

A REVIEW OF EMPIRICAL STUDIES ON FOREIGN DIRECT INVESTMENT AND TRADE

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ABSTRACT

In the first section, this article reviews the empirical evidence on the comparative behaviour of Japanese and US subsidiaries as well as the comparative behaviour of foreign-owned and locally-owned firms in developing countries. The next section reviews the long run impacts of Foreign Direct Investment (FDI) inflows from Japan and the US as well as the relationship between FDI AND trade in general. This study found that there are differences between Japanese and US subsidiaries and that FDI contributes the trade performance of host countries.

Keywords: Export performance, Import dependency, Foreign and domestic firms, Developing countries, FDI inflows.

INTRODUCTION

A considerable amount of empirical research has been conducted in the last three decades, following the theoretical development on Foreign Direct Investment (FDI) and trade. Unlike the early trade models that implicitly suggested that changes in the export competitiveness of host countries depended on the technological capabilities of their domestic firms rather than foreign firms in these countries, the new trade models found some evidence that the activities of foreign subsidiaries also played an important role in improving the export competitiveness of the host countries, since they not only have better access to information and marketing networks of their parent firms, but also easy access to parent firms' advanced technology and monopolistic advantages of patent, trade marks, and other investment related intellectual properties of parent firms (see among others Blomström, 1990 and Blomström and Kokko, 1997).

The earliest empirical works on the activities of foreign firms were descriptive and utilised simple export-sales and foreign inputs-total inputs ratios to investigate the trade performance of these firms. Later on, econometric models were developed to analyse the macroeconomic relationship between inward FDI and trade flows in developing as well as in developed countries. The

primary concern of this work is to critically review the literature on the impact of inward FDI on the trade performance of developing countries.

Within this context, the empirical studies are classified according to their methodologies. The next section is devoted to the descriptive studies which both deal with the comparative trade performance of Japanese and US subsidiaries and the comparative trade performance of foreign and local firms at aggregate and at the industrial level. The third section consists of econometric studies that attempt to establish a long run relationship between inward FDI and trade in the context of both host developed and developing countries.

I. DESCRIPTIVE STUDIES ON THE TRADE PERFORMANCE OF FOREIGN FIRMS

Empirical studies that employ the descriptive approach can be divided into two groups. The first group of these studies tries to find evidence for the validity of Kojima's hypothesis that Japanese FDI is more trade-oriented than US FDI (Kojima, 1973, 1975, and 1982), while the second group investigates differences between foreign and local firms in a host country with respect to their trade-orientation. The basic tools of this type of studies are export-sales and foreign inputs-total inputs ratios¹. A summary of the descriptive studies is provided in Tables 1 and 2 at the end of each sub-section.

A. STUDIES ON THE TRADE PERFORMANCE OF JAPANESE AND US SUBSIDIARIES

A number of studies exist in the literature concerning the trade-orientation of Japanese and US subsidiaries (Lee, 1980, 1983; Ranis and Schive, 1982; Kojima, 1985; Yue, 1997; Tu, 1997; and Ling and Yong, 1997). In these studies, in order to compare the trade-orientation of Japanese and US FDI, it is assumed that a subsidiary is trade-oriented if it exports more than half of its sales and imports more than half of its total inputs. It should be emphasised that the investigation of the trade-orientation is conceptually different from the analysis of the balance of payment impact of these firms (Kojima, 1985). Therefore, a full consideration of Kojima's hypothesis requires both export- and import-orientations of Japanese and US subsidiaries.

The earliest work was conducted by Lee (1980, 1983), who used the export-sales and local content ratios to assess the trade performance of Japanese and US firms in Korean manufacturing industries for the periods 1962-1974 and 1974-1978. It was found from both studies that Japanese FDI, on average, was much more export-oriented than US FDI, although the gap between the sets of firms got smaller over time. However, the industry level analysis suggested that for the early period, Japanese subsidiaries were more export-oriented than their US counterparts in labour- and capital-intensive sectors, while for the latter

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Makalenin Geliş Tarihi: Şubat 2006, Kabul Tarihi: Aralık 2006

period, Japanese subsidiaries were more export-oriented than US subsidiaries only in capital-intensive sectors. Therefore, Lee concluded that there is strong evidence for Kojima's hypothesis only in the period 1962-1974, since Japanese FDI had a relatively higher export ratio than US FDI in most industries. The analysis of the local content ratio for Japanese and US subsidiaries for the latter period for all industries showed that Japanese subsidiaries used a higher percentage of local inputs than their US counterparts. However, the industry level analysis revealed that Japanese subsidiaries used more local inputs than their US counterparts in the capital-intensive and high technology industries (K-H). The relatively small amount of local inputs in the production of US subsidiaries was attributed to their concentration in the K-H industries, especially in petroleum refining, where very few locally produced materials existed.

In assessing the relative contribution of US and Japanese subsidiaries to the exports of Taiwanese manufacturing industries, Ranis and Schive (1982) preferred the exports per unit of paid-up capital instead of export-sales ratio. In 1975, the overall export propensity of US firms was somewhat higher than Japanese firms. However, the industrial level analysis showed that US firms were more export-oriented than Japanese firms in garments & footwear, lumber & bamboo products, and electrical & electronic products, while Japanese firms were more export-oriented than US firms in food & beverages, plastic & rubber products, and machinery equipment. Thus, the finding does not support Kojima's contention that Japanese FDI in resource-based and labour-intensive sectors are more export-oriented than US FDI.

Kojima (1985), using the survey data compiled by the Investment Commission of Taiwan for 1982, investigated differences between US and Japanese subsidiaries in terms of trade-orientation. The analysis for all industries showed that both export-sales and import content ratios were slightly higher for US firms than for Japanese firms. However, these firms tended to have large differences in the sub-sectors of manufacturing. More specifically, Japanese firms were more export-oriented than US firms in three resource-based industries, like non-metallic minerals, food & beverages, and plastic & rubber as well as in machinery equipment and chemicals, while US firms were more export-oriented than Japanese firms in textiles and electrics & electronics. This suggested that even though Japanese and US FDI seemed to have significantly different export behaviours over a number of sectors, limited support for Kojima's hypothesis came from the resource-based industries. On the other hand, US firms seemed to import more foreign inputs than their Japanese counterparts in most of these sectors, except for non-metallic minerals and chemicals.

A study of a sample of foreign firms making electronic products in Singapore, by Yue (1997), found that US subsidiaries were more export-oriented than their Japanese counterparts. The analysis also showed that US firms relied relatively more on the home country market for export (55 per cent of total sales) than Japanese firms (11 per cent of total sales). Such a difference between Japanese and US subsidiaries was attributed to their industrial distributions. The former were concentrated on industrial electronics to supply the home country whereas the latter were concentrated on consumer electronics to exploit the opportunities of both host and third country markets. Based on the findings of the electronics sector of Singapore, one could not suggest that Japanese FDI is more export-oriented than US FDI due to the technology-intensive nature of the sector. Yue also studied the import behaviour of these firms and suggested that Japanese and US firms were heavily dependent on foreign inputs due to the inability of local suppliers to meet the strict technical standards. But, Japanese and US firms showed no significant difference in their import dependence.

A similar study conducted by Tu (1997) for 9 US and 17 Japanese firms in the electronic sector of Taiwan, did not find any significant difference in the export-orientation of these firms (64 per cent versus 61 per cent). It was also found that US firms were more home market-oriented than Japanese ones, who sold 48 per cent and 20 per cent of their output respectively. In order to explain such a difference, a hypothesis that younger subsidiaries rely much more on their home country markets than older ones because of their familiarity, was tested. The results showed that the relatively high reliance of US firms on the home country market was explained by the age of their subsidiaries. In Taiwan, US subsidiaries set up their businesses 15 years ago as compared to an average of 23 years for Japanese subsidiaries.

Ling and Yong (1997) compared the trade-orientation of Japanese and US subsidiaries in the electrics & electronics sector of Malaysia by using survey data from 4 Japanese and 6 US firms. The survey results indicated that sales by these firms were largely directed to foreign markets, comprising 99 per cent of their total sales. The results also showed that two-thirds of the US firms' exports were directed to the home market, while a great majority of the Japanese firms' exports were directed to the third countries. The concentration of Japanese firms' exports on the third country markets was attributed to the increasingly complex links within the network of overseas subsidiaries rather than with the parent companies in Japan. Again, Kojima's hypothesis is not supported by this work since both types of firms have identical export-sales ratios. Ling and Yong (1997) also found that Japanese firms were relatively less dependent on foreign inputs than US firms in their production (69 per cent versus 91 per cent). The reason for such a difference was that US firms, as semiconductor producers,

were higher up the value-added chain and could use inputs only from their own sources, while Japanese firms, as intermediate goods producers, were half way down the value-added chain and had more procurement options.

Table 1: Trade Performance of Japanese and the US Subsidiaries: A Summary of Empirical Studies

Study	Country	Study Period	Nature of Study	Results	Summary
Lee	South Korea	1962-1974	Survey 97 US and 529 Japanese firms	Japanese FDI was much more export-oriented than US FDI in 7 out of 8 manufacturing industries.	$J_x > US_x$
Lee	South Korea	1974-1978	Survey 45 US and 292 Japanese firms	Japanese firms were more exported than US firms and used more local materials than US firms in capital-intensive and high technology industries.	$J_x > US_x$ $J_m > US_m$
Ranis and Schive	Taiwan	1975	Survey 749 firms	Japanese FDI was not more export-oriented than US FDI in resource and labour-intensive sectors.	$J_x = US_x$
Kojima	Taiwan	1982	Survey	Japanese FDI was more export-oriented than US FDI in resource and labour-intensive sectors, except for textiles.	$J_x > US_x$
Yue	Singapore	1992	Survey 48 US and 49 Japanese firms	US subsidiaries were more export-oriented than Japanese subsidiaries and both had similar import contents in their production of electronic goods.	$US_x > J_x$ $J_m = US_m$
Tu	Taiwan	1992	Survey 9 US and 17 Japanese firms	Japanese and US subsidiaries had a similar export-sales ratio in the electronics sector.	$J_x = US_x$
Ling and Yong	Malaysia	1992	Survey 6 US and 4 Japanese firms	Japanese and US subsidiaries had a similar export ratio in the electronics and electronics sectors. But, Japanese firms were less dependent on foreign inputs, compared to US firms.	$J_x = US_x$ $J_x < US_x$

To sum up, descriptive studies on the trade-orientation of Japanese and US subsidiaries in Asian economies have found limited empirical evidence to support Kojima's hypothesis. This evidence reflects the early stages of the development of Japanese FDI. In the 1960s and 1970s, Japanese MNEs shifted labour- and resource-intensive industries to the region due to the large increases in real wages and the shortages of natural resources in Japan, while US MNEs

were concentrated in capital- and technology-intensive industries in the Asian countries. Although the structure of Japanese FDI resembled to the US FDI after 1980, Japanese and US subsidiaries still showed somewhat different export behaviour in the case of Singaporean electronics; the former was concentrated on consumer electronics to exploit the opportunities of both host and third country markets whereas the latter was concentrated on industrial electronics to supply the home market. Kojima (1995) took this development into account and continued to believe that his theory has been shown to be a useful framework for describing outward FDI from the East Asian countries. Following the early stages of Japanese FDI, MNEs from these countries shifted the production of more labour-intensive goods to less developed countries in the region in order to maintain their competitiveness in export markets.

B. STUDIES ON THE TRADE PERFORMANCE OF FOREIGN AND LOCAL FIRMS

The literature on the export performance of foreign firms falls into two categories. The first group, assuming that each subsidiary is a profit maximising unit in the host country, argues that foreign firms tend to export a greater proportion of their output than do their local counterparts. Presumably, foreign firms have better access to international markets through their distribution networks and are able to respond quickly to changing demands in world markets (Hill, 1990). The second group, assuming that each subsidiary is used to maximise its parent's global profit, argues that foreign firms do not export more than local firms. Vaitos (1972) and UNCTAD (1972) have analysed hundreds of "Parent-Subsidiary" relationships and found large numbers of restrictive clauses that prohibited exports from the Subsidiaries. This view also asserts that the exports of foreign firms are expected to have a higher import content ratio than local firms within particular industries. One reason for the high ratio is transfer pricing. It is widely used by MNEs in order to avoid higher local taxes. In this section, the empirical studies that compare the trade performance of foreign and local firms will be summarised.

Cohen (1975), using survey data on 12 local and 10 foreign firms in South Korea, 4 local and 9 foreign firms in Singapore, 8 local and 15 foreign firms in Taiwan, studied the trade performance of local and foreign firms. He found that foreign firms exported a higher proportion of their output in South Korea, a lower proportion in Singapore, and about the same proportion in Taiwan, compared with local firms in these countries. Cohen also showed that foreign firms had a higher import propensity in South Korea, a lower propensity in Taiwan, and a similar propensity in Singapore, compared with local firms in these countries.

Riedel (1975), using survey data on 445 manufacturing firms in Taiwan, investigated the export and import behaviours of foreign and local firms. His study included six manufacturing industries, namely textiles, apparel, plastic products, metal products, electronics, and miscellaneous manufactures. He employed multivariate variance analysis. As far as the export performance of the sample firms was concerned, electronics was the only industry where foreign firms had a significantly higher export propensity than local firms. On the other hand, foreign firms seemed to have higher import contents than local firms in apparel, metal products, electronics, and miscellaneous manufactures. This contradicts with the finding of Cohen (1975). However, one should bear in mind that Riedel used a larger sample of firms than Cohen, making the former more reliable than the latter.

Willmore (1976), using a sample of 33 matched pairs, examined the trade performance of foreign and local firms in Costa Rica. His analysis showed that foreign subsidiaries exported a significantly higher proportion of their output compared with locally owned firms. He also found that foreign firms tended to import a larger proportion of their total purchases of raw materials and intermediate goods, but the difference was not statistically significant at the 5% level.

Fairchild (1977), using data from 25 local and 25 US firms in Mexico, analysed the export performance of both sets of firms. Two-tailed t-tests were used to determine whether or not the mean differences of the two groups were significantly different. The test results suggested that Mexican firms were competing successfully with US firms in export markets during the period 1966-1973. The comparable export performance of Mexican firms was attributed to both the internal innovative activities and the use of domestic consultants rather than imported foreign technology.

Lall and Streeten (1977) utilised analysis of variance (ANOVA) to see whether there was any significant difference in the export performance of foreign controlled and locally owned firms in India. They obtained data from 33 foreign and 20 local firms to conduct this analysis. The results of the variance analysis indicated that the mean value of the export-sales ratio was significantly lower for foreign firms than for local firms, at the 5% level. The authors, therefore, inferred that foreign control did not generally seem to promote exports and may even inhibit them.

Jenkins (1979), using survey data compiled by the Institute of Foreign Trade for 1974, compared the export performance of foreign firms with local ones in Mexican industries. Manufacturing industries were classified into four main groups: traditional, intermediate, engineering, and other industries. The analysis of all industries showed that local firms exported a higher proportion of

their output than did foreign firms. However, the analysis of the above industry groups revealed that the export propensity was significantly higher for local firms than for foreign firms in both traditional and intermediate industries, while the reverse was true for engineering. The relatively high export ratio of foreign firms in the engineering industries was explained by the international division of labour and the importance of brand names and trademarks in export markets.

Koo (1985), using survey data provided by the Economic Planning Board, compared the export performance of foreign and local firms in South Korean manufacturing sector over the period 1974-1978. Throughout the period, foreign firms always had a higher export propensity than local firms. The average export propensity was about 35 per cent for foreign firms and 23 per cent for local firms. This was attributed to two main factors: (a) the government seldom allowed foreign firms to compete in domestic markets (except for import-substituting industries); (b) many foreign investors came into South Korea to exploit cheap and abundant labour sources for their offshore assembly operations.

Willmore (1986) compared the export performance of foreign-owned and private Brazilian firms, based on survey data from 111 pairs, which were matched by sales and by four-digit manufacturing sectors. He employed ANOVA to test whether the average differences between the two sets of firms were significant. It was found that foreign firms were, on average, better exporters than local firms since the standardized difference between the two sets of firms was 57 per cent and highly significant. This result was expected since the cost of exporting was lower for foreign firms, which have easy access to market information and distribution networks through their parent companies.

Ghars El-Din (1986), using a sample of 92 foreign firms and export data for Egyptian industries, analysed the export performance of foreign and local firms over the period 1980-1982. His study covered 22 manufacturing industries where foreign firms existed. As far as the export performance of foreign firms was concerned, foreign firms had a substantially higher export propensity than local firms in beverages, batteries, medicinal products, metal cutting, and other metal products. These are clearly either capital or skill-intensive industries in which Egypt held no comparative advantages. However, foreign firms faced strong competition from local firms in labour-intensive industries, like textiles, clothing, and food processing. He employed the Wilcoxon matched pairs signed-ranks test to see whether these differences in the export propensities of foreign and local firms were statistically significant or not. At the aggregate level, the test results indicated that the differences between foreign and local firms were not significant.

Lee and Ramstetter (1991) studied the export performance of foreign and local firms in South Korean manufacturing sectors over the periods 1974-1978 and 1984-1986. The analysis for all industries showed that foreign firms had a higher export to total production ratio than local firms in both periods. However, the analysis of individual sectors indicated that foreign and local firms had significant differences in their export performances. Foreign firms were export-oriented in textiles & apparel and metals & machinery industries (exporting over 70 per cent and 60 per cent of their production respectively). In the latter, foreign firms had a two to three times higher export ratio than local firms. Moreover, foreign firms also had a relatively higher export ratio than local firms in food and non-metallic minerals sectors.

There are a few studies examining the export performance of foreign and local firms in Turkish manufacturing sectors. The earliest work was carried out by Kirim (1986), who used data for seven pairs of firms to analyse the export performance of foreign and local firms in the pharmaceutical sector. His study clearly indicated that despite all the incentives provided by the state, both types of firms in the Turkish pharmaceutical industry were predominantly domestic market-oriented (selling 98 per cent and 93 per cent of their production in the domestic market respectively).

Karadeniz (1995), using survey data obtained through her questionnaire for 1987 and 1988, compared the export performance of foreign firms with national firms across Turkish manufacturing sectors. The sample firms were drawn from 19 manufacturing sectors, which were classified within two groups; less technology-intensive and more technology-intensive industries. The analysis for all industries showed that local firms had a higher export propensity than foreign firms. However, the analysis for individual industries suggested that there were a number of industries in which foreign firms had a higher export propensity than local ones and there were even a few industries that have been set up entirely for export purposes. These sectors included tobacco and clothing for foreign firms and clothing for local firms.

Coskun (1996), using a sample of firms, examined the export performance of foreign and local firms in eight Turkish manufacturing industries. These industries included food & beverages, textiles & clothing, wood & paper, chemicals, stone-clay-glass, basic metals, machinery, and transportation. One-way ANOVA was employed to test the null hypothesis that the average export ratios for foreign and local firms do not differ significantly from each other. The test results suggested that although the null hypothesis was not rejected for all manufacturing it was rejected for stone-clay-glass at the 5% level in favour of local firms. Contrary to the previous findings by Karadeniz (1995), both foreign and local firms have been set up mainly to supply the local market in the selected industries.

Overall, the survey of descriptive studies on the export performance of foreign owned and locally owned firms provided no clear evidence to support the view that foreign firms export more than local firms. In fact, these studies showed a very mixed pattern on the export performance of foreign firms across industries and countries. The proportion of export to total sales by local firms exceeded those of foreign firms in some traditional industries as well as in countries where import substitution policies were emphasised. There are also other factors, such as government policies towards foreign investment and technology contracts between a parent company and its subsidiaries, which might affect export performance in different ways. On the other hand, the balance of evidence suggested that foreign firms had a greater import propensity than local firms, though in some cases the differences may be minimal. Transfer pricing was one of the main reasons why a subsidiary chose to buy from its parent company rather than from local suppliers.

Table 2: Trade Performance of Foreign and Local Firms: A Summary of Empirical Studies

Reference	Country	Nature of Study	Results	Summary
Cohen (1975)	South Korea, Taiwan, and Singapore	Survey 24 local and 34 foreign firms	Foreign firms had a higher export-sales and foreign input-total inputs ratios than local firms only in the South Korean case.	$F_x > D_x$ $F_m > D_m$
Riedel (1975)	Taiwan	Statistical Industry level	Foreign firms were more export-oriented than local firms in electronics, while they used more foreign inputs than local firms in four industries.	$F_x > D_x$ $F_m > D_m$
Willmore (1976)	Costa Rica	Statistical 33 matched pairs	Foreign firms had a significantly higher export ratio than local counterparts.	$F_x > D_x$
Fairchild (1977)	Mexico	Statistical 25 matched pairs	Foreign and local firms had a similar export-sales ratio.	$F_x = D_x$
Lall and Streeten (1977)	India	Statistical 33 foreign and 20 local firms	Local firms had a significantly higher export ratio than foreign firms.	$D_x > F_x$
Jenkins (1979)	Mexico	Statistical	Local firms were more successful in exporting traditional and intermediate goods than foreign firms.	$D_x > F_x$
Koo (1985)	South Korea	Survey	Foreign firms had a higher export propensity than local firms.	$F_x > D_x$
Willmore (1986)	Brazil	Statistical 111 matched pairs	Foreign firms exported a significantly higher proportion of their output than did local firms.	$F_x > D_x$
Ghars El-Din (1986)	Egypt	Statistical	Foreign firms were more successful in exporting capital or skill intensive products than local firms.	$F_x > D_x$
Lee and Ramstetter (1991)	South Korea	Survey	Foreign firms were more export-oriented in textiles & apparel and metals & machinery sectors than local firms.	$F_x > D_x$
Karadeniz (1995)	Turkey	Survey 182 foreign firms	Local firms, on average, had a higher export ratio than foreign firms.	$D_x > F_x$
Coskun (1996)	Turkey	Statistical 144 foreign firms	Local and foreign firms had no significantly different export propensity except for stone-clay-glass sector.	$F_x = D_x$

II. ECONOMETRIC STUDIES ON THE IMPACT OF INWARD FDI ON TRADE

In this section, studies that investigate macroeconomic relationships between inward FDI and trade flows in host countries will be reviewed. All studies discussed here use econometric techniques to examine the long run effect of inward FDI on the trade performance of the host countries. As was done for descriptive studies above, time series studies can also be divided into two categories. The first group of econometric studies tries to test the validity of Kojima's hypothesis by using disaggregated FDI data with respect to the country of origin. On the other hand, the second group of studies attempts to establish long run relationships between inward FDI and trade flows of host countries at the aggregate and/or industry level. A summary of the time series studies is illustrated in Tables 3 and 4 respectively.

Before moving on to the existing empirical studies, it should be emphasised that an econometric approach has three main advantages over a descriptive one, at least theoretically. First, it is possible to distinguish between FDI flows which complement trade and FDI flows which substitute for trade. This clear distinction is useful in evaluating the trade-orientation of given FDI flows. Secondly, aggregate modelling of the relationship between inward FDI and trade flows can capture the intersectoral linkage effect of inward FDI. However, the ability to clarify the extent of such an effect and analyse them depends on the model type and model structure. Finally, it is possible to capture the dynamic effect by explicitly introducing time into the model.

A. STUDIES ON THE IMPACT OF JAPANESE AND US FDI INFLOWS ON TRADE

Although there existed a few econometric studies dealing with the trade impact of inward FDI in the host countries there were no such empirical studies to test Kojima's hypothesis until the 1980s. A number of empirical studies are conducted since then to test Kojima's hypothesis that Japanese FDI is more trade-oriented than US FDI. Studies that developed and estimated different types of trade models are reviewed in this section. Abe (1983) first attempted to test the validity of Kojima's hypothesis by estimating a bilateral import equation on the Thai economy for the period 1970-1979. Current imports were modelled only as a function of current FDI inflows and equations were estimated by Ordinary Least Squares method (OLS) in a logarithmic form. The estimation results were consistent with Kojima's argument that Japanese FDI stimulated more imports from Japan than US FDI did from the US, since the estimated coefficient of Japanese FDI was significantly larger than that of US FDI. The import model to be estimated was as follows:

$$M_t^s = \beta_0 + \beta_1 FI_t^s + u_t \quad (1)$$

where M_t^s is imports from a home country at time t; FI_t^s is FDI inflows from a home country at time t; u_t is error terms; and β_0 and β_1 represent a constant and coefficient of FI respectively; and s denotes Japan and the US.

Kojima (1985) tested the validity of his theory by estimating bilateral trade functions on Asian developing countries (the Philippines, South Korea, Taiwan, and Thailand) for the period 1967-1982. Current exports and imports were modelled only as a function of FDI inflows and all equations were estimated by OLS in a logarithmic form. The estimation results indicated that, except for US FDI in South Korea and Thailand, the coefficients of Japanese and US FDI seemed to be statistically significant. Kojima reached a conclusion from the estimates that the support for his theory was quite limited. The cases of South Korea and Thailand provided empirical support for his hypothesis since the coefficient of Japanese FDI was larger than that of US FDI in the relevant export and import functions. The trade models to be estimated were as follows:

$$X_t^s = \alpha_0 + \alpha_1 FI_{t-1}^s + u_t \quad (2)$$

$$M_t^s = \beta_0 + \beta_1 FI_{t-1}^s + u_t \quad (3)$$

where X_t^s represents exports to a home country at time t. The rest of the variables are defined as above.

Ramstetter (1986) developed above models further by adding domestic investment into the system. He examined the full impact of Japanese and US FDI on the trade performance of host countries (South Korea, Taiwan, and Thailand) as well as their limited impact on trade with the investing countries. According to Ramstetter, the estimations of above models yield bias results since they exclude a certain investment variable: If one has a theory that inward FDI is associated with trade flows, then both FDI and domestic investment must be included in the trade models. In his trade functions, a time lag was allowed between the completion of investment project and its impact on trade flows. It is commonly expected that the largest part of imports associated with investment projects is made within a year, while exports cannot start until the projects are fully completed. Therefore, Ramstetter preferred weighted averages over lagged investment variables and adopted different weights for the export and import models. In order to test the validity of Kojima's hypothesis, both multilateral trade equations (4-9) and bilateral trade equations were estimated by OLS:

$$X_t = \alpha_0 + \alpha_1 DI_t + \alpha_2 FI_t + u_t \quad (4)$$

$$X_t = \alpha'_0 + \alpha'_1 DI_t + \alpha'_3 JUI_t + \alpha'_6 OI_t + u_t \quad (5)$$

$$X_t = \alpha''_0 + \alpha''_1 DI_t + \alpha''_4 JI_t + \alpha''_5 UI_t + \alpha''_6 OI_t + u_t \quad (6)$$

$$M_t = \beta_0 + \beta_1 DI_t + \beta_2 FI_t + u_t \quad (7)$$

$$M_t = \beta'_0 + \beta'_1 DI_t + \beta'_3 JUI_t + \beta'_6 OI_t + u_t \quad (8)$$

$$M_t = \beta''_0 + \beta''_1 DI_t + \beta''_4 JI_t + \beta''_5 UI_t + \beta''_6 OI_t + u_t \quad (9)$$

where *DI* represents domestic investment; *JUI* denotes Japanese plus US FDI; and *OI* represents other FDI. The rest of the variables are defined as before.

Although both multilateral and bilateral trade functions were estimated the former produced better results for the host countries. The estimations of above export equations indicated that the disaggregation of total FDI was meaningful in both South Korean and Taiwanese cases, where Japanese and US FDI had significantly different impacts on exports from the two host countries; US FDI in South Korea was more export-oriented than Japanese FDI, while Japanese FDI in Taiwan was more export-oriented than US FDI. The latter provided empirical evidence to Kojima's hypothesis when macroeconomic policy changes were taken into consideration. However, the estimations of above import models showed that the disaggregation of total FDI was meaningful only in South Korean case where Japanese and US FDI had significantly different impact on South Korean imports. This provided limited support to Kojima's hypothesis since the coefficient of Japanese FDI became significantly negative and that of US FDI became significantly positive in the period 1975-1981.

In another study, Kojima's hypothesis was tested for Colombian and Brazilian economy over the period 1971-1988. In this study, Gullett (1990) used OLS to estimate the multilateral trade models developed by Ramstetter (1986). The estimation results for the export equations indicated that the disaggregation of total FDI was meaningful, implying that Japanese and US FDI had a positive and significantly different impact on Colombian and Brazilian exports. However, the results were consistent with Kojima's hypothesis only for the Colombian case. On the other hand, the estimation results for the import equations showed that the disaggregation of total FDI was also meaningful in both cases, where Japanese and US FDI had a significantly different impact on Colombian and Brazilian imports. Again, the estimation results supported Kojima's contention only in the Brazilian case. As for the Colombian case,

negative coefficients obtained for Japanese and US FDI were interpreted as indicating the success of the implementation of ISI policies followed by the Colombian governments during the study period.

The trade models developed Ramstetter were interesting because they separated the impact of FDI from the impact of domestic investment. However, the application of the models to developing countries, although having better theoretical support, yielded some unexpected results. First, model misspecification still remained unsolved since relative prices were not taken into account. Second, the existence of serial correlation in some of the estimations made them statistically less reliable. Third, the type of lag structure embodied for investment variables was not direct. As was mentioned before, they used weighted averages rather than lagging investment variables. Therefore, these studies were not sufficient to capture the full effect of FDI on the trade performance of host countries. Moreover, the time period studied by these authors was not long enough to suggest a persistent long run economic relationship. Finally, the estimation results that were obtained through OLS might be spurious and t-statistics and F-tests might be invalid, since the variables concerned were not checked as to whether they were stationary or not.

Naya and Ramstetter (1992) extended the trade models of Ramstetter by adding relative prices and world income into the system. They estimated export supply and import demand functions for each host country in order to see whether Japanese and US FDI imparted different impacts on the trade performance of South Korea, Taiwan, and Thailand over the period 1967-1986. In this study, export supplies and import demands were determined by foreign capital stock and other control variables. The estimation results indicated that Japanese FDI contributed positively to the export performance of South Korea, while US FDI had a negative effect on South Korean exports. This study, contrary to the early work of Ramstetter (1986), provided empirical evidence for Kojima's hypothesis. In the Taiwanese and Thai cases, however, Japanese FDI imparted negative impacts on the export performance of these countries, while US FDI did not have any significant effects on the export performance of these countries. On the other hand, the empirical results showed that neither Japanese nor US FDI led to significant changes (increases or decreases) in the level of imports from these countries. The following multilateral trade models were estimated by OLS in a logarithmic form:

$$X_t = \alpha_0 + \alpha_1 DI_t + \alpha_2 FI_t + \lambda_1 L_t + \lambda_2 RP_t^{xy} + \lambda_3 RP_t^{xw} + \lambda_4 Y_t^w + u_t \quad (10)$$

$$X_t = \alpha'_0 + \alpha'_1 DI_t + \alpha'_3 JI_t + \alpha'_4 UI_t + \alpha'_5 OI_t + \lambda'_1 L_t + \lambda'_2 RP_t^{xy} + \lambda'_3 RP_t^{xw} + \dots + \lambda'_4 Y_t^w + u_t \quad (11)$$

$$M_t = \beta_0 + \beta_1 DI_t + \beta_2 FI_t + \delta_1 L_t + \delta_2 RP_t^{my} + u_t \quad (12)$$

$$M_t = \beta'_0 + \beta'_1 DI_t + \beta'_3 JI_t + \beta'_4 UI_t + \alpha'_5 OI_t + \delta'_1 L_t + \delta'_2 RP_t^{my} + u_t \quad (13)$$

where L represents the level of employment; RP^{xy} , RP^{xw} , RP^{my} are the domestic export prices, world export prices, and domestic import prices respectively; and Y^w denotes the GNP of the world.

Goldberg and Klein (1997) used panel data from Southeast Asian and Latin American countries to investigate the long run impacts of inward Japanese and US FDI on the trade performances of these countries over the period 1979-1995. In this study, bilateral exports and imports were expressed as functions of GDP of the host countries and a home country (Japan or the US), Japanese FDI, US FDI, and bilateral exchange rates relative to a home country. All independent variables were lagged up to one year to capture the current and future trade performance of the host countries. The estimation results for the bilateral export equations indicated that Japanese FDI in both Latin America and Southeast Asia were positively and significantly related to exports to the US and Japan, while US FDI in both regions was not significantly related to exports to the US and Japan. Similarly, the estimation results for the bilateral import models revealed that Japanese FDI in the Southeast Asia had a positive and significant impact on imports from Japan. The results were fully consistent with Kojima's argument since Japanese FDI created more trade than US FDI in these developing countries. The basic regression equations for a particular group of developing countries took the following form:

$$X_t^s = \alpha_0 + \alpha_1 \sum_{i=0}^1 Y_{t-i}^h + \alpha_2 \sum_{i=0}^1 Y_{t-i}^s + \alpha_3 \sum_{i=0}^1 JI_{t-i}^h + \alpha_4 \sum_{i=0}^1 UI_{t-i}^h + \alpha_5 \sum_{i=0}^1 ER_{t-i}^s + u_t \quad (14)$$

$$M_t^s = \beta_0 + \beta_1 \sum_{i=0}^1 Y_{t-i}^h + \beta_2 \sum_{i=0}^1 Y_{t-i}^s + \beta_3 \sum_{i=0}^1 JI_{t-i}^h + \beta_4 \sum_{i=0}^1 UI_{t-i}^h + \beta_5 \sum_{i=0}^1 ER_{t-i}^s + u_t \quad (15)$$

where ER_t^s is bilateral exchange rates relative a home country (Japan or the US); superscript h denotes the host countries.

In a study for India, Sharma (2000), by using annual data for 1970-98, investigated the determinants of export performance in relation with inward FDI by employing a simultaneous equation framework. The author found that FDI appears to have statistically no significant impact on export performance although the coefficient of FDI has a positive sign.

In another study for India, Banga (2003) tried to assess the impact of FDI on trade and to evaluate whether there is a difference between Japanese FDI and US FDI. Industry level analysis for 74 disaggregated industries for the period 1995-96 to 1999-2000 is carried out. The empirical analysis is conducted by using panel data estimation with random and fixed effect models. It was shown that FDI from the US has a positive and significant effect on the export-intensity of the industries in the non-traditional export sector, while the impact of Japanese FDI is not significant. In addition, US firms were found to have larger spill-over effects on the exports of the domestic firms as compared to Japanese firms.

In conclusion, the survey of econometric studies on the trade-orientation of Japanese and US FDI in Latin American and Asian countries produced mixed evidence in supporting the view that Japanese FDI is more trade-oriented than US FDI. This is consistent with the findings of the descriptive studies that were reviewed in the earlier section. Moreover, these studies were criticised for not being properly specified and for using traditional estimation method rather than using modern time series techniques, such as cointegration and error correction models.

Table 3: A Summary of Empirical Studies on the Impact of Japanese and US FDI Inflows on Trade

Reference	Countries	Nature of Study	Empirical Findings
Abe (1983)	Thailand	Bilateral import	Japanese FDI stimulated more imports than US FDI, giving support to Kojima's hypothesis.
Kojima (1985)	Philippines, South Korea, Taiwan, Thailand	Bilateral trade	Kojima obtained empirical evidence to support his hypothesis only in the Korean and the Thai cases.
Ramstetter (1986)	South Korea, Taiwan, Thailand	Multilateral and Bilateral trade	Kojima's contention received limited support from the Korean imports and the Taiwanese exports.
Gullett (1990)	Colombia and Brazil	Multilateral trade	Colombian exports and Brazilian imports provided support to Kojima's hypothesis.
Naya and Ramstetter (1992)	South Korea, Taiwan, Thailand	Multilateral trade	Korean exports provided limited support to Kojima's hypothesis.
Goldberg and Klein (1997)	Seven developing countries	Bilateral trade Panel data	Japanese FDI was more trade-oriented than US FDI, giving full support to Kojima's hypothesis.
Sharma (2000)	India	Bilateral trade	FDI has a positive impact on export although it is not statistically significant
Banga (2003)	India	Panel data	FDI from the US has a positive and significant effect, while the impact of Japanese FDI is not significant

B. STUDIES ON THE IMPACT OF FDI INFLOWS ON TRADE

In conventional trade models, changes in export are typically related to changes in foreign income and relative export prices, while changes in import are associated with changes in domestic income and relative import prices. However, the recent trade literature frequently stated that the export share of a country in the world market has also been affected by measures of product variety and quality as well as its price competitiveness. In practice, there are a number of ways to incorporate such non-price factors into the export model. The most well known ones are 'input' measures, such as R&D expenditure and 'output' measures, such as number of successful innovations or registered patents (see Hughes, 1986; Fagerberg, 1988, and Greenhalgh, 1990). Existing studies acknowledged that low level of technological innovations and/or failure to adapt international technological advances are often found as factors behind the decline in the export market share of many countries (Freeman, 1978; Greenhalgh, 1990, Pain and Blake, 1994; Pain and Wakelin, 1997).

It is possible that the variety and quality of products in a given country can change independently of both the number of innovations and the level of R&D expenditure. In this case, the country must have certain advantages in adapting new innovations, either through imitation or through inward FDI. There are a number of studies which use fixed capital investment as an alternative means of accounting for technological innovations (see Hughes, 1986; Fagerberg, 1988; Pain and Blake, 1994; and Pain and Wakelin 1997). These studies suggest that the high level of inward FDI may affect the variety and quality of products produced within the host country and increase the percentage of world exports accounted for by this country. However, one must also remember that the impact of inward FDI is likely to vary according to whether it is for the exploitation of natural resources, the improvement of access to local markets or simply part of the international division of labour within the firm (Cantwell, 1994). Empirical studies that incorporate inward FDI into the conventional trade models are reviewed in this section.

One of the earliest empirical studies was carried out by Yoon (1971) for the South Korean economy. Trade functions, which were employed by the study, consisted of two exports and two imports equations -one for commodity and one for service sector. He estimated merchandise export as functions of the weighted average of industrial output in the US and Japan, the foreign capital stock in agriculture, fisheries, mining, and manufacturing and a lagged dependent variable. He also estimated merchandise import as functions of the GNP of the host country, the total foreign capital stock, and a lagged dependent variable. Yoon (1971) concluded that there existed a positive and significant relationship between FDI and export and between FDI and imports. The following equations were estimated by OLS:

$$X_t^m = \alpha_0 + \alpha_1 IND_t + \alpha_2 FCA_t^m + \alpha_3 X_{t-1}^m + u_t \quad (16)$$

$$M_t^m = \beta_0 + \beta_1 Y_t + \beta_2 FCA_t^m + \beta_3 M_{t-1}^m + u_t \quad (17)$$

where IND_t is the weighted average of industrial output in the US and Japan at time t; FCA_t^m represents the foreign capital stock in agriculture, fisheries, mining, and manufacturing at time t; Y_t is the GNP of South Korea at time t.

Ghars El-Din (1986) examined the effect of FDI on the export performance of Egyptian industries over the period 1952-1981. In his model, manufacturing exports were determined by FDI stock, domestic investment stock, real exchange rates, and capital utilisation variables. The exchange rate was used as a measure of relative export prices and obtained by inflating with the US wholesale price index and deflating with the wholesale price index of Egypt. The results of OLS estimates showed that the inclusion of foreign investment stock was not successful in explaining the growth of manufacturing exports over time, even though the model explained 90 per cent of changes in manufacturing exports. The export supply function is as follows:

$$X_t = \alpha_0 + \alpha_1 FI_t + \alpha_2 DI_t + \alpha_3 ER_t + \alpha_4 CU_t + u_t \quad (18)$$

where CU_t denotes the capital utilisation and is measured by the ratio between real industrial output and its long-term semi-log trend estimated by OLS.

Schive and Tu (1991) developed aggregate export and import models to investigate the effect of FDI on the trade performance of Taiwan for the period 1958-1987. Exports were determined by world income, relative export prices, FDI stock, and one-year lagged exports, while imports were determined by GDP of Taiwan, real exchange rates, FDI stock, and one-year lagged imports. The trade models were estimated by Three Stage Least Squares (3SLS) method. The estimation results indicated that FDI stock was a positive and significant determinant of Taiwanese exports, while it had an insignificant effect on Taiwanese imports during the period. The following trade equations were estimated:

$$X_t = \alpha_0 + \alpha_1 W_t + \alpha_2 RP_t + \alpha_3 FI_t + \alpha_4 X_{t-1} + u_t \quad (19)$$

$$M_t = \beta_0 + \beta_1 Y_t + \beta_2 ER_t + \beta_3 FI_t + \beta_4 M_{t-1} + u_t \quad (20)$$

Orr (1991) examined the relationship between foreign ownership of the US manufacturing and the value of both exports and imports over the period 1967-1989. The trade models include world income, GDP of the US, foreign share of the US manufacturing capital stock, US capital stock, and relative prices as

independent variables. The regression results for the export model indicated that the export competitiveness of the US manufacturing improved significantly in response to the increased foreign ownership of the US manufacturing. The response was estimated to occur on average two years after the initial foreign investment. However, the estimation results for the import model showed that the initial increases in the US imports were not offset, even several years after the initial investment took place. The following equations were estimated by OLS in a logarithmic form:

$$X_t = \alpha_0 + \alpha_1 W_t + \alpha_2 RP_t + \alpha_3 DI_t + \alpha_4 FI_{t-2} + u_t \quad (21)$$

$$M_t = \beta_0 + \beta_1 Y_t + \beta_2 RP_t + \beta_3 DI_t + \beta_4 FI_{t-2} + \beta_5 FI_{t-3} + u_t \quad (22)$$

where W_t is trade weighted average of GDP in six major foreign countries at time t .

O'Sullivan (1993) developed a system of six simultaneous equations to investigate the effect of FDI on the export performance of Irish economy over the period 1960-1978. The main feature of this study was that FDI was endogenised in the system and determined by relative wage rate, real exchange rate, real GDP of the United Kingdom and grants and subsidies to private FDI. O'Sullivan (1993) also asserted that merchandise exports were determined by relative export prices, real GDP of the United Kingdom², and one-year lagged private FDI inflows. The system was estimated by Two-Stage Least Squares method. The estimation results of the export equation indicated that private FDI were positively and significantly related to the supplies of Irish exports. The basic regression model is as follows:

$$X_t = \alpha_0 + \alpha_1 W_t + \alpha_2 RP_t + \alpha_3 FI_{t-1} + u_t \quad (23)$$

Leichenko and Erickson (1997) examined the impact of FDI inflows on the export performance of the US manufacturing industries for the period 1980-1991. In this study, exports were modelled as functions of FDI and other control variables. FDI and domestic investment variables were also lagged by one-year since the study period was too short (twelve years). The model was estimated by OLS for all manufacturing and for five two-digit manufacturing sectors: food products, chemicals & allied products, primary & fabricated metals, industrial machinery & electronics, and all other manufacturing industries. The regression results for all manufacturing suggested a positive and significant relationship between FDI and exports. Second, the results for individual sectors showed that the impact of FDI was greatest among the durable goods sectors, including metals, machinery & electronics, and other manufacturing. However, the impact of FDI was found statistically insignificant in the non-durable goods sectors, namely food and chemicals. The following equation was estimated by OLS in a logarithmic form:

$$X_t = \alpha_0 + \alpha_1 DI_{t-1} + \alpha_2 FI_{t-1} + \alpha_3 X_{t-1} + \alpha_4 ER_t + u_t \quad (24)$$

where ER_t is the multilateral trade-weighted value of the US dollar at time t .

Following more recent developments in time series econometrics, Pain and Blake (1994) were among the first to employ multivariate cointegration techniques to establish a long run relationship between net FDI stock and the export performance of the UK over the period 1972Q1 to 1992Q2. They augmented the conventional export demand model by adding net FDI stock and proxies for product quality, including relative R&D expenditure and relative FDI. Although there were variables in the model that could be related to one another (for example R&D expenditure and relative FDI) the Stock-Watson minimal eigenvalue tests suggested that there is a unique cointegrating relationship between the set of variables. By using Fully Modified Estimation (FME) method, they obtained a negative and significant coefficient for the net FDI stock variable, suggesting that a rise in the level of direct investment by UK companies tended to reduce the share of manufacturing exports in world exports, particularly in the late 1970s and early 1980s. The following export model was estimated:

$$X_t = \alpha_0 + \alpha_1 W_t + \alpha_2 RP_t + \alpha_3 RQ_t + \alpha_4 IN_t + \alpha_5 (OUT_t - IN_t) + u_t \quad (25)$$

where W_t is the weighted average of GDP in the main export markets of the UK; RQ denotes the relative product quality and is measured by cumulative UK R&D expenditure relative to the weighted world R&D expenditure; OUT and IN represent the stocks of outward and inward FDI respectively.

Pain and Wakelin (1997) used panel data for eleven OECD countries³ to investigate the relationship between FDI (both outward and inward) and export performance of these countries, over the period 1971Q1 to 1992Q2. They employed OLS to obtain both mean-group and panel estimators. The estimation results showed that the impacts of inward and outward FDI were not statistically significant in the mean-group estimates but were significant in the panel estimates. This implied that there was no systematic relationship between FDI and exports across countries. Nonetheless, the estimations of individual country parameters for FDI suggested that the two FDI stock variables were jointly significant in at least some cases. Moreover, the regression results for the panel data suggested that the impacts of FDI variables varied both in sign and in magnitude between countries, reflecting various factors that might affect the decision to produce abroad and different forms of direct investment. Overall, this study suggested that any competence gained by inward FDI was offset completely by outward FDI, since the coefficients of inward and outward FDI were equal but of opposite signs in most countries, with the exception of Spain. The underlying export demand model can be expressed as the following:

$$X_t^i = \alpha_o^i + \alpha_1^i W_t^i + \alpha_2^i RP_t^i + \alpha_3^i RQ_t^i + \alpha_4^i OUT_t^i + \alpha_5^i IN_t^i + u_t^i \quad (26)$$

where W_t^i is the weighted average of import volumes in the main export markets of country i and RQ_t^i denotes the relative product quality which is measured by the ratio of patents taken out in the US by companies resident in exporting country i relative to the weighted average of patents taken out in the US by competitors.

Mankovska (2001), using panel data, constructed trade models for the Ukrainian manufacturing sectors to investigate whether there is a significant relationship between FDI and trade over the period 1996-2000. In this thesis, exports and imports were viewed as functions of FDI inflows and other control variables. Separate estimations were carried out for trade with the EU and the former Council for Mutual Economic Assistance (CMEA). The estimation results of aggregate export model showed that EU FDI in the Ukrainian primary industries had a significant impact on Ukrainian exports to the world rather than exports to the EU. This implied that EU FDI in the Ukrainian primary industries, particularly in ferrous metal, wood-processing, and chemical industries, was attracted mainly to exploit high rates of return and unrealised profit opportunities on the world wholesale market. The estimation results for both multilateral and bilateral import models indicated that FDI from the CMEA into the Ukrainian secondary industries led to considerable increases on the imports of intermediate secondary products, such as machineries, from both the CMEA and the outside world. The models for the export supply and import demand took the following form⁴:

$$X_t^i = \alpha_o^i + \alpha_1 FI_t^i + \alpha_2 DGDP_t^i + \alpha_3 ER_VAR_t + \alpha_4 IND_t + u_t^i \quad (27)$$

$$M_t^i = \alpha_o^i + \alpha_1 FI_t^i + \alpha_2 DGDP_t^i + \alpha_3 ER_VAR_t + \alpha_4 Y_t + u_t^i \quad (28)$$

where DGDP denotes the absolute difference in real GDP per capita between Ukraine and country i ; ER_VAR represents exchange rate variability and was measured by the spot exchange rate around its quadratic trend; IND is the real output for industries; and superscript i denotes the EU and the former CMEA countries.

Sun (2001), using provincial-level data, investigated the impact of FDI on the export performance of Chinese regions over the period 1984-1997. He estimated exports as functions of domestic investment, FDI, exchange rate, and a time trend. The trend variable is inserted into the equation in order to de-trend the relationship between the dependent and independent variables. The estimation results showed that FDI had a positive and significant impact on the coastal and central regions while it had a negative but statistically insignificant

impact on the western region. However, when the Asian financial crisis in 1997 was excluded from the estimation, there appeared a positive and significant relationship between FDI and exports in the western region. Moreover, the estimations suggested that FDI in the coastal region had a stronger effect than in the central and western regions. The estimated export model was expressed as follows:

$$X_t = \alpha_0 + \alpha_1 DI_{t-1} + \alpha_2 FI_{t-1} + \alpha_3 ER_{t-1} + \alpha_4 T + u_t \quad (29)$$

where ER_{t-1} is the annual percentage change in province-specific trade-weighted exchange rates of the Chinese currency in year $t-1$ and T represents a time trend.

In another study for China, Zhang and Felmingham (2001) found that there is a causal links between inward FDI and exports from the provincial export trade as a whole. The study is based on a monthly time series from the years 1986 to 1999 and employed cointegration and error correction mechanism techniques. In the analysis, three panel data sets, namely the high FDI recipients concentrated along the Chinese coast, medium FDI recipients in Central China and the low FDI group in Western China, are developed. The empirical results revealed that, in the high and low FDI recipients group, bidirectional causality applies from FDI to trade, while export Granger causes FDI in the medium FDI recipients region.

Alguacil and Orts (2002) empirically examined the impact of FDI on export for Spain and used a time series approach by employing quarterly aggregate data for the period 1970:Q1-1992:Q3. The results obtained from multivariate cointegration analysis and Granger temporal causality testing revealed that there is a long-term Granger causality from FDI to exports.

Alguacil, Cuadros and Orts (2002) also investigated the relationship between FDI, exports and economic performance in Mexico for the period 1980:Q1-1999:Q4. They observed that there is a positive causal relationship between FDI and exports suggesting that the integration of Mexico in the world economy is being fostered by the export orientation of foreign firms.

Min (2003) tried to investigate the impact of FDI inflow on the pattern of trade flows, especially focusing on the manufacturing sector, in Malaysia for the period 1975-1995 by employing Granger-Sims causality approach. The results revealed that the impact of FDI on the host country's export performance is positive.

As can be seen from the survey on the trade impact of FDI in both developed and developing countries FDI in most cases had significantly contributed the trade performance of these countries.

Table 4: A Summary of Empirical Studies on Inward FDI and Trade Flows

Reference	Countries	Nature of Study	Empirical Findings
Yoon (1971)	South Korea	OLS	Inward FDI increased both exports and imports of the South Korean manufacturing sector.
Ghars El-Din (1986)	Egypt	OLS Economy-wide	Inward FDI had insignificant effects on the Egyptian manufacturing exports.
Schive and Tu (1991)	Taiwan	3SLS Economy-wide	FDI stock had a positive and significant effect on Taiwanese exports, but an insignificant effect on the Taiwanese imports.
Orr (1991)	United States	OLS Economy-wide	Inward FDI increased significantly both exports and imports of the USA.
O'Sullivan (1993)	Ireland	Simultaneous Economy-wide	Private FDI inflows contributed to the Irish export performance significantly.
Leichenko and Erickson (1997)	United States	Times series Industry-level	FDI inflows contributed only to the export performance of durable goods sector in the USA.
Pain and Blake (1994)	United Kingdom	FME method Economy-wide	Inward FDI did not contribute to the export performance of the UK.
Pain and Wakelin (1997)	Eleven OECD Countries	Panel data Time series Country-level	Except for Spain, any competence gained by inward FDI was offset fully by outward FDI.
Mankovska (2001)	Ukraine	Panel data Time series Industry-level	EU FDI contributed significantly to the exports of primary products, while CMEA FDI in secondary industries was heavily dependent on foreign intermediate products for production of final goods.
Sun (2001)	China	Panel data, Time series Regional-level	The effect of inward FDI on Chinese exports was stronger in the coastal region than in the central and western regions.
Alguacil and Orts (2002)	Spain	Cointegration and causality	There is a long-term Granger causality from FDI to exports
Alguacil, Cuadros and Orts (2002)	Mexico	Causality	There is a positive causal relationship between FDI and exports
Min (2003)	Malaysia	Causality	There is a positive causal relationship between FDI and exports

CONCLUSION

This chapter has reviewed a number of empirical studies on the trade performance of FDI in host economies. The results obtained from such studies can be classified as follows: First of all, the survey of descriptive studies on the trade-orientation of Japanese and US subsidiaries showed that Japanese subsidiaries have changed their characteristics through time and have become more similar to those of the US. More specifically, changes in the trade structure of Japanese firms could come from changes in both geographical and industrial locations (Kojima, 1995). Since the 1980s, Japanese firms have started to shift

their investment away from labour-intensive industries of Asian economies to more capital-intensive industries of European and Latin American economies.

Second, the survey of descriptive studies on the trade performance of foreign and local firms indicated that although foreign firms tended to have a greater import propensity than local firms, they were no better than local firms in terms of their export performance. Such a high import propensity of foreign firms was expected since most subsidiaries preferred to buy their intermediate inputs from the parent company (or another subsidiary) and used this transaction as an opportunity to transfer profits (Jenkins, 1990). However, most descriptive studies did not make clear whether such a difference between foreign and local firms resulted only from foreign ownership. Other factors, such as firm size and industrial location, should also be taken into consideration when such analyses were made.

Third, the survey of time series studies on the trade-orientation of Japanese and US FDI in host developing countries showed that although Japanese and US FDI in many developing countries had significantly different impacts in the long run, they provided limited support for Kojima's contention. Finally, changes in the export competitiveness of many developing and developed countries were found to be significantly and positively related to the level of inward FDI.

NOTES

1) The foreign inputs ratio was usually measured by the ratio of imported inputs to total inputs. However, a few studies used the foreign input-sales ratio due to the unavailability of such information.

2) This variable is included in the model as a proxy for income of trading partner or world income since the majority of Irish exports were destined for the United Kingdom.

3) The US, Japan, the UK, Germany, France, Italy, Spain, Sweden, Finland, the Netherlands, and Denmark.

4) In the estimation of aggregate trade flows, superscript *i* attached to the variables for export and import was eliminated and DGDP was dropped from the estimations, since there was no economic sense.

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