THE INTERNATIONAL USE OF THE JAPANESE YEN: THE CASE OF JAPAN'S TRADE WITH EAST ASIA

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I. INTRODUCTION

In recent years there has been a renewed interest in the internationalization of the Japanese yen. In the beginning of 1999, the European Economic and Monetary Union (EMU) is likely to be realized in Europe, and the EMU's currency, the Euro, is expected to become a key currency of equal proportions to the U.S. dollar. Whereas East Asian countries had so far linked their currencies largely to the U.S. dollar, the Asian currency crisis in 1997 prompted some of these countries to adopt a more flexible exchange rate system. In response to the above movement, the role of the yen in East Asia, and also the possibility of further yen internationalization, has attracted a great deal of attention again.

There has so far been a considerable number of articles on the internationalization of the Japanese yen, some of which have been devoted to the study of the role of the yen as a trade invoice currency using the data on currency invoicing of Japan's foreign trade published by the Ministry of International Trade and Industry (MITI).[1] Relying on the above studies, this paper makes a close examination of the MITI data in order to explore whether the yen will be used more widely in Japan's trade with East Asian countries.[2]

As Japan expanded investment and trade with East Asian countries in response to the sharp appreciation of the Japanese yen against the U.S. dollar after the Plaza Accord in 1985, yen-invoiced trade increased substantially in Japan's trade with East Asian countries. The expansion of Japan's investment and trade with these countries is particularly prominent in the 1990s, and economic interdependence between the two

[1] For example, Ito (1993), Fukuda and Ji (1994), Fukuda (1996), and Kawai (1996).

[2] For the geographical definition of this paper, see Appendix A.

regions deepened significantly. Accordingly, it is natural for some studies to conclude that further integration of Japan with East Asia through trade and investment will increase the role of the yen in East Asia over time.[3] Contrary to this conclusion, however, the yen-invoiced ratio declined considerably from 1994 in Japan's exports to East Asia, and the U.S. dollar was still used more than the yen even in March 1998 (Table 1). The main purpose of this paper is, therefore, to examine why yen-invoiced trade has not increased despite the recent expansion of investment and trade between Japan and East Asia.

Trade invoicing patterns are in practice determined in numerous ways depending on the convenience of money and capital markets, characteristics of products traded such as product differentiation, market structures such as the degree of competitiveness, and so on. However, recently more attention has been given to the "pricing-to-market" (henceforth PTM) behavior of Japanese exporting firms as a key determinant of trade invoicing practices. Many studies, such as Hamada and Horiuchi (1987), Tavlas and Ozeki (1992), and Ito (1993), suggested that Japan's trade invoicing patterns might be related to the PTM of Japanese firms. Fukuda and Ji (1994) and Fukuda (1996) examined the PTM behavior of Japanese firms empirically, and concluded that Japanese firms conducted PTM in their exports to the United States but not in their exports of manufactured products to East Asia. This suggests that Japanese exporters tend to invoice their products in the U.S. dollar in their exports to the United States in order to keep the export price unchanged, while they prefer yen-invoiced transactions in their manufacturing exports to East Asia and changes in currency values are fully passed through to the importers.

The recent decline of yen-invoiced exports to East Asia, however, may imply that Japanese exporters stabilize their export prices even in their exports of manufactured products to East Asia. In Fukuda and his co-author's work, four selected commodities (TVs, VCRs, and two types of automobiles) are tested to examine the relationship between the PTM behavior of Japanese exporters and the trade invoicing

[3] See, for example, Kawai (1996) p.351, p.355.

practices, and the sample period is from January 1988 to December 1992. It must be noted, however, that whereas the electronics industry is the leading export sector in the 1990s, TVs and VCRs account for only a small part of the industry. Rather, semiconductors and ICs (integrated circuits) play a major role in Japan's trade with East Asia. This paper, therefore, examines empirically whether the Japanese exporters stabilize their export prices in foreign markets for ICs and other major exporting products over a longer sample period, instead of examining TVs and VCRs.

The noteworthy result of the empirical test is that Japanese exporting firms tend to stabilize the export price even in their exports of ICs to East Asia, which is likely to lower not only yen-invoiced exports of the electric machinery industry to East Asia but also overall yen-invoiced exports to East Asia. The trade invoicing pattern of the electric machinery industry, especially semiconductors and ICs, is particularly important because the recent increase in Japan's trade with East Asia is mainly attributed to the expansion of investment and trade in this industry. Given such an invoicing practice in this industry, it is hard to expect further use of the yen in Japan's trade with East Asia.

The remainder of this paper is organized as follows. Section II reviews the theory of a trade invoice currency and compares trade invoicing patterns of Japan's foreign trade with those of other advanced industrial countries. Section III investigates the trade invoicing patterns of Japan's exports and imports by commodity and region using the MITI data. Section IV empirically examines how the PTM theory can explain the trade invoicing patterns of Japanese exporting firms. Section V considers the investment-trade nexus between Japan and East Asia and discusses the conditions for further internationalization of the yen in East Asia. Section VI presents some concluding remarks.

II. DETERMINANTS OF AN INVOICE CURRENCY

2.1 Theory of Trade Invoice Currency

A considerable number of studies have been done so far on the theory of

international currency, and there is fairly general agreement that the following two principal conditions are required for the use of a currency internationally.

(a) There needs to be confidence in both the political stability of the country concerned and in the value of its currency.

(b) A country should maintain the convertibility of both its current and capital accounts. It should also possess well-developed financial markets; broad, in that they contain a large assortment of financial instruments; deep, in that they have well-developed secondary markets; and free of controls on financial transactions.[4]

Japan is considered to meet the first condition. Tavlas and Ozeki point out that although Japan experienced relatively high inflation variability in the 1970s, Japan's inflation performance appears to have established credibility for its monetary policy from the 1980s onward (Tavlas and Ozeki, 1992, p.9).

It appears to be controversial whether or not Japan meets the second condition. Japan embarked upon domestic financial liberalization from the mid-1970s, and especially from the mid-1980s. Up until the mid-1970s, the authorities regulated not only the domestic money and capital markets to protect domestic financial institutions and preserve monetary stability, but also international capital transactions to maintain a stable exchange rate. From the mid-1970s, however, Japan undertook domestic financial liberalization, stimulated by domestic and foreign pressure. In December 1980, the Foreign Exchange and Foreign Trade Control Law was drastically revised to liberalize all foreign exchange transactions in principle. The May 1984 Yen/Dollar Agreement specified substantial liberalization measures to be adopted. Furthermore, the Ministry of Finance issued a report entitled, "The Current State of and Prospects for Financial Liberalization and Yen Internationalization," and various measures to liberalize and foster domestic money and capital markets have been undertaken since then with the object of facilitating the use of the yen as an international currency.[5]

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[4] My understanding of these conditions is based mainly on Tavlas and Ozeki (1992). Tavlas and Ozeki emphasize the amount of trade invoiced in a currency concerned as an additional condition for an international currency (Tavlas and Ozeki, 1992, pp.4-5).

[5] Kawai (1996) presents a brief summary of the Japan's financial liberalization process. See also

These liberalization processes seem to have facilitated yen-invoiced trade. Tables 1 and 2 show that yen-invoiced trade increased from the 1970s. As will be seen below, however, yen-invoiced trade is quite low compared to the own currency-invoiced trade of other industrial countries (Table 3), partly because the above liberalization processes did not achieve fully the establishment of well-developed money and capital markets in Japan. Even now, there still remain de facto constraints on yen transactions in domestic capital markets, especially in short-term capital markets.

Generally speaking, the limited international use of the yen is attributed mainly to the underdevelopment of the yen-denominated money and capital markets. When we discuss the role of a trade invoice currency, however, an additional factor, i.e., the type of goods traded must be considered.[6] [7] McKinnon argues that trade in specialized manufactured products tends to be invoiced in the exporter's currency and trade in primary products tends to be invoiced in a major international currency (so-called the "McKinnon's hypothesis").[8]

Producers of manufactured products in an advanced industrial country appear to have some market power over their products due to distinctive character of the products, and hence can control their market price. Since producers wish to stabilize their profits in terms of their own currency, they generally prefer to invoice their exports in their national currency.

On the other hand, primary products are relatively homogeneous and one

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Osugi (1990) and Takeda and Turner (1992).

[6] More specifically, a trade invoice currency is selected or determined as a result of bargaining on dividing currency risk between exporters and importers. This bargaining is generally affected by the following factors: exchange rate expectations and variability, tradition and habit, differences in attitudes toward risk, the characteristics of the goods traded, market power, and financial convenience (McKinnon, 1979, Chap.4; Kawai, 1990, pp.229-232). It is convenient at this point, however, to focus on the character of the goods themselves. The rest of the factors will be mentioned below.

[7] Iwami (1995) considers real factors (such as trade structures and competitiveness of products traded), rather than financial factors (such as well-developed capital markets and financial instruments), as a key determinant for international currency. See Iwami (1995) Chapter 5.

[8] McKinnon (1979) Chapter 4.

producer's output may be precisely graded and compared to that of others. Since these products are neither firm-specific nor country-specific, unlike most manufactured products, the producers do not have particular market power over their products. Due to the sufficiently homogeneous characteristic of these products, a centralized commodity exchange may register worldwide supply and demand in a country whose currency is used internationally. Accordingly, trade in these products tend to be invoiced mainly in the U.S. dollar (or U.K. sterling).

2.2 International Comparison in Trade Invoicing Patterns

Relying on the above conditions of a trade invoice currency, let us examine the share of exports and imports invoiced in the national currency of six industrial countries (Table 3).

First, for EU countries (except Italy), more than fifty percent of exports and about fifty percent of imports are invoiced in their national currency. A number of empirical studies have found such a typical pattern of invoicing practice: trade between developed countries tends to be invoiced in the exporter's currency.[9] This regularity of invoicing patterns is called the "Grassman's law."

Second, the United States is in a unique position, in that 98 percent of its exports and 88.8 percent of its imports are invoiced in its own currency in 1996. This high share of the dollar-invoiced trade implies that the larger the U.S. share of a country's trade, the lower the share of trade invoiced in its national currency.

Finally, Japan's share of trade invoiced in the yen is by far the lowest among six industrial countries. This low level of yen-invoiced trade is generally attributed to the Japan's unique trade structure: one is the relatively large share of the United States in Japan's exports and the other is the Japan's high import ratio of raw materials and

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[9] See Grassman (1973) (1976), Page (1981). These studies show, based on the data on trade invoice currency in the European country's case, that most of foreign trade transactions are invoiced mainly in the exporter's currency and, to a lesser extent, in the importer's currency, and that the U.S. dollar plays only a marginal role. In EU countries as of 1996, about 61 percent of their trade was directed toward intra-regional trade and about 77 percent of their trade toward industrial countries (computed from IMF, *Direction of Trade Statistics, Yearbook*, 1997).

fuels.[10] Since the United States tend to invoice its exports and imports in the U.S. dollar, the high trade dependence on the United States leads to the rise of the dollar-invoiced ratios. In addition, raw materials and fuels are mainly invoiced in the U.S. dollar as suggested by McKinnon's hypothesis. Hence, the high import share of raw materials and fuels also impedes yen-invoiced trade.

It should be noted, however, that the U.S. share in Japan's exports declined substantially from 34.1 percent in 1988 to 27.5 percent in 1996, and also that the share of imports of raw materials and fuels fell sharply from 67.8 percent in 1980 to 26 percent in 1996 (Table 3). The recent change in the trade structure may affect the rise of yen-invoiced exports and imports from 1980 to 1996 (Table 3). In section III, Japan's trade invoicing patterns are examined in detail by commodity and trading partner.

2.3 Other Factors in the Low Level of Yen-Invoiced Trade

Before turning to the next section, let us discuss other factors impeding the use of the yen in Japan's trade: one is the relatively small size or lesser development of the treasury bill (TB) market and the other is the underdevelopment of the yen-denominated bankers acceptance (BA) market. Whereas many scholars consider the two factors the barriers to the use of the yen,[11] it is worth reconsidering whether their views are valid or not.

First, the TB market is generally considered to be an important factor in facilitating yen-invoiced trade. The short-term capital market would be where foreign investors would put their yen-denominated funds, so its limited size reduces the invoice currency ratio of the yen in trade. Whereas the TB market in Japan is larger than that of the United Kingdom and Germany, the Japan's TB market is much smaller than that of United States (Table 4). As long as we compare the Japan's TB market with the U.S.

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[10] See, for example, Hamada and Horiuchi (1987) p.173, Tavlas and Ozeki (1992) p.32, and Fukuda (1996) p.150, pp.156-159.

[11] See, for example, Hamada and Horiuchi (1987) p.174, Tavlas and Ozeki (1992) p.13.

counterpart, the less developed TB market is likely to impede yen-invoiced trade. It is quite interesting, however, that despite the relatively small size of the TB market in Germany, the DM-invoiced ratio is quite high in Germany's trade (Table 3).[12] This implies that the size of the TB market itself is not necessarily a crucial factor in trade invoicing, whereas the well-developed short-term capital markets or financial instruments are clearly important factor in facilitating yen-invoiced trade.

Second, and more arguable factor is the yen-denominated BA market. There appears to be the general agreement that the undeveloped BA market is a barrier to the increase of yen invoiced exports, because the well-developed BA market enables banks to refinance yen-denominated trade credit and hence exporters could utilize the yen-denominated trade credit readily. Whereas the yen-denominated BA market was established in June 1985, as shown in Table 5, the market had declined in size since then and has in effect disappeared since March 1990 due to the heavy regulations on the market (e.g., high fees, high stamp duties and cumbersome procedures).[13] It must be noted, however, that the yen-invoiced ratio increased considerably from 1987 to 1993 without the yen-denominated BA market (Table 1).[14] This evidence suggests that the yen-denominated BA market has little influence upon yen-invoiced trade.

More importantly, Japan's trade settlement method shifted from letter of credit (henceforth L/C) to settlements without L/C. Table 6 shows that the weight of L/C declined whereas that of remittance checks increased in Japan's exports from 1983 to 1991. The weight of remittance bills increased substantially in Japan's imports during the same period, while that of L/C remained at a relatively low level. These trends were particularly prominent in advanced countries. The settlements without L/C, especially remittance checks (bills), tend to be preferred in trade with overseas affiliates

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[12] For a comparison of the internationalization of the Japanese yen with that of Deutsche Mark, see Iwami (1995) Chapter 5.

[13] For a comprehensive review of the problem of the yen-denominated BA market, see Okuda (1992) Chapter 4.

[14] For Japan's trade finance from the 1970s, see Okuda (1992) Chapters 3 and 4, Iwami (1995) Chapter 4.

(Okuda, 1992, pp.111-112, Tokunaga, 1996, pp.15-16). Japan expanded FDI in response to the sharp appreciation of the Japanese yen after the Plaza Accord in 1985, which promoted intra-firm trade. Since this trend has continued in the 1990s, especially in Japan's FDI and trade with East Asia, a further increase in settlements by remittance checks (bills) is expected after 1991.[15] These observations suggest that yen-invoiced trade is unlikely to be promoted even if the well-developed yen-denominated BA market is reestablished.

In summary, the comparison in trade invoicing patterns between the Japanese yen and other major currencies indicates that the yen lags far behind other major currencies in the role of the trade invoice currency. The limited use of the yen in Japan's foreign trade is generally attributed to the underdevelopment of yen-denominated money and capital markets and the Japan's unique trade structure. Whereas, generally speaking, financial factors are clearly important in facilitating the use of the yen, the underdevelopment of yen-denominated TB and BA markets per se does not necessarily seem to be a determinant factor in the low yen-invoiced trade. On the other hand, the recent change in Japan's trade structure is likely to affect the yen-invoiced ratio of Japan's foreign trade. In the next section, close examinations are made on trade invoicing patterns of Japan's exports and imports by commodity and region using the MITI data. Particular attention will be paid to the invoicing patterns of Japan's trade with East Asian countries.

III. RECENT TRENDS IN YEN-INVOICED EXPORTS AND IMPORTS

3.1 Yen-Invoiced Trade by commodity and region

Table 7 shows the summary of the shares of Japan's exports and imports invoiced in the yen and the U.S. dollar in March 1998, broken down by commodity and by geographical region of a trading partner. This data reveals several features of

[15] In 1991, MITI ceased to publish the data on the settlement method in Japan's foreign trade. At present, no statistics are available concerning the trade settlement patterns.

Japan's trade invoicing patterns.[16]

First, the dollar-invoiced exports and imports are dominant in Japan's trade with the United States. More than 80 percent of exports to the United States are invoiced in the U.S. dollar for each commodity except chemicals and precision instruments. Even in Japan's major machinery industries, such as general machinery, electric machinery, and transport equipment, the share of the dollar-invoiced exports is over 80 percent. The dollar-invoiced ratio is also significantly high in overall imports from the United States (83 percent). It is interesting that the dollar-invoiced ratio is somewhat lower in Japan's imports of machinery and equipment from the United States than in the exports of machinery industries to the United States.

Second, in Japan's exports to and imports from EU countries, the dollar-invoiced ratio is quite low: only 13.2 percent of exports and 14.3 percent of imports are invoiced in the dollar. On the other hand, the yen and other currencies (i.e., EU country's currencies) are largely used, which suggests that the Grassman's law holds in the case of Japan's trade with EU countries.

Third, the yen-invoiced ratio is relatively high in Japan's exports to Southeast Asia, which is particularly prominent in the exports of machinery and equipment. For example, 81.3 percent of the exports in the transport equipment industry is invoiced in the yen. On the other hand, only 26.7 percent of the imports from Southeast Asia are invoiced in the yen and the dollar-invoiced imports account for 71.6 percent. This low level of yen-invoiced imports from Southeast Asia is particularly interesting, because 44.3 percent of the imports from EU countries are invoiced in the yen. Even in Japan's imports of manufactured goods, the yen-invoiced ratio is higher in the imports from EU (46.5 percent) than in those from Southeast Asia (33.7 percent).

3.2 PTM Behavior, Trade Structures, and Yen-Invoiced Exports and Imports

As shown in Table 7, the dollar-invoiced transactions are preferred in Japan's

[16] This data published by MITI is based on a report entitled "yushutsu (yunyu) hokoku-sho" (export and import report on currency invoicing) which all firms are required to submit to MITI in every foreign trade the amount of which is 5 million-yen and over.

exports to the United States, even in the case of machinery exports. Table 1 also shows that more than eighty percent of the exports to the United States have been invoiced in the dollar since 1987. The trend of a high dollar-invoiced ratio for the U.S. destined exports is usually explained by the PTM behavior of Japanese firms: Japanese exporting firms invoice their products in the U.S. dollar in order to keep the export price (in dollar) unchanged even when the exchange rate fluctuates widely.[17] For example, the yen-invoiced ratio of overall exports (i.e., exports to the world) dropped substantially from 1985 to 1987 (Table 1), which appears to have reflected the PTM behavior of Japanese exporters in response to the sharp appreciation of the yen during the same period.

Ito (1993) points out two factors for the reason why Japanese exporters conduct PTM. First, Japanese exporters seem to have pursued a market-share-maximizing behavior in the short-run. Since sunk costs were large and the U.S. markets were highly competitive, Japanese exporters kept the selling price constant and undertook the exchange rate risk. Second, Japanese parent firms may have tended to mitigate exchange rate risks of their foreign affiliates and trading partners, possibly because the parent firms could readily access hedging technology at lower costs (Ito, 1993, pp. 303-305).

Table 8 shows the time-series data on invoicing ratios for Japan's exports to Southeast Asia, broken down by commodity and region.[18] As for the invoicing currency ratio from 1987 to 1991, the yen-invoiced ratio in the exports of machinery

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[17] See Hamada and Horiuchi (1987) p. 174, Osugi (1990) pp. 46-48, Tavlas and Ozeki (1992) pp. 14-15, and Ito (1993) pp.303-305.

[18] MITI ceased to publish the annual data on currency invoicing of Japan's exports and imports, broken down by commodity and region, in 1991. Whereas MITI began to publish the data on currency invoicing again in September 1992, the data are for monthly basis (published twice a year: in March and in September) and did not show any information on currency invoicing, broken down by commodity and region. MITI started to publish again the broken down data (by commodity and region) in March 1994, but the sub-categories of machinery and equipment reported in March 1994 are different from those in the 1987-1991 data. The current statistics (from March 1994) do not report the currency invoicing shares of machinery and equipment per se, but divide machinery and equipment into four categories: general machinery, electric machinery, transport equipment, and precision instruments.

products increased substantially from 54 percent in 1987 to 62.6 percent in 1991. In the exports of TVs and ships, the yen-invoiced ratios exceed 70 percent in 1991. This suggests that the invoicing patterns of Japanese exporting firms contrast sharply between the exports to the United States and those to the Southeast Asian countries, partly due to the less competitiveness of the Southeast Asian markets relative to the U.S. market.

Another factor is the recent increase in economic interdependence through investment and trade between Japan and East Asian countries. As Japan's manufacturing FDI in East Asia increased in response to the sharp appreciation of the Japanese yen against the U.S. dollar from the mid-1980s, Japanese exporting firms advanced the so-called "product differentiation strategy."[19] Under this strategy, Japanese exporting firms shifted the production bases of low-tech products to East Asian countries through FDI and specialized in producing high-tech products in the home country. As suggested by McKinnon's hypothesis, high quality products tend to be invoiced in the yen (exporting country's currency), which facilitated yen-invoiced exports in the machinery industry.

Expansion of the Japanese manufacturing FDI in East Asia promoted intra-industry trade between Japan and East Asia, and a certain fraction of it are accounted for by intra-firm trade. One plausible explanation for the increase in yen-invoiced exports to East Asia is the expansion of intra-firm trade that is said to be invoiced mainly in the yen. However, Fukuda (1996) and Tokunaga (1996) present contrary evidence against the above explanation and insist that yen-invoiced transactions are not necessarily preferred in intra-firm trade.[20] Applying the same reasoning as Ito's conjecture mentioned above, we can suppose that a parent company is likely to prefer the importing country's currency for trade with its foreign affiliates in

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[19] Urata (1993) p.283ff, Kawai and Urata (1995) pp.13-18.

[20] Fukuda (1996) pp.152-153, and Tokunaga (1996) pp.146-151. See also Appendix Table that shows quite interesting data on trade invoice currency of Japanese MNCs, which is based on the questionnaire survey though the response rate of the survey is only 25 percent. According to this table, the yen-invoiced ratio is significantly higher in exports to independent foreign companies than in exports to local subsidiaries and affiliates.

order to mitigate their exchange rate risk when the exchange rate fluctuates widely. Hence, it is hard to say that yen-invoiced exports are commonly preferred in intra-firm trade.

Let us now consider yen-invoiced imports from 1987 to 1991. Table 9 shows that the yen-invoiced ratio of Japan's imports from Southeast Asia increased from 11.5 percent in 1987 to 21.6 percent in 1991, whereas the share was still significantly low. As mentioned in the previous section, the low level of yen-invoiced imports is usually attributed to Japan's high dependence on imports of oil and raw materials, and the share of imports of raw materials and fuels in Japan's total imports decreased significantly from 1980 (Table 3). Indeed, the share of raw materials and fuels in Japan's imports from Southeast Asia also declined from 85.8 percent in 1985 to 66.9 percent in 1991.[21] It should be noted, however, that the share of imports of raw materials and fuels still remained at a high level in 1991, which continued to impede yen-invoiced imports from Southeast Asia. This observation supports the conclusion of Fukuda (1996) that the low yen-invoiced ratios are attributed mainly to the Japan's import structure.[22]

Turning to the yen-invoiced ratio in imports of manufactured goods, however, the ratio increased from 21.6 percent in 1987 to 32.8 percent in 1991. Above all, the yen-invoiced ratio of machinery and equipment rose from 27 percent to 43.9 percent during the same period. The increase in the yen-invoiced ratio of manufacturing imports appears to have increased the overall yen-invoiced ratio to a certain extent, whereas the share of manufactured products accounted for only a small portion of Japan's overall imports from Southeast Asia.[23]

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[21] This share declined further to 51.4 percent in 1997. Computed from Japan Tariff Association, *The Summary Report on Trade of Japan*, December 1985, December 1991, and December 1997.

[22] See Fukuda (1996) pp.156-159.

[23] It is difficult to explain why the yen-invoiced ratio increased in Japan's imports of manufactured goods (especially machinery and equipment) from Southeast Asia from 1987 to the mid-1990s. One possible explanation is that the increase in yen-invoiced imports may be related to the active intra-firm trade between Japan and East Asia, unlike the export side. Appendix Table shows that the yen-invoiced ratio is higher in imports from local subsidiaries than in imports from independent foreign companies. In the case of intra-firm trade, Japanese companies can manage exchange rate risks efficiently involved in yen-invoiced transactions by pooling and marrying claims and liabilities in yen. Given that a large portion of Japan's imports from foreign affiliates are conducted within

3.3 Recent Decline of Yen-Invoiced Trade

Observation of yen-invoiced exports and imports by commodity and region reveals that the yen-invoiced ratios increased significantly in Japan's exports to and imports from Southeast Asia from 1987 to 1991, whereas the yen-invoiced ratios remained at a low level in the imports from Southeast Asia. The low level of yen-invoiced imports from Southeast Asia is attributed mainly to the high share of imports of raw materials and fuels.

Let us turn to the recent trend of yen-invoiced exports and imports with East Asian countries, especially from 1994. If we look at Tables 8 and 9, it is particularly interesting to note that yen-invoiced exports to and imports from Southeast Asia declined substantially from 1994 and 1995 respectively. Why did the yen-invoiced ratio decline from then on?

One possible explanation is the sharp appreciation of the yen-dollar exchange rate from 1994 to 1995. Since the yen appreciation during that period increased uncertainty of the yen-dollar exchange rate, exporters and importers may tend to avoid yen-invoiced trade. Specifically, Japanese exporters or parent companies appear to have chosen the dollar-invoiced trade temporarily in order to mitigate the exchange rate risk of their trading partner or their own affiliates in East Asia.[24] This implies that the yen-invoiced ratios will return to the previous level if the trend of yen appreciation is reversed or the yen-dollar exchange rate is stabilized.

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intra-firm trade, active operations of Japanese affiliates in East Asia may facilitate yen-invoiced imports from East Asia, whereas there is room for further investigation on the relationship between trade invoicing patterns and intra-firm trade. In the case of Japan's imports from the overseas affiliates in Asia, the ratio of intra-firm trade is 84.5 percent in Japan's imports from manufacturing affiliates in 1995 fiscal year (MITI, *Kaigai Jigyo Katsudo Kihon Chosa*, No.6, 1998, p.213).

[24] Generally speaking, exporters and importers discuss and determine the price, invoice currency, and the payment due when they make a contract of trade. They may also determine the *ex post* risk sharing of unexpected exchange rate fluctuations. Suppose, for example, that Japan's exports to a foreign country are invoiced in the yen and the yen appreciates unexpectedly. In this case, Japanese exporters may not demand the importers to pay the full price in yen, or rather the former may permit the *ex post* price reduction and allow the latter to pay a certain portion of the full price in yen. The risk sharing is conditional on which party has the stronger bargaining power. (Interview at MITI on January 13, 1994.)

Table 8 shows that the yen-invoiced ratio of transport equipment exports to Southeast Asia declined from 1994 and then increased from around 1996. In March 1998, the yen-invoiced ratio exceeded 80 percent in the exports of the transport equipment industry. On the other hand, in exports of the general machinery industry, the yen-invoiced ratio was 59.7 percent in March 1998 and did not return to the previous level (i.e., 69 percent in March 1994). More noteworthy is that the yen-invoiced ratio of electric machinery exports remained at around 40 percent from March 1994 to March 1998. In particular, the yen-invoiced ratio of IC exports was at 20 to 30 percent during the same period. Accordingly, our main concern below is to examine why the yen-invoiced ratios have declined or remained at a low level in Japan's exports of manufactured products to East Asia.

In the next section, focusing on three major machinery industries, I apply the theory of PTM to the trade invoicing behavior of Japanese exporting firms of these industries and test it empirically. Fukuda and his co-author ran the same empirical test and concluded that Japan's firms preferred yen-invoiced exports of manufactured products to East Asia. This paper yields the contrary result that Japanese exporters tend to stabilize the export price even in their exports of ICs to East Asia, invoicing in the U.S. dollar.

IV. EMPIRICAL TESTS

4.1 Model

The studies of PTM examine optimal pricing policies of monopolistically competitive firms that are assumed to produce in the domestic country but sell in both domestic and export markets, with no resale possibility between the two markets.[25] To the extent that the foreign market is highly competitive and exporters cannot control market prices for their own products, a rise in selling price will lead to a loss of market share in the foreign market. If exporters wish to maintain the market share, they will

[25] See, for example, Krugman (1987), Marston (1990), and Knetter (1993).

keep their export prices unchanged in terms of the importer's currency.

The studies of the yen internationalization rely on the results of the above studies and conjecture that the selection of an invoice currency may be related to the PTM behavior of Japanese exporting firms. Giovannini (1988) is one of the most important studies relating PTM with the selection of an invoice currency. Giovannini shows theoretically that the selection of the invoice currency depends on the shape of the firm's profit function in each foreign market: firms set their export prices in the foreign (home) currency if the profit function is concave (convex) in the exchange rate. Fukuda and Ji (1994) and Fukuda (1996) apply Giovannini's results and examine the validity of the following hypothesis empirically:

HYPOTHESIS:
When invoicing in the foreign currency, the export price in terms of the domestic currency is positively correlated with the exchange rate in terms of the domestic currency. When invoicing in the domestic currency, the correlation between the export price and the exchange rate is ambiguous in terms of the domestic currency.[26]

This hypothesis implies that the selection of an invoice currency may be revealed by the correlation between the export price and the exchange rate. Specifically, PTM implies that an exporting firm discriminates between the domestic selling price and the export price in terms of the exporter's currency when the exchange rate fluctuates. Suppose, for example, that the yen appreciates against the U.S. dollar and also that a Japanese firm exports its products invoiced in the dollar to the United States. In this case, while the domestic selling price remains constant, the export price in terms of the yen will decline with the yen appreciation. In other words, the relative price of the export price in terms of the yen against the domestic selling price declines as the yen appreciates. Accordingly, PTM behavior, and hence invoicing practices,

[26] Fukuda (1996) p.151. The proof of this hypothesis is given by Giovannini (1988) and Fukuda and Ji (1994).

can be measured by the correlation between the relative price of the yen-denominated export prices against the yen-denominated domestic prices and the yen-dollar exchange rate. The hypothesis is usually tested by running the following regression:

$$d\ln\left(\frac{P_E^i}{P_D^i}\right)_t = const. + a \cdot d\ln S_t, \quad (1)$$

where P_E^i and P_D^i are the export price of commodity *i* in terms of the yen and the corresponding domestic price index respectively. d is the first difference operator. $d\ln\left(P_E^i / P_D^i\right)_t$ is the first difference of the logarithm of the relative price of commodity *i*'s exports at time *t*, and $d\ln S_t$ is the first difference of the U.S. dollar exchange rate in terms of the yen at time *t*. The nominal exchange rate is used in this analysis, and S_t is assumed to follow a random walk process.

4.2 Data

This paper examines how the export prices of some specific commodities are correlated with the yen-dollar exchange rate in Japan's exports to the United States, Southeast Asia, and East Asia.[27] Unlike the Fukuda and his co-author's work, I test the following three types of commodities: piston engines (henceforth engines), ICs, and automobiles. These three products are selected from the three major machinery industries respectively: general machinery, electric machinery, and transport equipment (see also Appendix B). Whereas Fukuda and his co-author examine PTM for TVs, VCRs, and two types of automobiles, the trade volume of TVs and VCRs are relatively small in the 1990s and the recent increase in Japan's trade with East Asia is attributed mainly to semiconductors and ICs.

The data sources used in the empirical test are listed in Appendix B. Before turning to the results of the test, the following two points should be mentioned.

First, *Japan Exports & Imports (Commodity by Country)*, published by Japan Tariff Association, reports the quantities and values of Japan's exports by both

[27] In the definition of the MITI data, Southeast Asia does not include China (see Appendix A). Therefore, exports to East Asia are also investigated (East Asia includes Asian NIEs, ASEAN4, and China).

commodity and country. Each export value is based on the FOB value in terms of the yen. Since commodity classifications are highly disaggregated in these statistics, export price of each commodity to each country can be approximated by dividing each total export value by its export quantity.[28] All data are monthly, and seasonality is adjusted by moving average method. The sample period is from January 1988 to April 1998, but the sample size is 123 because I take the first difference.[29]

Second, I use the yen-dollar exchange rate in examining the PTM behavior in Japan's exports to East Asia and Southeast Asia. Most East Asian countries adopt the currency basket system and the composition of the basket is not officially announced. It is widely known, however, that East Asian currencies have in effect been pegged to the U.S. dollar.[30] Accordingly we can assume that exporters and importers in East Asian countries (and possibly Southeast Asian countries) are exposed to less exchange rate risk when their trading goods are invoiced in the U.S. dollar.

4.3 Estimation and Results

As discussed in Section III, the dollar-invoiced transactions are dominant in Japan's exports to the United States. In Japan's exports of ICs to Southeast Asia, the dollar-invoiced ratio is also high, while the yen-invoiced transactions are preferred in the exports of automobiles and engines to Southeast Asia. To the extent that the above hypothesis holds true, we can suppose that the exchange rate in terms of the yen is positively correlated with the export prices in terms of the yen in Japan's exports to the United States, and also that this is the case even in the exports of ICs to East Asia and Southeast Asia. On the other hand, we can expect that the exchange rate will be less

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[28] This calculation for the export price of each commodity follows Fukuda and Ji (1994).

[29] The reason why I chose this sample period is that the commodity classifications in *Japan Exports and Imports (Commodity by Country)* changed drastically in January 1988. Up until the end of 1987, the commodity classification was based upon the Customs Co-operation Council Nomenclature. Since the beginning of 1988, the classification has been based upon Harmonized Commodity Description and Coding System (HS).

[30] See, for example, Frankel (1993), Frankel and Wei (1994), and Kwan (1994). After the Asian currency crisis, some East Asian countries adopted more flexible exchange rate system. Regarding this change in the exchange rate system, see footnote 31.

correlated with the export prices in Japan's exports of automobiles and engines to East Asia and Southeast Asia.

Table 10 reports the regression result of Equation (1). The equation is estimated by the maximum likelihood method in order to correct the first-order serial correlation of error terms.

First, as for the exports to the United Sates, all estimates of α are significantly positive, though the estimated value of α in the exports of ICs is larger than one. This result implies that in the case of Japan's exports to the United States, Japanese exporters adjust their export prices in terms of the yen to the exchange rate fluctuations. Taking into consideration that Japan's exports of manufactured products to the United States are invoiced largely in the U.S. dollar (Table 7), the result is consistent with the above hypothesis. In other words, Japanese exporters prefer the dollar-invoiced exports in order to keep their selling prices constant in terms of the U.S. dollar.

Second, while the estimated values of α are small or negative and not significantly different from zero in Japan's exports of engines and automobiles to Southeast Asia and East Asia, the corresponding values are significantly positive in Japan's exports of ICs to these regions. This implies that Japanese exporters of ICs tend to stabilize their export prices in terms of the U.S. dollar in the exports to East Asia and Southeast Asia. Our result contrasts sharply with the Fukuda and his co-author's work which concludes that there is no evidence that Japanese exporters keep their export prices unchanged in terms of the dollar in the exports of manufactured products to East Asia.

Fukuda and Ji (1994) and Fukuda (1996) run the regression by the Almon lag method to allow the lagged exchange rate effects. Following their approach, another regression is run:

$$d\ln\left(\frac{P_E^i}{P_D^i}\right)_t = const. + \sum_{k=0}^{2}\beta_k \cdot d\ln S_{t-k}\,. \qquad (2)$$

In estimating the Almon lags, distributed lags are assumed to follow quadratic forms and β_3=0 is also assumed. Table 11 shows the result which was estimated by

the maximum likelihood method to correct the first-order serial correlation of error terms.

The result is almost the same as that in Table 10. As for engines and automobiles, the estimated values of $\sum \beta_k$ are significantly positive in the exports to the United States but small and are not significantly different from zero in the exports to East Asia and Southeast Asia. In the case of ICs, however, the estimated values of $\sum \beta_k$ are significantly positive and close to one in the exports to East Asia and Southeast Asia, as well as the exports to the United States.

The above regression analysis gives us the following important results. First, there is no evidence that the selling price is stabilized in the local market in Japan's exports of automobiles and engines to East Asia and Southeast Asia, which is consistent with the result of Fukuda and his co-author's work. This result implies that yen-invoiced transactions are preferred in Japan's exports of these products, and that the changes in currency values are fully passed through to the importers.

Second, contrary to the result of Fukuda and his co-author's work, Japanese exporting firms tend to adjust their export prices in terms of the yen to the fluctuations of the yen-dollar exchange rate in the exports of ICs to East Asia and Southeast Asia as well as the United States. This result is consistent with the high level of the dollar-invoiced exports of ICs to East Asia and Southeast Asia (Table 8). Whereas Fukuda and his co-author conclude that pricing behavior of differentiated machinery exports differs markedly between U.S. and East Asian markets, the selected commodities for their empirical tests are different from those of this paper. This paper runs the empirical test using more important commodities in terms of the volume of trade with East Asia, Southeast Asia, and the United States, and shows that the low level of yen-invoiced exports of ICs to these regions can be explained by the PTM behavior of the IC industry.[31]

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[31] It is interesting to examine whether the parameters of the above equations are constant in the case of Japan's exports of ICs to East Asia and Southeast Asia over the sample period, especially after the Asian currency crisis in 1997. I ran the Chow test over the sample period in order to test the hypothesis of parameter stability. The result is that we cannot reject the hypothesis of stability over the 1990s, though we reject the hypothesis from July to September 1988 at 1 percent significance

V. PROSPECTS FOR FURTHER YEN INTERNATIONALIZATION

5.1 Investment-Trade Nexus and Its Effect on Yen Internationalization

As discussed in the previous sections, yen-invoiced exports to Southeast Asia declined substantially from 1994, and the low level of the yen-invoiced ratio is particularly prominent in exports of the electric machinery industry. Focusing on this trend, I ran the regression analysis and concluded that Japanese firms tended to stabilize their export prices in their exports of ICs to East Asia and Southeast Asia, using the U.S. dollar as an invoice currency.[32]

It is important to consider the trade invoicing patterns of the electric machinery exports, especially semiconductors and ICs, because recent increase in Japan's trade with East Asia is largely due to the active investment and trade of the electric machinery industry, particularly semiconductors and ICs.[33] In 1997, for example, the share of electric machinery exports is 30 percent of Japan's overall exports to East Asia, and the exports of semiconductors etc. (including ICs) account for 44 percent of electric machinery exports to East Asia.[34]

Let us discuss the investment and trade relationship between Japan and East Asia. It is widely known that Japan's FDI of the manufacturing industry, especially the electric machinery industry, in East Asia expanded significantly in the 1990s. Such an investment-trade nexus can be illuminated by considering the foreign operations of

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level. I ran the regression of the equations (1) and (2) using dummy variables to allow the parameter changes, but the estimated values were similar to those in Tables 10 and 11.

[32] Semiconductors and ICs are a highly dynamic industry. Due to the rapid pace of technological change, the product cycle of each commodity is quite short and the markets are highly competitive. Therefore, the pricing behavior of this industry is different from that of other machinery industries in Japan's exports to East Asia and Southeast Asia.

[33] See JETRO (1997) pp.68-72.

[34] Computed from Japan Tariff Association, *The Summary Report on Trade of Japan*, December 1997.

Japanese MNCs in East Asia.[35]

Table 12 shows the sales and procurement of the Japanese manufacturing affiliates in Asia. We can easily observe that the electric machinery industry is by far the largest in terms of total amount of sales and procurement, and also that the electric machinery industry is outwardly oriented judging from the relatively low level of local sales and procurements. More noteworthy is that Japanese MNCs in the electric machinery industry tend to promote intra-regional trade (including trade with Japan and Asian countries). According to Table 12, 48.2 percent of the sales in the electric machinery industry were directed toward Japan and other Asian countries, and 63.7 percent of procurements were from Japan and other Asian countries. In addition, the ratio of "reverse importing" (i.e., Japan's imports from foreign affiliates) to Japan's total imports is much higher in imports from the affiliates in Asia than in those from other regions. According to the MITI questionnaire survey, this ratio is 18.5 percent in Japan's imports from Asia in 1995 fiscal year, 2.1 percent in the imports from North America, and 1.4 percent from Europe.[36]

In summary, the above observation indicates that the investment-trade linkage between Japan and East Asia has been facilitated by the electric machinery industry including semiconductors and ICs. We have also observed that the yen-invoiced ratio is relatively low in the electric machinery exports to East Asia, especially in the exports of ICs due to the PTM behavior of this industry. To the extent that Japanese exporters continue to stabilize the export price in the exports of ICs to East Asia, the yen-invoiced

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[35] The reason why the foreign operations of MNCs are discussed instead of Japan's FDI in East Asia is that Japan's FDI data published by Ministry of Finance (MOF) is quite unreliable. Generally speaking, the MOF data on FDI flows and stocks is more commonly used than the balance of payments-based data such as the data published by Bank of Japan, because the MOF data provide detailed breakdowns by host country and industry. However, the approved-reported FDI figures, like the MOF data, tend to overestimate highly the actual FDI, because a large portion of the approved-reported FDI is not realized. For further details of this problem, see Ramstetter (1996).

[36] MITI, *Kaigai Jigyo Katsudo Kihon Chosa*, No.6, 1998, Table 3-2-5. It should be noted, however, that the data based on the MITI questionnaire survey is not necessarily reliable, because in the 1995 survey the response rate is only 60.4 percent. Furthermore, since the sample firms do not necessarily answer all the questions, the coverage of some data should be under 60.4 percent (see also notes in Table 12). Due to this data constraint, the data on the ratio of reverse importing should be treated more carefully.

ratio is unlikely to increase significantly in Japan's exports to East Asia.

5.2 *The U.S. Dollar and the Yen in East Asia*

For the past several decades, East Asian countries as well as Japan have relied heavily on the United States for their export market. Although the weight of the U.S. economy in the world has declined and the United States has run current account deficits since the first half of the 1980s, the U.S. dollar has continued to play a dominant role as an international currency.[37] Even in Japan's trade with East Asia, the U.S. dollar-invoiced trade is significantly large.

There is additional evidence that shows the dominance of the U.S. dollar, and hence the limited use of the Japanese yen in East Asia.[38]

First, whereas the yen is used to a certain extent in trade between Japan and East Asian countries, these countries are unlikely to use the yen in their trade with other countries except Japan. Table 13 shows that most of Korean trade is invoiced in the U.S. dollar: in 1997, for example, 89.2 percent of Korean exports and 82.1 percent of its imports were invoiced in the U.S. dollar. On the other hand, the yen-invoiced ratio was significantly lower than the dollar-invoiced ratio over the sample period and had declined for the last few years. These observations indicate that Korean foreign trade except its trade with Japan is mainly invoiced in the U.S. dollar.

Second, the volume of foreign exchange trading involving the U.S. dollar is still dominant and that of foreign exchange trading involving the yen is quite small in Asian foreign exchange markets. Table 14 shows that in April 1995 the U.S. dollar was used in 93.7 percent, 90.9 percent, and 93.3 percent of trading in the Tokyo, Singapore, and Hong Kong markets, respectively, and that the Japanese yen was used in 81.1 percent, 27.9 percent, and 31.1 percent, respectively. The share of the yen in Singapore and Hong Kong were significantly lower than that of the U.S. dollar. The

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[37] See Tavlas (1997).

[38] The role of the yen in capital transactions is not discussed below. Useful information on this is given by Kawai (1996), Iwami (1995), and Iwami and Sato (1996).

very high share of the U.S. dollar in foreign exchange markets implies that the dollar plays the role of a vehicle currency, due to the low transaction costs of the U.S. dollar based on economies of scale. The dominant vehicle role in mediating exchanges of various currencies facilitates the dollar-denominated transactions not only in financial and capital markets but also in foreign trade, which impedes yen-invoiced trade in East Asia.

Third, it is widely known that most East Asian currencies were strongly linked to the U.S. dollar. To the extent that monetary authorities in East Asian countries continue to stabilize their currencies against the U.S. dollar, the dollar-invoiced transactions are more advantageous to exporters and importers of East Asian countries in avoiding the exchange rate risk. After the outbreak of Asian currency crisis in 1997, however, several East Asian countries began to adopt a more flexible exchange rate system. Will this movement lead to a further increase in the use of the yen in East Asia?

Whereas Japan's economic interdependence with East Asia has deepened over time through investment and trade, the use of the yen is quite small in Japan's trade with East Asian countries and not observed in East Asian trade with other countries except Japan. Unless the gap between the degree of deepening investment-trade linkage and that of yen-invoiced trade is narrowed, the yen is unlikely to become a full-fledged international currency in East Asia.

VI. CONCLUDING REMARKS

The economic interdependence through investment and trade between Japan and East Asia has deepened significantly since the mid-1980s, especially in the 1990s. Despite this fact, the international use of the Japanese yen in East Asia has not grown. The limited use of the yen is usually explained by the underdevelopment of yen-denominated money and capital markets in Japan and the Japan's unique trade structure. This paper focuses particularly on the trade invoicing practice of Japanese firms as well as Japan's trade structure, and explores why the use of the yen in Japan's

trade with East Asia has not increased in the 1990s.

Examining empirically the relationship between the PTM behavior of Japanese exporting firms and trade invoicing practices, this paper revealed that Japanese exporting firms tended to stabilize the export price even in their exports of ICs to East Asia, invoicing their products in the U.S. dollar. This result is particularly important because the recent increase in economic interdependence between Japan and East Asia through investment and trade is largely attributed to the electric machinery industry, especially semiconductors and ICs. To the extent that Japanese exporters of this industry prefer the dollar-invoiced transactions based on the PTM behavior, the yen-invoiced ratio of the electric machinery exports to East Asia, and possibly that of overall exports to this region, are unlikely to increase significantly.

This paper also pointed out that the low level of yen-invoiced imports from East Asia is mainly due to the high import ratio of raw materials and fuels. Even in 1997, imports of raw materials and fuels account for 51.4 percent of Japan's overall imports from Southeast Asia,[39] which suggests that the weight of these products is still enough to impede the increase in yen-invoiced imports from this region.

The analysis of this paper can be extended in the following way. First, we could use more sample commodities for the empirical test, which leads to further investigation of the relationship between Japan's trade invoicing patterns and the PTM behavior in order to support our results. Second, the recent decline in yen-invoiced imports from Southeast Asia is not discussed fully in this paper. Whereas this decline has to do with the sharp fluctuations of the yen-dollar exchange rate in the mid-1990s, further examination should be necessary. Finally, the investigation of invoicing practices in intra-firm trade may be conducive to our further understanding of Japan's trade invoicing patterns, whereas only a few data are available. These are left for future research.

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[39] Computed from Japan Tariff Association, *The Summary Report on Trade of Japan*, December 1997.

Appendix A: Geographical Definition

This paper focuses on East Asia in examining the use of the Japanese yen in trade transactions. However, the statistics that are investigated in this paper do not necessarily report the data on East Asia. Hence, it is useful to present the geographical definition of this paper.

East Asia includes the following 9 countries (or areas): Asian NIEs (Korea, Taiwan, Hong Kong, and Singapore), ASEAN4 (Indonesia, Malaysia, Philippines, and Thailand), and China.

Yushutsu (Yunyu) Kessai Tsukadade Doko Chosa, published by MITI, reports the data on trade invoice currency. In this data, Southeast Asia is defined to include the following 22 countries (or areas): Asian NIEs (Korea, Taiwan, Hong Kong, and Singapore), ASEAN4 (Indonesia, Malaysia, Philippines, and Thailand), Brunei, Cambodia, Laos, Myanmar, India, Pakistan, Sri Lanka, Maldives, Bangladesh, East Timor, Macao, Afghanistan, Nepal, and Bhutan.

Kaigai Jigyo Katsudo Kihon Chosa, published by MITI, reports the foreign operations of Japan's MNCs. In the MITI questionnaire survey, Asia is defined to include the following 19 countries (or areas): East Asia, Bangladesh, Brunei, Cambodia, India, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, and Vietnam.

Appendix B: Data for Empirical Tests

The data of export prices are based on *Japan Exports & Imports (Commodity by Country)*, various issues, published by Japan Tariff Association. In the estimation of equations (1) and (2), three kinds of commodities are used: (a) Engines = Spark-ignition reciprocating internal combustion piston engines of a kind used for the propulsion of vehicles (other than railway or tramway rolling-stock, and parts and accessories thereof), of a cylinder capacity exceeding 1,000 cc, other than those for motorcycles. (b) ICs = Hybrid integrated circuits. (c) Automobiles = Motor cars and

other motor vehicles principally designed for the transport of persons with spark-ignition internal combustion reciprocating piston engine, of a cylinder capacity exceeding 1,500 cc but not exceeding 2,000 cc, excluding those unassembled or disassembled.

The domestic price indexes are based on *Price Indexes Annual* and *Price Indexes Monthly* (Bank of Japan), various issues. In the engine category, the price index of industrial internal combustion engines-gasoline is used. In ICs, the price index of ICs is used. In automobiles, the price index of small passenger cars (up to 2,000 cc) is used.

The yen-dollar exchange rate is the monthly average (nominal) exchange rate, based on *International Financial Statistics* (IMF, CD-ROM edition).

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Table 1 Invoice Currency Ratios in Japan's Exports (%)

	Exports to:							
	World		United States		EU (EC)		Southeast Asia	
Year	Yen	Dollar	Yen	Dollar	Yen	Dollar	Yen	Dollar
1970	0.9	90.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1975	17.0	78.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1980	28.9	66.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1981	31.8	62.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1982	33.8	60.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1983	42.0	50.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1984	39.5	53.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	39.3	52.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1986	36.5	53.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1987	33.4	55.2	15.0	84.9	44.0	8.2	41.1	56.5
1988	34.3	53.2	16.4	83.5	43.9	7.6	41.2	56.0
1989	34.7	52.4	16.4	83.5	42.2	7.0	43.5	53.6
1990	37.5	48.8	16.2	83.7	42.1	6.4	48.9	48.1
1991	39.4	46.8	16.5	83.4	42.0	6.8	50.8	45.9
S1992	40.1	46.6	16.6	83.2	40.3	11.1	52.3	41.6
M1993	42.8	45.6	18.0	81.6	42.7	7.2	52.4	44.4
S1993	39.9	48.4	16.5	83.3	41.0	7.5	52.5	44.3
M1994	40.7	48.6	19.4	80.5	40.9	8.5	52.0	45.1
S1994	39.7	48.3	19.0	80.8	36.6	9.0	49.0	47.9
M1995	37.6	51.5	17.5	82.3	37.2	11.3	47.2	49.9
S1995	36.0	52.5	17.0	82.9	34.9	12.2	44.3	53.4
M1996	35.9	53.1	15.9	83.9	36.1	12.5	44.1	53.5
S1996	35.2	53.3	14.5	85.4	33.3	12.4	46.3	51.3
M1997	35.8	52.8	16.6	83.2	34.3	13.4	45.5	51.7
S1997	35.8	52.1	15.3	84.5	34.2	12.3	47.0	50.2
M1998	36.0	51.2	15.7	84.1	34.9	13.2	48.4	48.7

Note: S refers to September and M refers to March.

Sources:

BOJ, *Yushutsu Shinyojo Tokei* (Export Letter of Credit Statistics).---Data for 1970-1982.

MITI, *Yushutsu Kakunin Tokei* (Export Confirmation Statistics).---Data for 1983-1991.

MITI, *Yushutsu Hokukosho Tukadate Doko* (Export Currency Invoicing Report).
---Data for S1992-S1993.

MITI, *Yushutsu Kessai Tsukadate Doko Chosa* (Export Settlement Currency Invoicing).
---Data for M1994-M1998.

Table 2 Invoice Currency Ratios in Japan's Imports (%)

	Imports from:							
	World		United States		EU (EC)		Southeast Asia	
Year	Yen	Dollar	Yen	Dollar	Yen	Dollar	Yen	Dollar
1970	0.3	80.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1975	0.9	89.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1980	2.4	93.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1981	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1982	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1983	3.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1984	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	7.3*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1986	9.7*	83.2*	7.8*	91.9*	28.9*	21.2*	9.2*	89.8*
1987	10.6	81.7	9.2	90.6	27.3	19.5	11.5	87.6
1988	13.3	78.5	10.0	89.9	26.9	21.0	17.5	81.2
1989	14.1	77.3	10.2	89.5	27.7	19.5	19.5	79.0
1990	14.6	75.5	11.6	88.2	26.9	16.3	19.4	78.8
1991	15.6	75.4	11.2	88.7	31.4	15.9	21.6	76.5
S1992	17.0	74.5	13.8	86.6	31.7	17.9	23.8	73.9
M1993	18.2	75.0	16.2	83.6	35.7	24.2	23.4	74.8
S1993	20.9	72.4	13.8	86.1	45.0	18.2	25.7	72.0
M1994	21.6	72.1	12.4	87.5	44.1	19.4	30.1	67.4
S1994	19.2	73.9	13.3	86.4	38.6	21.9	23.6	74.2
M1995	24.3	68.9	18.4	80.9	40.6	20.2	34.1	64.2
S1995	22.7	70.2	21.5	78.4	44.8	16.1	26.2	71.9
M1996	20.5	72.2	17.5	82.7	40.9	15.3	23.9	74.1
S1996	20.6	72.4	16.4	83.2	46.1	12.5	24.0	73.8
M1997	18.9	74.0	14.2	85.6	41.3	17.0	23.3	74.9
S1997	22.6	70.8	22.0	77.8	49.3	13.1	25.0	73.0
M1998	21.8	71.5	16.9	83.0	44.3	14.3	26.7	71.6

Notes:
1. S refers to September and M refers to March.
2. * denotes fiscal year data.

Sources:
MITI, *Yunyu Shonin Todokede Hokokusho* (Import Approval Notification Report).
--Data for 1970-1980.
MITI, *Hokokushorei ni Motozuku Hokoku* (Report Based on Report Guidance).
---Data for 1985.
MITI, *Yunyu Hokoku Tokei* (Import Report Statistics).---Data for 1986-1991.
MITI, *Yunyu Hokukosho Tukadate Doko* (Import Currency Invoicing Report).
---Data for S1992-S1993.
MITI, *Yunyu Kessai Tsukadate Doko Chosa* (Import Settlement Currency Invoicing).
---Data for M1994-M1998.

Table 3 Share of Trade Invoiced in National Currency: Selected Industrial Countries (%)

	Exports				Imports			
	1980	1988	1992-96	80 to 96 *	1980	1988	1992-96	80 to 96 *
United States	97.0	96.0	98.0 [e]	+1.0	85.0	85.0	88.8 [e]	+3.8
Germany	82.5	79.2	76.4 [c]	-6.1	43.0	52.6	53.3 [c]	+10.3
Japan	28.9	34.3	35.9 [e]	+6.5	2.4	13.3	22.5 [e]	+20.1
United Kingdom	76.0	57.0	62.0 [b]	-14.0	38.0	40.0	51.7 [b]	+13.7
France	62.5	58.5	51.7 [d]	-10.8	34.1	48.9	48.4 [d]	+14.3
Italy	36.0	38.0 [a]	40.0 [c]	+4.0	18.0	27.0 [a]	37.0 [c]	+19.0

	Exports to the United States**				Imports of Raw Materials & Fuels***			
	1980	1988	1992-96	80 to 96 *	1980	1988	1992-96	80 to 96 *
United States	—	—	—	—	37.6	13.2	11.7 [c]	-25.9
Germany	6.1	8.0	8.0 [c]	+1.9	30.8	14.5	11.7 [c]	-19.1
Japan	24.5	34.1	27.5 [f]	+3.0	67.8	37.1	26.0 [f]	-41.8
United Kingdom	9.6	13.1	11.5 [b]	+1.9	21.2	10.3	9.6 [b]	-11.6
France	4.3	7.0	5.8 [c]	+1.5	33.2	13.2	11.6 [c]	-21.6
Italy	5.3	9.6 [a]	7.8 [c]	+2.5	38.9	25.1 [a]	17.3 [c]	-21.6

Notes:
a. Data for 1987.
b. Data for 1992.
c. Data for 1994
d. Data for 1995
e. Data for March 1996
f. Data for 1996.
* denotes percentage point.
** denotes the share of exports to the United States in total exports.
*** denotes the share of imports of raw materials and fuels in total imports.

Sources:
Tavlas (1997), Tavlas and Ozeki (1992), Deutsche Bundesbank (1991)
MITI, *Yushutsu (Yunyu) Kessai Tsukadate Doko Chosa* (Export and Import Settlement Currency Invoicing); BOJ, *Comparative Economic and Financial Statistics: Japan and Major Countries*, various issues.

Table 4 International Comparison of Short-term Capital Markets, End of December 1996

(Billions of U.S. Dollars)

	Japan		United States		United Kingdom		Germany	
Interbank market	Call loans	343.6	FF & RP	697.7	Call	12.6	Call loans	371.7
	Bills	95.3			Deposit	196.9		
Open market	TB	111.2	TB	777.4	TB	6.5	TB	17.8
	FB	7.8			Bills	36.5	Bills	11.2
	CD	276	CD	590.3	CD & CP	163.7		
	CP	93.5	CP	775.4				
	Gensaki	103	BA	25.8				
Total		1030.3		2866.6		416.1		400.7

Notes:
1. FF for US denotes Federal funds.
2. The RP market in US is the conditional sales (purchases) market for securities including T-bills. It is virtually a financial market of short-term funds mortgaged securities including T-bills.
3. CD for US denotes large time deposits of US $100,000 or more.
4. Call for UK denotes "Money at Call" which is defined as banks' deposits to discount houses (which corresponds to short-term credit dealer in Japan).
5. Call loans for Germany excludes rediscount bills of Bundesbank.
6. Gensaki for Japan denotes bills with repurchase agreement.

Source: BOJ, *Comparative Economic and Financial Statistics: Japan and Other Major Countries* , 1997.

Table 5 Amounts Outstanding in Yen-Denominated BA market

(100 million yen)

	1985	1986	1987	1988	1989	1990	1991
End of March	—	366	158	87	7	0	0
End of June	590	244	137	51	10	0	0
End of September	450	147	82	15	12	0	0
End of December	304	213	91	25	9	0	0

Source: *Gaitame Nenkan* (Annual Report on Foreign Exchange), 1990, 1992.

Table 6 Trade Settlement in Japan's Foreign Trade (%)

A. Japan's Exports

	Letter of Credit			D/P, D/A			Remittance Checks			Others		
Exports to:	1983	1987	1991	1983	1987	1991	1983	1987	1991	1983	1987	1991
World	64.0	52.0	42.2	21.2	23.3	20.7	8.5	19.7	32.5	6.4	5.0	4.6
Advanced Countries	53.1	36.2	22.1	31.2	31.8	28.6	11.0	27.7	45.2	4.7	4.3	4.0
United States	59.5	39.1	23.1	24.1	25.3	24.9	12.2	31.6	48.4	4.2	4.1	3.6
EC	39.9	28.7	18.1	45.2	42.5	33.4	10.2	24.6	44.3	4.7	4.2	4.3
Developing countries	74.1	69.0	59.1	12.6	14.7	14.3	5.8	11.1	21.8	7.5	5.2	4.8
Southeast Asia	74.2	69.9	59.5	12.3	14.4	14.0	6.0	11.2	22.2	7.5	4.5	4.2
West Asia	83.3	79.9	75.5	7.0	7.9	8.4	3.8	6.1	10.6	5.8	6.2	5.5
Latin America	54.8	49.6	36.6	27.5	25.2	24.9	7.7	16.5	30.0	10.0	8.7	8.5
Africa	66.4	66.0	67.0	15.6	13.5	9.2	6.5	10.4	15.0	11.4	10.1	8.8
Communist Countries	69.1	69.1	69.0	8.6	9.8	7.6	10.3	10.6	15.1	12.0	10.6	8.3

B. Japan's Imports

	Letter of Credit			Bill for Collection			Remittance Bills			Others		
Imports from:	1983	1987	1991	1983	1987	1991	1983	1987	1991	1983	1987	1991
World	23.0	29.2	25.2	50.5	32.8	25.6	26.5	37.9	50.0	0.0	0.1	0.1
Advanced Countries	20.3	18.2	13.8	49.2	35.2	25.1	30.4	46.5	61.0	0.0	0.1	0.1
United States	14.5	14.5	10.9	50.7	36.0	25.3	34.7	49.4	63.7	0.0	0.1	0.1
EC	29.2	25.6	18.6	30.5	19.7	14.0	40.4	54.6	67.2	0.0	0.1	0.2
Developing countries	19.0	66.2	32.7	55.0	33.0	27.1	25.9	33.7	40.1	0.0	0.1	0.1
Southeast Asia	34.0	48.6	47.5	34.1	19.3	16.9	31.9	31.8	35.5	0.0	0.2	0.2
West Asia	5.1	4.2	4.8	71.9	56.8	49.5	23.1	38.9	45.7	0.0	0.0	0.0
Latin America	25.1	23.9	21.6	60.4	46.6	27.7	14.5	29.5	50.6	0.0	0.0	0.0
Africa	22.7	25.6	20.6	55.9	44.8	28.2	21.4	29.6	50.1	0.0	0.0	0.1
Communist Countries	78.8	71.1	57.9	14.5	16.2	18.8	6.8	12.6	23.3	0.0	0.1	0.0

Note: D/P denotes documents against payment and D/A denotes documents against acceptance.
Sources: MITI, *Yushutsu Kakunin Tokei* (Export Confirmation Statistics), *Yunyu Hokoku Tokei* (Import Report Statistics).

Table 7 Invoice Currency Ratios in Japanese Exports and Imports, March 1998 (%)

A. Japanese Exports:

	To World		To United States		To EU		To South-east Asia	
Commodity	Yen	Dollar	Yen	Dollar	Yen	Dollar	Yen	Dollar
All commodities	36.0	51.2	15.7	84.1	34.9	13.2	48.4	48.7
Food Stuff	52.7	42.9	17.6	82.4	37.9	21.1	59.2	35.6
Textiles	35.7	59.0	16.3	83.3	59.8	8.8	28.2	70.8
Chemicals	29.7	61.5	29.0	70.5	38.3	20.4	29.8	68.5
Non-metallic mineral manufs.	41.8	50.9	18.4	81.3	40.7	11.6	53.1	43.1
Metal products	21.3	74.3	11.2	88.8	34.2	31.2	23.2	76.2
General machinery	38.1	50.2	17.7	82.1	32.6	22.9	59.7	37.7
Electric machinery	32.4	55.6	13.6	86.4	37.4	9.7	42.7	53.4
ICs (Integrated circuits)	21.4	68.9	9.3	90.5	16.2	15.9	26.7	70.8
Telecom equipment	24.8	59.2	10.8	89.2	38.0	6.1	34.0	48.6
Transport equipment	43.4	40.4	12.6	87.4	36.9	3.6	81.3	15.4
Passenger motor cars	37.6	40.7	13.6	86.4	37.8	0.1	87.7	2.6
Parts of motor vehicles	39.3	53.8	12.4	87.6	51.2	0.1	81.1	17.8
Precision instruments	37.1	45.6	20.9	78.9	34.5	6.2	61.5	37.1
Others	27.2	55.6	16.6	83.2	23.8	13.0	40.3	54.9

B. Japanese Imports:

	From World		From United States		From EU		From South-east Asia	
Commodity	Yen	Dollar	Yen	Dollar	Yen	Dollar	Yen	Dollar
All commodities	21.8	71.5	16.9	83.0	44.3	14.3	26.7	71.6
Food stuff	27.4	66.7	21.4	78.6	31.7	19.0	30.7	68.8
Raw materials	6.8	91.3	1.2	98.7	27.6	53.0	14.8	84.6
Mineral fuels	1.3	98.6	4.5	95.5	38.0	42.8	1.0	98.7
Crude oil	0.5	99.3	0.0	100.0	—	—	4.6	93.3
Petroleum products	0.9	98.9	1.7	98.3	29.8	52.7	1.0	99.0
Manufactured goods	28.2	62.2	16.9	83.0	46.5	12.3	33.7	63.9
Chemicals	32.1	61.2	14.8	85.1	76.8	7.6	22.8	71.5
Textile	18.5	72.5	11.1	88.6	41.8	6.0	16.6	82.0
Metals	27.2	69.7	14.4	85.6	35.1	43.1	51.6	46.9
Machinery & equipment	31.2	57.3	19.8	80.3	35.2	10.1	37.7	60.1
Office machinery	31.9	65.4	32.6	67.3	16.5	62.1	34.9	63.1
Semiconductors etc.	51.6	47.4	23.2	76.8	44.4	32.1	54.3	45.6
Motor vehicles	43.0	14.2	26.0	73.9	45.7	0.2	90.5	7.6
Others	20.8	67.4	14.7	85.2	31.0	15.3	24.5	72.7

Source: MITI, *Yushutsu (Yunyu) Kessai Tsukadate Doko Chosa* (Export and Import Settlement Currency Invoicing).

Table 8 Invoice Currency Ratios in Japanese Exports to Southeast Asia, 1987 - March 1998

A. Invoice currency ratio (%) from 1987 to 1991

	Yen-invoiced ratio					*Dollar-invoiced ratio*				
Commodity	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
All commodities	41.1	41.2	43.5	48.9	50.8	56.5	56.0	53.6	48.1	45.9
Machines	54.0	52.6	55.3	60.9	62.6	43.0	43.8	40.9	35.2	33.2
Generators	66.1	64.3	68.1	67.8	67.5	29.0	32.9	31.1	29.2	25.9
TVs	38.8	42.8	53.0	72.4	74.8	55.8	49.0	41.8	21.1	19.9
VCRs	63.6	48.2	44.7	61.8	62.3	31.0	44.0	45.9	28.9	27.7
Automobiles	71.5	68.6	68.2	67.1	69.8	25.9	26.1	24.6	26.1	19.1
Ships	42.6	63.6	85.7	79.4	77.2	57.3	36.3	13.3	20.6	22.8
Heavy electric	40.9	39.9	49.0	46.6	51.7	53.9	58.2	48.9	51.2	45.4

B. Yen-invoiced ratio (%) from March 1994 to March 1998

Commodity	M.,1994	S.,1994	M.,1995	S.,1995	M.,1996	S.,1996	M.,1997	S.,1997	M.,1998
All commodities	52.0	49.0	47.2	44.3	44.1	46.3	45.5	47.0	48.4
General machinery	69.0	65.8	66.8	63.7	59.9	57.9	59.7	61.9	59.7
Electric machinery	41.8	39.7	37.0	35.9	39.7	41.3	37.9	42.0	42.7
ICs (Integrated circuits)	25.9	28.6	24.2	24.7	24.4	32.6	24.4	22.3	26.7
Telecom equipment	n.a.	n.a.	n.a.	n.a.	35.8	34.9	28.3	36.0	34.0
Transport equipment	78.4	74.4	71.5	69.3	58.5	68.5	72.3	75.6	81.3
Passenger motor cars	75.0	73.6	66.1	66.4	72.6	72.3	74.1	81.8	87.7
Parts of motor vehicles	n.a.	n.a.	n.a.	n.a.	60.5	62.3	61.3	72.7	81.1
Precision instruments	79.0	73.9	71.6	63.8	69.3	59.0	49.5	54.5	61.5

C. Dollar-invoiced ratio (%) from March 1994 to March 1998

Commodity	M.,1994	S.,1994	M.,1995	S.,1995	M.,1996	S.,1996	M.,1997	S.,1997	M.,1998
All commodities	45.1	47.9	49.9	53.4	53.5	51.3	51.7	50.2	48.7
General machinery	29.3	32.6	31.6	34.9	38.7	40.6	38.5	36.4	37.7
Electric machinery	53.2	54.6	57.6	60.2	56.5	54.5	57.2	53.9	53.4
ICs (Integrated circuits)	67.8	65.5	71.4	73.2	72.5	63.6	71.7	74.6	70.8
Telecom equipment	n.a.	n.a.	n.a.	n.a.	55.1	53.8	62.3	52.0	48.6
Transport equipment	18.9	23.3	26.2	28.8	39.7	29.7	25.1	21.4	15.4
Passenger motor cars	14.4	18.8	22.8	26.8	20.8	22.0	16.5	8.2	2.6
Parts of motor vehicles	n.a.	n.a.	n.a.	n.a.	39.3	37.4	38.4	26.6	17.8
Precision instruments	18.4	23.2	25.4	34.1	38.1	39.0	47.8	43.0	37.1

Note: S refers to September and M refers to March.

Sources:
MITI, *Yushutsu Kakunin Tokei* (Export Confirmation Statistics).---Data for 1987-1991.
MITI, *Yushutsu Kessai Tsukadate Doko Chosa* (Export Settlement Currency Invoicing).---Data for M1994- M1998.

Table 9 Invoice Currency Ratios in Japanese Imports from Southeast Asia, 1987 - March 1998

Yen-invoiced ratio (%)

Commodity	1987	1988	1989	1990	1991	M.,1994	S.,1994	M.,1995	S.,1995	M.,1996	S.,1996	M.,1997	S.,1997	M.,1998
All commodities	11.5	17.5	19.5	19.4	21.6	30.1	23.6	34.1	26.2	23.9	24.0	23.3	25.0	26.7
Food stuff	15.0	18.3	22.5	23.4	26.3	33.3	28.5	33.7	31.3	36.6	29.9	34.0	24.5	30.7
Raw materials	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.1	9.8	9.1	9.5	12.0	11.8	14.8
Mineral fuels	0.3	0.3	0.5	0.2	0.3	1.2	0.8	0.2	0.8	2.0	1.2	1.9	0.7	1.0
Crude oil	0.1	0.0	0.2	0.0	0.0	4.2	0.7	0.0	0.2	1.5	0.0	0.0	0.0	4.6
Petroleum products	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	0.9	4.2	3.6	5.9	1.8	1.0
Manufactured goods	21.6	28.2	29.6	30.4	32.8	38.3	29.9	44.1	32.1	27.5	29.5	28.6	31.6	33.7
Chemicals	22.5	24.3	25.4	25.1	28.0	36.3	23.0	23.1	28.5	29.3	25.0	26.9	27.4	22.8
Textile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	60.6	18.1	13.7	16.1	14.4	18.6	16.6
Metals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51.9	51.9	52.8	50.5	53.9	54.3	51.6
Machinery & equipment	27.0	36.5	39.4	38.6	43.9	48.4	34.9	44.8	39.2	30.0	33.0	31.5	35.0	37.7
Office machinery	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	60.2	32.5	22.6	32.0	26.0	25.1	34.9
Semiconductors etc.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	40.8	37.4	36.6	44.4	54.3
Motor vehicles	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	62.7	63.2	69.2	0.7	59.7	74.8	90.5
Others	20.5	26.6	27.6	28.4	29.0	34.6	28.1	20.7	18.6	20.3	23.5	19.9	22.0	24.5

Dollar-invoiced ratio (%)

Commodity	1987	1988	1989	1990	1991	M.,1994	S.,1994	M.,1995	S.,1995	M.,1996	S.,1996	M.,1997	S.,1997	M.,1998
All commodities	87.6	81.2	79.0	78.8	76.5	67.4	74.2	64.2	71.9	74.1	73.8	74.9	73.0	71.6
Food stuff	84.5	81.3	77.0	76.0	73.1	66.4	70.9	65.7	68.0	62.9	69.7	65.5	74.9	68.8
Raw materials	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	93.4	90.0	90.2	90.1	87.5	87.6	84.6
Mineral fuels	99.6	99.7	99.5	99.8	99.7	98.8	99.2	99.8	99.2	98.0	98.8	98.0	99.3	98.7
Crude oil	99.3	100.0	99.7	100.0	100.0	95.8	99.3	100.0	99.8	98.5	100.0	100.0	100.0	93.3
Petroleum products	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	98.7	98.9	95.8	96.3	93.9	98.0	99.0
Manufactured goods	76.4	69.2	67.6	66.2	63.8	57.3	66.5	53.4	65.0	69.4	67.1	68.8	65.6	63.9
Chemicals	75.1	73.6	72.6	72.4	69.8	61.1	73.1	73.1	68.1	66.0	70.2	68.0	70.3	71.5
Textile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	38.9	79.2	83.3	82.2	83.0	79.9	82.0
Metals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	47.2	46.2	46.3	45.0	44.7	43.2	46.9
Machinery & equipment	69.2	57.4	54.3	54.9	49.5	46.9	61.2	51.8	57.9	66.9	63.7	66.1	62.0	60.1
Office machinery	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	37.9	66.3	75.4	65.2	72.1	72.4	63.1
Semiconductors etc.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	59.0	62.4	63.3	55.4	45.6
Motor vehicles	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23.8	26.8	19.1	99.3	40.3	20.3	7.6
Others	77.9	71.5	70.3	69.0	68.5	61.6	68.5	75.1	78.3	76.4	72.4	76.9	74.7	72.7

Note: S refers to September and M refers to March.

Sources:
MITI, *Yunyu Hokoku Tokei* (Import Report Statistics).---Data for 1987-1991.
MITI, *Yunyu Hokukosho Tukadate Doko* (Import Currency Invoicing Report).---Data for S1992-S1993.
MITI, *Yunyu Kessai Tsukadate Doko Chosa* (Import Settlement Currency Invoicing).---Data for M1994-M1998.

Table 10 Regression of Export Prices on the Exchange Rate
(Equation (1): Maximum Likelihood Method)

Commodity	Export Destination	constant	α	RHO	Adj.R-sq.	DW
Engines	United States	-0.0002	0.54 ***	-0.24 ***	0.16	2.05
		(0.0028)	(0.11)	(0.09)		
	Southeast Asia	0.005	0.13	-0.43 ***	0.18	2.22
		(0.006)	(0.28)	(0.08)		
	East Asia	0.004	-0.13	-0.37 ***	0.13	2.16
		(0.006)	(0.27)	(0.09)		
ICs	United States	0.005	1.42 ***	-0.39 ***	0.22	2.26
		(0.010)	(0.41)	(0.08)		
	Southeast Asia	0.007	0.61 **	-0.46 ***	0.23	1.94
		(0.006)	(0.24)	(0.08)		
	East Asia	0.007	0.69 ***	-0.47 ***	0.25	1.97
		(0.006)	(0.24)	(0.08)		
Automobiles	United States	0.006 ***	0.47 ***	-0.33 ***	0.20	1.98
		(0.002)	(0.09)	(0.09)		
	Southeast Asia	-0.001	-0.27	-0.22 **	0.04	1.94
		(0.010)	(0.41)	(0.09)		
	East Asia	-0.0004	-0.32	-0.29 ***	0.09	2.00
		(0.0072)	(0.29)	(0.09)		

Notes: Numbers in parentheses are standard errors.
* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Sources: See Appendix B.

Table 11 Regression of Export Prices on the Exchange Rate (Equation (2): Maximum Likelihood Method)

Commodity	Export Destination	constant	β_0	β_1	β_2	$\sum \beta_k$	RHO	Adj.R-sq.	DW
Engines	United States	0.001	0.45 ***	0.14 **	-0.01	0.58 ***	-0.28 ***	0.20	2.04
		(0.002)	(0.10)	(0.06)	(0.07)	(0.13)	(0.09)		
	Southeast Asia	0.004	0.30	-0.19	-0.29	-0.17	-0.47 ***	0.21	2.21
		(0.006)	(0.27)	(0.15)	(0.19)	(0.34)	(0.08)		
	East Asia	0.003	0.10	-0.10	-0.10	-0.19	-0.43 ***	0.14	2.00
		(0.006)	(0.26)	(0.15)	(0.18)	(0.32)	(0.09)		
ICs	United States	0.006	1.47 ***	0.02	-0.47 *	1.01 **	-0.39 ***	0.22	2.27
		(0.010)	(0.40)	(0.23)	(0.28)	(0.52)	(0.08)		
	Southeast Asia	0.007	0.47 **	0.15	-0.01	0.61 **	-0.47 ***	0.23	1.95
		(0.006)	(0.24)	(0.13)	(0.16)	(0.30)	(0.08)		
	East Asia	0.007	0.59 **	0.12	-0.08	0.63 **	-0.47 ***	0.24	1.98
		(0.006)	(0.24)	(0.14)	(0.17)	(0.30)	(0.08)		
Automobiles	United States	0.006 ***	0.45 ***	0.11 **	-0.04	0.53 ***	-0.32 ***	0.23	1.99
		(0.002)	(0.08)	(0.05)	(0.06)	(0.11)	(0.09)		
	Southeast Asia	-0.001	-0.44	0.28	0.43	0.27	-0.24 **	0.05	1.93
		(0.010)	(0.41)	(0.24)	(0.28)	(0.54)	(0.09)		
	East Asia	0.001	-0.50 *	0.38 **	0.55 ***	0.43	-0.32 ***	0.13	2.03
		(0.007)	(0.28)	(0.16)	(0.19)	(0.36)	(0.09)		

Notes: Numbers in parentheses are standard errors.
* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Sources: See Appendix B.

Table 12 Sales and Procurement of the Japanese Affiliates in Asia (by sector): 1995 Fiscal Year

	Sales Destination (%)					
		Exports to:				Total Amount
Sector	Local Sales	Japan	Other Asia	North America	Other Countries	of Sales (million yen)
Manufacturing	58.4	18.8	13.4	3.6	2.6	8,812,835
Food	63.7	12.5	12.6	2.4	4.6	292,109
Textiles	53.7	20.9	12.8	5.7	4.9	349,824
Wood & Pulp	80.2	13.6	4.6	1.5	0.0	42,504
Chemical Products	69.4	4.1	23.0	0.6	1.2	517,054
Iron & Steel	90.8	2.7	1.9	0.5	0.0	225,790
Nonmetallic Products	64.0	13.2	11.5	1.0	1.0	229,235
General Machinery	48.5	28.5	13.9	0.7	6.2	398,946
Electric Machinery	38.0	28.7	19.5	5.5	3.2	3,619,400
Transport Machinery	92.8	2.2	0.8	2.3	1.0	2,162,485
Precision Instruments	27.7	51.2	15.9	1.9	3.0	273,933
Coal and Petroleum Products	11.2	46.7	34.3	1.3	1.4	107,739
Other manufacturing	61.1	15.8	13.6	3.3	3.7	593,816

	Procurement Sources (intermediate goods)(%)					
		Imports from:				Total Amount
Sector	Local Procurement	Japan	Other Asia	North America	Other Countries	of Procurement (million yen)
Manufacturing	40.3	40.3	14.4	1.4	2.9	5,497,585
Food	86.6	3.6	5.7	0.9	3.2	143,124
Textiles	32.0	46.7	12.1	2.1	4.5	188,432
Wood & Pulp	74.0	3.9	9.5	3.9	0.0	12,597
Chemical Products	45.8	25.9	13.6	7.0	4.5	239,123
Iron & Steel	26.1	55.3	8.4	0.4	7.7	111,374
Nonmetallic Products	45.7	24.3	9.2	0.8	20.0	120,392
General Machinery	42.9	44.0	12.6	1.1	1.1	271,715
Electric Machinery	33.8	38.9	24.8	1.3	0.3	2,248,170
Transport Machinery	45.6	51.6	1.1	0.9	0.8	1,529,954
Precision Instruments	34.9	44.3	20.6	0.1	0.2	254,093
Coal and Petroleum Products	6.8	1.8	16.3	0.8	74.3	94,886
Other manufacturing	56.6	25.0	10.5	2.6	3.8	286,725

Notes:

1. Some numbers do not add up to 100 percent, not only because of rounding, but also because of data inconsistency.
2. This data is based on the MITI questionnaire survey. MITI periodically conducts the questionnaire survey to Japanese companies that have foreign affiliates. In the 1995 survey, a questionnaire was sent to 3,959 Japanese companies, 2,390 of whom responded (response rate: 60.4 percent). The respondents covered the activities of 10,416 overseas affiliates.
3. The sample companies do not necessarily answer all the questions, so the response rate of the data in this table should be lower than 60.4 percent. For example, some companies did not answer the destination of their sales or procurement, and just answered the amounts of their total sales or procurement. Since such a number is not included in this table, the amounts of total sales and procurement are also underestimated.

Source: MITI, *Kaigai Jigyo Katsudo Kihon Chosa* (The Basic Survey of the Overseas Business Activities of Japanese Companies), No.6, 1998.

Table 13 Trade Invoice Currency in Korea's Foreign Trade (%)

	Exports (Receipts)					*Imports (Payments)*				
Year:	U.S. Dollar	Yen	DM	Pound Sterling	Others	U.S. Dollar	Yen	DM	Pound Sterling	Others
1980	96.1	1.2	2.0	0.4	0.3	93.2	3.7	1.7	0.5	0.9
1981	95.0	2.1	1.6	0.5	0.8	92.6	4.9	1.4	0.5	0.7
1982	95.0	3.3	0.8	0.3	0.6	90.7	6.1	1.5	0.5	1.2
1983	95.1	3.4	0.7	0.2	0.7	87.3	9.1	1.6	0.4	1.6
1984	95.0	3.5	0.6	0.2	0.7	85.3	10.5	1.7	0.4	2.1
1985	94.7	3.7	0.6	0.3	0.7	82.4	12.3	2.0	0.5	2.8
1986	94.2	3.8	0.8	0.4	0.8	78.4	15.7	2.9	0.6	2.4
1987	91.7	5.7	1.2	0.5	1.0	80.3	13.8	2.9	0.6	2.4
1988	87.7	8.5	1.6	0.7	1.5	82.4	11.9	2.9	0.6	2.2
1989	87.0	9.4	1.4	0.6	1.6	83.3	10.7	3.2	0.6	2.2
1990	88.0	7.8	2.1	0.5	1.7	79.1	12.7	4.1	0.9	3.4
1991	88.2	7.4	2.2	0.9	1.3	78.1	13.6	4.2	0.8	3.4
1992	88.8	6.3	2.8	0.8	1.3	78.6	13.6	3.8	0.6	3.4
1993	89.0	6.4	2.7	0.7	1.4	79.3	13.7	3.4	0.6	3.0
1994	88.9	6.4	2.6	0.5	1.7	76.8	14.7	4.1	0.7	3.7
1995	88.1	6.5	2.4	0.8	2.2	79.4	12.7	3.8	0.7	3.4
1996	89.1	5.1	2.2	1.0	2.6	81.0	10.7	3.6	0.7	4.0
1997	89.2	5.0	1.8	0.9	3.2	82.1	10.0	2.9	0.8	4.2

Notes:
1. Calculated from the data on foreign exchange and payments in Korean current transactions by settlement currencies.
2. DM denotes Deutsche Mark.

Source: The Bank of Korea, *Monthly Statistical Bulletin*, various issues.

Table 14 Currency Compositions of Foreign Exchange Market Activity in April 1992 and April 1995: Average Daily Turnover

(Percent; Billions of U.S. Dollars in Parentheses)

		Currency:							
Market:	*Year:*	U.S. Dollar	Deutsche Mark	Japanese Yen	Pound Sterling	ECU	Local Currency	Others	Total
Japan	1992	92.4	18.6	73.9	5.6	0.4	—	9.1	200.0 (252.2)
	1995	93.7	15.9	81.1	2.2	0.2	—	6.8	200.0 (322.6)
Singapore	1992	90.4	36.6	31.5	14.7	0.9	3.2	22.7	200.0 (151.7)
	1995	90.9	31.9	27.9	7.6	0.5	5.6	35.6	200.0 (210.8)
Hong Kong	1992	90.2	32.4	28.0	13.5	0.5	14.5	20.9	200.0 (121.8)
	1995	93.3	28.5	31.1	7.9	n.a.	17.0	22.2	200.0 (180.4)

Notes:

1. Data for both April 1992 and April 1995 are based on reported foreign exchange market turnover by country and currency net of local inter-dealer double-counting.
2. The sum of transactions in each individual currency equals twice total transactions because two currencies figure in every deal. Therefore, the total currency composition adds up to 200 percent, and total amounts in parentheses also equal twice total transactions.

Sources:

BIS, *Central Bank Survey of Foreign Exchange Market Activity in April 1992*, Basle, March 1993.
BIS, *Central Bank Survey of Foreign Exchange and Derivative Market Activity 1995*, Basle, May 1996.

Appendix Table Invoice Currency Ratios in Foreign Trade of Japanese MNCs: Estimated Share (%)

Exports to:	Yen	Dollar	Partner's Currency	Others
Local Subsidiaries				
World	40.1	39.5	18.9	1.4
East Asia	54.9	38.9	6.1	0.1
Asian NIEs	53.3	37.8	8.8	0.1
ASEAN	55.6	40.5	3.9	0.0
China	60.4	39.6	0.0	0.0
North America	22.2	67.1	10.7	0.1
Europe	35.0	8.0	51.5	5.5
Local Affiliates				
World	48.2	39.4	12.1	0.2
East Asia	56.1	39.1	4.8	0.0
Asian NIEs	56.5	39.2	4.3	0.0
ASEAN	51.4	42.9	5.7	0.0
China	62.5	33.1	4.3	0.0
North America	34.4	57.5	8.1	0.0
Europe	39.6	23.5	35.8	1.1
Independent Foreign Companies				
World	56.6	35.7	7.3	0.4
East Asia	63.5	33.7	2.8	0.1
Asian NIEs	64.5	32.3	3.2	0.1
ASEAN	63.6	33.6	2.7	0.1
China	61.8	36.1	2.2	0.0
North America	40.3	53.6	6.0	0.1
Europe	50.7	26.1	21.5	1.7
Total				
World	48.5	37.9	12.8	0.8
East Asia	59.1	36.5	4.3	0.1
Asian NIEs	58.4	35.9	5.6	0.1
ASEAN	58.5	37.7	3.7	0.0
China	61.7	36.1	2.2	0.0
North America	30.2	61.0	8.8	0.1
Europe	41.8	17.9	37.1	3.2

Imports from:	Yen	Dollar	Partner's Currency	Others
Local Subsidiaries				
World	30.8	46.0	23.2	0.1
East Asia	45.3	39.9	14.7	0.1
Asian NIEs	39.4	42.2	18.3	0.1
ASEAN	46.8	40.7	12.6	0.0
China	76.0	24.0	0.0	0.0
North America	12.6	78.4	9.0	0.0
Europe	18.2	10.2	71.4	0.2
Local Affiliates				
World	27.4	49.2	23.4	0.0
East Asia	39.8	46.0	14.3	0.0
Asian NIEs	44.4	43.6	11.9	0.0
ASEAN	31.6	50.3	18.0	0.0
China	39.9	45.3	14.9	0.0
North America	8.2	87.4	4.4	0.0
Europe	14.4	19.8	65.8	0.0
Independent Foreign Companies				
World	24.5	46.2	28.7	0.6
East Asia	39.1	47.0	13.9	0.0
Asian NIEs	42.7	43.9	13.4	0.0
ASEAN	30.7	52.9	16.4	0.0
China	42.5	46.5	11.1	0.0
North America	9.1	76.2	14.7	0.0
Europe	12.8	19.3	65.8	2.0
Total				
World	27.8	46.8	25.2	0.2
East Asia	41.9	13.7	14.3	0.0
Asian NIEs	41.6	43.1	15.3	0.0
ASEAN	37.7	47.1	15.2	0.0
China	52.1	39.2	8.7	0.0
North America	10.6	79.4	10.0	0.0
Europe	15.0	16.4	67.7	1.0

Notes:

1. The data is based on the questionnaire survey, conducted in June 1992, on Japanese MNCs in Manufacturing with more than three overseas subsidiaries. The questionnaire was delivered to 522 MNCs, and 130 companies responded (the response rate was 25 percent).
2. The data shows the shares of the invoice currencies in MNCs' foreign trade, classifying the following three trade partners: (i) their local subsidiaries, (ii) their local affiliates (local companies that are not MNCs' subsidiaries, but have a lasting economic relationship, such as technical affiliation, leasing of production facilities, provision of raw materials and parts, dispatch of executives, etc.), (iii) totally independent foreign companies.
3. East Asia includes Asian NIEs, ASEAN countries, and China.
4. For the estimation method of the share of trade invoice currency, see the original sources.

Sources: Tokunaga (1993), (1996).