEAN countries from home country Japan

	1974			1981		
	Estimated intrafirm exports (Mill.US$)	In % of all intrafirm exports	In % of total exports	Estimated intrafirm exports (Mill.US$)	In % of all intrafirm exports	In % of total exports
Japanese exports to Indonesia						
All manufacturing industries	238	100	17.5	452	100	11.4
Food products	8	3.3	(-)	1	0.2	6.6
Textiles and clothing	76	32.1	65.6	32	7.1	29.7
Wood products	1	0.6	3.7	0	0.0	0.0
Chemical products	18	7.6	9.1	10	2.1	2.5
Iron and Steel	46	19.3	18.6	138	30.6	20.8
Non ferrous metals	12	5.0	85.8	43	9.6	59.9
Machinery	1	0.5	0.5	8	1.7	0.8
Electric equipment	13	5.3	11.2	44	9.8	11.8
Transport equipment	26	10.7	10.2	94	20.8	8.8
Precision instruments	10	4.1	68.3	83	18.2	(-)
Other manufacturing	28	11.6	33.3	52	11.5	33.9
Japanese Exports to Malaysia						
All manufacturing industries	83	100	14.4	127	100	7.0
Food products	5	5.4	(-)	1	0.5	3.4
Textiles and clothing	19	22.9	46.5	10	7.6	16.7
Wood products	1	1.3	6.4	0	0.1	0.2
Chemical products	4	5.2	7.4	22	17.0	18.2
Iron and Steel	1	11.5	6.5	6	4.3	2.0
Non ferrous metals	10	3.0	24.7	2	1.3	5.3
Machinery	1	0.8	0.6	5	3.5	2.3
Electric equipment	30	35.8	55.3	59	46.3	17.0
Transport equipment	5	6.5	6.5	12	9.7	2.8
Precision instruments	1	1.3	13.5	12	9.7	37.1
Other manufacturing	5	6.2	23.9	8	6.1	3.9
Japanese Exports to the Philippines						
All manufacturing industries	41	100	4.9	89	100	4.8
Food products	5	12.0	17.4	1	0.6	1.6
Textiles and clothing	5	12.0	8.5	2	2.1	2.1
Wood products	0	0.5	3.1	0	0.0	0.0
Chemical products	7	16.4	3.9	8	9.5	4.8
Iron and Steel	8	20.5	5.1	14	15.3	5.8
Non ferrous metals	2	5.4	10.7	4	4.8	12.1
Machinery	0	1.0	0.3	2	2.3	0.6
Electric equipment	5	11.7	8.5	8	8.9	3.4
Transport equipment	5	13.2	4.5	42	46.8	10.0
Precision instruments	0	0.7	2.8	9	9.7	15.7
Other manufacturing	3	6.6	5.5	5	6.1	5.7
Japanese Exports to Singapore						
All manufacturing industries	173	100	12.9	500	100	11.5
Food products	1	0.6	8.7	0	0.1	0.9
Textiles and clothing	2	1.1	1.7	1	0.2	0.5
Wood products	0	0.2	1.7	0	0.0	0.0
Chemical products	4	2.0	4.6	11	2.1	5.3
Iron and Steel	4	2.5	1.2	7	1.4	1.0
Non ferrous metals	1	0.6	6.5	2	0.4	3.3
Machinery	8	4.6	4.1	61	12.2	7.4
Electric equipment	8	21.6	25.4	157	31.3	14.3
Transport equipment	110	63.4	47.2	176	35.1	33.1
Precision instruments	1	0.9	3.9	86	17.1	49.9
Other manufacturing	4	2.4	4.4	54	10.8	16.8
Japanese Exports to Thailand						
All manufacturing industries	66	100	7.4	91	100	4.2
Food products	14	20.5	(-)	2	1.9	12.3
Textiles and clothing	33	33.0	39.8	12	12.8	16.8
Wood products	0	0.2	0.6	0	0.0	0.0
Chemical products	6	9.0	4.6	4	4.2	1.4
Iron and Steel	4	6.6	2.6	4	4.1	1.0
Non ferrous metals	1	1.7	7.7	1	1.2	3.3
Machinery	1	1.1	0.3	6	6.0	1.1
Electric equipment	3	4.4	3.6	8	8.7	3.5
Transport equipment	12	18.2	7.0	46	50.6	9.5
Precision instruments	0	1.1	6.9	10	10.5	23.7
Other manufacturing	3	4.4	10.8	6	6.7	9.7

(-) denotes a ratio exceeding unity.

Source: MITI, various years; Ministry of Finance, various years; OECD Trade by Commodities, various years.

Appendix Table 5 - Intrafirm exports to ASEAN countries from home country United States

	1977			1982		
	Intrafirm trade exports (Mill.US$)	In % of all intrafirm exports	In % of total exports	Intrafirm trade exports (Mill.US$)	In % of all intrafirm exports	In % of total exports
US exports to Indonesia						
All manufacturing industries	D	n.a.	D	102	100.0	7.1
Food products	*	n.a.	0		0	0
Chemical products	6	n.a.	9.9	12	11.8	4.7
Primary and fabricated metals	0	n.a.	0	4	3.9	5.7
Machinery	*	n.a.	0	1	1.0	0.2
Electric equipment	D	n.a.	D	D	D	D
Transport equipment	1	n.a.	1.0	0	0	0
Other manufacturing	3	n.a.	9.0	D	D	D
All sectors	40		5.3	261		13.5
US exports to Malaysia						
All manufacturing industries	D≥186	n.a.	D≥39.9	876	100.0	57.1
Food products	*	n.a.	0	D	D	D
Chemical products	D	n.a.	D	12	1.4	10.4
Primary and fabricated metals	0	n.a.	0	1	0.1	7.1
Machinery	2	n.a.	3.4	4	0.5	2.0
Electric equipment	184	n.a.	68.0	843	96.2	91.6
Transport equipment	*	n.a.	0	0	0	0
Other manufacturing	D	n.a.	D	D	D	D
All sectors	217		40.7	956		56.1
US exports to the Philippines						
All manufacturing industries	63	100.0	10.1	229	100.0	15.8
Food products	6	9.5	15.5	15	6.6	24.0
Chemical products	D	D	D	27	11.8	14.3
Primary and fabricated metals	9	14.3	18.8	2	0.9	3.0
Machinery	0	0	0	*	0	0
Electric equipment	11	17.5	9.3	163	71.2	30.1
Transport equipment	6	9.5	9.7	6	2.6	9.4
Other manufacturing	D	D	D	17	7.4	8.7
All sectors	237		29.1	282		15.4
US exports to Singapore						
All manufacturing industries	231	100.0	22.2	484	100.0	17.4
Food products	*	0	0	3	0.6	2.6
Chemical products	2	0.9	2.2	133	6.8	11.5
Primary and fabricated metals	4	1.7	16.0	1	0.2	0.9
Machinery	20	8.7	27.1	141	29.1	12.5
Electric equipment	D	D	D	285	58.9	50.7
Transport equipment	2	0.9	1.1	18	3.7	7.1
Other manufacturing	D	D	D	3	0.6	0.9
All sectors	355		32.1	849		27.2
US exports to Thailand						
All manufacturing industries	49	100.0	14.0	226	100.0	35.1
Food products	1	2.0	9.0	D	D	D
Chemical products	5	10.2	6.0	20	8.8	14.7
Primary and fabricated metals	0	0	0	0	0	0
Machinery	0	0	0	0	0	0
Electric equipment	D	D	D	202	89.4	92.7
Transport equipment	0	0	0	0	0	0
Other manufacturing	D	D	D	D	D	D
All sectors	72		14.9	266		31.1

D denotes data not disclosed for reasons of confidentiality.

* denotes values of less than 500.000 US$.

Source: US Department of Commerce, 1981 and 1985; OECD Trade by Commodities, various issues.

Appendix Table 6 - US Intrafirm Imports from ASEAN Countries

	1977			1982		
	Intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports	Intrafirm imports (Mill.US$)	In % of all intrafirm imports	In % of total imports
			US imports from Indonesia			
All manufacturing industries	6	100	1.6	D	n.a.	D
Food products	0	0	0	0	n.a.	0
Chemical products	*	0	0	*	n.a.	0
Primary and fabricated metals	0	0	0	0	n.a.	0
Machinery	0	0	0	0	n.a.	0
Electric equipment	5	83.3	27.8	D	n.a.	D
Transport equipment	0	0	0	0	n.a.	0
Other manufacturing	1	16.7	11.0	D	n.a.	D
All sectors	D		D	1890		41.9
			US imports from Malaysia			
All manufacturing industries	296	100	43.0	1036	100	69.4
Food products	0	0	0	0	0	0
Chemical products	0	0	0	0	0	0
Primary and fabricated metals	0	0	0	0	0	0
Machinery	0	0	0	*	0	0
Electric equipment	296	100	89.6	1028	99.2	81.5
Transport equipment	0	0	0	0	0	0
Other manufacturing	0	0	0	8	0.8	5.6
All sectors	D		D	1128		57.7
			US imports from the Philippines			
All manufacturing industries	149	100	19.7	279	100	17.1
Food products	D	D	D	D	D	D
Chemical products	D	D	D	3	1.1	48.4
Primary and fabricated metals	0	0	0	0	0	0
Machinery	0	0	0	D	D	D
Electric equipment	4	2.7	5.2	198	71.0	31.7
Transport equipment	0	0	0	0	0	0
Other manufacturing	26	17.5	9.8	20	7.2	3.3
All sectors	180		16.7	302		15.5
			US imports from Singapore			
All manufacturing industries	D≥580		D≥87.9	1111	100	54.0
Food products	D	n.a.	D	4	0.4	8.1
Chemical products	*	n.a.	0	29	2.6	(-)
Primary and fabricated metals	2	n.a.	22.4	*	0	0
Machinery	56	≥7.6	(-)	236	21.2	68.2
Electric equipment	517	≥70.5	(-)	787	70.8	63.0
Transport equipment	D	n.a.	D	54	4.9	(-)
Other manufacturing	5	n.a.	3.4	0	0	0
All sectors	733		83.1	1221		53.7
			US imports from to Thailand			
All manufacturing industries	D	n.a.	D	D	n.a.	D
Food products	0	n.a.	0	0	n.a.	0
Chemical products	0	n.a.	0	*	n.a.	0
Primary and fabricated metals	0	n.a.	0	0	n.a.	0
Machinery	0	n.a.	0	0	n.a.	0
Electric equipment	D	n.a.	D	D	n.a.	D
Transport equipment	D	n.a.	0	0	n.a.	0
Other manufacturing	0	n.a.	0	*	n.a.	0
All sectors	D		D	D		D

D denotes data not disclosed for reasons of confidentiality.

* denotes values of less than 500.000 US$.

(-) denotes ratios exceeding unity.

Source: US Department of Commerce, 1981 and 1985; OECD Trade by Commodities, various issues.