Chapter I

Industrial Linkage and Direct Investment in APEC[1]

Satoru D. Okuda
APEC Study Center
Institute of Developing Economies

Introduction

It is now widely believed that the Asia Pacific economies have become more closely interrelated than before. Deepening interdependence is cordially welcome, because it implies enhanced division of labor, and it further implies enhanced welfare in the region. We should know that the increased linkage has various aspects: trade, investment, travel, technology exchange, aid, etc. Due to a lack of relevant statistics, the degree of intra-regional linkage in the region is very often measured by linkage through international trade. Traditionally, the determinants of trade flows included the income level of both importing and exporting countries, relative prices, geographical distance, similarity of culture, etc. However, the interdependence in the APEC region, measured by international trade transactions, decreased in 1998. This is, of course, due to the contraction of income levels in some Asian developing economies bitterly hit by economic turbulence in 1997 and 1998. Nevertheless, it is important to know that another factor, foreign direct investment (FDI), has gradually increased influence over bilateral trade flows. A new foreign establishment very often affects the existing trade flows, both imports and/or exports. A good example is cross-border transactions by multi-national companies.

In this study, the author focuses on the relationship between foreign direct investment and interdependence in the APEC region. At the same time, the author considers how APEC can better accelerate investments in the region using its existing schemes. Considering that the following chapters deal with country-specific

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trade/investment issues, the author organized the contents of this study so that it supplements their rather micro point of view.   At the same time, this study's estimation result of the impact of FDI inflow on the host country's exports will serve as an assumption in the region-wide macroeconomic model.   This model measures the region-wide impact of the APEC investment promotion schemes, demonstrated in Chapter V of this book.

The rest of the study is organized as follows.   Section 1 first sketches the interdependence in terms of trade flows in 1998 and then overviews the industrial linkage between major APEC economies.   It uses international input/output tables released by the Institute of Developing Economies (IDE, currently IDE-JETRO), covering the years 1975, 1985 and 1990.   For the region's interdependence in the 1990s, a simple gravity model for international trade flow will give some explanations. Section 2 investigates the relationship between foreign direct investment stock and trade. Firstly, the author examines the case of Japan and the United States, between 1985 and 1990. For the 1990s, the relationship will be explained by using a gravity model for explaining exports, which additionally incorporates inflow and outflow FDI variables. Section 3 considers how APEC investment promotion schemes can work better, considering the estimation results in the previous Section.   The last Section, Section 4, concludes.

1.   Interdependence in APEC

1.1.   Lower Interdependence in 1998----Influence of the Asian Crisis

It is now widely believed that the interdependence of Asia Pacific economies has deepened.   A research result published in 1998 showed a deepening interdependence in the APEC region by estimating import functions of major APEC members (see Osada (1998)).   Osada calculated and showed "Interregional Multipliers" incorporating major APEC economies, using the sample up to 1996.   As a result of a close examination of the multiplier values, he concluded that the interdependence[2] in the region became quite deep by then.   He even worried about expansion of adverse effects through the network of the interlinkage.

However, in 1998, as measured by trade volume, interdependence in the APEC

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[2] In Osada's definition, interdependence is measured by the magnitude of induced demand, caused by an independent increase in a certain country's final demand, realized in other member countries in the region.

region rather lowered.   Table 1 summarizes intra-regional trade in APEC in 1998.

Table 1. Exports in APEC and World ----1998

	Exports Total	APEC	(Share,%)	Interregional trade	(Share,%)
Japan	388	272	70(75)		
China	184	135	73(77)		
NIES3	417	299	72(74)	47	11(12)
ASEAN7	333	245	74(76)	70	21(24)
ANZCERTA	67	47	70(74)	6	9(10)
NAFTA	1,009	719	71(77)	522	52(54)
(US)	680	416	61(63)	233	34(32)
Other APEC	93	24	26(27)	1	1(1)
APEC	2,490	1,740	70(74)	1,740	70(74)
EU12	2,233	381	17(19)	1,347	60(61)
World	5,487	2,373	43(46)		

Remarks: Million U.S. dollars, nominal.   Shares in ( ) are those for 1997.   NIEs refers to Korea, Taiwan and Hong Kong; ASEAN7 refers to Singapore, Malaysia, Brunei, Indonesia, Philippines, Thailand and Vietnam; ANZCERTA refers to Australia and New Zealand; NAFTA refers to the United States, Canada and Mexico; Other APEC refers to Russia, Peru, Chile and Papua New Guinea; EU12 refers to Belgium, Luxembourg, Netherlands, United Kingdom, Ireland, Denmark, Germany, France, Spain, Portugal, Italy and Greece.
Data Sources: IMF, *Direction of Trade* (DOT) 2000, supplemented by Republic of China, Ministry of Finance, Monthly Statistics of Exports and Imports, various issues.

Table 2. GDP in APEC and World---1997 and 1998

	97	98	Change (%)
Japan	4,190	3,783	-9.7
China	918	965	5.1
NIEs3	900	752	-16.5
ASEAN5	667	426	-36.1
ANZ	471	418	-11.4
NAFTA	9,146	9,779	6.9
US	8,111	8,760	8.0
APEC21*	16,880	16,576	-1.8
EU15	8,148	8,381	2.9
World	29,493	29,236	-0.9

Remarks: *Excluding Brunei. Unit is billion U.S. dollars (nominal, at market exchange rate).
Data Sources: IMF, International Financial Statistics, January 2000 (for country GDP figures) and IMF, World Economic Outlook, October 1999 (for world GDP).

Table 1 shows that APEC's intra-regional trade share fell from 74% in 1997 to 70% in 1998.   The most probable reason for the lowered interdependence in the APEC region in 1998 was the drastic plunge in national currencies due to the Asian crisis and

the consecutive contraction of the dollar-denominated income in Asia Pacific economies. Table 2 shows nominal GDP of major APEC sub-regions in 1997 and 1998; and it shows the percentage change over the periods.   According to the Table, all the Asian and Oceania subgroups, except China, decreased their dollar denominated GDP in 1998. Especially, ASEAN economies, most affected by the Asian crisis, decreased their GDP by 36.1%.   Although the magnitude was somewhat weaker, the negative impact of the Asian crisis attacked NIEs, among which it affected Korea most.   Nevertheless, NIEs' GDP in 1998 fell as much as 16.5% compared to 1997.   Intra-regional trade in NIEs and ASEAN also shrank.   According to Table 1, the intra-regional trade share in NIEs and ASEAN fell from 12% and 24% in 1997 to 11% and 21% in 1998, respectively. This suggests that NIEs and ASEAN economies diverted their exports from their own neighbors to the partners less affected by the Asian crisis, such as NAFTA members or EU members.

1.2.   Change in Industrial Linkage---Input Output Analysis for 1975, 1980 and 1990

1.2.1.   Input-Output Analysis Framework and Leontiev Inverse Matrix

As mentioned above, the strength of economic interdependence is usually measured by international trade flows.   However, if available, analysis through international input-output framework provides us with better insight about interdependence.   Using an input-output framework, one can first calculate the so-called Leontiev inverse matrix, which is analogous to the multiplier in Keynesian macroeconomic analysis.   The inverse matrix tells us how much every sector (say sector i) will be affected as a result of a demand increase in other sectors (say sector j). In the case of a non-competitive imports table, which separately records imports from outside the region and the region's own products, a typical inverse matrix looks as follows:

$(I-A_d)^{-1}$……………………………………………………………………………..(1)

Multiplying the assumed impact that the examiner gives, induced demands to each sector will be calculated in a vector form as follows[3]:

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[3] Suppose A is an n x n input coefficient matrix, Ad is an n x n input coefficient matrix for domestic products, Am is an n x n input coefficient matrix for imports, F is an n x 1 final demand vector, F_d is an n x 1 final demand vector for domestic products, Fm is an n x 1 final demand vector for imports, X is an n x 1 total domestic production vector and M is an n x 1 total imports vector.   The demand-supply balance matrix equation is written as follows.

Domestic products: $X = A_d X + F_d$…………………(a)

Imports: $M = A_m X + F_m$…………………(b)

Rearranging Equation (a) above and isolating X, we obtain,

$$X = (1- A_d)\text{-}1 \quad F_d\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

The induced demand vector, X, contains detailed information about the effect that each sector receives. The vector can also be interpreted as the induced demands after collecting every possible repercussion within the region[4].

1.2.2. Patterns Not Uniform: Change in Industrial Linkage in APEC---Using International I/O Tables-----

In order to analyze in more detail how interdependence in the APEC region deepened in the past, the author will use the above analytical framework. Specifically, the author will analyze international input-output tables, which treat an endogenous country just like a group of sectors in domestic tables.

In the past, JETRO-IDE published Asia-Pacific international input-output tables for 1975, 1985, and 1990[5]. Using these three international input/output tables and applying Equation 2, the author calculated the impact of independent demand increases in each country's manufacturing sector on the manufacturing sectors of endogenous countries. In this study, the size of the increase is assumed to be one million dollars.

Table 3 summarizes the impact of each country's demand increase. Firstly, we can notice that developed economies, like Japan and the United States, induced only a minimal portion to other countries in the region compared to its domestic impact. The share of international inducement of Japan and the United States in 1990 was only 1.8%. This implies that Japan and the United States are highly self-reliant economies, which do not leak much demand to other economies. Secondly, the developing endogenous countries tended to generate more international inducement. Specifically, Singapore, as the "key stone" in Southeast Asia, would induce about 468 thousand dollars internationally, which is equivalent to 27.5% of domestically induced production.

$$X = (1- A_d)\text{-}1 \quad F_d\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(c)$$

Diffentiating Equation (c) above, we obtain

$$X = (1- A_d)\text{-}1 \quad F_d$$

[4] When an independent demand increase, X, occurs, the primary impact on the region's industries will be $A_d \quad X$. The primary impact will then cause the secondary impact, $Ad2 \quad X$. The interaction will continue until And X becomes zero. Hence, summing up those impacts will lead us to $SUM(A_{d,i})_i \quad X = (1\text{-}A_d)\text{-}1 \quad X$. This implies that the increased demands calculated from the Leontiev inverse matrix can be interpreted as the accumulated repercussion through the industrial linkage.

[5] For details, please see Institute of Developing Economies (1982, 1992, and 1998). The project team in charge is now working on the table for 1995. Country coverages are: 8 endogenous countries for the 1975 table (Japan, Korea, Singapore, Malaysia, Indonesia, Philippines, Thailand and United States), and 10 endogenous countries for the 1985 and 1990 tables (above mentioned 8 countries plus China and Taiwan).

Table 3. Impact of Increased Demand on Own Country and the Region---I/O Analysis

year	Induced to	Japan	China	Korea	Taiwan	Singapore	Malaysia	Indonesia	Philippines	Thailand	United States
75	Own economy(A)	1,813,060		1,681,277		1,463,600	1,333,824	1,281,881	1,367,253	1,376,775	1,646,075
	Others(B)	31,061		222,203		253,433	114,753	126,598	109,726	99,554	19,887
	B/A	1.7%		13.2%		17.3%	8.6%	9.9%	8.0%	7.2%	1.2%
85	Own economy(A)	1,825,414	1,759,805	1,809,870	1,900,648	1,674,188	1,525,518	1,325,780	1,366,463	1,479,559	1,587,659
	Others(B)	35,508	57,361	192,035	184,432	369,704	248,104	99,315	78,267	111,734	26,383
	B/A	1.9%	3.3%	10.6%	9.7%	22.1%	16.3%	7.5%	5.7%	7.6%	1.7%
90	Own economy(A)	1,796,376	1,938,390	1,858,213	1,871,309	1,700,796	1,690,036	1,380,179	1,462,736	1,591,682	1,509,724
	Others(B)	32,649	57,556	194,226	256,878	468,289	260,801	94,106	145,678	234,572	27,103
	B/A	1.8%	3.0%	10.5%	13.7%	27.5%	15.4%	6.8%	10.0%	14.7%	1.8%

Remarks: The initial impact is set as one million U.S. dollars for each country.   International production inducements (B) are the total of 7 countries in 1975 and 9 countries in 1985 and 1990, excluding the own country.   For example, a one million dollar increase in demand in Singapore in 1990 would induce 1,700,796 dollars of production at home, and 468,289 dollars of production in the other 9 endogenous countries.
Data Sources: Author's compilation using Leontiev inverse matrix for Asian International Input-Output Tables (1975, 1985 and 1990 tables).

The ratio of international inducements soared in Singapore, Thailand, Malaysia, and Taiwan.   On the other hand, the ratio decreased in Indonesia and Korea, and those for Japan, China and the United States stayed almost the same.   In sum, the above analysis reveals that enhancement of the region's industrial linkage, or interdependence, did not occur uniformly.

1.3.   Emerging Sub-Regions and Interdependence----1990s
1.3.1.   Gravity Model for International Trade Flows

As demonstrated above, the input-output analysis provides us with detailed information about industrial linkage.   However, for now, the international input-output analysis is only possible for some selected years, with the most recent sample year being 1990.   The compilation of international tables takes years.

Therefore, in order to know the interdependence in the APEC region in the 1990s, the author will analyze the region's trade flows using a simple gravity model, which incorporates dummies for APEC sub-regions.   As shown in Section 1-1 above, the fall in the share of APEC's intra-regional trade flows is partly due to decreased interdependence within sub-regions such as ASEAN (=AFTA).   The author will measure the effects sub-regions have on trade flows for various years, and compare them.

Simplifying the equation form adopted in Okuda (1999), the author formulates the

regression equation for international trade flows in APEC as follows[6]:

$$T_{ij} = f [CNST, GDPX, GDPM, DIST,$$
$$HK, SPORE, CHN, MEX,$$
$$AFTA, NAFTA, CER] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Table 4 summarizes the variables used in the above equation.   For technical notes on the data and estimation, please see APPENDIX 3.   The above equation tries to explain trade flows from country i to j basically by using the income levels of the countries involved (GDPX and GDPM) and the distance apart (DIST).   Other variables are country or sub-region dummies.   HK and SPORE are interport dummies for Hong Kong and Singapore, respectively, to control the upward anomaly due to their property as interports.   The China dummy measures China's inactivity towards international trade: this variable was relevant especially during the 1970s and early 1980s.   MEX

Table 4.   Explanatory Variables---Simple Gravity Model

Tij*	Exports from country i to j
CNST	Constant
GDPX*	GDP of exporting country i
GDPM*	GDP of importing country j
DIST*	Distance between exporting and importing countries
HK	Hong Kong interport dummy: 1 if the flow involves Hong Kong, 0 otherwise
SPORE	Singapore interport dummy: 1 if the flow involves Singapore, 0 otherwise
CHN	China dummy: 1 if the flow involves China, 0 otherwise
MEX	Mexico dummy: 1 if the flow involves Mexico, 0 otherwise
AFTA	Intra-AFTA dummy: 1 if the flow is intra-AFTA, 0 otherwise
NAFTA	Intra-NAFTA dummy: 1 if the flow is intra-NAFTA, 0 otherwise
CER	Intra-ANZCERTA dummy: 1 if the flow is between Australia and New Zealand, 0 otherwise

 * Log Transformed.

is the Mexico dummy, and it is used to control the downward anomaly with most of the sample economies, due to its strongly upward biased trade orientation towards its huge neighbor, the United States[7].   AFTA, NAFTA, and CER dummies are applied for the intra-region flows within them.   The value of the estimated coefficients show the

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[6] For details about the gravity model, refer to Okuda (1999, 1998 and 1997).

[7] In earlier studies by Okuda (Okuda 1999,1998 and 1997), the Mexican dummy was only applied to Mexican exports.   The reason was that the downward bias of Mexican exports to the sample economies, except the United States, was larger than in the case of imports.   However, it is true that imports also tend to be biased downward.   The author considers that omitting the downward bias of the imports may arouse another problem, and the Mexico dummy is now applied to both exports and imports.

strength of the intra-regional trades in those sub-regions.

1.3.2.   Closer Interdependence in AFTA Detected--- Considering Income Plunge in 1998

Table 5 summarizes the estimation results for Equation 3.   According to the estimation results, sub-region dummies became statistically significant after 1995.   By that time, those three sub-regions were established as official regional trade arrangements.   This tells us that interdependence within the sub-regions gradually deepened towards the end of the decade.   An interesting finding for 1998 is that the dummy value for AFTA showed a substantial jump compared to the previous year.   It went from 0.372 to 0.754.   The statistical significance also improved greatly.

Table 5.   Estimation Results for the Determinants of the Trade Flows in APEC

Dependent Variable: log(Tij)

Explanatory Variables	Estimated Coefficients						
	1970	1980	1990	1995	1996	1997	1998
CNST	5.713****	4.992****	4.860****	3.240****	2.926****	3.389****	3.771****
GDPX+	0.957****	0.820****	0.803****	0.779****	0.803****	0.777****	0.716****
GDPM+	0.875****	0.852****	0.836****	0.760****	0.795****	0.779****	0.793****
DIST+	-0.949****	-0.839****	-0.846****	-0.589****	-0.609****	-0.619****	-0.622****
HK	1.637****	0.847****	0.993****	1.132****	1.086****	0.928****	0.884****
SPORE	2.150****	1.876****	1.590****	1.390****	1.384****	1.282****	1.157****
CHN	-3.555****	-1.104****	-0.829****	-0.360***	-0.332***	-0.469****	-0.423****
MEX	-3.341****	-2.483****	-1.726****	-1.839****	-1.647****	-1.749****	-1.630****
AFTA	-0.454	-0.337*	-0.166	0.351*	0.353*	0.372*	0.754****
NAFTA	0.492	0.393	0.022	1.325****	1.047****	1.077****	0.906***
CER	1.085	0.962*	0.814*	1.427***	1.475****	1.296***	1.184***
R-squared (adj)	0.638	0.831	0.868	0.835	0.833	0.821	0.820
Log likelihood	-453.9	-284.3	-251.3	-273.7	-270.0	-274.4	-277.1
S.E. of regression	1.754	0.840	0.719	0.790	0.763	0.777	0.786

Remarks: Estimation results for Equation 3.   A '+' signifies that the corresponding variable is log transformed.   The number of asterisks (*) attached to the estimated coefficients signifies the statistical significance of the estimated coefficients.
****   1% significance   ***   5% significance
  **   10% significance   * 20% significance

The improvement in estimated dummy values for AFTA seem to contradict the descriptive observation of the lower intra-regional trade ratio in ASEAN in 1998. However, we should once again consider the nature of the gravity model: it incorporates income variables of the countries involved.   Therefore, the model

successfully controls the effect of income plunge of the AFTA economies in 1998. The distinct improvement in the AFTA dummy should be interpreted as the economies' effort to divert their export destination to their neighbors[8].

2. Investment Flows and Trade Flows---Did the FDI Stock Make a Difference in the Crisis?

In the previous Section, it was shown that the seemingly decreasing interdependence in APEC in 1998 may be misleading; and after controlling the income plunge during the year, interdependence, specifically in AFTA, rather strengthened. Also, it was shown that the deepening of interdependence did not proceed uniformly.

The author suspects that FDI is one of the most probable factors for each country's varied pace of involvement in intra-regional trade.   If one can show that FDI affects trade flow, then that would help explain the varied pace of participation in intra-regional trade.   A past research result from the IDE APEC Study Center suggested FDI impacts trade flows.   Specifically, a research result published in 1997 suggested that foreign direct investment attracted by APEC developing economies tended to boost their exports (see Okuda (1997)).   The focus in this study is whether or not FDI stock, both inward and outward, tends to boost exports or imports and whether or not the effect differs in developed economies and developing economies.   The estimation of Okuda (1997) is based on FDI stock as of 1994[9].   In this study, the author tries to run models using the most recent data.   Also, the author tries to improve the sample data for investment.

2.1. Investment Flows in APEC---Recent Trend

First of all, let us take a look at a recent trend for investment flows in the APEC region.   Indeed, Asian economies, especially ASEAN members and China, attracted huge amounts of foreign direct investment from major leading economies in the 1990s.

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[8] At the peak of the Asian Crisis, AFTA members that tried to import goods were was not able to open sufficient amount of letters of credit denominated in U.S. dollars because of the shortage of foreign exchange reserves.   Instead of importing goods from the country where dollar denominated letters of credit were required, it is said, some of the importers negotiated with their own currency when importing from neighboring countries.

[9] In Okuda (1997), the set of data for the regression did not cover the investment data for Hong Kong, and the data for Mexico and Malaysia was based on the net figures of outward and inward FDI flows.

Table 6. Flow and Estimated Balance of Foreign Direct Investment in APEC

		Flow			Estimated Balance, End of 1998	Balance/ GDP (98,%)
		1980-89*	1990-94*	1995-98*		
INWARD	Japan	2	7	7	11	0
	China	15	80	164	198	20
	NIEs3	20	22	35	51	7
	ASEAN5	39	75	98	144	34
	ANZ	48	36	43	77	18
	NAFTA	395	256	540	792	8
	US	331	194	451	647	7
	APEC21	524	486	927	1,316	2
	EU12	283	386	498	786	10
OUTWARD	Japan	144	131	97	215	6
	China	4	12	9	17	2
	NIEs3	28	75	128	166	22
	ASEAN5	4	19	38	45	10
	ANZ	28	17	17	35	8
	NAFTA	233	321	510	750	8
	US	188	290	435	646	7
	APEC21	441	578	810	1,238	2
	EU12	424	517	870	1,254	16

Remarks: Investment figures are BOP basis, billion US dollars.
Data Sources: [FDI] Author's compilation using the following sources: UNCTAD, *World Investment Report*, various issues; The Central Bank of China, Economic Research Dept., *Balance of Payments Quarterly, Taiwan District, The Republic of China*, various issues; IMF, *International Financial Statistics*, various issues; Bank Negara Malaysia, *Monthly Statistical Bulletin*, various issues.   [GDP] Author's compilation using the following sources: IMF*, International Financial Statistics*, various issues; The Central Bank of China*, Financial Statistics, Taiwan District, The Republic of China*, various issues.
Remarks: * total flow during the indicated period.   For the calculation of the FDI stock, please refer to Appendix 1.

Table 6 summarizes cross-border investments in APEC.   In the 1990s, inward investments increased drastically in China, ASEAN and the United States.   Outward investments increased in Japan, NIEs, and the United States.   In the APEC region, basically, Japan and NIEs played the role of investors, and China ASEAN and ANZ mainly received the investments.   The United States invested abroad, but at the same time received investments from abroad.   The presence of FDI was large in ASEAN, and its balance to GDP ratio recorded as much as 34% in 1998.   On the other hand, the presence of NIEs' outward investment is relatively large, with the ratio to GDP equaling 22% in 1998. We can notice that NIEs' outward investment for the period 1995-98 recorded 128 billion dollars, which exceeded Japan's figure of 98 billion dollars.   In matured economies, specifically Japan and the United States, the presence of both inward and outward FDI was not very great, although the investment amount was quite large.   On the contrary, small sized economies, specifically NIEs, AFTA members,

and China as measured by total GDP size, tended to actively receive or offer investments.

2.2. Deepening Industrial Linkage and FDI---An Analysis of the Late 1980s

In Section 1.2 above, we have seen that APEC economies' involvement to deepen interdependence was not uniform.   Some economies, such as Singapore and Thailand, deepened industrial linkage within the APEC region, but some did not.   In this subsection, the author will analyze whether or not the FDI outflows from Japan and the United States affected the industrial linkage.

2.2.1. FDI and Repercussions to Home Countries---Effects Differed between Japan and the U.S.

For various sample years, Table 7.1 and Table 7.2 summarize the impact of independent demand in the manufacturing sectors abroad on the manufacturing sectors of Japan and the United States, and they compare the potentially induced 1990 production to that of 1985.   For example, Table 7.2 shows that in 1990 Malaysia's additional one million dollar demand would induce additional production worth 48,458 dollars in the United States, and that the amount was equivalent to approximately 0.89 times the potential induced production in 1985.   The tables also compare changes in induced production in the two developed countries with the changes in their FDI balances in the other major Asia Pacific economies. For example, Table 7.2 compares the 0.89 times change in induced production in the United States caused by Malaysia during 1985 and 1990, to the 1.10 times change in the U.S. FDI balance in Malaysia for the same period.

In 1985, as Table 7.1 shows, Singapore ($118,629), Malaysia and Korea would induce relatively more production in Japan.   In 1990, Japan would benefit relatively more from Singapore ($241,238), Taiwan and Thailand.   During the period, the estimated impact to Japan grew for the Philippines (2.78 times), Thailand and Singapore. Similarly, according to Table 7.2, the United States enjoyed relatively larger induced production from the demand increase caused by Singapore ($88,233), Korea, Taiwan and Malaysia in 1985.   In 1990, Singapore ($119,481), Taiwan and Korea affected the United States more than other economies.   During the period, Thailand (2.25 times), China and Taiwan developed greater estimated impacts on the United States.

Generally speaking, the international repercussions, which Japan and the United States would enjoy, increased for the period 1985-90.   Also, Japan would receive more repercussions compared to the United States in every sample year.

Table 7.1.   Impact of Asia Pacific Economies on Japan and Its FDI Balance

Induced Production		China	Korea	Taiwan	Singapore	Malaysia	Indonesia	Philippines	Thailand	United States
					Countries of Original Impact					
1975			143,442		122,768	65,024	97,244	71,052	82,874	16,567
1985(A)		42,263	117,138	112,729	118,629	117,067	55,013	24,315	67,642	19,764
1990(B)		29,358	116,270	147,458	241,238	130,912	56,676	67,590	136,803	19,282
B/A		0.69	0.99	1.31	2.03	1.12	1.03	2.78	2.02	0.98
* Japan's FDI Balance	1985(C)	250	875	451	1,519	652	4,646	456	429	17,610
	1990(D)	2,172	2,495	1,917	4,612	2,252	5,452	884	3,515	100,779
	D/C	8.70	2.85	4.25	3.04	3.45	1.17	1.94	8.20	5.72

Remarks:

(1) Assumption: an independent demand increase of one million U.S. dollars occurred in the manufacturing sector of each listed country.

(2) Since the 1975 international input-output table of IDE does not incorporate China and Taiwan, the corresponding cells are left blank.   Since the other figures for 1975 do not include the repercussions through Taiwan and China, they are not directly comparable with figures for other sample years.

(3) Columns for "Induced production" denote the amounts of induced production in the Japanese manufacturing sector in respective years due to independent increased demand abroad. Unit: U.S. dollars.

(4) Japan's FDI balance in each listed country was calculated in the same manner as in APPENDIX 1, using the data on notification-based outflows from Japan to respective countries compiled by the Ministry of Finance, Japan.   The data are gross figures, without netting any decreasing factors, such as withdrawals, etc.   Unit(*): million U.S. dollars.

Data Sources: [Induced Production] Author's compilation using the Leontiev inverse matrix for IDE's international input-output tables (1975,85,90);   [FDI Data].   Japan, Ministry of Finance, "Ministry of Finance Statistics Monthly", various issues (December special editions for inward and outward investments to/from Japan).

Table 7.2.   Impact of Asia Pacific Economies on the United States and Its FDI Balance

Induced Production		Japan	China	Korea	Taiwan	Singapore	Malaysia	Indonesia	Philippines	Thailand
						Countries of Original Impact				
1975		21,971		69,202		67,931	25,067	17,170	36,601	11,159
1985(A)		23,554	10,631	63,759	54,246	88,233	54,188	26,830	31,157	20,489
1990(B)		20,056	15,408	62,581	74,919	119,481	48,458	17,172	42,059	46,107
B/A		0.85	1.45	0.98	1.38	1.35	0.89	0.64	1.35	2.25
* US FDI Balance	1985(C)	3,259	335	230	511	1,262	461	3,023	172	638
	1990(D)	5,276	470	1,078	1,220	1,761	507	2,125	302	1,052
	D/C	1.62	1.40	4.69	2.39	1.40	1.10	0.70	1.76	1.65

Remarks: See remarks for Table 7.1.

(1) Columns for "Induced Production" denote the amount of induced production in the U.S. manufacturing sector in respective years due to independent increased demand abroad. Unit: U.S. dollars.

(2) U.S.' FDI balance in each listed country was calculated in the same manner as in APPENDIX 1, using the BOP-based data on outward investment from the United States to respective countries compiled by the U.S. Bureau of Economic Analysis.   The data are net figures, allowing for the decreasing factors, such as withdrawals, etc.   Unit (*): million U.S. dollars.

Data Sources: [Induced Production] Same as Table 7.1; [FDI Data] U.S. Bureau of Economic Analysis, "Survey of Current Business", various issues.

Comparing the changes in FDI balances to production impacts on the investing countries will suggest how FDI balance with a certain economy could impact the investor's domestic production.

Figure 1.1. Japan's FDI and Impact from Host Countries
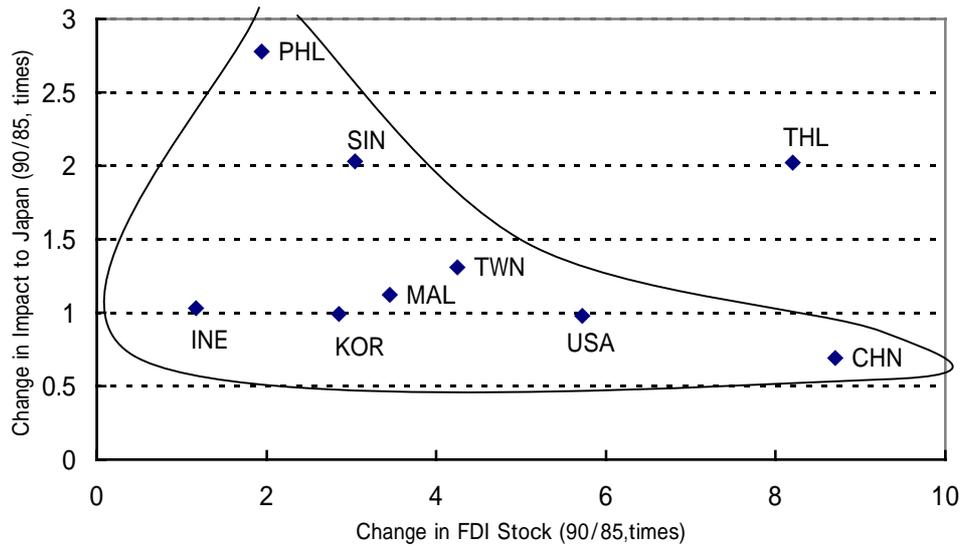
Remarks: Drawn from Table 7.1.

Figure 1.2. U.S. FDI and Impact from Host Countries
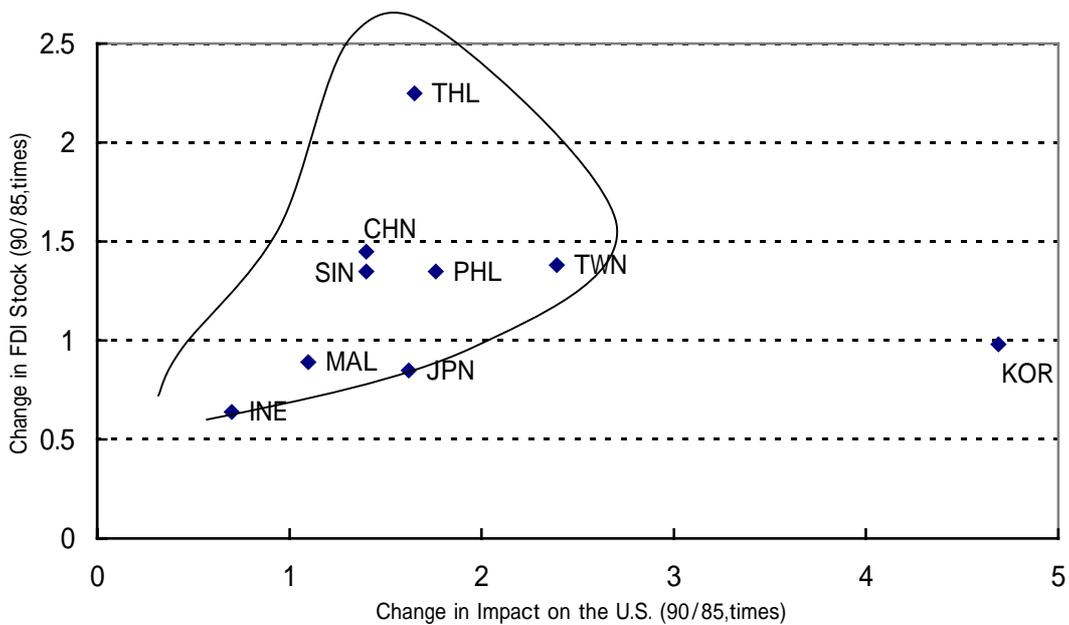
Remarks: Drawn from Table 7.2.

The following scattered diagram, Figure 1.1, shows the relation between Japan's FDI balances with each country and the impacts on the manufacturing sector attributable to each country.   Figure 1.2 shows a similar diagram for the United States.

From Figures 1.1 and 1.2, we can notice differing patterns between the two countries. The plots on the figure for Japan (Figure 1.1) generally show a downward trend; changes in impact on Japan and Japan's FDI balance are negatively correlated. This further suggests that Japan's FDI tended to replace existing export flows from Japan with FDI. This implication supports the view expressed by Fukao and Nakakita (1996) that overseas activities of Japanese firms tended to shrink production in Japan. On the other hand, the plots on the figure for the United States (Figure 1.2) show an

Table 7.3.   Impact of Japan on Asia Pacific Economies and Its FDI Balance

Induced Production		China	Korea	Taiwan	Singapore	Malaysia	Indonesia	Philippines	Thailand	United States
					Countries that Receive Impact					
1975			2,532	0	1,044	756	1,116	2,038	1,604	21,971
1985(A)		5,506	4,336	3,406	1,843	1,393	2,220	873	1,289	23,554
1990(B)		5,561	5,706	4,935	1,614	1,299	1,816	598	1,560	20,056
B/A		1.01	1.32	1.45	0.88	0.93	0.82	0.68	1.21	0.85
* Japan's FDI Balance	1985(C)	250	875	451	1,519	652	4,646	456	429	17,610
	1990(D)	2,172	2,495	1,917	4,612	2,252	5,452	884	3,515	100,779
	C/D	8.70	2.85	4.25	3.04	3.45	1.17	1.94	8.20	5.72

Remarks: See remarks for Table 7.1.
(1) Assumption: an independent demand increase of one million U.S. dollars occurred in Japan's manufacturing sector.
(2) Columns for "Induced Production" denote the amount of induced production in the manufacturing sector of each listed countries in respective years due to independent increased demand in the Japanese manufacturing sector. Unit: U.S. dollars.
Data Sources: [Induced Production] Same as Table 7.1; [FDI Data] Table 7.1.

Table 7.4.   Impact of the United States on Asia Pacific Economies and Its FDI Balance

Induced Production		Japan	China	Korea	Taiwan	Singapore	Malaysia	Indonesia	Philippines	Thailand
						Countries that Receive Impact				
1975		16,567	0	1,223	0	390	692	244	534	237
1985(A)		19,764	1,064	2,950	4,296	1,034	1,064	521	632	418
1990(B)		19,282	2,189	3,371	4,612	1,686	1,177	491	433	663
B/A		0.98	2.06	1.14	1.07	1.63	1.11	0.94	0.69	1.59
* US FDI Balance	1985(C)	3,259	335	230	511	1,262	461	3,023	172	638
	1990(D)	5,276	470	1,078	1,220	1,761	507	2,125	302	1,052
	D/C	1.62	1.40	4.69	2.39	1.40	1.10	0.70	1.76	1.65

Remarks: See remarks for Table 7.1.
(1) Assumption: an independent demand increase of one million U.S. dollars occurred in the manufacturing sector of each listed country.
(2) Columns for "Induced Production" denote the amount of induced production in the manufacturing

> sector of each listed countries in respective years due to independent increased demand in the U.S. manufacturing sector. Unit: U.S. dollars.

Data Sources: [Induced Production] Same as Table 7.1; [FDI Data] Table 7.1.

upward trend, which can be interpreted as U.S. FDI's tendency to induce more new production in the home economy.   In other words, the U.S. FDI tended to create an export flow to the host country, which is a clear contrast with the case of Japan.

2.2.2.   Effects of FDI on Asia Pacific Production---Increasing Impact of Japan

We have just seen that Japan's and the United States' FDI tend to affect the home economy differently.   Next, we will examine the impact of Japan's and the United States' FDI on the host economies.   Table 7.3 and Table 7.4 summarize the potential induced production when we assume an independent one million dollar increase in the manufacturing sectors of Japan and the United States.

The above two Tables show that, among the sample economies, Japan and the United States affected each other the most, in terms of real volume, in every sample year. Also, we can notice that the impact the two countries have on developing economies are estimated to be very small compared with the impact they receive from the host countries in the Asia Pacific.   In 1985, Japan brought about relatively large production inducement to China ($5,506), Taiwan and Korea.   The United States in that year induced relatively large production in Taiwan ($4,612), Korea and China.   The United States caused less production than Japan in Asian developing countries, but both countries similarly tended to induce production more in the Far Eastern developing economies.   In 1990, such a tendency basically did not change: Japan induced more production in Korea ($5,706), China and Taiwan, and the United States induced more production in Taiwan ($4,612), Korea and China.   By 1990, Japan's impact grew fastest in Taiwan (1.45 times), and for the United States, the impact grew fastest in China (2.06 times).   In Singapore and Thailand, the U.S. impact grew moderately by 1990.   Generally speaking, the relative magnitude of Japan's impact in each country did not change.

Again, using diagrams, we will check whether or not the change in FDI balance affected the repercussions that the host economies receive as a result of domestically increased demand in the investors' economies.

In a sense, the above two Figures are again contrasting; the figure for Japan (Figure 1.3) shows, although slight, an upward tendency, while the figure for the United States (Figure 1.4) shows no clear-cut tendency.   An upward tendency in the figure for Japan implies that the Japanese manufacturing sector tends to increase production in host countries of its FDI.

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The above analysis combines the induced production under an international input-output framework and FDI stock.   We could say that the effect of FDI, both on the home economies and on the host economies, will probably differ.

Figure 1.3. Impact of Japan's FDI on Asia Pacific Economies
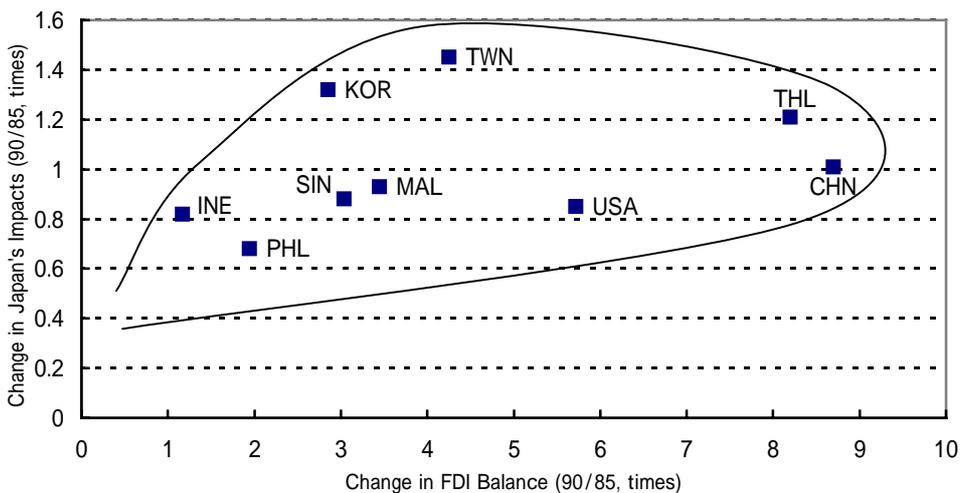
Remarks: Drawn from Table 7.3.

Figure 1.4. Impacts of U.S. FDI on Asia Pacific Economies
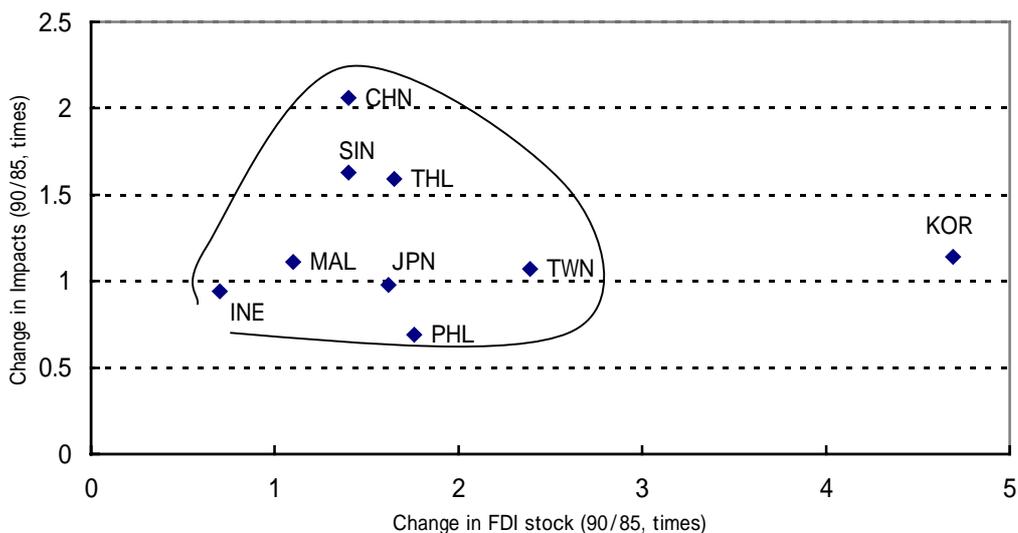
Remarks: Drawn from Table 7.4.

2.3.   Impact of FDI on Trade---Does FDI Attraction Really Promote Exports?

2.3.1.   Improvements in the Estimation

The above subsection shows that the effect of FDI would probably differ by country.   Past studies about the impact of FDI on international trade include Okuda (1997).   In his study, the stock of FDI inflow was estimated to positively influence the host country's exports.   However, considering the recent changes surrounding FDI and developing economies, such as the increasing importance of export-oriented FDI destined from several developing economies (Hong Kong to China, Taiwan to Vietnam, etc), his model had several shortcomings:

(1) The FDI variables used in his study did not distinguish between developed and developing host and home countries in examining its influence on trade flows.

(2) His model analyzed the export effects of inward FDI in the exporting economy and outward FDI from the importing country.   However, it did not analyze the trade effect of outward FDI from the exporting country or inward FDI in the importing country.

Utilizing the suggestion drawn from the discussion in the above subsection, and considering the shortcomings in the old model, the author will improve and expand the old gravity model in Okuda (1997) and update the data used for the estimation.

Specifically, improvements in the new gravity model include:

(1) Two separate equations that incorporate FDI-related variables will be estimated. One equation estimates the export effect of FDI attraction (inward FDI in the exporting country and outward FDI from the importing country), and the other equation estimates the export effect of outward FDI (outward FDI from the exporting country and inward FDI into the importing country)

(2) In order to focus on the role of FDI in developing economies, FDI variables will be separated so that we can distinguish FDI's effects in developing economies and those in developed economies.

Thus, two improved econometric models to measure the effect of FDI on trade are defined as follows. For the additional variables introduced in the following equations, refer to Table 8.

$$\textbf{T}_{ij} = \textbf{f [CNST, GDPX, GDPM, DIST,}$$
$$\textbf{HK, SPORE, CHN, MEX,}$$
$$\textbf{AFTA, NAFTA, CER}$$
$$\textbf{FDIXI, FDIXI*XLDC, FDIMO, FDIMO*MLDC] ……………..…….(4)}$$

$$\textbf{T}_{ij} = \textbf{f [CNST, GDPX, GDPM, DIST,}$$
$$\textbf{HK, SPORE, CHN, MEX,}$$
$$\textbf{AFTA, NAFTA, CER}$$
$$\textbf{FDIXO, FDIXO*XLDC, FDIMI, FDIMI*MLDC] ……………..…….(5)}$$

Equation 4 measures the export effect of increased FDI.   The Equation basically contains two FDI-related variables, FDIXI and FDIMO.   FDIXI is the inward FDI balance in the exporting country, which expresses the magnitude of FDI attraction by the exporting country[10].   FDIMO is the outward FDI balance of the importing country. Since FDIMO is the outward FDI balance of the importing country with the world, the bilateral balance is only a portion of that variable.   Still it can be partially regarded as an FDI-related variable destined to the exporting country.   Thus, as seen from the export country, both FDIXI and FDIMO signify the accumulation of incoming investment flows to themselves.

In contrast to Equation 4, Equation 5 measures the export effect of outward FDI. The Equation contains two FDI-related variables, FDIXO and FDIMI.   FDIXO is the exporting country's outward FDI balance with the world, which shows the level of overseas investment activity by the exporting country.   FDIMI implies the magnitude of the importer's FDI attraction.   These two variables can be regarded as the outgoing investment from the exporting country, although only a portion of FDIMI is actually outward investment from the exporting country.

Compared with Equation 3, Equation 4 has four additional FDI-related variables. Two variables, FDIXI and FDIMO, are balances of inward FDI to the exporting country and outward FDI from the importing country, respectively; and they are applicable to all the sample countries. As explained later, the effects of these simple variables, without

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[10] In this study, FDI-related balances are not broken down into a bilateral basis.   At first, the author planned to compile BOP-based bilateral FDI balances for the sample economies. However, because of the limited availability of such data, the author instead adopted balances with the rest of the world, like Okuda (1997).   Some of the sample countries, such as the United States, release data on bilateral investment flows based on BOP statistics, while some others only have breakdown figures based on approval (such as Japan). There is another somewhat positive reason for not breaking down. FDI sometimes creates trade with a third country.   If this were the case, breaking down the investment data would result in missing such third country effects.

Table 8. Explanatory Variables---FDI-Related Variables

FDIXI	Balance of inward FDI in the exporting country [+]
FDIMO	Balance of outward FDI from the importing country [+]
FDIXO	Balance of outward FDI from the exporting country [+]
FDIMI	Balance of inward FDI in the importing country [+]
XLDC	1 if the exporting country is a developing economy[++], 0 otherwise
MLDC	1 if the importing country is a developing economy[++], 0 otherwise

Remarks: For other explanatory variables not listed above, refer to Table 4.
+   Refer to APPENDIX1 for the calculation of FDI balances.   Inward FDI balances are the accumulation of FDI inflows from the world to a host country, allowing for depreciation, and are not on a bilateral basis.   Similarly, outward FDI balances are the accumulation of FDI outflows from an investing country.
++   "Developing economies" are China, Korea, Taiwan, Malaysia, Indonesia, Philippines, Thailand and Mexico.

crossing with other variables, should be mainly interpreted as those for developed economies, because the effects for developing economies are examined by cross variables.   Other variables are cross variables, FDIXI*XLDC and FDIMO*MLDC. XLDC and MLDC are both only applicable to developing economies as defined in Table 8.   The string "LDC" stands for "less developed country."   Therefore, FDIXI*XLDC equals FDIXI only if the exporting country is a developing economy, and the estimated coefficient should be interpreted as additional export effect of the developing economies' FDI inflow.   On the other hand, the estimated coefficient for the variable FDIMO*MLDC is relevant only if the importing country is a developing economy, and it examines whether or not the importer's overseas investment activity significantly affects bilateral trade flows.

Compared with Equation 3, Equation 4 has four additional FDI-related variables. Two variables, FDIXI and FDIMO, are balances of inward FDI to the exporting country and outward FDI from the importing country, respectively; and they are applicable to all the sample countries. As explained later, the effects of these simple variables, without crossing with other variables, should be mainly interpreted as those for developed economies, because the effects for developing economies are examined by cross variables.   Other variables are cross variables, FDIXI*XLDC and FDIMO*MLDC. XLDC and MLDC are both only applicable to developing economies as defined in Table 8.   The string "LDC" stands for "less developed country."   Therefore, FDIXI*XLDC equals FDIXI only if the exporting country is a developing economy, and the estimated coefficient should be interpreted as additional export effect of the developing economies' FDI inflow.   On the other hand, the estimated coefficient for the variable FDIMO*MLDC is relevant only if the importing country is a developing

economy, and it examines whether or not the importer's overseas investment activity significantly affects bilateral trade flows.

Similarly, Equation 5 includes two single variables and two cross variables, FDIXI*XLDC and FDIMO*MLDC.   These variables are relevant only when the exporting or the importing country is a developing country, respectively.   The estimated coefficients should be regarded as LDC-specific FDI effects.

Regarding other specifications about the models, compared with the case for Equation 3, the country coverage is the same, but the sample years before 1990 were not covered due to insufficient FDI-related variables.

Table 9.1. Estimation Results for the Determinants of Trade Flows in APEC
-----Impact of FDI Attraction on Trade-----

Dependent Variable: ln Tij

Explanatory Variables	Estimated Coefficients			
	1995	1996	1997	1998
CNST	-0.262	-0.358	-0.123	0.056
GDPX+	0.846****	0.874****	0.873****	0.854****
GDPM+	0.779****	0.835****	0.853****	0.946****
DIST+	-0.407****	-0.412****	-0.396****	-0.365****
HK	1.598****	1.579****	1.515****	1.647****
SPORE	1.902****	1.915****	1.906****	1.946****
CHN	-0.746****	-0.667****	-0.866****	-0.981****
MEX	-2.217****	-2.023****	-2.252****	-2.351****
AFTA	0.313*	0.339*	0.352*	0.730****
NAFTA	1.944****	1.716****	1.832****	1.768****
CER	2.443****	2.507****	2.465****	2.551****
FDIXI	0.004	-0.017	-0.029	-0.039
FDIXI*XLDC	0.057****	0.051****	0.064****	0.090****
FDIMO	0.077	0.049	0.021	-0.055
FDIMO*MLDC	0.096****	0.090****	0.090****	0.086****
R-squared(adj)	0.853	0.851	0.843	0.848
Log likelihood	-258.1	-253.7	-256.3	-254.4
S.E. of regression	0.746	0.719	0.727	0.721

Remarks: Estimation results for Equation 4.   A '+' signifies that the corresponding variable is log transformed.   The number of asterisks (*) attached to the estimated coefficients signifies the statistical significance of the estimated coefficients.
****   1% significance   ***   5% significance
**   10% significance   * 20% significance

Table 9.1 and Table 9.2 summarize the estimation results for Equation 4 and Equation 5, respectively.

Table 9.2. Estimation Results for the Determinants of Trade Flows in APEC
-----Impact of Outward FDI on Trade-----
Dependent Variable: ln Tij

Explanatory Variables	Estimated Coefficients			
	1995	1996	1997	1998
CNST	-1.896***	-1.508*	-1.207*	-1.087*
GDPX+	0.659****	0.735****	0.772****	0.786****
GDPM+	0.804****	0.852****	0.841****	0.845****
DIST+	-0.430****	-0.425****	-0.418****	-0.413****
HK	1.490****	1.493****	1.441****	1.513****
SPORE	1.845****	1.870****	1.855****	1.817****
CHN	-0.886****	-0.773****	-0.978****	-1.053****
MEX	-2.168****	-1.988****	-2.240****	-2.262****
AFTA	0.298*	0.304*	0.296*	0.659****
NAFTA	1.834****	1.650****	1.743****	1.584****
CER	2.482****	2.566****	2.499****	2.489****
FDIXO	0.239****	0.159****	0.104*	0.046
FDIXO*XLDC	0.118****	0.095****	0.098****	0.108****
FDIM	0.105***	0.060*	0.068*	0.100***
FDIM*MLDC	0.076****	0.073****	0.079****	0.082****
R-squared(adj)	0.875	0.866	0.856	0.859
Log likelihood	-238.5	-241.4	-246.1	-245.7
S.E. of regression	0.687	0.683	0.697	0.696

Remarks: Estimation results for Equation 5.   A '+' signifies that the corresponding variable is log transformed.   The number of asterisks (*) attached to the estimated coefficients signifies the statistical significance of the estimated coefficients.
****   1% significance   ***   5% significance
  **   10% significance   * 20% significance

2.3.2.   Effects of FDI on Trade after the Mid-1990s---LDC's Commitment to APEC Economy through FDI

The insignificant estimated coefficients for FDIXI show that FDI attraction did not always have a significant export promotion effect in all the sample countries. Similarly, the insignificant coefficients for FDIMO show that levels of the importer's investment activity did not always affect the bilateral trade flows in all the cases. These results sound discouraging, but at the same time, the estimation shows that FDI's effects in developing countries are more dynamic.

The coefficients for FDIXI*XLDC were highly significant, showing that inward FDI balances in developing economies positively affect their export volume. Interestingly, the estimated coefficient for 1998 increased somewhat to 0.090, which suggests that countries that intensively attracted FDI tended to increase exports in spite of the Asian crisis.   Also, FDIMO*MLDC were estimated to be generally stable at 0.09-0.10 level and statistically highly significant.   This implies that an export flow

tends to increase when the importer is a developing country, and the country has a large outward FDI balance.   In other words, a developing country with a large outward investment tends to import more[11].

2.3.3.   Export Effect of Outward FDI----Generally Disappearing Except LDC

Estimation results for Equation 5 reveals that export effects of outward FDI have changed over time.   The estimated coefficients for FDIXO were statistically significant for 1995.   However, the estimated coefficient values and significance fell over time, and for 1998, the outward FDI of the exporting country was estimated to have no significant impact on exports.   One possible explanation for this is that foreign affiliates at first imported a larger portion of their inputs from abroad.   Usually, it comes from the investment origin.   But afterwards the affiliates come to use more local inputs in order to take advantage of their lower costs[12].   On the other hand, if the exporting country is a developing country, explanatory power of its outward FDI balance remained even in 1998, as shown by continuously significant estimates for FDIXO*XLDC.   This result suggests that developing economies may need to seek a viable way of increasing exports by investing abroad.   This suggestion is probably more relevant to Korea and Taiwan, where factor prices soared in the course of their development.

Generally, significant coefficients for FDIMI imply that FDI attraction in the importing country tends to induce imports in all the sample economies.   The estimated result for the cross term with the LDC dummy, FDIMI*MLDC, suggests that FDI into developing countries has an even more import-inducing tendency than other cases.

2.3.4.   Investment in Developing Economies----Catalyst to Deepen
Interdependence in the Region

In order to expedite the estimation results we have obtained so far, matriculation of the results will help readers' understanding.   See the result matrix, Table 10, above.

The impact of FDI on trade seems to be different between developed and developing economies.   Results for the sample, which should be mainly interpreted as those for developed economies, were rather ambiguous.   Attracting FDI results in increased imports, but no clear results are expected.   Outward FDI used to promote

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[11] For example, the tendency of LDC's outward FDI to increase imports to the home country is the case for Taiwan and Korea.   Fujita shows in Chapter II that investments by Korea and Taiwan into Vietnam tend to increase the country's exports, mainly to their home countries.

[12] After the Asian economic crisis, foreign affiliates situated in Southeast Asia have tried to procure more local inputs to cut down the production costs.

Table 10.   FDI's Effect on Trade---Summary Result Matrix

		All Sample		Developing Economies	
		Trade		Trade	
		Exports	Imports	Exports	Imports
FDI	Inward				
	Outward				

Remark: Compiled from Table 9.1 and Table 9.2.

exports, but now the effect has calmed down.   This may be attributable to industry distribution of developed countries' FDI.   Developed countries tend to emphasize investments in service sectors, such as banking, commerce and hotels.   These sectors generate only small international demands.   Increasing the amount of direct investments in service sectors will surely deepen the interdependence in the region, but at least in terms of trade, they are considered to exert only a limited effect on promoting interdependence in the region.

On the other hand, the trade effects of FDI become dynamic once a developing country is involved.   Both inward and outward FDI have two-way effects, that is, export creation and import creation effects.   Thus, investment to/from developing economies will enhance deepening interdependence in the APEC region.

As mentioned above, inward FDI tended to increase exports in 1998.   This suggests that inward FDI could serve as an anchor, or a safety net, in the event of economic turbulence like the Asian Crisis.   Another interesting thing is that developing countries may sometimes have to shift their production site abroad, just as Japan and the United States did in the past.   Regarding the import-inducing tendency of FDI, economic policy makers in developing countries may be worried about worsening current account.   Indeed, imports will possibly increase as a result of attracting FDI or promoting outward FDI.   Nevertheless, increased imports, with the concurrent increase in exports, will eventually lead to improved productivity.   Increased imports imply the country expanded its access to international inputs, which are of higher quality than domestic inputs.   At the same time, increased exports means more chances of victory in international competition in the long run.   Both factors will eventually ensure future prosperity for the developing economies.

3.   APEC's Role in Promoting Investment in the Region

The above Section shows that FDI into/from developing economies serves as a catalyst to further deepen interdependence in the APEC region.   There should be various channels through which developing economies in APEC can promote investment flows.   In this section, among others, we are going to examine how existing frameworks of APEC can better serve to promote developing members' FDI.

3.1.   APEC-Investment Expert's Group (APEC-IEG)

APEC deals with the issue of investment promotion mainly in the Investment Expert's Group (IEG).   IEG is a sub-group of the APEC Committee on Trade and Investment (CTI), an affiliate of the Senior Officials Meeting (SOM).   In 1994, CTI established IEG in response to the "Non-Binding Investment Principles for APEC" (See APPENDIX 4), which was declared at the Bogor Leaders' Meeting held in the same year, in order to bring together officials in the region involved in the regulation of FDI.   Since then, IEG, based on the non-binding investment principle, has assisted the CTI in achieving the investment-related components of APEC's liberalization and facilitation agenda[13].

3.2.   Action Agenda and Values for Developing Economies

Currently, efforts of IEG can be classified into 11 collective actions, which can be divided into three broad due-date categories.   The actions by due-date are shown in Table 11.

The collective actions aim to attract more FDI into members by further improving the investment environment, specifically through liberalization and facilitation.   As stated in OAA (Osaka Action Plan), the coverage of the collective action includes transparency, policy dialogue and economic and technical cooperation (ECOTECH).

"Enhanced transparency" includes disseminating investment regime information, collecting investment data collection, etc.   Publishing the APEC investment guidebook is especially helpful to developing economies and those trying to invest in such countries, which usually lack adequate information.

The value of "policy dialogue" lies in summarizing the needs of the business sector and improving the investment environment.   Recommendations from the business sectors, which are affected by various kinds of investment-related regulations, will

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[13] See APEC (1999-1) and APEC (1999-2)

Table 11.   APEC-IEG Collective Actions Since 1996 (as stated in OAA)

Time Horizon	Actions
Short-term	**Transparency** 1. Increase the transparency of APEC investment regimes by: i. Updating APEC guidebook on investment regimes; ii. Establishing software networks on investment regulations and investment opportunities; iii. Improving the state of statistical reporting and data collection;. *iv. Increasing understanding among member economies about investment policy-making issues.

	Policy Dialogue
	
	2. Promote dialogue with the APEC business community about ways to improve the APEC investment environment.
	  *Introduced in 1994, policy discussions on the investment regimes of member economies.
	  *Policy dialogues with other APEC fora to provide an understanding of their work programs and to avoid duplication of work.

	Economic and Technical Cooperation 3. Identify ongoing technical cooperation needs in the Asia-Pacific region and organize training programs that will assist APEC economies in fulfilling APEC investment objectives. 4. Establish a dialogue process with the OECD and other international fora involved in global and regional investment issues. 5. Define and implement follow on training to the Uruguay Round implementation seminars. 6. Evaluate the role of investment liberalization in economic development in the Asia-Pacific region *Study the impact of trade liberalization on investment.

	Facilitation
	
	7. Facilitation
	  *Progressively work towards reducing impediments to investment.
	  *Undertake business facilitation measures to strengthen APEC economies.
	  *Initiate investment promotion activities to promote intra-APEC investment.

Medium-term	**Economic and Technical Cooperation** 8. Study possible common elements relevant to investments between existing sub-regional arrangements. 9. Refine APEC's understanding of free and open investment.
Long-term	10. Assess the merits of developing an APEC-wide discipline on investment based on APEC's own progress through the medium-term actions and the developments in other international fora.
	Capacity Building Initiatives 11. Capacity Building Initiatives *Undertake new activities that contribute to capacity building.

Remarks: * implies that the action plan was added after 1996.
Sources: Author's compilation arranging Appendix IV of APEC (1999-1)

improve investment regimes better than other channels.

As for ECOTECH-related actions, which are considered the most valuable for

developing economies, the real value lies in identifying policy needs related to FDI, as well as studying the impact of opening up the domestic investment market.   Training government personnel in charge of investment policy and showing them how to attract growth industries are quite valuable for developing economies.

The actions in Table 11 also include IAP (individual action plan) assistance-, facilitation- and capacity-building-related ones.   Of those, prominent attention has been given to "the menu of options."   *"Review of CAP (Collective Action Plan) Implementation since 1996*[14]*"*, submitted in the 2nd CTI meeting in May 1999 specifically stated that "The menu of options for investment liberalization is one of *IEG*'s more notable contributions."   The menu of options is "for helping economies to identify policy measures that member economies may include unilaterally in their IAPs for implementation of this objective.[15]"   In other words, it is a reference when an economy intends to improve its investment regime.   This is especially helpful when developing economies, usually inexperienced in liberalizing investment regimes, carry out improving their investment regime.

3.3.   Recent Achievements and Future Direction
---Support for Developing Economies---

With the collective action plan finished for 1999, IEG completed following actions during the year[16].

Published a new edition of the investment guidebook.

Compiled a compendium of "Initiatives, Development Efforts, Aspiration and Strategies" (IDEAS) of the four major stakeholders in FDI themes, that is, the foreign direct investor, the home economy, the host economy, and the domestic investor.

Held policy discussions to review the investment regimes of New Zealand (February), Peru (May) and People's Republic of China (August)

Held the APEC Investment Mart, 2-5 June, in Seoul, Korea.

Conducted a seminar on FDI policy and administration adjustment" in Bangkok, Thailand 10-11 June.

Conducted a training program on strategies to identify and facilitate investment in specific areas, e.g., small and medium enterprises (SMEs) development and industrial linkage, high tech industries and R&D activities in the APEC Secretariat, Singapore from 15-17 June.

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[14] See Appendix IV of APEC (1999-1)
[15] For a summary table for the "menu of option", please see APPENDIX 5.
[16] See APEC (1999-2)

Conducted a seminar on start up companies and venture capital in Chinese Taipei, 28-30 July.

Conducted the first phase of the awareness program for APEC investment/trade officials to understand and become informed of the various options for investment liberalization and business facilitation.

Ideally, all APEC members should benefit from the IEG activities.   However, looking at the above list of achievements in 1999, the activities seem to emphasize supporting FDI attraction by developing economies.   Activities especially relevant to developing economies include, the investment mart, seminars (FDI policy, startup companies and venture capital), training programs (Strategies for SME and industrial linkage, high tech industries and R&D activities).   Such de-facto support of investment issues for developing economies was also seen in APEC as early as 1994 in the "APEC Non-Binding Investment Principles", which clearly recognized that investment flows enhance the transfer of technology.

In the year 2000, as IEG identified in its update report[17], expected efforts include the following:

Organize the Fifth APEC Investment Symposium in China in 2000.

Organize the Second APEC Investment Mart in 2000.

Develop the "Menu of Facilities" offered by a "One Stop Agency."

Update the "Menu of Options."

Voluntarily include and record by cross-referencing the implementation of "Menu of Options" in the IAPs of individual member economies.

Undertake the review of CAPs.

Hold Phase II and Phase III training on awareness programs to understand and become informed of the various options for investment liberalization and business facilitation.

The Investment Mart and Investment Symposium will be held in the year 2000, and they are expected to continuously serve an investment promotion schemes.   New projects in the year 2000 include "The Menu of Facilities" offered by "One-Stop Agency," also promoted within the IEG activities.   This will serve to mitigate the problems in the approval / notification procedures.   Thus, APEC-IEG's activity will steadily benefit developing economies as well as investors into those economies.

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[17] See APEC (1999-2)

3.4.   Issues Not Covered in the Current Framework of APEC-IEG

So far, we have seen that the current actions taken by APEC-IEG mainly target investment promotion through liberalization and facilitation.   For deepening interdependence and future prosperity, as shown in Section 2, and especially in developing countries, promoting both inward and outward FDI are almost equally important.   In reality, some developing economies try to protect foreign exchange reserves by imposing restrictions on outward investments.

Therefore, many hope the revisions to the menu of options will consider lifting any restrictions on outward investments in developing economies.

3.5.   Estimated Effects of Investment-Related Actions by APEC

Considering the nature of the existing APEC-IEG activities to rather support inflow of FDI into developing economies, the primary benefit will be brought to the developing countries.   Through the interlinkage in the region, benefits will eventually spread to the whole region.

How much investment do the APEC-IEG activities create?   This is a kind of difficult question to answer, and at the same time a quite challenging question.   First of all, the size of the activities, in money term is not very large, which will probably not exceed one million dollars in total.   Therefore, the investment creation effect of the APEC-IEG activities will be quite moderate.

Nevertheless, considering a relatively high leverage effect of public R&D expenditures in developing countries, the author tentatively assumes that FDI promotion activities of APEC-IEG increase FDI inflows into developing economies by the equivalent of 0.1% of the inward FDI balance of each affected economy.

[18]The increment of FDI brought about by the APEC-IEG activities is assumed to be about 390 million dollars.   Uemura demonstrates a region-wide simulation in Chapter V.   The result shows that the total additional effect APEC will receive, after all the repercussions in the region, amounts to about 427 million dollars.

Allowing for the price fall due to enhanced productivity (by 0.1%) and export creation effects of inward FDI into developing economies, which was measured through the estimation of Equation 4 (elasticity 0.09), APEC as a whole is estimated to receive about 584 million dollars.

It should be noted that the result of the simulation is somewhat downward biased because the system did not fully take into account the domestic interactions in each

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[18] For detailed reports on the simulations, see Uemura's arguments in Chapter V.

sample economy.   Also, the import-inducing effect of FDI inflows to developing economies was not incorporated.   Since developing economies' imports will mainly come from developed economies of the region, the total benefit to the region would even increase.

Conclusion

It is widely believed that interdependence in the APEC region deepened over time. However, the Asian Crisis in 1997 and 1998 drew back the recent trend of deepening interdependence.

An Input-output analysis for the period 1985-1990 revealed that industrial linkage for the period generally developed, but at the same time, each country proceeded at a different pace.   The gravity model of international trade for the years 1970, 1980, 1990, 1995, 1996, 1997 and 1998 show that, especially for 1998, interdependence in AFTA rather enhanced, after controlling the income factor.   Thus, it was again shown that deepening of interdependence in the region did not proceed at a uniform pace.

The author suspects that the differing pace of deepening interdependence might relate to FDI balances that each economy owes and holds.   For the period 1985-1990, the analysis using international input-output tables showed that Japan's outward investment tended to replace the existing export flow to Japan.   This was contrary to the case for the United States.   Also, Japan's investment tended to increase the host countries' exports, although weakly, while the U.S. investment showed no clear tendency.

For the 1990s, the trade effects of FDI were examined by modifying the gravity model so that the equation includes several FDI-related variables.   The refined model has another feature.   That is, it distinguishes FDI related variables so that we could closely analyze possibly differing effects by group.   As a result of the estimation, FDI was found to have quite a dynamic effect on trade.   Both inward and outward investments in/from the developing economies in the region have a significant effect on both exports and imports of those economies.   Further, FDI involving the developing economies in the region could act as a catalyst to further intensify interdependence in the region.

Lastly, the author considered how the existing framework of APEC could better promote investment flows in the region.   An examination into APEC-IEG's activities found that the nature of the activity rather supports developing economies in attracting

FDI.   The author at the same time suggested that APEC-IEG should pay attention to the problem surrounding regulations on outward investment in developing economies due to foreign exchange constraints.   Considering the observation that APEC-IEG's activity is in fact supporting the developing economies, a rough estimate of the impact of the APEC-IEG's investment promotion scheme was attempted.   The assumed increment of FDI inflow to the developing economies was tentatively expected to be around 390 million dollars.   Uemura simulated that the increased FDI would increase the region's GDP by 584 million dollars, after allowing for price decline due to enhanced productivity and export creation effect.

This study shows that FDI inflow into developing economies has an export creation effect.   This result leads to an insight that APEC-IEG's current efforts bring about multi-layered effects---increasing FDI inflow and exports.   Past literature points out that FDI also tends to enhance productivity.   Considering this, future expansion of APEC-IEG's activities will be highly appreciated, especially by new members, such as Vietnam and Russia, whose economies are now in transition and are in an urgent need for stabilization.

Appendix 1.   Calculation of FDI Stock

The stock of inward and outward FDI of each sample economy was calculated by summing up the annual respective flows allowing for a depreciation rate.

Summation started with the data for 1968, through 1998.   The countries covered include the following: APEC members (21 economies); and EU 12 (Belgium, Demark, France, Germany, Great Britain, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain).   The depreciation rate was set to 0.10.   Before setting the rate, for reference, the author preliminarily calculated total domestic capital stock depreciation in the case of Japan for the period of 1993-1997. The calculated depreciation rate was 8.16% per annum.   Considering that domestic capital stock contains more construction, whose durable periods are rather long, and that FDI is essentially technology intensive, the author decided that the depreciation rate applied for the FDI in this study should be somewhat higher than the calculated rate shown above.   Okuda (1997) and Choi and Hyeon (1991) adopted the rate of 0.10, and the author also decided to adopt the same rate in this study.

Summation proceeded using the following formula:

$$K(t+1) = K(t) * (1 - 0.10) * P(t+1) / P(t) + I(t+1),$$

Where,

K: inward/outward FDI stock in current U.S. dollars,

P: price level of U.S. capital goods,

I: FDI inflow/outflow in current US dollars.   Arguments in ( ) denote time subscript.

In other words, the series K is re-valued each year using the price index of capital goods, so the series is always based on current prices.

FDI flow data used for the calculation are direct investment abroad and direct investment into the reporting country, and they are all balance of payment (BOP) basis. The following sources supplied the data.

(1) IMF, *International Financial Statistics*, September 1999 (CD-ROM version) and January 2000 (print version); this source covered most of the sample economies for the whole sample period.   However, a considerable number of data were missing or inappropriate to use, due to changes in the series, netting inflows and outflows, or no report.   The following data sources supplemented the missing data.

(2) UNCTAD, *World Investment Report*, various issues; this source mainly supplied the data for outward flows from Hong Kong and Mexico after 1980, whose domestic source was not located.

(3) Bank Negara Malaysia, *Monthly Statistical Bulletin*, various issues; this source supplied both inflow and outflow to/from Malaysia after 1991.

(4) The Central Bank of China, Economic Research Dept., *Balance of Payments Quarterly, Taiwan District, The Republic of China*, various issues; this source supplied both inflow and outflow to/from Taiwan after 1968.

(5) Website of Statistics New Zealand

(http://www.stats.govt.nz/domino/external/PASfull/PASfull.nsf/7cbdaf9dea00c1b94c25 63ea001a5289/5ca6a9a5707e25ef4c2567d600799655?OpenDocument), table 17.4, "Annual balance of payments: direct investment statistics, 1989-98"; this source supplemented the data for 1998.

Appendix 2.   Trade Matrix for Major APEC Sub-Regions in 1998

(Billion US Dollars)

	Japan	China	NIES3	ASEAN7	ANZ CERTA	NAFTA	(U.S.).	Other APEC	APEC	EU15	World
Japan	0	20	63	46	9	130	120	2	272	72	388
China	30	0	49	10	3	41	38	3	135	28	184
NIES3	31	73	47	36	7	102	93	3	299	63	417
ASEAN7	39	11	41	70	9	73	69	1	245	57	333
ANZCERTA	12	3	10	7	6	8	7	1	47	9	67
NAFTA	64	16	51	41	15	522	286	11	719	164	1009
(U.S.)	58	14	48	39	14	233	0	10	416	150	680
Other APEC	5	4	2	1	1	11	9	1	24	28	93
APEC	180	126	263	213	50	887	622	22	1740	421	2490
EU15	35	19	44	34	17	204	177	28	381	1347	2233
World	254	155	344	265	71	1207	905	77	2373	2073	5487

Sources: IMF, Direction of Trade (DOT) 2000, supplemented by Republic of China, Ministry of Finance, Monthly Statistics of Exports and Imports, various issues

Appendix 3. Technical Notes on the Data Used in Gravity Model of International Trade Flows

----Equation 3---

Kind of Flows: Exports

Years Covered: 1970, 1980, 1990, 1995, 1996, 1997 and 1998

Country Covered: 15 members of APEC (Japan, China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, Philippines, Thailand, Australia, New Zealand, United States, Canada and Mexico), and the total of the 12 EU countries (Belgium, Luxembourg, Netherlands, United Kingdom, Ireland, Denmark, Germany, France, Spain, Portugal, Italy and Greece): 16 sample countries in all.

Sub-regions: AFTA=Singapore, Malaysia, Indonesia, Philippines and Thailand

CER (ANZCERTA)=Australia and New Zealand

NAFTA=The United States, Canada and Mexico

Sources of Data:

[Trade Flows] Primary source is IMF, *Direction of Trade (DOT)*.   Export data of Taiwan, which is not an IMF member, comes from Republic of China, Ministry of Finance, *Monthly Statistics of Exports and Imports*, various issues. Some missing data, exports from Singapore to Indonesia, was supplemented by the import data in Indonesia. The data actually used for the estimation was log transformed, in nominal million US dollars.   Trade flows to/from EU12 is the total of the 12 countries.

[GDP] Primary source is IMF, International Financial Statistics (IFS).   GDP figures in national currencies were converted into dollar figures using the average market exchange rate.   Taiwan's GDP was collected in the same manner from The Central Bank of China*, Financial Statistics, Taiwan District, The Republic of China*, various issues.   The data actually used for the estimation was log transformed, in nominal million US dollars.   GDP figures for EU12 are total of the dollar denominated GDP of the 12 countries.

[Distance] The distances are mainly based on marine distance between the major ports of the countries involved.   The sample countries facing two oceans (North American countries) are assumed to use two ports, and the trade flows are assumed to come from and go to closer ports.   Virtual distance is set in the case where the countries involved are adjacent by a land border.   Virtual distance in Asia (Singapore-Malaysia and China-Hong Kong) is 100 miles, and that for North America (US-Canada and US-Mexico) is 500 miles.

Appendix 4.   APEC Non-Binding Investment Principles

APEC NON-BINDING INVESTMENT PRINCIPLES

Jakarta, November 1994

In the spirit of APEC's underlying approach of open regionalism,

Recognizing the importance of investment to economic development, the stimulation of growth, the creation of jobs and the flow of technology in the Asia-Pacific region,

Emphasizing the importance of promoting domestic environments that are conducive to attracting foreign investment, such as stable growth with low inflation, adequate infrastructure, adequately developed human resources, and protection of intellectual property rights,

Reflecting that most APEC economies are both sources and recipients of foreign investment,

Aiming to increase investment, including investment in small and medium enterprises, and to develop supporting industries,

Acknowledging the diversity in the level and pace of development of member economies as may be reflected in their investment regimes, and committed to ongoing efforts towards the improvement and further liberalization of their investment regimes,

Without prejudice to applicable bilateral and multilateral treaties and other international instruments,

Recognizing the importance of fully implementing the Uruguay Round TRIMs Agreement,

APEC members aspire to the following non-binding principles:

Transparency

- Member economies will make all laws, regulations, administrative guidelines and policies pertaining to investment in their economies publicly available in a prompt, transparent and readily accessible manner.

Non-discrimination between Source Economies

- Member economies will extend to investors from any economy treatment in relation to the establishment, expansion and operation of their investments that is no less favorable than that accorded to investors from any other economy in like situations, without prejudice to relevant international obligations and principles.

National Treatment

- With exceptions as provided for in domestic laws, regulations and policies, member economies will accord to foreign investors in relation to the establishment, expansion, operation and protection of their investments, treatment no less favorable than that accorded in like situations to domestic investors.

Investment Incentives

- Member economies will not relax health, safety, and environmental regulations as an incentive to encourage foreign investment.

Performance Requirements

- Member economies will minimize the use of performance requirements that distort or limit expansion of trade and investment.

Expropriation and Compensation

- Member economies will not expropriate foreign investments or take measures that have a similar effect, except for a public purpose and on a non-discriminatory basis, in accordance with the laws of each economy and principles of international law and against the prompt payment of adequate and effective compensation.

Repatriation and Convertibility

- Member economies will further liberalize towards the goal of the free and prompt transfer of funds related to foreign investment, such as profits, dividends, royalties, loan payments and liquidations, in freely convertible currency.

Settlement of Disputes

- Member economies accept that disputes arising in connection with a foreign investment will be settled promptly through consultations and negotiations between the parties to the dispute or, failing this, through procedures for arbitration in accordance with members' international commitments or through other arbitration procedures acceptable to both parties.

Entry and Sojourn of Personnel

- Member economies will permit the temporary entry and sojourn of key foreign technical and managerial personnel for the purpose of engaging in activities connected with foreign investment, subject to relevant laws and regulations.

Avoidance of Double Taxation

- Member economies will endeavor to avoid double taxation related to foreign investment.

Investor Behavior

- Acceptance of foreign investment is facilitated when foreign investors abide by the host economy's laws, regulations, administrative guidelines and policies, just as domestic investors should.

Removal of Barriers to Capital Exports

- Member economies accept that regulatory and institutional barriers to the outflow of investment will be minimized.

(Full text available from http://www.apecsec.org.sg/guidebook/annex-3a.html.)

Appendix 5.   APEC-IEG "Menu of Options"   (summary)

**Options for Investment Liberalization and Business Facilitation
to Strengthen the APEC Economies -
For Voluntary Inclusion in Individual Action Plans**

GENERAL 　On prior authorization requirements: 　Involving other economies:
TRANSPARENCY
NON-DISCRIMINATION 　Related to MFN 　Related to National Treatment or both MFN and National Treatment 　　*Sectors* 　　*Ownership* 　　*Finance and Capitalization* 　　*Other measures*
EXPROPRIATION AND COMPENSATION
PROTECTION FROM STRIFE AND SIMILAR EVENTS
TRANSFERS OF CAPITAL RELATED TO INVESTMENTS
PERFORMANCE REQUIREMENTS
ENTRY AND STAY OF PERSONNEL
SETTLEMENT OF DISPUTES
INTELLECTUAL PROPERTY
AVOIDANCE OF DOUBLE TAXATION
COMPETITION POLICY AND REGULATORY REFORM
BUSINESS FACILITATING MEASURES TO IMPROVE THE DOMESTIC BUSINESS ENVIRONMENT

Remarks: Summary Table for the "Menu of Options". The full table is obtained from the following APEC

Secretariat web page, http://www.apecsec.org.sg/committee/menu_investment.html

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