



ASEAN Research Group “The Trend of Trade, Foreign Direct Investment and
Monetary Flows in East Asia, and its Policy Implication”

Draft Final Report

(Confidential)

March 2009

Prepared

by

NRI

Nomura
Research Institute

Table of Contents

1.	Analysis of trade, FDI and portfolio investment.....	3
1.1.	Overview of BOP, financial account, and domestic markets	3
1.1.1.	Introduction	3
1.1.2.	Overview of BOP.....	4
1.1.3.	Overview of Financial Account	7
1.1.4.	Overview of Monetary Statistics	10
1.1.5.	Overview of Asset Price and Economic Growth	13
1.1.6.	Assessment of Period of 1997 Financial Crisis and Recent Financial Turmoil...	13
1.2.	Overview of Trade and FDI	14
1.2.1.	Introduction	14
1.2.2.	Foreign trade.....	15
1.2.3.	Foreign Direct Investment in East Asia.....	45
2.	Verification of macro-economic sensitivity toward external fluctuation.....	52
2.1.	Observed impact of capital flow on domestic market.....	52
2.1.1.	1997 Crisis.....	52
2.1.2.	Capital flow and domestic market in selected countries	53
2.2.	Correlation among capital markets	58
2.2.1.	Overview of the historical data.....	58
2.2.2.	Verification of impact of global factors.....	64
3.	Evaluation of the effect of trade/FDI policies.....	69
3.1.	Trade and FDI Policies by East Asian Countries.....	69
3.1.1.	Trade Liberalization	69
3.1.2.	FDI Liberalization.....	74
3.2.	Production Network and Foreign Direct Investment: An Empirical Analysis	76
3.2.1.	Estimation Method.....	76
3.2.2.	Data.....	77
3.2.3.	Estimation Results	78
4.	Analysis of the factors that affect trade and FDI	85
4.1.	Factors that affect FDI.....	85
4.1.1.	Estimation Results	86
4.1.2.	Residual analysis.....	88
4.2.	Export function.....	91
4.2.1.	Model and Data.....	91
4.2.2.	Data.....	91

4.2.3.	Results of Estimation	91
4.2.4.	Stepwise Chow Test	93
4.3.	Import function.....	97
4.3.1.	Data.....	97
4.3.2.	Estimation result	97
4.3.3.	Stepwise Chow Test	99
5.	Analysis of relations between global financial markets and domestic financial and asset markets	103
5.1.	Impacts of global markets, capital flow on domestic financial and asset markets	103
5.1.1.	Methodology.....	103
5.1.2.	Estimation results.....	103
5.1.3.	“De facto” measurement	104
5.1.4.	Historical paths of Asian economies	104
5.2.	Impacts of global markets, capital flow on domestic financial and asset markets	107
5.2.1.	Granger causality analysis.....	107
5.2.2.	VAR analysis	108
5.3.	Implication on policy mix and market monitoring	113
5.3.1.	Existing literatures	113
5.3.2.	Probit model estimation	114
5.3.3.	Estimation results.....	115
5.3.4.	Implications	117
6.	Recommendation on regional policy coordination	117
	References	119

1. Analysis of trade, FDI and portfolio investment

1.1. Overview of BOP, financial account, and domestic markets

1.1.1. Introduction

There are ways to observe the movement of flows and their effect on economies. In this report, we observe data on trade, foreign direct investment, financial flows, and market information from Balance of Payments (BOP), Monetary Statistics, and market prices. The linkage amongst data will lead to explanations of the movements.

Recording system on BOP uses “net” concept, which is the difference between Assets and Liabilities (or inflows and outflows). This will cancel out double records. In this case, it is possible to assume that the sum of each member countries is net information for the region. In other words, we can observe external regional transactions by building up individual BOPs.

Moreover, BOP also records cross-border transactions divided in 2 main accounts, namely Current Account and Financial Account. From IMF definition, Current Account is the balance of exports f.o.b. and imports f.o.b. A positive trade balance shows that merchandise exports are larger than merchandise imports, whereas a negative trade balance shows that merchandise imports are larger than merchandise exports. Financial Account is the net sum of direct investment, portfolio investment, financial derivatives, and other investment. Direct investment includes equity capital, reinvested earnings, other capital, and financial derivatives associated with various intercompany transactions between affiliated enterprises. Excluded are flows of direct investment capital into the reporting economy for exceptional financing, such as debt-for-equity swaps. Direct investment abroad is usually shown with a negative figure, reflecting an increase in net outward investment by residents, with a corresponding net payment outflow from the reporting economy. Direct investment in the reporting economy is generally shown with a positive figure, reflecting an increase in net inward investment by nonresidents, with a corresponding net payment inflow into the reporting economy. Portfolio Investment Assets and Liabilities include transactions with nonresidents in financial securities of any maturity (such as corporate securities, bonds, notes, and money market instruments) other than those included in direct investment, exceptional financing, and reserve assets. Other Investment Assets and Other Investment Liabilities include all financial transactions not covered in direct investment, portfolio investment, financial derivatives, or reserve assets. Major categories are transactions in currency and deposits, loans, and trade credits. Thus, BOP can represent cross-border economic activities structure. Some characteristics and unique trend also be able to interpret from BOP.

While BOP shows structure of external activities, Monetary Statistics such as exchange

rates and interest rates are instruments which influence on the structure. On the other hand, other Monetary Statistics, for example, M2, base money, and money supply, along with asset prices are resulted indicators which affected by the change in BOP.

The relationship of BOP, Monetary Statistics, and market prices seems to have high dependency. For instant, when BOP records high capital flows, it could be detected that at the same period market prices were rising while international reserve accumulated more. One of the causes of foreign capital inflows could be monetary policy that pulled up interest rate. As a result of high reserve, exchange rate appreciation would effect on import and export, as shown in BOP.

In this section we use BOP data to find the structure of regional external activities including characteristics and relationships in general. Then, we focused more on Financial Account which represented transactions such as Direct Investment, Portfolio Investment (both in equities and bonds), and Other Investment. We further observed the movement of indicators form Monetary Statistics, weighted on exchange rates and interest rates. The last observation will be on asset prices and economic growth. We also observed interactions of BOP, Monetary Statistics, and market prices, and their movement during 1997 Financial Crisis and the recent Financial Turmoil.

1.1.2. Overview of BOP

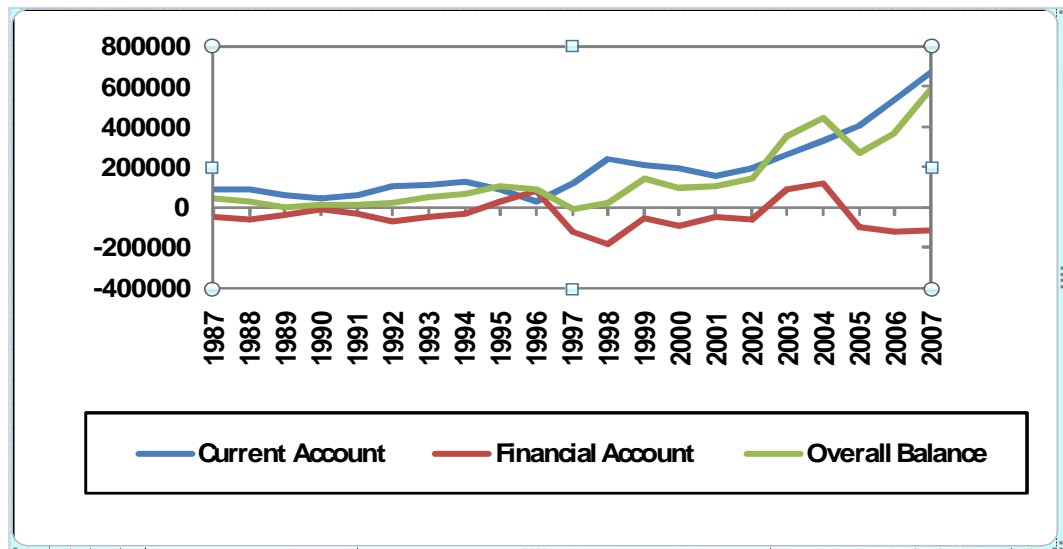
In this section, we observed the movement of Current Account, Financial Account, and Overall Balance which showed in Balance of Payments. First, we summarize data from each ASEAN+3 member countries to see the overview trend of the region. The observation includes data from Indonesia, Malaysia, Philippines, Singapore, Thailand, Loa PDR., Myanmar, China P.R., Japan, and Korea from 1987 to 2007, Cambodia from 1992, Vietnam from 1996, Hong Kong from 1998, and Brunei Darussalam from 2001.

The structure of both Current Account and Financial Account presented a big changed since 1996. Showing a sharp drop in financial account which implied that there were capital outflows from the region through financial channel. However, the declining trend had recovered two years later. During 2002-2004, financial account was surplus, on top of the current account; as can be seen in the increasing of foreign reserve. After the crisis, member countries tried to adjust their currency values by adjusting exchange rate policy which led to depreciation on foreign exchange. Thus, the overall balance reached the highest level. While everyone was focusing on financial situation in the region, trading value of the region has been increasing dramatically during the crisis and even accelerated since 2002 due to sharp rise of China trade.

The movement of ASEAN+3 countries Balance of Payments can be observed as follow;

- In pre-financial crisis period, current account shows surplus trend over time while financial account showed balance or little deficit.
- Since 1992, as capital liberalization had been introduced to many member countries as a suggestion to coop with globalization, financial account upward trend but sharp drop during Asian Financial Crisis.
- Increasing trend of current account surplus due to high export growth and import controlling under stabilization process from the crisis.
- Little deficit in financial account and large surplus in current account made overall BOP significantly rose since crisis.
- This imbalance trend made a huge amount of reserve accumulation.

Figure 1-1 ASEAN+3 Balance of Payments



Unit: Million USD

To have more understanding about the movement of Balance of Payments, we also observed on Current Account and Financial Account separately in more details;

- Before 1997, regional Current Account had the same trend as Japan Current Account while after the crisis export boom in China dominated regional Current Account trend.
- Most ASEAN countries had Current Account deficit before crisis (except Singapore) and turned to surplus in 1998, only Philippines still had Current Account deficit until 2002.
- Currently, Vietnam is the only country that has Current Account deficit according to high import, which is almost the same rate as export growth.
- Regional trend of Financial Account is dominated by Japanese financial account

movement due to a development of market capitalization.

- Focusing on ASEAN, Financial Account showed net inflows in the period before crisis. However, after 1997, the number turned to be net outflows. This situation also applied in the case of Korea.

Figure 1-2 Current Account

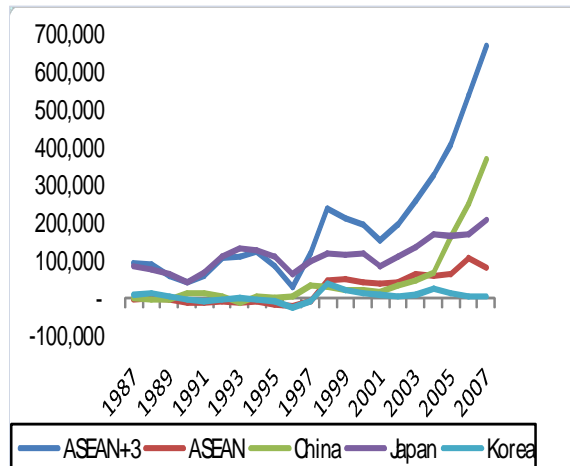
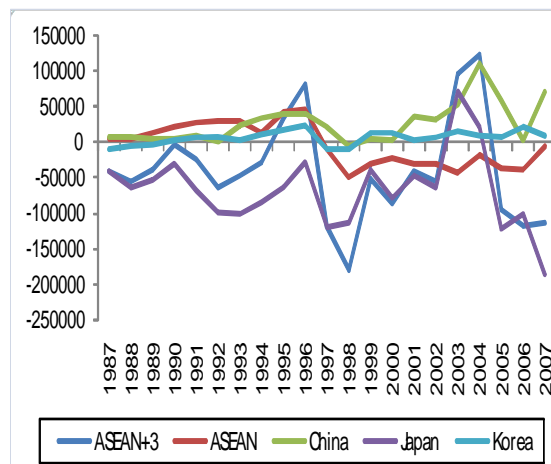


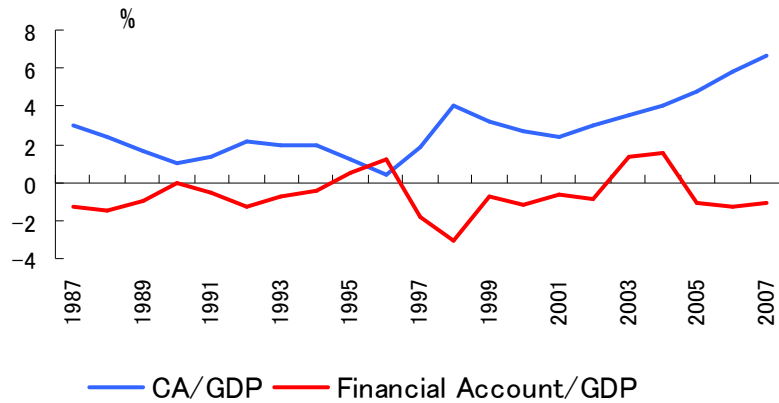
Figure 1-3 Financial Account



Unit: Million USD

In general cross-border transactions of ASEAN+3 is dominated by trade which can be seen as a share of GDP. The structure changed as the ratio of Current Account to GDP in 1987 was 3.00 percent while Financial Account to GDP was -1.29 percent rose to 6.63 percent and -1.12 percent respectively in 2007.

Figure 1-4 Ratio of CA and Financial Account to GDP since 1987



1.1.3. Overview of Financial Account

To be more details on financial flows, the structure of Financial Account has been observed. Between observations period (1987-2007), aggregated ASEAN+3 financial flows mostly in deficit, which means there were financial outflows from the region in most of time. This picture has been drawn after Japanese markets movements. On the other hand, if we look more closely on only ASEAN countries' financial flows, there has been opposite movements. ASEAN Financial Account has been surplus except during 1998-2003 according to Asian Financial Crisis. However, there has been approximately stable amount of FDI inflows continuously.

Figure 1-5 ASEAN+3 Financial Account

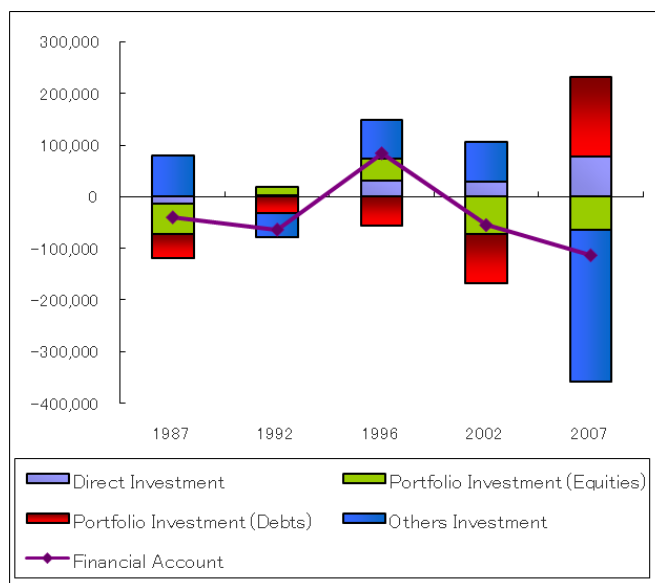
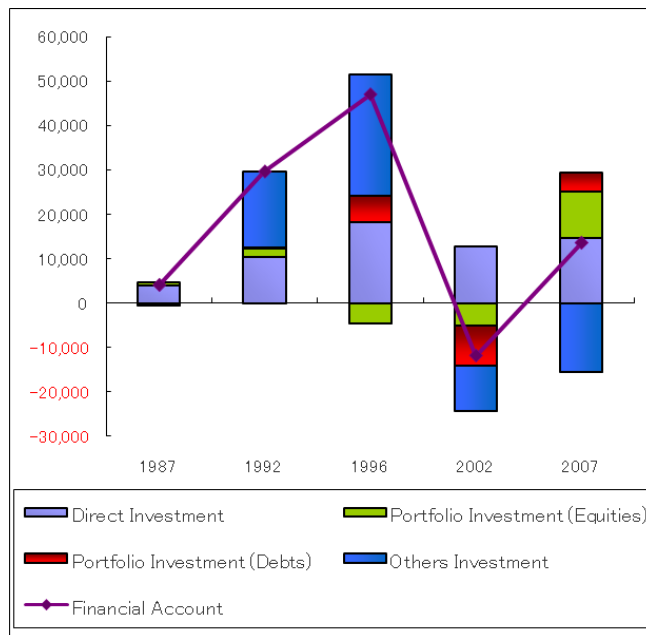


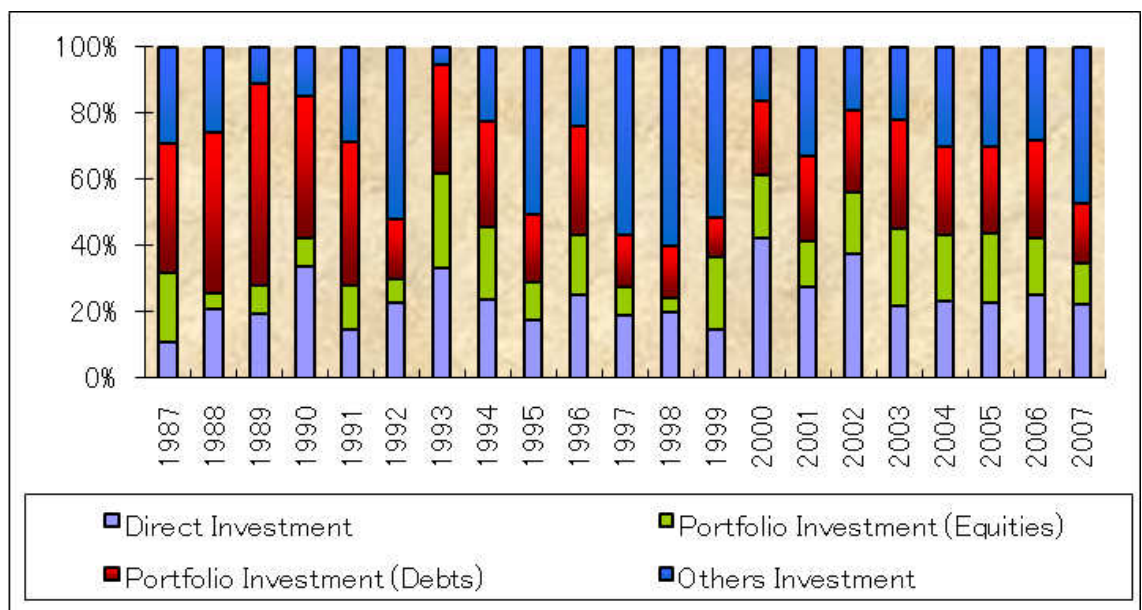
Figure 1-6 ASEAN Financial Account



Unit: Million USD

Other investments have been a largest portion of Financial Account significantly. This partly came from banking-related flows which retrenched in mid-1990s, and also from non-banking related flows which included more sophisticated financial transactions and banking derivatives such as hedging and carry-trade.

Figure 1-7 Financial Account Structure



Focusing on portfolio investment (equities and debts), the observation period is 1997 and 2001-2006. Share of portfolio assets in ASEAN+3 markets is around 7 percent of total investment from ASEAN+3 countries on average, much smaller than assets in US markets, which has approximately 30 percent share. However, investment behavior in ASEAN+3 markets are different from investment in US ones. Portfolio investment share from ASEAN+3 countries to US markets has declined overtime while the share of ASEAN+3 gradually declined but picked up again in 2005-2006. On the other hand, share of portfolio investment liabilities to regional markets is 10 percent on average while Liabilities to US is about 35 percent. Therefore, the tendency of intra-regional share is rising overtime due to the potential of economic growth while liabilities to US seem to have little change. More focus on regional markets both as creditor and debtor as the investor behavior to search for higher yield. Monetary policy that concerned about rising of inflation brought to higher policy interest rates.

Table 1-1 portfolio investment (equities and debts)

Portfolio Investment	1997	2001	2002	2003	2004	2005	2006
Asset in ASEAN+3	104,918	115,082	102,450	116,367	150,401	183,784	256,648
Total value of investment	946,141	1,614,586	1,778,462	2,233,502	2,629,336	2,814,747	3,285,060
Share %	11.09	7.13	5.76	5.21	5.72	6.53	7.81
Asset in US	341,078	553,821	566,915	706,296	801,831	864,378	934,360
Share %	36.05	34.30	31.88	31.62	30.50	30.71	28.44
Liabilities to ASEAN+3	48,059	93,230	89,625	125,988	161,695	204,861	320,025
Total value of investment	762,826	941,980	841,068	1,203,854	1,579,209	2,131,016	2,592,131
Share %	6.30	9.90	10.66	10.47	10.24	9.61	12.35
Liabilities to US	254,479	303,016	300,874	447,170	553,280	787,949	978,754
Share %	33.36	32.17	35.77	37.14	35.04	36.98	37.76

Figure 1-8 ASEAN+3 Assets growth

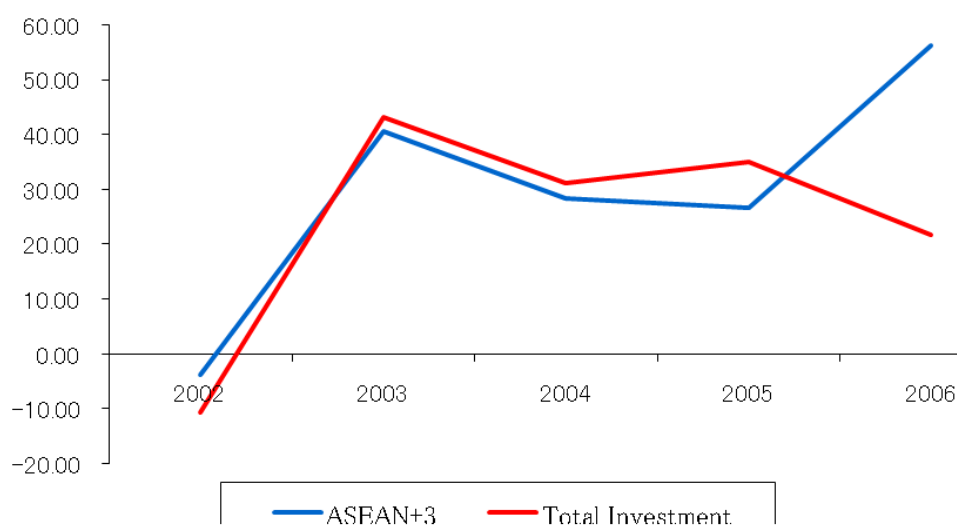
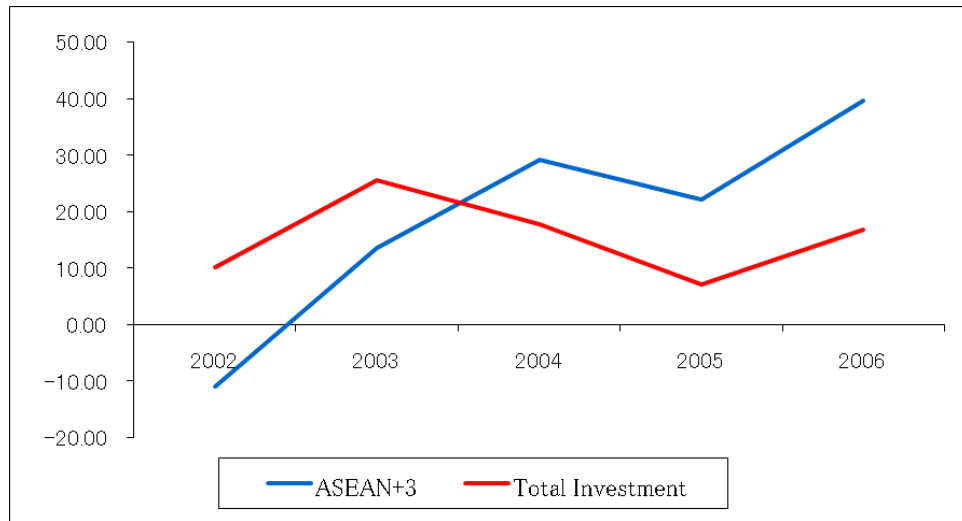


Figure 1-9 ASEAN+3 Liabilities growth



The most popular market amongst ASEAN+3 member countries is Hong Kong, with 35 percent share of total assets investing in the region, following by Singapore, Japan, China, and Korea with the share of 29, 24, 7, and 3 percent respectively. Highly developed markets are main focus for investors because of facilities to do transactions. Policies that control financial flows also include in the investment target decisions. The top 5 investors are Japan (50 percent), Korea (15 percent), Hong Kong (12 percent), Singapore and Malaysia (6 percent). The pattern of investment share structure has been similar throughout the period since 2002.

Similar to regional investors, the investment destinations from US are Japan, Korea, Hong Kong, Singapore, China, Malaysia, Thailand, Indonesia, and Philippines while ASEAN+3 member countries which highly invests in US markets are Japan, Hong Kong, Singapore, Korea, and Philippines respectively.

1.1.4. Overview of Monetary Statistics

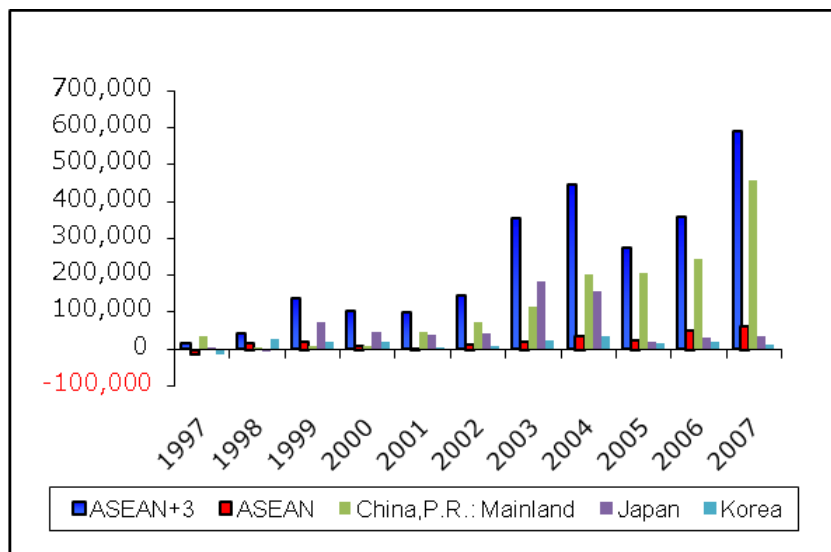
There are also monetary indicators such as exchange rates, international reserves, and domestic credits, which link to the movement of international transactions. Note that the observed international reserve data were from Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei, Vietnam, Cambodia, Myanmar, Lao PDR, China, Hong Kong, Japan, and Korea during 1997-2007. Domestic credits excluded Myanmar and Loa PDR and exchange rates data further excluded Brunei and Cambodia from countries mentioned above. Data sources are IMF's International Financial Statistics and EIU database.

Since 1997, most regional currencies were depreciated from the impact of the crisis except China. It seemed that the currencies would bunch back in 1999 but then moved forward the declining trend again until 2001. The situation was quite stable the next year, however the exchange rates trend turned up side down to be appreciated from 2003 because of high export growth and slowdown of investment made lower import especially for raw material and equipments.

While nominal exchange rates depreciated in the beginning of the period then turned to be appreciated after export became the main driver of the economies, Real Effective Exchange Rates (REER) which calculated by using Consumer Price Index (CPI) showed that compare to their main trading partners most currencies were appreciated until 2004 along with the recovering period from Asian Financial Crisis and started to depreciated when inflation was getting higher partly because of rising in crude oil prices except for Malaysia and Korea whose currencies were depreciated over time.

The accumulation of international reserves is consistence with the movement of nominal exchange rates. During depreciation period, international reserve dramatically accumulated but suddenly jumped up in 2003 when export started to boom especially in China. For this result, exchange rates have been appreciated. There are statements mentioned that Asia is the main source of finance for US twin deficits both on BOP and fiscal account. As we could observe from the dataset, international reserve held by ASEAN+3 countries is at least 20 times larger than US overall balance.

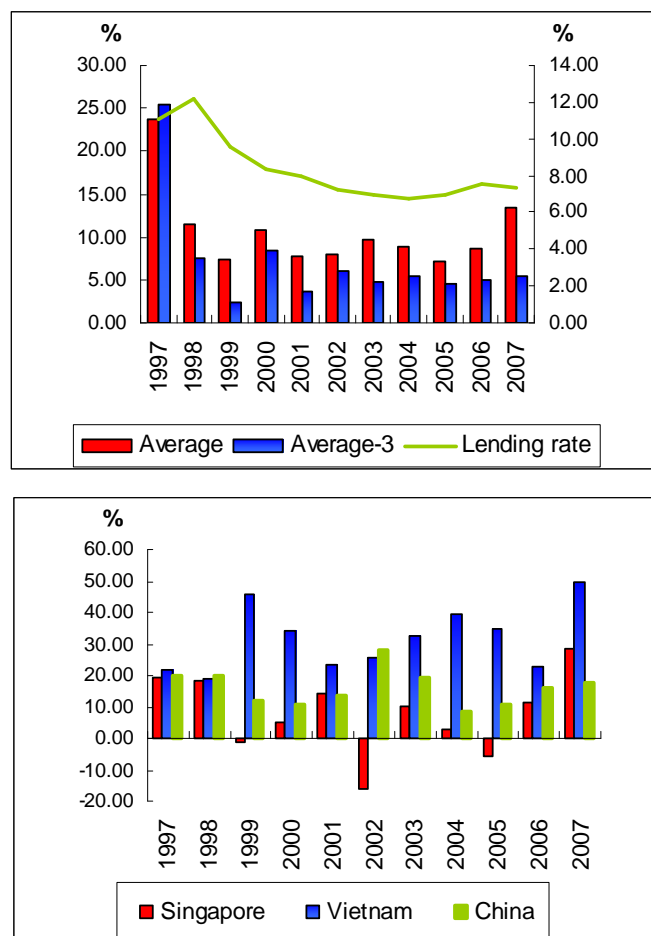
Figure 1-10 International Reserve 1997-2007



Unit: Million USD

While we are looking at international transactions, the effect of those flows also reflects on domestic activities such as domestic credits. As an impact of the 1997 Financial Crisis, banking sector has been re-considering and closely monitoring on lending activities by adapting risk management to control and stabilize banking system along with the declining in investment climate which was lower comparing to the period before crisis. Most of the observed countries showed a sharp drop in domestic credit growth from 2 digits growth to 1 digit growth but there are exceptional for Vietnam and China who continued to have 2 digits growth from after the crisis until present. It is contrasted with the rising of financial inflows into the region and as the result, making central banks to perform closer monitoring and more effective risk management on this issue. Further steps should concern about how to utilize the accumulated international reserves, both by country individually and as a group within the region, and to stimulate investment, especially in infrastructures for the economic growth of countries in the region as a whole.

Figure 1-11 Average domestic credit growth and average lending rate



Note: Average-3 excluded Singapore, China, and Vietnam

1.1.5. Overview of Asset Price and Economic Growth

Lastly, we observed the price of assets by focusing on interest rates such as deposit rates, long-term bond yields, money market interest rates, and stock index. Asset prices are ones of the determinants for investors in order to make a decision of investments. Money market interest rates had been declining since the crisis as the result of easing monetary policy in order to stimulate economic growth. However, as export growth was largely expanded especially intra-regional trade in 2003, which rose demands while a sharpening rise of crude oil which impact on cost-push inflation caused the interest rates to be lower, to balance money circulation.

Considering equity markets, Stock Exchange Indices of 10 economies, namely Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam, China, Hong Kong, Japan, and Korea at the end of the year from 1998 to 2003 mostly return back or decreased compare to the point of the previous year. The situation changed in 2004 onwards when the indices level increased except for China who has joined the upward trend since 2006. The rising trend of Stock Exchange Indices is partly of the more liberalization, more corporate governance and transparency, and also the economic fundamental of the countries.

Table 1-2 Stock Exchange Indices

Difference	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
JIS(Indonesia)	-181.290	124.157	-49.031	-88.190	50.226	61.588	289.057	283.452	353.209	768.044
Bursa Malaysia	-430.243	178.366	135.463	-188.419	60.003	6.470	144.810	45.144	64.985	368.983
PSE (Philippines)	-684.772	324.572	-629.853	-209.832	-128.989	-7.751	424.516	361.433	429.276	1030.503
Straits Times (Singapore)	-603.589	728.553	97.279	-394.865	-82.733	-74.863	419.269	310.037	362.157	871.463
SET (Thailand)	-219.246	67.003	-95.542	-21.271	60.629	132.663	155.226	35.870	26.492	61.908
HOVC (Vietnam)	na	na	na	310.183	-116.297	-40.984	90.759	20.226	262.213	492.904
Shanghai Stock Exchange Bshare (China)	-32.728	-2.330	20.488	103.503	-21.715	-26.784	-16.376	-28.965	31.203	185.311
Hang Seng (Hong Kong)	-3810.237	3375.463	2978.403	-3391.488	-2125.621	25.024	2641.936	1413.817	2716.306	6582.146
Nikkei 225 (Japan)	-3017.046	1672.632	-43.440	-4917.991	-1920.291	-777.235	1940.442	1365.132	3689.511	716.759
KOSPI (South Korea)	-210.713	336.998	-103.023	-125.184	167.630	-65.977	156.865	250.188	280.569	368.421

Along with all economic conditions that have been mentioned above, economic growth rates in ASEAN+3 have been rising dramatically. After the recovering period of Asian Financial Crisis, economies in the region were sharply developed, supporting by large export as a main driver for most of the countries. The economic in this region has become more and more important to the world.

1.1.6. Assessment of Period of 1997 Financial Crisis and Recent Financial Turmoil

Background:

The 1997 Financial Crisis in Asia and the recent financial turmoil which started in US have very similar background. Both crises happened because of the property bubble causing by price speculation then passed the impact to banking credits as credit risks rising. More details on Asian Financial Crisis, not only property price rose but also equity prices which affected on exchange rates via speculations. On the other hand, financial institutions took the lead by absorbing NPLs and turned them into more sophisticated financial instruments without adequate risk management.

Effect on financial system:

Many financial institutions had been bankrupted by holding large amount of NPLs (under chapter 11). The difference between the two crises is 1) size of effected financial institutions and 2) how the governments solved the problem. First, effected financial institutions in Asian Financial Crisis were smaller and more domestic than the ones in the recent turmoil as they are international financial institutions who have operation and holding assets in many countries. Thus, it explains why the recent turmoil affected global financial sector. While governments tried to stop Asian Crisis by liquidate bankrupted financial institutions and let the market mechanism solve the problem, US government gave support to those who are in trouble by issuing treasury bonds.

Note that both crises were caused by the bubble of property sector. Speculation of prices and moral hazard within financial system, especially banking credits and instruments seemed to be triggers for both crises.

1.2. Overview of Trade and FDI

1.2.1. Introduction

East Asian countries of ASEAN member countries, China, Japan, and Korea (ASEAN+3 countries and East Asian countries, hereafter) achieved rapid economic growth for several decades, although there are variations among them in terms of the rate of economic growth. For example, compared to developing countries, Japan, which achieved high level of economic development, registered low economic growth. By contrast, China achieved extremely high growth in recent decades. A number of factors such as high savings and investment, and availability of educated labor, have contributed to rapid economic growth of ASEAN+3 countries¹. Among these factors, rapid expansion of foreign trade and foreign direct

¹ See, for example, the World Bank (1993), Stiglitz and Yusuf (2001) and Gill and

investment (FDI) has been shown to have played very important roles². Although the global recession currently underway has impacted foreign trade and FDI in the world and in East Asia unfavourably, the underlying patterns of foreign trade and FDI that have enabled East Asia to achieve rapid economic growth does not appear to have changed. With this background, this chapter attempts to discern the changing patterns of foreign trade and FDI for ASEAN+3 countries in order to derive implications for policy makers interested in formulating policies for achieving further economic growth³.

1.2.2. Foreign trade

1.2.2.1. Changing Patterns of Overall Trade: An Analysis of Foreign Trade Patterns using Aggregated Data

1) Trade Patterns

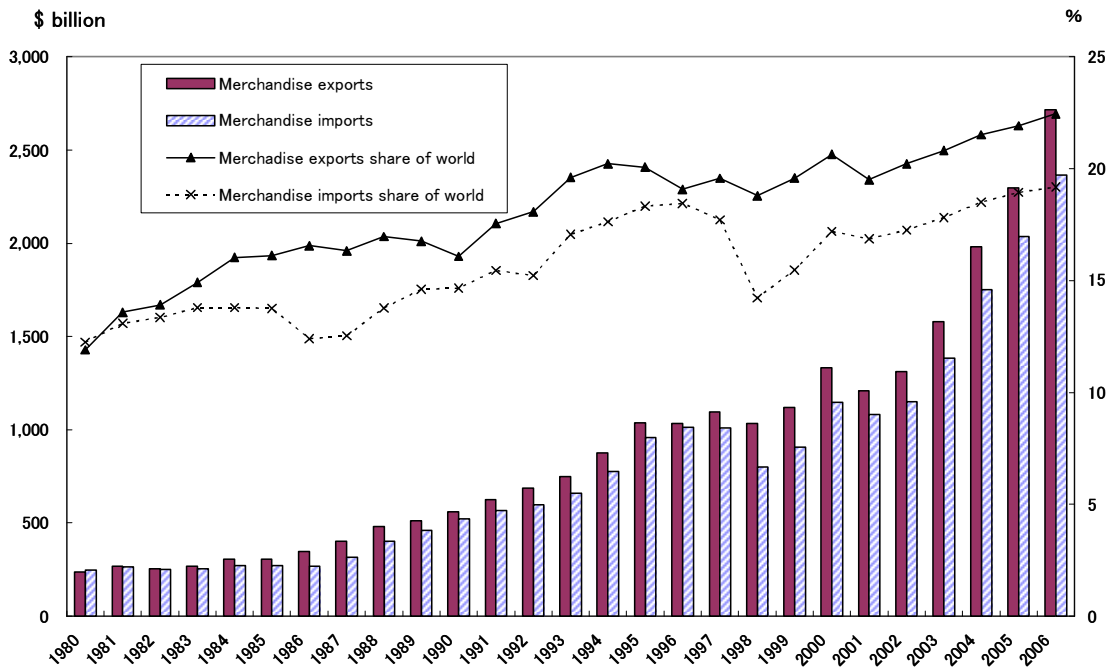
ASEAN+3 countries achieved rapid expansion in foreign trade from the mid-1980s until 2008, when the world economy suddenly started to slow down as a result of the global financial crisis. The rate of expansion of East Asia's foreign trade started to increase sharply in the early 2000s, after recovering from the financial crisis in the late 1990s and world economic slow down resulting from the burst of the IT (information technology) bubble and the terrorists' attacks in the early 2000s (Figure 1 12). Indeed, East Asia's exports grew on average at the annual rate of 17.6 percent in nominal \$US terms from 2001 to 2006, significantly faster compared to the earlier period when the average growth rate was 11.1 percent from 1985 to 1997, a previous period of high growth. As a result of rapid expansion of foreign trade in East Asia, the shares of East Asia in world's exports and imports increased from 11.9 and 12.2 percent in 1980 to 22.5 and 19.2 percent, respectively. It is worth noting that East Asia has registered trade surplus (exports-imports) continuously from the early 1981 through 2006. Another notable development is a sharp decline in East Asia's imports in 1998, which is due to a sharp decline in economic activities in many East Asian countries, especially in ASEAN countries and Korea, which in turn is attributable to the negative impacts of the financial crisis in 1997.

Kharas (2006)

² See, for example, Urata (2001) about the emergence of the trade and foreign direct investment nexus and its contribution to economic growth in East Asia.

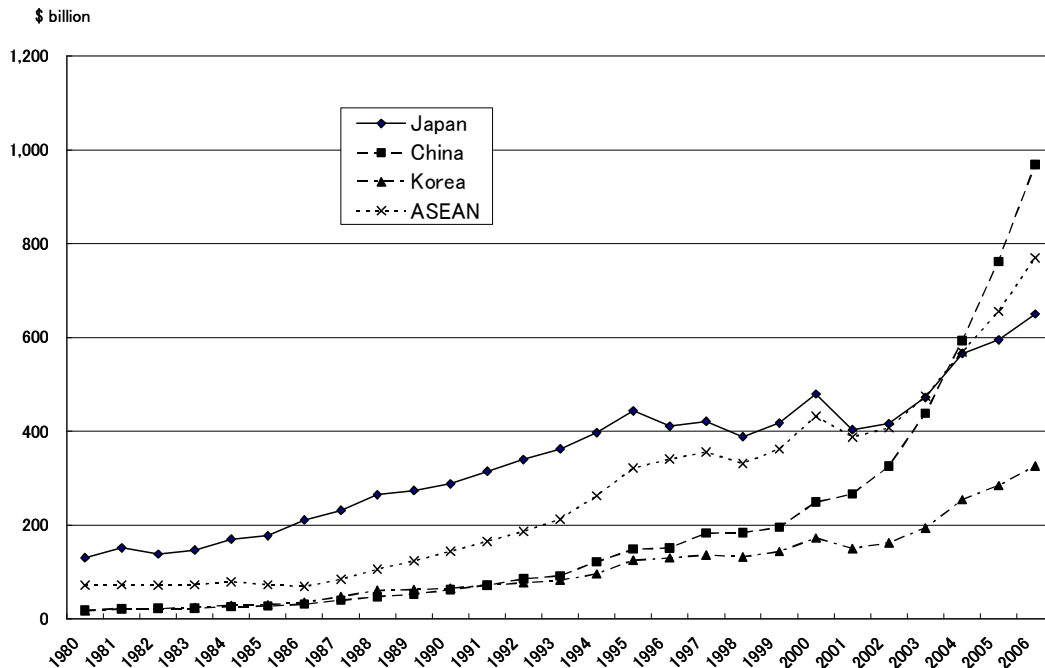
³ See Urata (2006) for the analysis of changing patterns of foreign trade in East Asia for the period from 1980 to the early 2000s.

Figure 1-12 East Asia Trade: Value and Share of the World



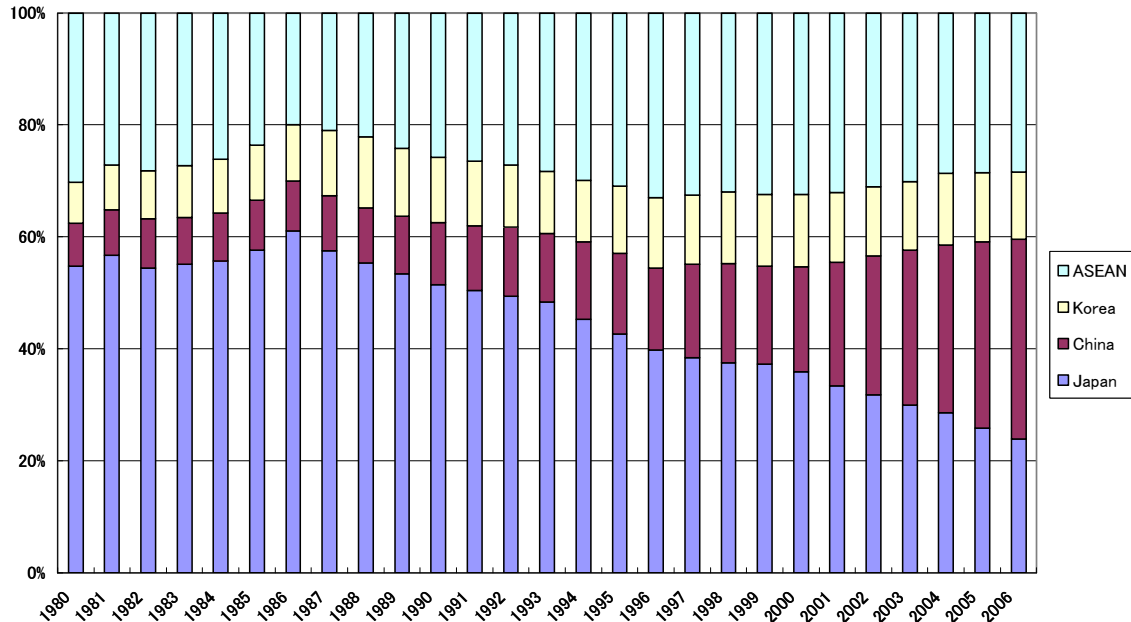
Export performance of East Asian countries followed similar trends among them until around 2000 (Figure 1 13). However, the trends started to register differences around the turn of the century. China’s exports began to rise sharply. Although exports by Japan, ASEAN, and Korea also increased but the rate of their increase is substantially lower compared to the rate achieved by China. Indeed, the average annual rate of growth of China’s exports from 2001 to 2006 amounted to 29 percent, while the corresponding rates for Korea, ASEAN, and Japan were significantly lower at 17, 15 and 10 percent, respectively.

Figure 1-13 East Asian Exports by Countries



As a result of these differences in the growth rates of exports among East Asian countries, the compositional shares of East Asian countries in East Asia's overall exports changed dramatically (figure 1 14). China's share increased sharply from a mere 7.6 percent in 1980 to 35.7 percent in 2006, surpassing Japan in 2004. Korea also increased its share during the 1980-2006 period, but the rate of increase was not as remarkable compared to the case of China. Korea's share was 12 percent in 2006. ASEAN's share fluctuated but it remained more or less around 30 percent. What is remarkable is the sharp decline in Japan's share from 54.8 percent in 1980 to 23.9 percent in 2006. As a result of the differences in export performance among the East Asian countries, the ranking of the size of exports among them changed as well. In 1980 Japan was by far the largest exporter, and the ASEAN was the second largest. China and Korea were very small exporters. The picture is quite different in 2006 as China became the largest exporter and the ASEAN was number two. Japan became number three and Korea remained the smallest among the four.

Figure 1-14 Country Composition of East Asian Exports



These differences in export performance among East Asian countries can be attributable to a variety of factors. The results of the constant market share analysis conducted by the Japan Center for Economic Research found that the competitiveness factor can explain China’s remarkable performance as well as Japan’s poor performance⁴. Specifically, for China approximately 70 percent of the export expansion from 1995 to 2005 was attributable to the improvement in its competitiveness, while for Japan the contribution of competitiveness to Japan’s export growth was negative, indicating the loss of competitiveness for Japan’s exports.

Another important factor explaining export performance is foreign direct investment (FDI) inflows. This is because FDI in recent decades has been export-oriented. In other words, one of the important motives of multinational enterprises (MNCs) for undertaking FDI is to achieve low cost production in order to expand their exports. As such, a country hosting FDI tends to achieve high export growth. We will come back to the impacts of FDI on foreign trade in a later section.

Turning to the pattern of imports by East Asian countries, one observes similar

⁴ The constant market share analysis decomposes the growth of exports to the following four factors, growth of world exports, changes in commodity composition, changes in export destinations, and competitiveness. See Japan Center for Economic Research (2007) for the details.

developments (Figure 1-15, 1-16). Namely, China's imports increased at the faster pace among the East Asian country group, while Japan's imports rose at the slowest rate. In terms of growth rate, Korea is the second and ASEAN the third. Reflecting these patterns, the ranking of these countries in terms of imports changed dramatically, as was the case for exports. China is the largest importer, which is followed by ASEAN, Japan, and Korea in the order of the import value.

Figure 1-15 Imports of East Asian Countries

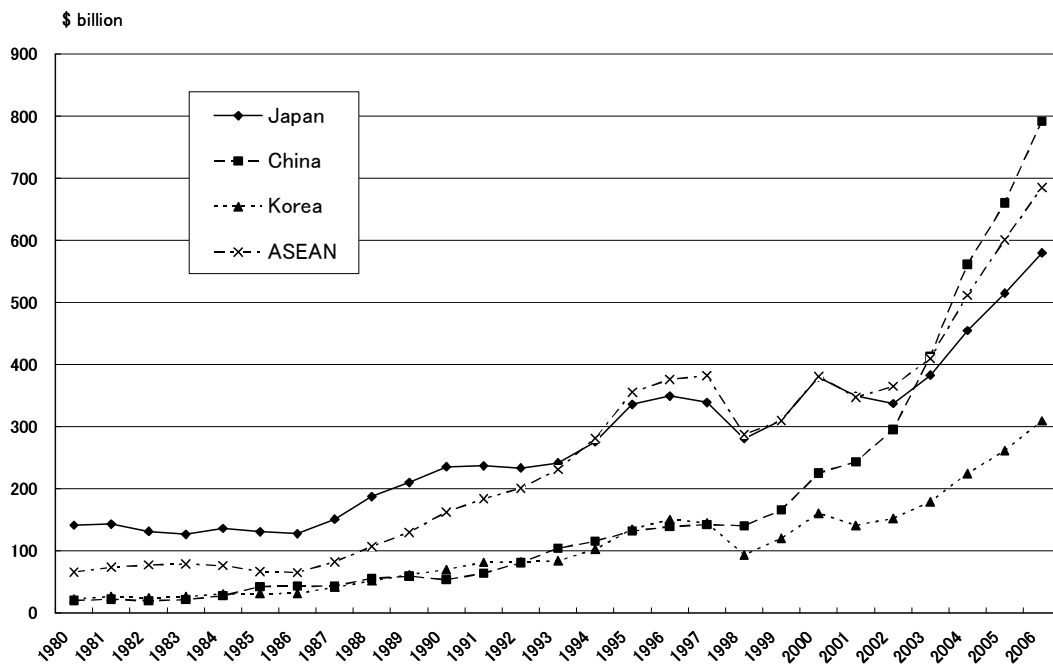
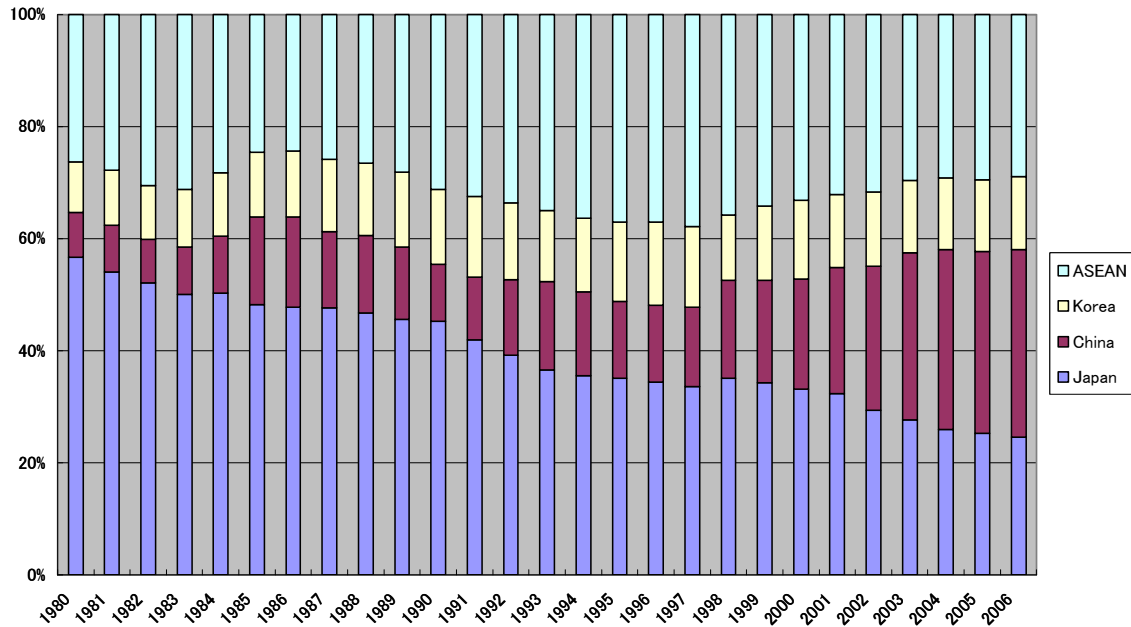


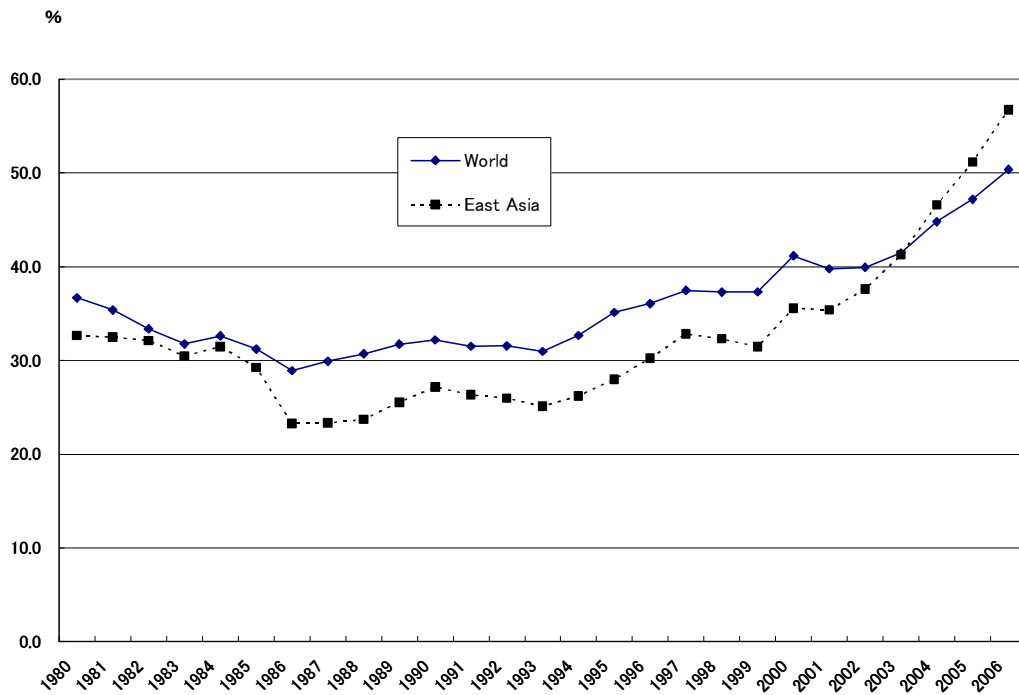
Figure 1-16 Composition of East Asian Imports (%)



2) Trade-GDP Ratios

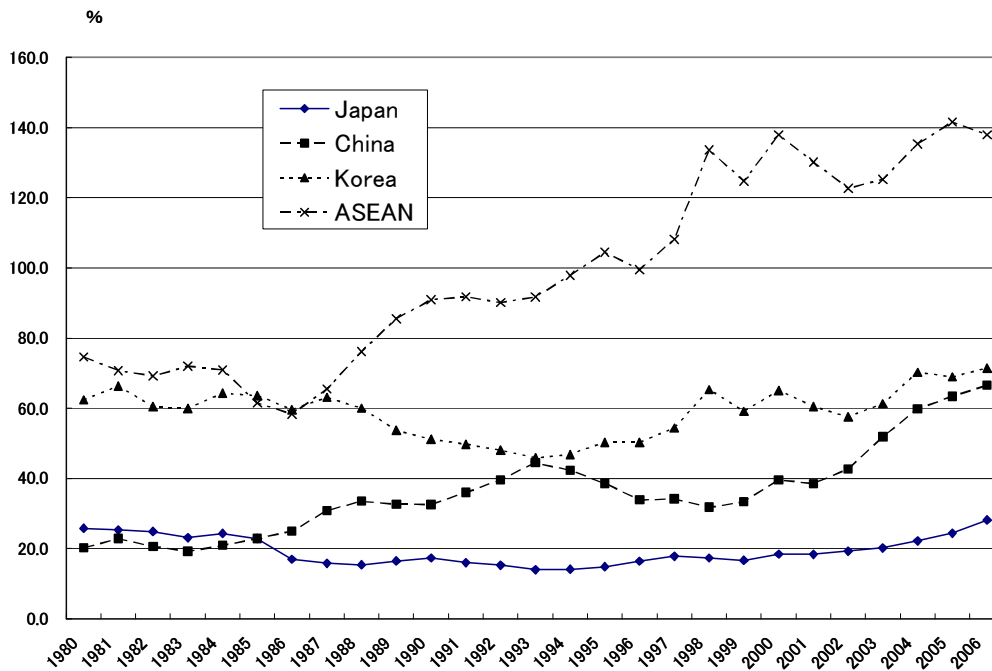
We saw earlier rapid expansion of foreign trade (exports and imports) by East Asian countries during the two decades starting the mid-1980s. This is reflected in the increase in the importance of foreign trade in economic activities for these countries. The trade-GDP ratio for East Asian countries increased slowly from 23.3 percent in 1986 to 35.4 percent in 2001 in parallel with the trend registered for the world, or the world average (Figure 1-17). The trade-GDP ratio for East Asian countries started to rise sharply after 2001, as the ratio increased more than 20 percentage points in five years from 35.4 percent in 2001 to 56.7 percent in 2006, surpassing the world average in 2004. These observations indicate that East Asian countries have globalized very quickly in the 21st century.

Figure 1-17 Trade-GDP Ratio for East Asia



Wide variations in the trade-GDP ratios can be observed for the East Asian countries (Figure 1-18). The ratio for ASEAN countries increased rapidly and continuously from the mid-1980s to mid-2000s, registering approximately 140 percent in 2006. The ratio for Korea remained more or less at the same level around 60 percent between 1980 and 2006 with a decline in the early 1990s. China saw rapid increase in the trade-GDP ratio starting in 2001, as the ratio increased from 38.5 percent in 2001 to 66.6 percent in 2006. The trade-GDP ratio for Japan remained low, compared to other East Asian countries, around 20 percent, although it began to increase slowly in the early 2000s. These findings show that it was China that contributed significantly to the increase in the trade-GDP ratio for the East Asian countries.

Figure 1-18 Trade-GDP Ratio in East Asia by Countries



3) Intra-regional Dependence

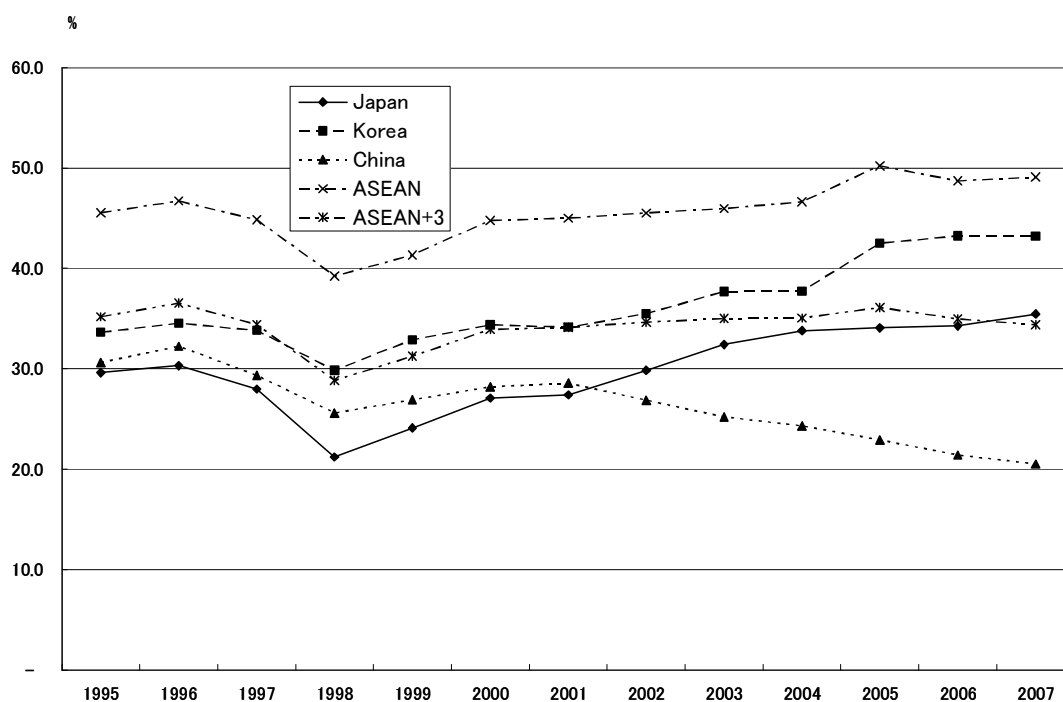
Intra-regional dependence in foreign trade (exports and imports) among East Asian countries increased only slightly from 37.8 percent in 1995 to 38.4 percent in 2007⁵. The degree of intra-regional dependence in foreign trade in East Asia in 2007 is lower compared with the cases in the NAFTA (43.0%) and the EU27 (67.1%). Although intra-regional dependence among East Asian countries did not change much for the 1995-2007, significant changes and differences in the pattern of intra-regional dependence are observed for individual East Asian countries. Let us examine the patterns of intra-regional dependence for China, Japan, Korea and ASEAN countries in terms of exports and imports.

Intra-regional dependence in exports for East Asia by countries is shown in Figure 1-19. Intra-regional dependence in exports for East Asia as a whole remained around 35 percent during the 1995-2007 period with a decline in 1998, which is due to a substantial decline in import demand of East Asian countries as a result of the financial crisis in 1997-98. The patterns of intra-regional dependence in exports for China, Japan, Korea and ASEAN countries show an interesting contrast in that dependence increased for Japan, Korea and ASEAN while it declined for China. In 2007 the degree of intra-regional dependence in exports for Japan, Korea, and ASEAN are 35.4, 43.2, and 49.1 percent respectively, while the corresponding value for China

⁵ The figures are computed from JETRO's international trade matrix database.

is significantly lower at 20.5 percent. It should be noted that for China, North America and the EU are more important export markets than East Asia, as 42.2 percent of China's exports went to North America and the EU27 in 2007. Indeed, it seems that China has become an export platform in East Asia for the rest of the world as China has replaced other East Asian countries in that role. We will investigate the characteristics of intra-regional trade more in detail below.

Figure 1-19 Intra-regional Dependence in East Asia's Exports



China and Japan show sharp contrast in the changes in their position as export markets for East Asian countries. China has become an increasingly important export market for Japan, Korea and ASEAN countries, while Japan has lost its importance as an export market for China, Korea and ASEAN countries (Figures 1-20, 1-21). Indeed, for Korea and ASEAN the importance of Japan and China completely reversed between 1995 and 2007. Japan was the most important export market in East Asia for Korea and ASEAN in 1995, but China became the most important market for them in 2007. It is worth noting that China was the most important export market for Korea and the second most important market for Japan behind the United States. The importance of ASEAN as an export region did decline from 1995 to 1998 due to the crisis, but it increased and reached the level registered in the pre-crisis period in mid-2005 (Figure 1-22). Although not shown in the figure, the importance of Korea as an export market for East Asia was lower compared to other East Asian countries and did not change

much around 4 percent.

Figure 1-20 Dependence on China for East Asia's Exports

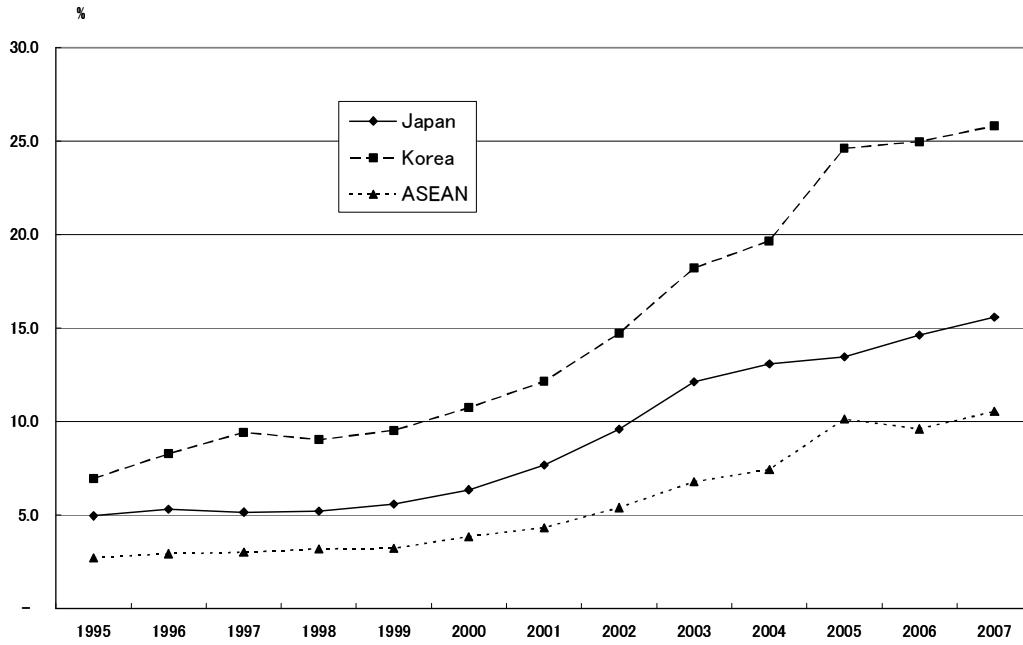


Figure 1-21 Dependence on Japan for East Asia's Exports

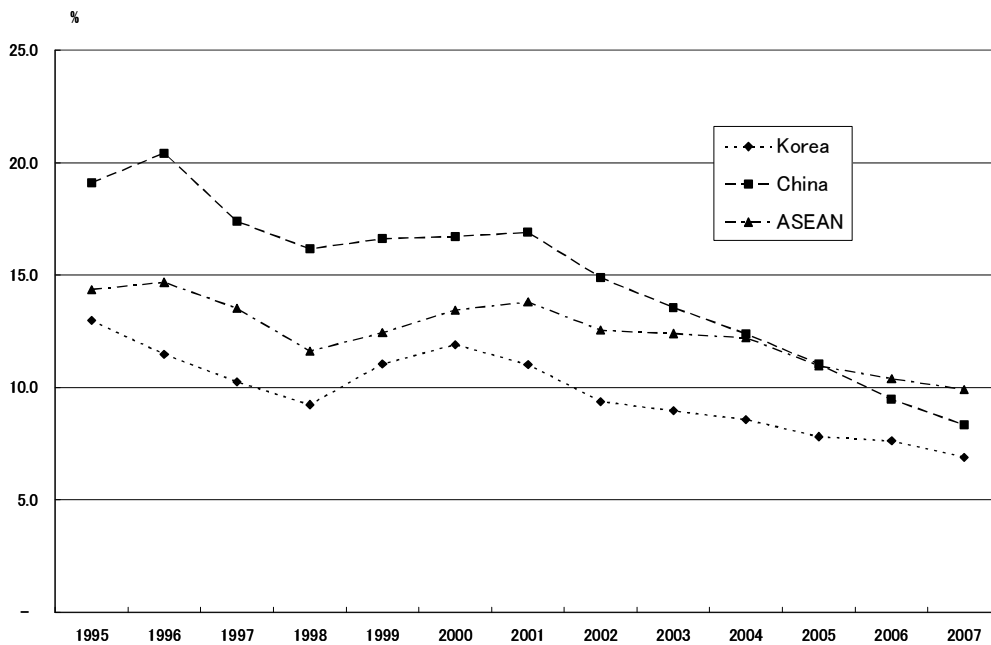


Figure 1-22 Dependence on ASEAN for East Asia's Exports

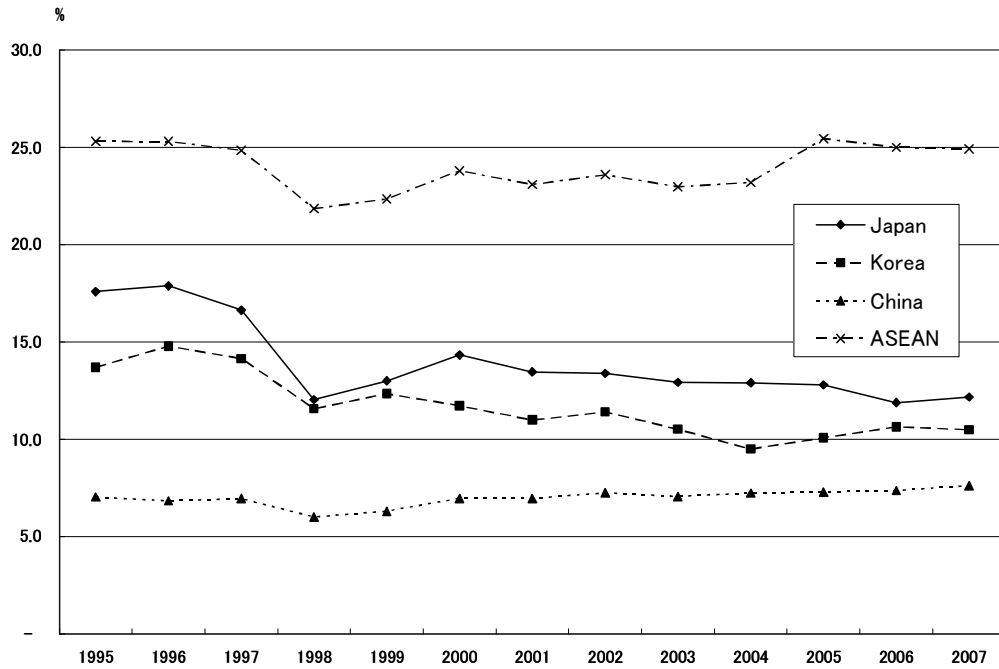
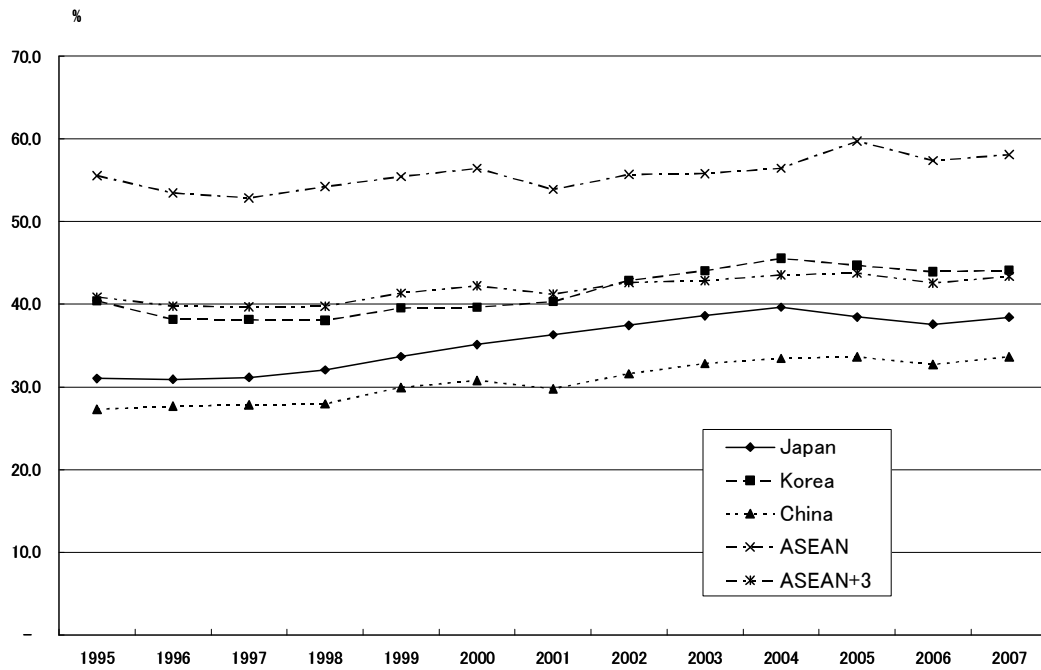


Figure 1-23 Intra-regional Dependence for East Asia's Imports



Turning to imports, unlike the case for exports intra-regional dependence increased for all the countries including China. Besides, the degree of intra-regional dependence in imports is greater than in exports for all the countries, indicating that for East Asian countries East Asia is more important as an import source than as an export destination. As we will see in a later section, this pattern is attributable to fragmentation strategy of multinational enterprises, which have established production networks through foreign direct investment by taking advantage of differences in production costs in East Asian countries. Among East Asian countries, ASEAN countries exhibit rather high dependence on other East Asian countries for their imports compared to China, Japan or Korea. It is also interesting to note that among East Asian countries, China shows the lowest dependence on other East Asian countries. Coupled with the observation on exports, this finding indicates that China is indeed the country that is least dependent on other East Asian countries in foreign trade in 2007.

As for intra-regional dependence in imports for East Asian countries, one finds similar contrasting positions of China and Japan (Figures 1-24, 1-25). However, there are some interesting differences in the patterns between exports and imports. Although China's importance increased for imports as it did for exports for other East Asian countries, the dependence on China for other East Asian countries is lower for imports compared to exports. Another similar development is the decline in the importance of Japan as import source as the case for export destination. However, the rate of decline is slower for the case of imports than for exports. Furthermore, the level of dependence on Japan for East Asian countries is higher for the case of imports compared to the case of exports. Concerning ASEAN, ASEAN has become a more important source of imports for ASEAN and China (Figure 1-26). Coupled with the observation on rising intra-ASEAN export dependence, we find that intra-ASEAN trade (exports + imports) ratio is increasing. The importance of Korea as an import source for East Asian countries was significantly lower compared to other East Asian countries and did not change much around 5 percent during the period under study.

Figure 1-24 Dependence on China for East Asia's Imports

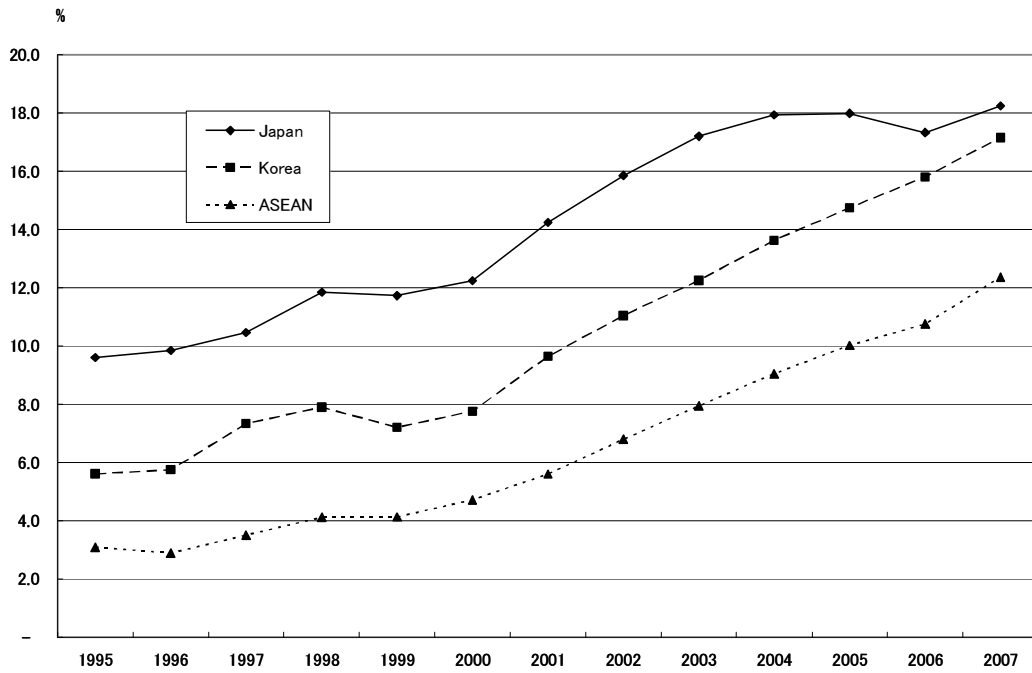


Figure 1-25 Dependence on Japan for East Asia's Imports

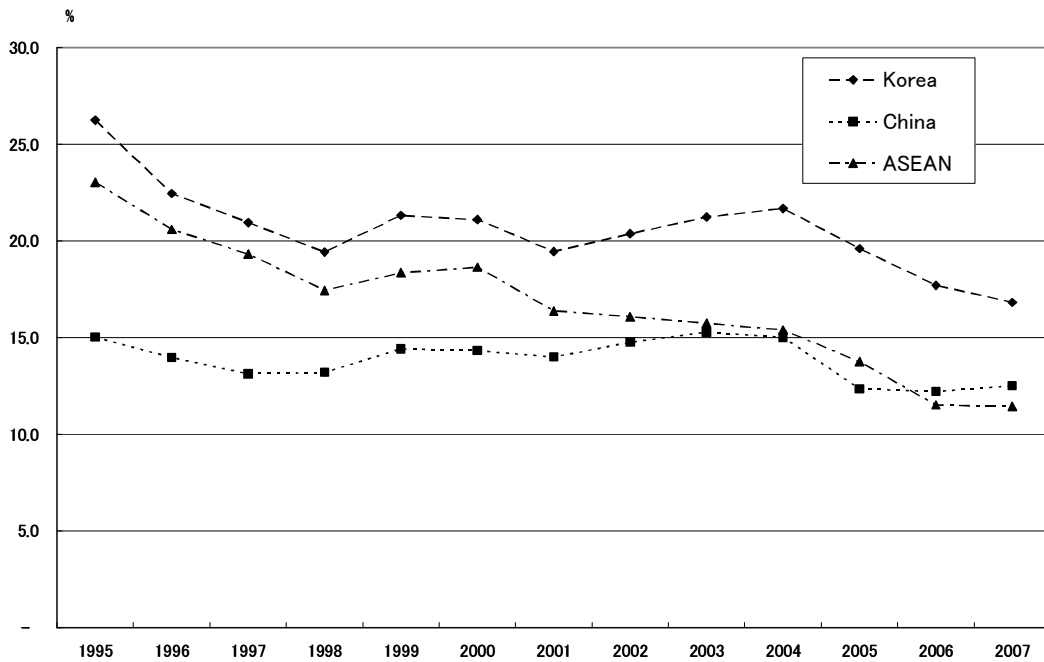
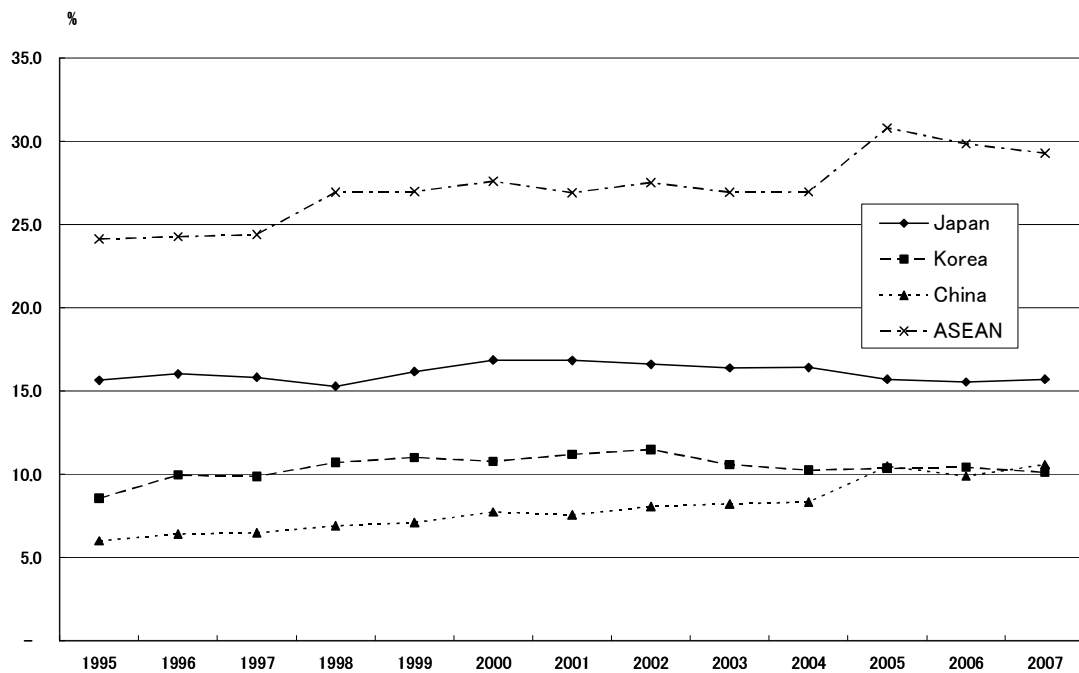


Figure 1-26 Dependence on ASEAN for East Asia's Imports



1.2.2.2. Changing Patterns of Trade by Products: An Analysis using Disaggregated Data

1) Trade Patterns

The patterns of trade by East Asian countries changed dramatically in recent years (Table 1-3). This is particularly notable for East Asian developing countries. The shares of machinery products, notably electrical machinery, in overall exports and imports increased remarkably at the expense of natural resource based products such as foods and labor-intensive products including textiles and toys. The shares of electrical machinery in total exports for China, Korea and ASEAN8 increased from 7.2, 14.3, and 13.4 percent in 1990 to 18.6, 33.5 and 27.4 percent in 2005, respectively. The increase in the share of electrical machinery for their imports is equally noticeable, as their shares in total imports for China, Korea and ASEAN8 increased from 17.0, 12.9, 16.1 percent to 22.7, 17.8, 27.3 percent, respectively. The notable increase in the share of electrical machinery in both exports and imports for East Asian countries indicate increased intra-industry trade in that sector, which will be discussed more later.

Table 1-3 Product Composition of Foreign Trade for ASEAN+3 Countries (%)

	China		Japan		Korea		ASEAN8		ASEAN8+3	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Exports										
Foods	7.8	2.4	0.6	0.5	3.7	0.9	10.3	5.0	4.3	2.4
Textile	27.7	12.8	2.3	1.3	19.0	4.1	7.9	4.8	9.1	6.9
Pulp, Paper and Wood	9.9	6.9	2.2	1.9	15.2	2.4	15.6	8.5	7.8	5.5
Chemicals	5.7	5.5	7.1	10.8	4.9	10.8	4.0	7.6	6.0	8.0
Oil and Coal	6.5	1.5	0.4	0.6	1.3	4.4	20.8	14.2	6.2	4.8
Stone, clay, glass and concrete product	2.1	2.0	1.1	1.1	1.4	0.6	1.7	1.1	1.4	1.4
Iron and steel , Nonferrous metals	4.9	6.6	6.8	8.1	9.5	8.3	4.5	4.1	6.2	6.5
General machinery	2.8	17.8	21.9	21.8	8.0	12.3	9.8	16.5	14.8	17.8
Electrical machinery	7.2	18.6	20.6	21.6	14.3	33.5	13.4	27.4	16.2	23.3
Household electric appliances	8.2	9.5	6.6	4.6	9.5	3.8	5.7	3.9	6.9	6.2
Transportation Equipment	0.8	1.7	23.8	21.2	4.9	12.9	1.0	2.2	13.1	8.0
Precision machinery	0.6	1.7	2.9	4.5	0.7	5.1	0.7	1.1	1.8	2.7
Toys and Miscellaneous goods	15.9	13.0	3.7	2.0	7.4	1.0	4.5	3.5	6.1	6.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Imports										
Foods	6.3	1.8	13.6	10.0	4.9	4.0	5.7	4.1	8.8	4.8
Textile	11.6	3.4	6.1	5.5	5.3	2.7	5.1	2.3	3.8	2.1
Pulp, Paper and Wood	7.7	6.3	9.9	5.6	9.0	3.5	4.8	2.8	8.5	5.5
Chemicals	11.6	13.8	7.2	8.3	11.7	10.4	11.2	9.7	12.3	14.0
Oil and Coal	1.7	11.1	24.4	26.3	15.5	26.1	10.8	17.1	6.4	5.1
Stone, clay, glass and concrete product	0.7	1.2	3.0	1.4	1.8	1.5	2.2	1.4	2.2	1.4
Iron and steel , Nonferrous metals	8.9	14.3	12.5	8.8	12.3	13.8	11.2	9.6	8.6	8.9
General machinery	16.9	14.3	5.9	9.6	17.6	10.8	17.7	15.5	17.9	18.4
Electrical machinery	17.0	22.7	4.7	11.0	12.9	17.8	16.1	27.3	14.0	24.9
Household electric appliances	2.5	1.1	1.0	2.7	1.3	1.7	3.5	2.2	1.9	2.0
Transportation Equipment	10.6	3.5	4.9	3.7	3.9	2.6	8.2	4.7	9.5	6.9
Precision machinery	0.8	5.7	1.1	2.5	2.0	3.5	1.3	1.5	1.9	4.0
Toys and Miscellaneous goods	3.7	0.8	5.7	4.6	1.8	1.6	2.3	1.6	4.3	2.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Despite the similarity in increased importance of electrical machinery in their trade for East Asian countries, there are several notable differences in the importance of other products, which mostly reflect the differences in the level of economic development among East Asian countries. For Japan and to lesser extent for Korea, exports of transportation equipment account for a large part of their exports, while for China textiles account for a notable share although its share declined significantly. For ASEAN8 oil and coal has a relatively large share of their exports. To examine similarities or differences in the compositional patterns of exports, we computed correlation coefficients concerning export compositions of a pair of countries for East Asia by using export data at 3 digit SITC level. The results of the computation, which are shown in Table 1-4, indicate increasing similarities for the East Asian countries. Indeed, all the computed correlation coefficients for the pair of countries among China, Japan, Korea and ASEAN8 increased from 1990 and 2005. Similarities among China, Japan, Korea and individual ASEAN8 countries increased as the computed correlation coefficients increased in 26 pairs out of possible 28 pairs, for which the necessary data are available. The results also show

that Japan and Korea share similar export compositional patterns, while Malaysia, the Philippines and Singapore exhibit similar patterns. One should be reminded that similar export compositional patterns between Malaysia and Singapore are partly due to Singapore's role as an entrepot, where some exports from Malaysia are shipped through Singapore.

Table 1-4 Comparison of Export Structure among ASEAN+3 Countries

		China	Japan	Korea	ASEAN8	Brunei	Indonesia	Malaysia	Philippine	Singapore	Thailand	Vietnam
China	1990	1.000										
	2005	1.000										
Japan	1990	0.066	1.000									
	2005	0.241	1.000									
Korea	1990	0.332	0.433	1.000								
	2005	0.528	0.728	1.000								
ASEAN8	1990	0.363	0.234	0.414	1.000							
	2005	0.548	0.436	0.634	1.000							
Brunei	1990	0.313	-0.034	-0.041	0.569	1.000						
	2005											
Indonesia	1990	0.379	-0.059	0.020	0.645	0.904	1.000					
	2005	0.175	0.012	0.079	0.353		1.000					
Malaysia	1990	0.280	0.188	0.406	0.757	0.534	0.563	1.000				
	2005	0.589	0.387	0.579	0.961		0.407	1.000				
Philippines	1990	0.181	0.094	0.098	0.268	-0.003	0.022	0.139	1.000			
	2005	0.412	0.421	0.539	0.899		0.098	0.859	1.000			
Singapore	1990	0.105	0.290	0.371	0.737	0.039	0.084	0.283	0.126	1.000		
	2005	0.451	0.440	0.654	0.943		0.101	0.849	0.887	1.000		
Thailand	1990	0.350	0.206	0.552	0.447	-0.018	0.072	0.345	0.196	0.312		
	2005	0.692	0.485	0.595	0.790		0.231	0.771	0.653	0.687	1.000	
Vietnam	1990											
	2005	0.175	-0.026	-0.001	0.242		0.559	0.256	0.055	0.031	0.176	

Notes: Correlation coefficients of export composition for a pair are computed using 3 digit SITC (version 3)

Source: UN, COMTRADE

Turning to imports by East Asian countries, one finds similar compositional patterns of increasing share of electrical machinery. Some notable differences include the following. Reflecting poor natural resource endowments, particularly energy resources, the share of oil and coal account for a sizeable share for the imports of Japan and Korea.

So far we have analyzed the trade patterns by referring to the products classified according to trade statistics. It would be of interest to examine the trade patterns for the products classified by their characteristics or nature, primary goods, processed materials, parts and components, capital goods and consumption goods⁶. Table 1-5 shows the patterns of exports and imports for East Asian countries following the classification described above. One common pattern observed for China, Korea and ASEAN8 is an increase in the share of parts and components, and capital goods, and a decline in the share of consumption goods. For Japan, a

⁶ This is the classification adopted by the Research Institute of Economy, Trade and Industry (REITI) in their trade database.

similar pattern is observed but the magnitude of the change is significantly smaller. It is worth noting that for ASEAN8+3 in 2005 the shares of processed materials, parts and components, capital goods, consumption goods are more less the same, each registering around 23-25 percent. The changes in the patterns of imports show similarities and differences among China, Japan, Korea and ASEAN8. All of them saw an increase in the share of parts and components although there are substantial differences in their shares. The share of parts and components in total imports is high for China and ASEAN8. For Japan and Korea, and to the lesser extent China, the share of primary goods is significant. It is to be noted that for Japan consumption goods account for about a quarter of its total imports.

Table 1-5 Comparison of Exports to the Rest of the World by Product Characteristics (%)

	China		Japan		Korea		ASEAN8		ASEAN8+3	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Exports										
Primary goods	9.7	1.8	0.3	0.8	1.4	0.4	16.6	9.0	5.7	3.2
Processed materials	22.7	18.0	18.9	22.4	25.7	28.3	32.5	26.1	23.4	22.3
Parts and components	3.6	17.0	25.8	32.0	15.9	31.3	14.8	29.8	18.9	25.6
Capital goods	9.8	26.8	30.8	25.8	13.7	24.7	11.7	18.5	21.4	24.2
Consumption goods	54.2	36.4	24.3	19.1	43.3	15.4	24.4	16.5	30.7	24.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Imports										
Primary goods	9.6	19.5	28.7	25.1	22.9	24.4	11.4	12.1	11.8	7.7
Processed materials	36.9	31.3	33.5	25.5	35.2	33.4	34.2	30.7	31.4	28.5
Parts and components	16.9	26.4	6.5	13.7	17.0	18.7	22.9	34.4	18.9	31.7
Capital goods	28.6	18.6	7.7	12.2	20.1	15.4	19.9	14.4	22.1	20.9
Consumption goods	8.0	4.1	23.6	23.5	4.9	8.1	11.6	8.4	15.8	11.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Earlier, we saw that the shares of electrical machinery in both exports and imports increased for East Asian countries. This finding possibly indicates increased importance of intra-industry trade for East Asian countries. To see the validity of this observation, we computed intra-industry trade index (Grubel-Lloyd index) for East Asian countries' trade with the rest of the world. The results of the computation, which are shown Table 1-6, reveal that high level of intra-industry trade in electrical machinery and parts and components trade for China and ASEAN and in 2005, while the level of intra-industry trade is significantly lower for Japan and Korea. These observations seem to indicate that China and ASEAN play a role of both parts and components producers as well as assemblers of final products using parts and components, while Japan and Korea are mostly the suppliers of parts and components and not the users, or assemblers of final products.

Table 1-6 Intra-Industry Trade in East Asia by Products and Product Characteristics

Table 4 Intra-Industry Trade in East Asia by Products and Product Characteristics (Grubel-Lloyd Index)

	China		Japan		Korea		ASEAN8		ASEAN8+3	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
By Products										
Foods	0.668	0.600	0.102	0.111	0.768	0.395	0.774	0.809	0.995	0.776
Textile	0.413	0.272	0.646	0.459	0.512	0.743	0.853	0.575	0.335	0.179
Pulp, Paper and Wood	0.656	0.701	0.432	0.610	0.843	0.867	0.520	0.435	0.692	0.483
Chemicals	0.877	0.808	0.889	0.757	0.509	0.923	0.480	0.970	0.999	0.717
Oil and Coal	0.281	0.384	0.038	0.059	0.123	0.317	0.744	0.999	0.666	0.504
Stone, clay, glass and concrete products	0.356	0.535	0.632	0.993	0.799	0.618	0.805	0.950	0.846	0.475
Iron and steel , Nonferrous metals	0.938	0.878	0.814	0.924	0.773	0.805	0.524	0.674	0.802	0.607
General machinery	0.420	0.641	0.353	0.518	0.541	0.878	0.654	0.879	0.742	0.495
Electrical machinery	0.806	0.836	0.308	0.575	0.952	0.642	0.844	0.908	0.591	0.509
Household electric appliances	0.314	0.132	0.212	0.635	0.295	0.576	0.820	0.633	0.231	0.189
Transportation Equipment	0.222	0.902	0.279	0.243	0.987	0.299	0.196	0.714	0.522	0.430
Precision machinery	0.893	0.683	0.462	0.616	0.467	0.755	0.631	0.932	0.682	0.645
Toys and Miscellaneous goods	0.251	0.068	0.899	0.701	0.453	0.807	0.738	0.557	0.510	0.179
Total	0.677	0.783	0.750	0.761	0.897	0.868	0.979	0.934	0.675	0.532
By Processes										
Primary goods	0.759	0.274	0.029	0.075	0.094	0.033	0.880	0.942	0.996	0.872
Processed materials	0.994	0.989	0.830	0.948	0.746	0.974	0.908	0.990	0.790	0.579
Parts and components	0.511	0.956	0.333	0.505	0.866	0.695	0.723	0.980	0.654	0.566
Capital goods	0.709	0.579	0.329	0.546	0.715	0.715	0.679	0.785	0.669	0.431
Consumption goods	0.169	0.125	0.871	0.985	0.246	0.636	0.703	0.597	0.400	0.252
Total	0.617	0.698	0.894	0.804	0.990	0.890	0.918	0.967	0.632	0.496

2) Intra-regional Dependence by Products

So far we have analyzed overall trade patterns for East Asian countries, and then we turned to intra-regional trade in East Asia in section II.1. In the previous section we investigated trade patterns by products. In this section we analyze the patterns of intra-regional trade by products in order to deepen our understanding of the trading pattern in East Asia. Table 1-7, 1-8 shows the compositional shares of East Asian countries in international trade of East Asian countries by products. We examine the patterns for exports and imports in turn.

As we saw earlier, East Asia became a more important export destination for other East Asian countries as can be seen in the increase in the share of ASEAN8+3 for ASEAN8+3's exports from 31.6 percent in 1990 to 35.1 percent in 2005 (Table 1-7). Among different products, intra-regional export dependence is particularly high for oil and coal, precision machinery, iron and steel, while it is very low for toys, transportation equipment, household appliances, textiles and pulp, paper and wood. These findings indicate that the markets outside East Asia such as the US and Europe are important for East Asian exports of toys and miscellaneous goods, transport equipment, household appliances. It is noteworthy that the rate of increase in intra-regional export dependence is particularly high for precision and electrical machineries. Since electrical machinery accounts for a large share of East Asian exports, we will investigate the pattern of exports for electrical machinery. A closer look at exports of electrical machinery reveals that China became a very important market for Japan (3.6%→21.1%), Korea (1.6%→26.1%), and ASEAN8 (0.4%→18.1%), while ASEAN8 became important markets for China (2.1%→9.5%)

and Japan(12.8%→16.5%) but not for Korea(11.7%→11.0%). Japan became a more important export destination in electrical machinery for China(4.5%→8.4%) and ASEAN (4.6%→7.0%)but not for Korea(11.9%→5.9%) Japan has lost its importance as an export market in many products but it is still an important market for East Asia in several products including foods, oil and coal. Korea is an important export market for metal products and oil and gas. ASEAN8 is an important market for East Asian countries for oil and coal, metal products electrical machinery, and others.

Turning to intra-regional imports in East Asia, one finds that East Asia became a more important import source for East Asia, as the share of intra-regional imports in total regional imports for East increased from 31.6 percent in 1990 to 45.1 percent in 2005 (Table 1-8). The rate of increase in the importance of intra-regional imports in total regional imports is particularly notable for textiles, chemicals, general machinery, electrical machinery, household machinery, precision machinery, and toys and miscellaneous goods. In terms of the level of importance, household electrical appliances, electric machinery, and textiles register particularly high figures above 60 percent.

China became notably an importance import source for East Asian countries for many products. Some of the products for which China was an important import source in 2005 include textiles (40%) and household electric appliances (28.5%). In contrast, Japan became a less important import source for East Asian in many products. However, Japan is still an important import source for several products as the share of Japan in East Asia's total imports for several products including precision machinery, transportation equipment, general machinery, electric machinery and household electric appliances including precision machinery exceeded 15 percent in 2005. ASEAN8 became an important import source for East Asia for many products as the share of ASEAN8 in total East Asian imports for household electric appliance, electric machinery, and pulp, paper and wood exceeded 23 percent in 2005. Korea was an important import source for precision machinery in 2005. Focusing on electric machinery, whose share in East Asian imports are substantial, one finds the rapid increase in the importance of China and ASEAN8 for East Asian countries. For China, in addition to ASEAN4, Korea's importance as an import source rose notably. By contrast, Japan's importance declined remarkably for Korea and ASEAN8.

An examination of intra-regional export and import patterns shown in Table 1-7 and 1-8 revealed that China increased its importance significantly in more or less all the products. This is particularly notable in electric machinery, for which China's importance as export destination as well as import source increased fast. Besides China, ASEAN8 became important export destination and import source for East Asia in electric machinery. Indeed, intra-regional trade in electric machinery is dominated by China and ASEAN8.

So far we have examined intra-regional trade in East Asia by products. It would be interesting to analyze intra-regional trade in East Asia by considering the characteristics of these products, i.e. primary goods, processed materials, parts and components, capital goods, and consumption goods. First we analyze the composition of these products concerning intra-regional trade and then we examine the pattern of intra-regional trade by focusing on export destinations and import sources.

Table 1-9 shows export and import composition of the products for East Asian countries with their trading partners in East Asia. The intersection of ASEAN8+3 and ASEAN8+3 indicates the increases in the share of parts and components for intra-regional exports as well as imports for East Asia increased at the expense of primary products. Although the share declined from 1990 to 2005, processed materials accounted for a sizeable portion of intra-regional trade in East Asia. Indeed, in 2005 the shares of parts and components and processed materials registered around 31-32 percent each for intra-East Asia exports and imports. Parts and components trade increased their shares in trade (exports and imports) involving China and ASEAN8 with East Asian countries. This pattern is particularly notable for

trade between China and ASEAN8. Specifically, more than 30 percent of exports from Japan, Korea, and ASEAN8 to China and ASEAN8 in 2005 were in parts and components, while the corresponding values for other pairs are smaller. The pattern is quite different for imports of parts and components, where their share in total trade accounted for more than 30 percent in the case of China and ASEAN8 but not for Japan or Korea.

Table 1-9 Composition of Trade by Trading Partners (%)

A. Exports

	China		Japan		Korea		ASEAN8		ASEAN8+3		World	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China												
Total			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods			31.1	3.7	5.5	9.4	21.3	2.8	26.4	4.5	9.7	1.8
Processed materials			22.5	17.8	51.6	35.3	42.6	25.2	30.3	23.2	22.7	18.0
Parts and components			1.0	15.6	19.7	19.4	3.4	34.1	3.2	21.4	3.6	17.0
Capital goods			2.2	21.2	14.4	19.1	17.7	27.0	7.5	22.4	9.8	26.8
Consumption goods			43.1	41.7	8.8	16.9	14.9	10.8	32.6	28.5	54.2	36.4
Japan	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	0.2	2.1			1.0	2.3	0.3	0.3	0.5	1.5	0.3	0.8
Processed materials	41.8	33.9			35.7	42.5	27.6	28.4	31.9	33.9	18.9	22.4
Parts and components	18.7	36.0			31.2	25.9	33.1	44.2	30.6	36.6	25.8	32.0
Capital goods	32.4	24.1			28.5	25.1	29.0	20.9	29.3	23.2	30.8	25.8
Consumption goods	6.9	4.0			3.6	4.3	10.0	6.3	7.7	4.8	24.3	19.1
Korea	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	1.2	0.4	3.9	1.2			1.0	0.4	3.0	0.6	1.4	0.4
Processed materials	67.7	38.7	33.6	40.6			47.6	34.6	39.0	38.3	25.7	28.3
Parts and components	18.9	37.6	9.8	31.3			22.8	42.6	13.9	37.3	15.9	31.3
Capital goods	7.4	20.9	6.2	14.1			18.3	17.3	9.7	18.9	13.7	24.7
Consumption goods	4.8	2.4	46.6	12.7			10.4	5.2	34.5	4.9	43.3	15.4
ASEAN8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	20.7	9.9	30.4	14.0	40.2	21.4	16.5	10.2	25.1	12.0	16.6	9.0
Processed materials	58.8	25.7	47.1	38.2	41.4	35.2	37.0	31.4	43.1	31.9	32.5	26.1
Parts and components	7.4	43.9	4.1	19.4	8.4	26.8	21.4	36.7	11.7	33.6	14.8	29.8
Capital goods	3.7	16.9	2.9	12.4	6.1	10.3	9.4	11.3	5.8	12.9	11.7	18.5
Consumption goods	9.5	3.6	15.4	15.9	3.9	6.3	15.7	10.3	14.3	9.6	24.4	16.5
ASEAN8+3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	5.2	3.9	18.6	6.1	9.2	9.1	7.6	5.2	12.0	5.6	5.7	3.2
Processed materials	47.3	32.9	37.8	30.5	37.8	38.3	33.4	29.6	36.7	31.9	23.4	22.3
Parts and components	16.0	38.8	11.5	20.2	25.9	23.9	26.2	38.7	19.7	31.7	18.9	25.6
Capital goods	24.0	21.0	10.0	18.8	23.1	19.6	20.5	17.5	17.0	19.1	21.4	24.2
Consumption goods	7.4	3.4	22.1	24.5	4.0	9.1	12.4	8.9	14.7	11.7	30.7	24.6

B. Imports

	China		Japan		Korea		ASEAN8		ASEAN8+3		World	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China												
Total			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods			0.2	2.1	1.2	0.4	20.7	9.9	5.2	3.9	9.6	19.5
Processed materials			41.8	33.9	67.7	38.7	58.8	25.7	47.3	32.9	36.9	31.3
Parts and components			18.7	36.0	18.9	37.6	7.4	43.9	16.0	38.8	16.9	26.4
Capital goods			32.4	24.1	7.4	20.9	3.7	16.9	24.0	21.0	28.6	18.6
Consumption goods			6.9	4.0	4.8	2.4	9.5	3.6	7.4	3.4	8.0	4.1
Japan	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	31.1	3.7			3.9	1.2	30.4	14.0	24.8	7.0	28.7	25.1
Processed materials	22.5	17.8			33.6	40.6	47.1	38.2	38.6	27.6	33.5	25.5
Parts and components	1.0	15.6			9.8	31.3	4.1	19.4	4.6	18.8	6.5	13.7
Capital goods	2.2	21.2			6.2	14.1	2.9	12.4	3.5	17.3	7.7	12.2
Consumption goods	43.1	41.7			46.6	12.7	15.4	15.9	28.5	29.3	23.6	23.5
Korea	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	5.5	9.4	1.0	2.3			40.2	21.4	9.2	9.1	22.9	24.4
Processed materials	51.6	35.3	35.7	42.5			41.4	35.2	37.8	38.3	35.2	33.4
Parts and components	19.7	19.4	31.2	25.9			8.4	26.8	25.9	23.9	17.0	18.7
Capital goods	14.4	19.1	28.5	25.1			6.1	10.3	23.1	19.6	20.1	15.4
Consumption goods	8.8	16.9	3.6	4.3			3.9	6.3	4.0	9.1	4.9	8.1
ASEAN8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	23.5	2.9	0.3	0.3	1.0	0.4	16.5	10.2	7.6	5.3	11.4	12.1
Processed materials	47.2	26.0	27.6	28.4	47.6	34.6	37.0	31.4	33.6	29.8	34.2	30.7
Parts and components	3.8	35.2	33.1	44.2	22.8	42.6	21.4	36.7	26.3	39.0	22.9	34.4
Capital goods	9.0	24.7	29.0	20.9	18.3	17.3	9.4	11.3	20.0	17.0	19.9	14.4
Consumption goods	16.5	11.2	10.0	6.3	10.4	5.2	15.7	10.3	12.5	8.9	11.6	8.4
ASEAN8+3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary goods	27.1	4.6	0.5	1.5	3.0	0.6	25.1	12.0	13.3	5.8	11.8	7.7
Processed materials	31.2	23.4	31.9	33.9	39.0	38.3	43.1	31.9	36.9	31.3	31.4	28.5
Parts and components	3.3	21.6	30.6	36.6	13.9	37.3	11.7	33.6	18.4	32.1	18.9	31.7
Capital goods	5.0	21.7	29.3	23.2	9.7	18.9	5.8	12.9	15.4	18.6	22.1	20.9
Consumption goods	33.5	28.7	7.7	4.8	34.5	4.9	14.3	9.6	16.0	12.2	15.8	11.1

The findings on export and import composition by trading partners in East Asia reveal that parts and components increased their importance in exports for Japan and Korea in their exports to China and ASEAN8, that is to say these products became more importance in imports for China and ASEAN8 from Japan and Korea. In addition, the share of parts and components in trade increased significantly in their bilateral trade for China and ASEAN8. Having indicated the increased importance of parts and components in bilateral trade for East Asian countries, one finds that processed materials register a large share of bilateral trade for East Asian countries in 2005 even after experiencing a decline in its share from 1990. Although the compositional share is much smaller compared to either processed materials or parts and components, capital goods register sizeable share in East Asia's trade (exports as well as imports) at just below 20 percent.

It would be interesting to discern the roles that China, Japan, Korea and ASEAN8 play in intra-regional trade in East Asia. Table 1-10 shows the importance of these countries and the group of countries in East Asia's trade as export destination and import source. Before we look at the roles of these countries, let us see how important they are in their trade as a group, that is to say the importance of intra-regional trade in East Asia's overall trade for different products. An examination of intersection of ASEAN8+3 row and column indicates that East Asia is an important supply source (import source) for East Asia for many products. In particular, their importance increased notably for processed materials, parts and components, capital goods and consumption goods. In contrast to the increased role as import source, East Asia's role as export destination for East Asia did not increase that much. Indeed, it is only parts and components that saw a substantial increase in the share of East Asia in East Asia's overall exports from 1990 to 2005. It should be emphasized that the share of exports destined to the countries outside ASEAN8+3 is very large for consumption goods and capital goods, indicating the importance of non-East Asian countries such as those in North America and Europe as export destinations for the final products.

**Table 1-10 Export Destinations and Import Source for East Asian Countries by Product
Characteristics (%)**

		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
A. Exports													
China	Total			13.9	11.1	1.7	4.0	5.9	5.7	21.5	20.7	100.0	100.0
	Primary goods			44.4	22.1	1.0	20.4	12.9	8.7	58.3	51.3	100.0	100.0
	Processed materials			13.8	10.9	3.9	7.8	11.1	7.9	28.8	26.6	100.0	100.0
	Parts and components			3.9	10.2	9.5	4.5	5.6	11.4	19.0	26.1	100.0	100.0
	Capital goods			3.2	8.7	2.5	2.8	10.7	5.7	16.4	17.3	100.0	100.0
	Consumption goods			11.1	12.7	0.3	1.8	1.6	1.7	13.0	16.2	100.0	100.0
Japan	Total	3.0	15.6			6.3	7.5	12.5	11.9	21.8	35.0	100.0	100.0
	Primary goods	2.0	42.0			18.6	22.2	12.0	4.8	32.6	68.9	100.0	100.0
	Processed materials	6.5	23.7			11.9	14.3	18.3	15.1	36.8	53.0	100.0	100.0
	Parts and components	2.1	17.6			7.6	6.1	16.1	16.4	25.9	40.1	100.0	100.0
	Capital goods	3.1	14.6			5.8	7.4	11.8	9.6	20.7	31.6	100.0	100.0
	Consumption goods	0.8	3.2			0.9	1.7	5.1	3.9	6.9	8.8	100.0	100.0
Korea	Total	1.2	26.3	20.1	8.1			8.5	8.0	29.8	42.4	100.0	100.0
	Primary goods	1.0	31.0	56.4	27.3			6.2	8.1	63.7	66.4	100.0	100.0
	Processed materials	3.2	36.0	26.3	11.6			15.8	9.8	45.2	57.4	100.0	100.0
	Parts and components	1.4	31.7	12.4	8.1			12.2	10.8	25.9	50.6	100.0	100.0
	Capital goods	0.7	22.3	9.0	4.6			11.3	5.6	21.0	32.5	100.0	100.0
	Consumption goods	0.1	4.1	21.6	6.7			2.0	2.7	23.7	13.5	100.0	100.0
ASEAN8	Total	2.2	11.7	21.5	11.0	3.7	4.1	18.9	19.6	46.2	46.3	100.0	100.0
	Primary goods	2.7	12.8	39.5	17.1	9.0	9.7	18.8	22.2	70.0	61.7	100.0	100.0
	Processed materials	4.0	11.5	31.1	16.0	4.7	5.5	21.5	23.5	61.3	56.6	100.0	100.0
	Parts and components	1.1	17.2	5.9	7.2	2.1	3.7	27.3	24.1	36.4	52.1	100.0	100.0
	Capital goods	0.7	10.7	5.4	7.4	1.9	2.3	15.1	12.0	23.0	32.2	100.0	100.0
	Consumption goods	0.9	2.5	13.6	10.6	0.6	1.6	12.1	12.3	27.1	27.0	100.0	100.0
ASEAN8+3	Total	2.2	9.9	12.4	9.8	4.4	4.4	12.6	11.0	31.6	35.1	100.0	100.0
	Primary goods	2.0	12.0	40.5	18.6	7.0	12.6	16.8	18.0	66.3	61.3	100.0	100.0
	Processed materials	4.4	14.6	20.1	13.4	7.1	7.6	18.0	14.6	49.6	50.2	100.0	100.0
	Parts and components	1.8	15.0	7.6	7.7	6.0	4.1	17.5	16.6	33.0	43.4	100.0	100.0
	Capital goods	2.4	8.6	5.8	7.6	4.7	3.6	12.1	7.9	25.1	27.7	100.0	100.0
	Consumption goods	0.5	1.4	8.9	9.7	0.6	1.6	5.1	4.0	15.1	16.7	100.0	100.0
B. Imports													
		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China	Total			16.2	17.5	1.3	13.4	5.6	13.0	23.1	43.9	100.0	100.0
	Primary goods			0.4	1.9	0.2	0.3	12.1	6.6	12.6	8.7	100.0	100.0
	Processed materials			18.4	18.9	2.4	16.5	8.9	10.7	29.7	46.2	100.0	100.0
	Parts and components			18.0	23.8	1.5	19.1	2.4	21.7	21.9	64.5	100.0	100.0
	Capital goods			18.4	22.7	0.3	15.1	0.7	11.8	19.4	49.6	100.0	100.0
	Consumption goods			13.9	16.8	0.8	7.9	6.6	11.3	21.3	36.0	100.0	100.0
Japan	Total	5.1	21.2			5.0	4.7	12.6	13.8	22.7	39.7	100.0	100.0
	Primary goods	5.5	3.1			0.7	0.2	13.3	7.7	19.5	11.0	100.0	100.0
	Processed materials	3.4	14.8			5.0	7.4	17.7	20.7	26.1	42.9	100.0	100.0
	Parts and components	0.8	24.3			7.5	10.7	7.9	19.7	16.3	54.7	100.0	100.0
	Capital goods	1.5	36.9			4.0	5.4	4.8	14.0	10.3	56.3	100.0	100.0
	Consumption goods	9.4	37.7			9.8	2.5	8.2	9.4	27.4	49.6	100.0	100.0
Korea	Total	2.1	14.9	26.1	18.7			7.2	10.0	35.3	43.6	100.0	100.0
	Primary goods	0.5	5.7	1.1	1.7			12.6	8.8	14.2	16.3	100.0	100.0
	Processed materials	3.1	15.7	26.5	23.7			8.4	10.6	38.0	50.0	100.0	100.0
	Parts and components	2.4	15.5	48.0	25.9			3.6	14.4	54.0	55.7	100.0	100.0
	Capital goods	1.5	18.4	37.1	30.4			2.2	6.7	40.7	55.4	100.0	100.0
	Consumption goods	3.7	31.2	19.2	9.9			5.7	7.8	28.6	48.9	100.0	100.0
ASEAN8	Total	2.9	10.0	23.6	14.3	3.2	4.4	16.5	23.5	46.2	52.2	100.0	100.0
	Primary goods	6.1	2.4	0.7	0.4	0.3	0.1	23.9	19.8	30.9	22.7	100.0	100.0
	Processed materials	4.0	8.5	19.1	13.2	4.4	4.9	17.9	24.0	45.4	50.6	100.0	100.0
	Parts and components	0.5	10.3	34.1	18.4	3.1	5.4	15.5	25.1	53.2	59.1	100.0	100.0
	Capital goods	1.3	17.3	34.4	20.8	2.9	5.2	7.7	18.5	46.3	61.8	100.0	100.0
	Consumption goods	4.2	13.3	20.3	10.7	2.8	2.7	22.4	28.8	49.6	55.5	100.0	100.0
ASEAN8+3	Total	3.5	10.7	12.5	12.0	3.4	6.6	12.3	15.8	31.6	45.1	100.0	100.0
	Primary goods	4.6	2.5	0.3	0.9	0.5	0.2	14.9	9.7	20.3	13.3	100.0	100.0
	Processed materials	3.2	8.4	11.6	13.6	3.8	8.5	15.4	16.9	34.0	47.3	100.0	100.0
	Parts and components	0.8	9.5	27.2	18.2	3.3	10.2	10.2	21.9	41.6	59.9	100.0	100.0
	Capital goods	1.1	15.2	23.9	18.3	2.1	8.2	4.7	13.4	31.9	55.1	100.0	100.0
	Consumption goods	7.5	27.5	6.1	5.2	7.4	2.9	11.2	13.6	32.1	49.2	100.0	100.0

The overall picture masks variations which are found for individual countries. Let us see the roles of these countries in supply of imports and destinations of exports for East Asia by different products. One notable pattern is the increased role of China in its role as an import source as well as an export destination for almost all the products under study. In particular, China is a very important import source for consumption goods for East Asia, as 27.5 percent of ASEAN8+3's imports of consumption goods came from China in 2005. Furthermore, China became an important export destination for East Asia for parts and components, processed materials, and primary products. As for Japan, it is an important import source for East Asian countries for processed materials, parts and components and capital goods, although its importance declined over time. Japan is an importance export destination in primary products. Korea became an increasingly important import source for processed materials, parts and components, and capital goods for East Asia. As for ASEAN8, one observes an increasing role as an import source for parts and components for East Asian countries, as the share of ASEAN8 in East Asia's overall imports of parts and components increased from 10.2 percent in 1990 to 21.9 percent in 2005. Although the magnitude is not as substantial compared to parts and components, the importance of ASEAN's role as import source for capital goods for East Asia also increased notably.

The analysis of the patterns of intra-regional trade by products reveals the emergence of regional production networks in East Asia during the 1990-2005 period. Inside the networks, processed materials, parts and components, and capital goods are exported from Japan, Korea, and ASEAN to China and ASEAN, where final consumption and capital goods are assembled and exported to non-East Asian countries such as those in North America and Europe. Coupled with the observation that the shares of consumption goods and capital goods in China's overall exports are substantially large as shown in Table 1-9, one comes to an observation that China is acting like a world factory by producing final goods and importing inputs and capital goods from the rest of East Asia.

A closer look at intra-regional trade pattern for electric machinery and household electric appliances would be of interest to discern the development of regional production network. Tables 1-11 and 1-12 show the composition of products by characteristics for electric machinery and household electric appliances, as well as their export destinations and import sources. An examination of these tables reveals that China is playing a role of assembling base of electric machinery and household electric appliances for the world by importing parts and components from the rest of East Asia. ASEAN and Korea have become particularly important suppliers of parts and components to China, while Japan has become a less important supplier of parts and components.

Table 1-11 Composition of Trade for Electric Machinery and Household Appliances for East Asian Countries (%)

		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
A. Exports													
China	Total			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials			5.6	7.0	4.2	4.7	7.3	3.2	5.4	5.2	6.9	6.1
	Parts and components			19.3	42.6	65.7	50.1	25.3	56.5	37.6	49.3	13.5	31.6
	Capital goods			54.4	35.8	26.9	40.8	44.2	34.9	42.2	36.4	43.0	46.5
	Consumption goods			20.8	14.6	3.1	4.4	23.1	5.4	14.8	9.2	36.7	15.9
Japan	Total	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	2.4	3.4			1.6	1.7	3.8	2.2	3.0	2.7	1.9	2.2
	Parts and components	28.9	75.5			76.1	66.5	58.0	75.3	59.3	73.8	42.9	61.1
	Capital goods	65.1	18.7			19.3	28.2	31.8	18.2	32.7	20.2	43.3	30.2
	Consumption goods	3.6	2.4			3.0	3.6	6.4	4.3	5.0	3.3	11.9	6.5
Korea	Total	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	1.7	2.6	2.6	2.8			2.0	1.3	2.3	2.3	2.1	1.6
	Parts and components	84.5	89.0	51.5	76.6			66.8	73.2	59.8	83.1	46.9	59.6
	Capital goods	12.3	7.2	29.7	12.6			16.9	23.5	23.3	12.2	26.9	31.2
	Consumption goods	1.5	1.2	16.1	8.1			14.3	2.0	14.7	2.4	24.1	7.6
ASEAN8	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	14.5	1.0	5.1	2.8	0.8	0.4	3.2	1.5	3.5	1.4	2.0	1.3
	Parts and components	20.8	88.2	53.7	62.9	85.3	79.0	59.2	75.7	59.3	78.2	55.4	69.6
	Capital goods	56.3	8.2	28.3	23.8	10.3	16.2	21.5	16.4	22.3	14.8	24.2	23.0
	Consumption goods	8.4	2.6	12.9	10.5	3.6	4.4	16.1	6.4	14.9	5.6	18.4	6.1
ASEAN8+	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	2.8	2.3	2.5	4.2	1.7	2.3	3.5	2.0	2.9	2.6	2.4	3.3
	Parts and components	31.5	84.1	65.5	57.4	76.2	64.5	58.7	71.4	61.2	71.9	42.9	52.4
	Capital goods	62.0	11.5	24.3	28.2	19.1	29.1	27.2	21.4	27.8	20.4	37.8	34.3
	Consumption goods	3.7	2.1	7.8	10.3	3.1	4.1	10.6	5.1	8.1	5.1	16.9	10.0
B. Imports													
		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China	Total			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials			2.4	3.4	1.7	2.6	14.5	1.0	2.8	2.3	3.0	2.5
	Parts and components			28.9	75.5	84.5	89.0	20.8	88.2	31.5	84.1	21.3	78.6
	Capital goods			65.1	18.7	12.3	7.2	56.3	8.2	62.0	11.5	71.8	16.4
	Consumption goods			3.6	2.4	1.5	1.2	8.4	2.6	3.7	2.1	3.8	2.4
Japan	Total	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	5.6	7.0			2.6	2.8	5.1	2.8	4.0	4.9	3.6	4.0
	Parts and components	19.3	42.6			51.5	76.6	53.7	62.9	48.3	54.8	49.9	56.5
	Capital goods	54.4	35.8			29.7	12.6	28.3	23.8	32.2	28.1	35.3	29.1
	Consumption goods	20.8	14.6			16.1	8.1	12.9	10.5	15.4	12.2	11.2	10.5
Korea	Total	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	4.2	4.7	1.6	1.7			0.8	0.4	1.7	2.3	2.2	2.1
	Parts and components	65.7	50.1	76.1	66.5			85.3	79.0	76.2	64.5	70.6	66.2
	Capital goods	26.9	40.8	19.3	28.2			10.3	16.2	19.1	29.1	23.3	26.9
	Consumption goods	3.1	4.4	3.0	3.6			3.6	4.4	3.1	4.1	3.9	4.8
ASEAN8	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	7.3	3.2	3.8	2.2	2.0	1.3	3.2	1.5	3.5	2.0	4.2	2.1
	Parts and components	25.3	56.5	58.0	75.3	66.8	73.2	59.2	75.7	58.7	71.4	60.5	74.3
	Capital goods	44.2	34.9	31.8	18.2	16.9	23.5	21.5	16.4	27.2	21.4	25.9	19.0
	Consumption goods	23.1	5.4	6.4	4.3	14.3	2.0	16.1	6.4	10.6	5.1	9.5	4.6
ASEAN8+	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Primary goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Processed materials	5.4	5.2	3.0	2.7	2.3	2.3	3.5	1.4	3.1	2.6	3.6	2.5
	Parts and components	37.6	49.3	59.3	73.8	59.8	83.1	59.3	78.2	58.7	72.2	53.5	71.8
	Capital goods	42.2	36.4	32.7	20.2	23.3	12.2	22.3	14.8	29.2	20.0	34.9	20.8
	Consumption goods	14.8	9.2	5.0	3.3	14.7	2.4	14.9	5.6	9.0	5.2	8.0	4.9

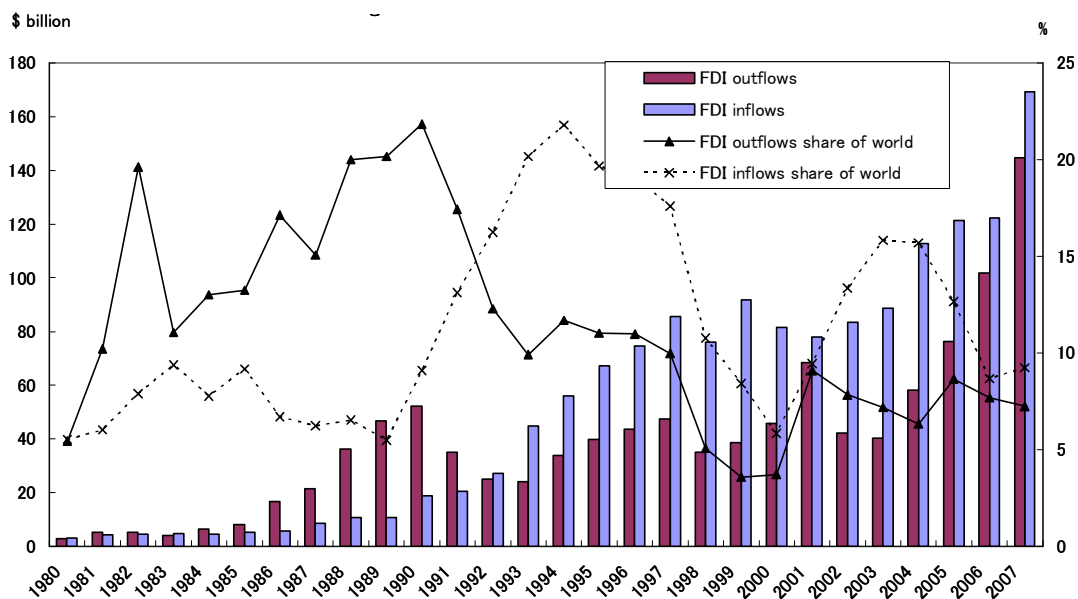
Table 1-12 Export Sources and Import Destination of Electric Machinery and Household Appliance for East Asian Countries (%)

Exports													
		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China	Total			2.9	8.1	2.5	3.6	1.5	7.1	6.9	18.9	100.0	100.0
	Primary goods												
	Processed materials			2.4	9.4	1.6	2.8	1.6	3.8	5.5	15.9	100.0	100.0
	Parts and components			4.2	11.0	12.4	5.8	2.8	12.7	19.4	29.5	100.0	100.0
	Capital goods			3.7	6.3	1.6	3.2	1.5	5.3	6.8	14.8	100.0	100.0
	Consumption goods			1.7	7.5	0.2	1.0	0.9	2.4	2.8	10.9	100.0	100.0
Japan	Total	2.9	18.7			6.2	7.5	12.1	15.0	21.2	41.2	100.0	100.0
	Primary goods												
	Processed materials	3.8	29.9			5.2	5.9	24.9	15.4	34.0	51.2	100.0	100.0
	Parts and components	1.9	23.1			11.0	8.2	16.4	18.5	29.3	49.8	100.0	100.0
	Capital goods	4.3	11.6			2.8	7.0	8.9	9.1	16.0	27.6	100.0	100.0
	Consumption goods	0.9	6.8			1.6	4.1	6.6	9.9	9.0	20.9	100.0	100.0
Korea	Total	1.0	24.1	10.6	6.0			9.1	10.2	20.7	40.3	100.0	100.0
	Primary goods												
	Processed materials	0.8	40.0	13.5	10.7			8.7	8.5	23.1	59.2	100.0	100.0
	Parts and components	1.7	36.0	11.7	7.7			12.9	12.5	26.3	56.2	100.0	100.0
	Capital goods	0.4	5.6	11.8	2.4			5.7	7.7	17.9	15.7	100.0	100.0
	Consumption goods	0.1	3.6	7.1	6.4			5.4	2.7	12.6	12.7	100.0	100.0
ASEAN8	Total	0.3	16.6	4.7	7.8	1.6	4.1	23.3	20.2	29.9	48.8	100.0	100.0
	Primary goods												
	Processed materials	2.5	12.5	12.0	16.9	0.7	1.4	37.7	24.4	52.9	55.1	100.0	100.0
	Parts and components	0.1	21.1	4.5	7.1	2.5	4.6	24.9	22.0	32.0	54.8	100.0	100.0
	Capital goods	0.8	5.9	5.4	8.1	0.7	2.9	20.7	14.5	27.6	31.3	100.0	100.0
	Consumption goods	0.2	7.2	3.3	13.4	0.3	3.0	20.4	21.1	24.1	44.6	100.0	100.0
ASEAN8+	Total	1.9	12.1	6.0	7.6	4.3	4.1	12.9	12.8	25.2	36.6	100.0	100.0
	Primary goods												
	Processed materials	2.2	8.5	6.2	9.7	3.0	2.9	18.9	8.0	30.3	29.1	100.0	100.0
	Parts and components	1.4	19.4	9.2	8.3	7.6	5.0	17.7	17.5	36.0	50.3	100.0	100.0
	Capital goods	3.1	4.1	3.9	6.2	2.2	3.5	9.3	8.0	18.5	21.8	100.0	100.0
	Consumption goods	0.4	2.6	2.8	7.8	0.8	1.7	8.1	6.6	12.1	18.7	100.0	100.0
Imports													
		China		Japan		Korea		ASEAN8		ASEAN8+3		World	
		1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
China	Total			22.2	23.0	1.3	19.2	0.9	24.4	24.4	66.6	100.0	100.0
	Primary goods												
	Processed materials			17.9	31.8	0.7	19.9	4.1	9.4	22.7	61.0	100.0	100.0
	Parts and components			30.1	22.1	5.1	21.7	0.8	27.4	36.1	71.2	100.0	100.0
	Capital goods			20.1	26.2	0.2	8.4	0.7	12.1	21.0	46.7	100.0	100.0
	Consumption goods			21.0	22.6	0.5	9.1	1.9	26.6	23.4	58.3	100.0	100.0
Japan	Total	2.9	32.1			11.1	9.4	9.2	22.5	23.1	64.0	100.0	100.0
	Primary goods												
	Processed materials	4.4	56.9			8.0	6.6	12.7	15.7	25.2	79.2	100.0	100.0
	Parts and components	1.1	24.2			11.4	12.8	9.9	25.1	22.4	62.1	100.0	100.0
	Capital goods	4.5	39.4			9.3	4.1	7.3	18.4	21.1	61.9	100.0	100.0
	Consumption goods	5.4	44.6			16.0	7.3	10.6	22.5	32.0	74.3	100.0	100.0
Korea	Total	3.3	19.7	49.1	24.9			4.1	16.1	56.5	60.6	100.0	100.0
	Primary goods												
	Processed materials	6.4	43.4	34.8	19.8			1.5	3.3	42.7	66.4	100.0	100.0
	Parts and components	3.1	14.9	52.9	25.0			5.0	19.2	61.0	59.1	100.0	100.0
	Capital goods	3.8	29.8	40.6	26.1			1.8	9.7	46.3	65.6	100.0	100.0
	Consumption goods	2.7	17.9	37.9	18.7			3.8	14.9	44.4	51.5	100.0	100.0
ASEAN8	Total	0.6	12.4	31.8	16.1	4.1	7.1	19.9	25.8	56.5	61.3	100.0	100.0
	Primary goods												
	Processed materials	1.1	19.4	29.2	17.3	2.0	4.5	15.3	19.4	47.6	60.6	100.0	100.0
	Parts and components	0.3	9.4	30.5	16.3	4.5	6.9	19.5	26.2	54.8	58.9	100.0	100.0
	Capital goods	1.1	22.6	39.1	15.3	2.7	8.7	16.6	22.2	59.5	68.9	100.0	100.0
	Consumption goods	1.6	14.6	21.6	15.1	6.2	3.1	33.9	35.8	63.2	68.7	100.0	100.0
ASEAN8+	Total	1.4	12.5	26.4	16.7	4.4	10.6	12.1	23.6	44.4	63.4	100.0	100.0
	Primary goods												
	Processed materials	2.2	25.4	22.0	17.7	2.9	9.6	11.9	13.5	38.9	66.3	100.0	100.0
	Parts and components	1.0	8.6	29.3	17.2	5.0	12.3	13.4	25.7	48.7	63.8	100.0	100.0
	Capital goods	1.7	21.8	24.8	16.3	3.0	6.2	7.8	16.7	37.2	61.0	100.0	100.0
	Consumption goods	2.6	23.4	16.6	11.3	8.1	5.2	22.4	27.0	49.7	67.0	100.0	100.0

1.2.3. Foreign Direct Investment in East Asia

Foreign direct investment (FDI) outflows from East Asia as well as inflows to East Asia increased more or less continuously from 1980 to 2007 with several ups and downs (Figure 1-27) As for FDI outflows, the value increased sharply in the second half of the 1980s because of a rapid expansion of Japan's FDI outflow. After experiencing a decline in the early 1990s, FDI outflows started to increase in the 1990s but the rate of increase was very low. FDI outflows began to rise notably in the early 2000s. This expansion, which is led by FDI outflows from Japan and joined by those from other countries, was mainly attributable to buoyant global economic conditions and deregulation in FDI policies in many countries in the world. As a result of rapid expansion in the 2000s, FDI outflows from East Asia exceeded \$140 billion, which is more than three times larger compared to the level in 2003.

Figure 1-27 FDI of East Asian Countries



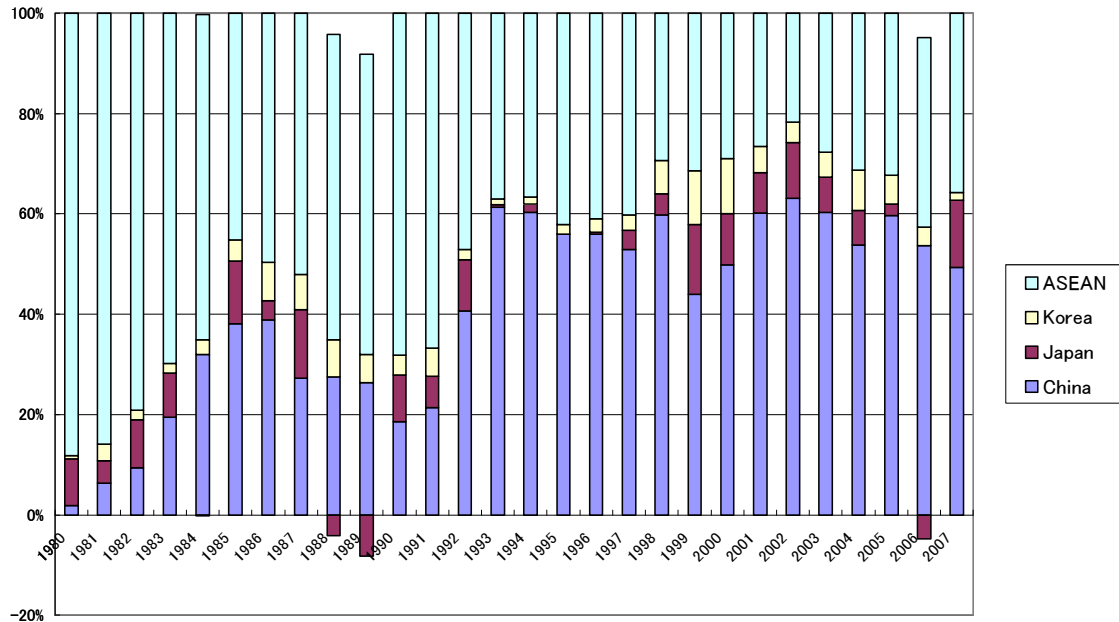
FDI inflows to East Asia increased noticeable in the 1990s. Despite a slight decline and slow growth in the late 1990s and early 2000s because of the Asian financial crisis and global economic slow down, respectively. FDI inflows to East Asia grew remarkably from the early 1990s through 2007 when its magnitude exceeded \$160 billion. It is worth noting that for East Asia FDI outflows were greater than inflows through the early 1990s but then these positions were reversed. From the early 1990s through 2007 FDI inflows were significantly greater than FDI outflows.

Although FDI outflows from and inflows to East Asia increased from the 1980s to 2000s, its shares in the world FDI inflows and outflows declined during the 1980-2000s period because of a large increase in FDI flows involving Europe and the United States. More specifically, East Asia's share started to decline in the early 1990s for the case of FDI outflows while the corresponding share started to decline in the middle of 1990s for FDI inflows. In 2007 East Asia's share in the world FDI outflows and inflows was below 10 percent. This decline in the share of East Asia in world FDI contrasts well against the case for international trade, for which East Asia's share steadily increased over time.

FDI outflows from China, Japan, Korea and ASEAN followed similar trends starting in the early 1990s, although their magnitudes differ substantially (Figures 17 and 18). One observes similar upward trends among these countries and the group of countries in the 2000s. It is worth noting that FDI outflows from China increased more than twenty times in seven years from 2000 to 2007. Japan has been a dominant country among East Asian countries in terms of FDI outflows but its dominance began to erode, as the shares of ASEAN, China, and Korea started to increase in the mid-1990s. In 2007, the shares of Japan, ASEAN, China and Korea in East Asia's FDI outflows stood at 51, 23, 16 and 11 percent, respectively.

FDI inflows to East Asia show two contrasting patterns, one for China and ASEAN and the other for Japan and Korea, starting in the 1990s. After experiencing low level of FDI inflows until the mid-1980s, FDI inflows to East Asia started to diverge among the countries. FDI inflows to ASEAN started to increase in the mid-1980s and then FDI inflows to China started to increase in the early 1990s. FDI inflows to these countries continued to grow rapidly with a decline during the period from the late 1990s to the early 2000s. It should be noted that FDI inflows to China surpassed those to ASEAN in the early 1990s, and since then China has been the largest FDI recipient in East Asia. Indeed, China was the largest FDI recipient in the world in 2003. Unlike China or ASEAN, Japan and Korea have seen low level of FDI inflows throughout the period under study, although FDI inflows to these countries show some increases in the 2000s. Rapid expansion of FDI inflows to China and ASEAN and low level of FDI inflows to Japan and Korea are reflected in the changes in their shares in overall FDI inflows to East Asia (Figure 1-28). Since the early 1990s, the shares of China, ASEAN, Japan and Korea remained relatively stable and to register 49, 36, 13 and 2 percent, respectively in 2007.

Figure 1-28 FDI Inflows to East Asia



So far we examined FDI outflows and inflows for East Asian countries in terms of their magnitude. It would be of interest to analyze the importance of FDI in their economic activities for these countries. Figures 1-29 and 1-30 show the ratio of outward and inward FDI stock to GDP, respectively. Figure 1-29 shows that outward FDI stock to GDP ratios for East Asian countries are lower than the world average, indicating that East Asian countries have not been active foreign investors compared to the rest of the world. This may be attributable to several factors including low level of economic development and lack of experiences in international business. Among East Asian countries, the outward FDI stock-GDP ratio is relatively high for ASEAN, although the ratio is below the world average. The corresponding ratios for other countries are significantly lower.

Figure 1-29 Outward FDI Stock to GDP (%)

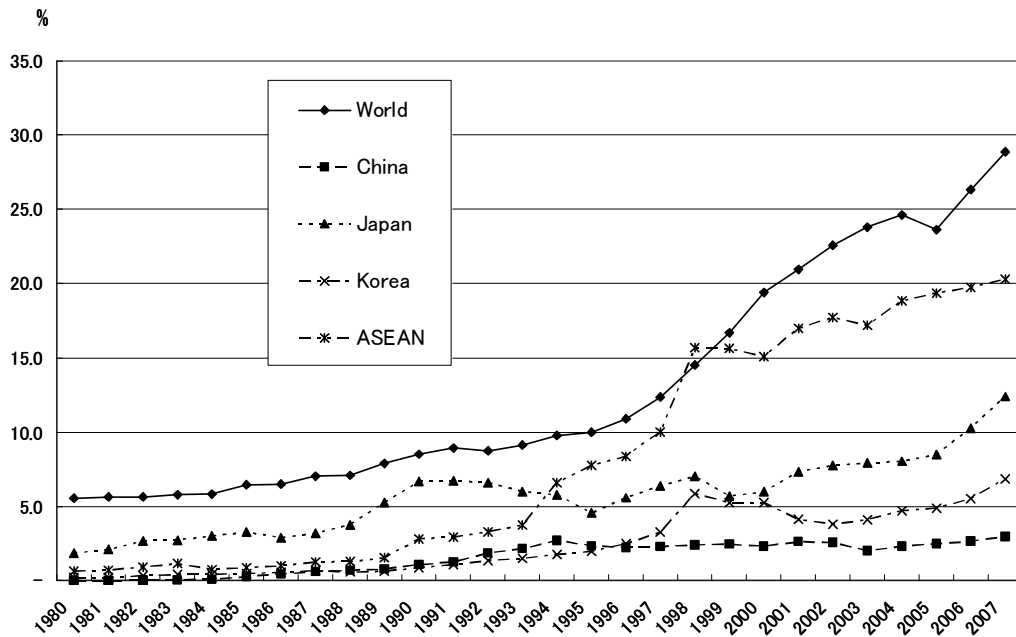
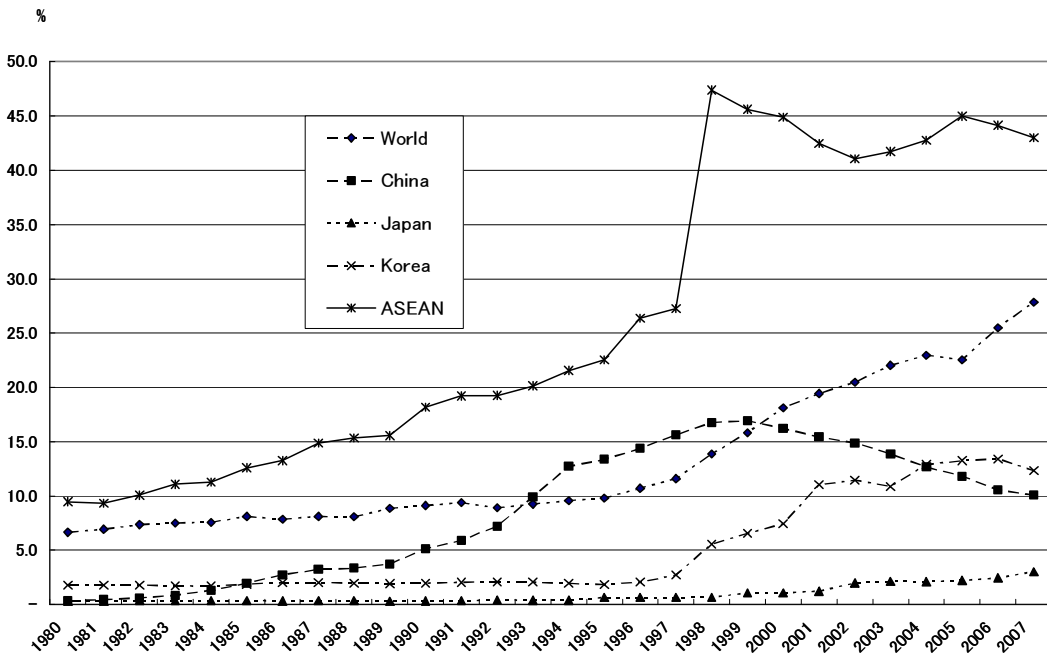


Figure 1-30 Inward FDI Stock-GDP Ratio (%)



Turning to the inward FDI stock-GDP ratios, ASEAN exhibits significantly high value around 45 percent in 2007 compared to other East Asian countries. Indeed, the ratio for ASEAN

has been much higher than the world average. By contrast, the inward FDI stock-GDP ratio for Japan is very low around 3 percent in 2007. The ratios for Korea and China are similar around 10 percent in 2007. These differences in inward FDI stock-GDP ratios mainly reflect FDI environment, or openness to inward FDI of the countries in East Asia.

We saw earlier that intra-regional dependence in East Asia's exports remained around the same level of 35 percent, while the corresponding value for East Asia's imports increased slightly to reach 43 percent. Let us now see intra-regional dependence in foreign direct investment. Because of the lack of necessary information on FDI, the analysis is limited compared to the case for international trade. Table 1-13 shows that intra-regional dependence in terms of FDI inflows increased from 19 percent in 1997-2000 to 25 percent in 2002-2006. The increasing importance of intra-regional FDI inflows is found for China, Japan, Korea, and ASEAN. Although intra-regional dependence in FDI inflows increased in recent years, the level of intra-regional dependence at 25 percent is significantly lower compared to 43 percent for the imports. The analysis of intra-regional dependence in FDI outflows covering all East Asian countries cannot be undertaken because of the absence of necessary information. As can be seen from Table 1-14, intra-regional dependence is analyzed for FDI outflows from Japan and Korea. The figures in the table show an increasing importance of intra-regional dependence for FDI outflows from these two countries from 1997-2001 to 2002-2006, although the level of intra-regional dependence differs substantially between the two countries, higher dependence for FDI outflows from Korea compared to those from Japan. The findings in this section indicate increasing intra-regional dependence in FDI, which is similar to the case for international trade.

Table 1-13 Intra-regional FDI Inflows in East Asia (%)

	China		Japan		Korea		ASEAN		East Asia	
	1997-2000	2002-2006	1997-2000	2002-2006	1997-2000	2002-2006	1997-2000	2002-2006	1997-2000	2002-2006
Indonesia	0.27	0.18	0.01	0.01	0.02	0.00	1.33	1.03	0.53	0.42
Malaysia	0.65	0.57	0.05	-0.04	8.59	2.09	1.43	2.48	1.88	1.28
Philippines	0.35	0.31	0.05	0.02	0.01	0.00	0.07	0.24	0.20	0.25
Singapore	5.93	3.52	1.64	12.99	3.69	3.33	6.82	7.01	5.56	4.92
Thailand	0.43	0.25	-0.66	-0.57	0.01	0.00	0.36	0.40	0.27	0.25
Brunei	0.00	0.20	0.00	0.00	0.00	0.00	0.15	0.05	0.04	0.13
Vietnam	0.01	0.01	0.00	-0.01	0.00	0.00	0.01	0.06	0.01	0.02
Laos	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Myanmar	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.01	0.02
Cambodia	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
ASEAN	7.67	5.08	1.08	12.39	12.32	5.42	10.20	11.33	8.52	7.31
China	0.00	0.00	-0.08	0.07	0.33	3.07	0.33	1.34	0.13	0.70
Japan	8.22	8.36	0.00	0.00	9.92	16.01	10.61	18.04	8.51	11.78
Korea	4.05	7.29	0.69	1.81	0.00	0.00	0.83	1.96	2.32	4.76
East Asia	19.94	20.74	1.70	14.27	22.56	24.51	21.98	32.66	19.48	24.56
ROW	80.06	79.26	98.30	85.73	77.44	75.49	78.02	67.34	80.52	75.44
World	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Country sources.

Table 1-14 Intra-regional Outward FDI in East Asia

	Japan		Korea	
	1997-2000	2002-2006	1997-2000	2002-2006
Indonesia	2.63	1.72	3.05	1.38
Malaysia	1.18	1.82	0.38	0.44
Philippines	1.58	1.06	1.73	0.51
Singapore	2.41	1.34	2.19	2.78
Thailand	4.05	3.82	1.70	0.73
Brunei	0.00	0.00	0.00	0.00
Vietnam	0.00	0.33	1.87	4.36
Laos	0.00	0.00	0.15	0.02
Myanmar	0.00	0.00	0.13	0.01
Cambodia	0.00	0.00	0.11	0.57
ASEAN	12.37	10.37	11.31	10.81
China	4.64	13.39	14.37	35.64
Japan	0.00	0.00	1.32	2.56
Korea	1.89	2.57	0.00	0.00
East Asia	18.90	26.33	27.00	49.01
ROW	81.10	73.67	73.00	50.99
World	100.00	100.00	100.00	100.00

Source: Country sources.

Turning to the sectoral allocation of FDI flows in East Asia, for which the information is very limited, one finds that electric machinery accounts for a large proportion. Table 12 shows the sectoral allocation of FDI inflows to Malaysia and Thailand as well as that of FDI outflows

to East Asia from Japan. For the case of Malaysia, the share of electric machinery in total manufacturing FDI inflows from 1997 to 2006 was as large as 42 percent, while the corresponding figure for Thailand was 25 percent, next to transport machinery, which received 32 percent of total FDI inflows to Thailand for the same period. A similar picture of the importance of electric machinery in FDI inflows to East Asia can be found from Japanese FDI outflows. Based on the stock value at the end of 2006, 28 percent of Japanese FDI stock in East Asia was in electric machinery, the largest recipient sector, which is followed by transport machinery at 18 percent.

Table 1-15 Sectoral Distribution of FDI in East Asia (%)

	Inward FDI Flows		Outward FDI Stock
	Malaysia	Thailand	Japan
	1997-2006	1997-2006	2006 stock
Manufacturing	100.0	100	100
Food	3.6	5.5	7.7
Textiles	1.7	2.0	1.6
Wood and wood products	6.1	-	1.4
Chemicals	12.1	10.4	16.2
Petro chemicals	12.4	2.1	0.3
Metal products	9.4	10.5	6.4
General machinery	2.3	-	7.4
Electric machinery	41.7	24.6	28.4
Transport machinery	4.4	31.6	18.4
Scientific instruments	2.0	-	3.4
Others	4.3	13.3	8.7

Notes: Figures for Malaysia are overall inward FDI flows on approval basis, those for Thailand are overall inward FDI flows on balance of payments basis, those for Japan are outward FDI stock in East Asia on reported basis.

Sources: Country sources

2. Verification of macro-economic sensitivity toward external fluctuation

This chapter will assess broader economic data including capital flow, domestic financial market, and economy through observation of panel data for individual ASEAN+3 markets from 1980 to 2007 with objective to analyze transmission of the impacts of global markets and capital flow on the domestic market and economy.

2.1. Observed impact of capital flow on domestic market

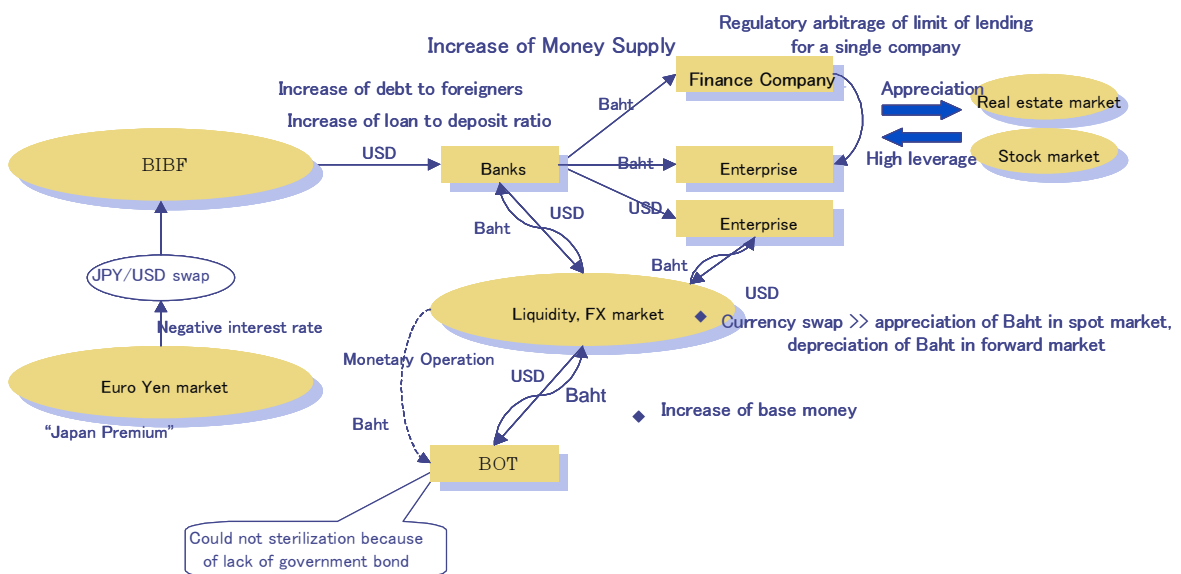
2.1.1. 1997 Crisis

First of all, here is reminding of typical historical example of crisis triggered by capital flow in the region.

Before 1997 crisis, huge foreign capital flew into Thailand domestic market via off-shore market such as BIBF, which triggered bubble of asset price such as real estate and equity. Capital inflow was mainly through short-term foreign funding. This capital flow was enhanced by specific anomaly/trends of foreign financial market such as extremely low interest rates of Japanese Yen, especially for non-Japanese financial institutions because of “Japan Premium”.

It was difficult for BOT to absorb excess liquidity partly because of lack of means of absorption in the inter-bank market of Thai Baht. Therefore, speculative investment under loosened money and credit continues.

Figure 2-1 Structure of impacts of capital inflow: Case of Thailand before 1997 crisis



Once substantial tightening implemented against the continuous speculation in the domestic asset market under very loosened money and credit, capital flow started to be reversed, then triggered liquidity shortage of foreign currency, asset price depreciation, and deterioration of credit of the sovereign and private entities, and real economy of Thailand.

2.1.2. Capital flow and domestic market in selected countries

With views to the historical data of capital inflow and domestic credit by each country, other investment composing loans and banking activity often causes volatility of capital flows. Credit growth of banking sector enhanced by external borrowing tends to not only enhance real economic growth but also foster speculative investment, which may lead to vulnerable ground against sudden reverse of capital flow.

Dependency on other investment had been decreased after 1997 crisis in some of ASEAN countries which was hit severely in the 1997 crisis, thanks to improved current account balance and increased portfolio investment and direct investment.

However, continuous repayment of external borrowing might limit available capital in the domestic market in some cases such as Indonesia.

Furthermore, increased dependency on other investment was observed just before 2008 global financial turmoil in some of the individual markets such as Korea, which seems to be transmitted to higher credit growth or/and booming stock market.

Capital flow and domestic financial market
(UNIT: million US dollars, % annual growth)

Figure 2-2 Current account balance, capital inflow, and foreign exchange reserve: Thailand

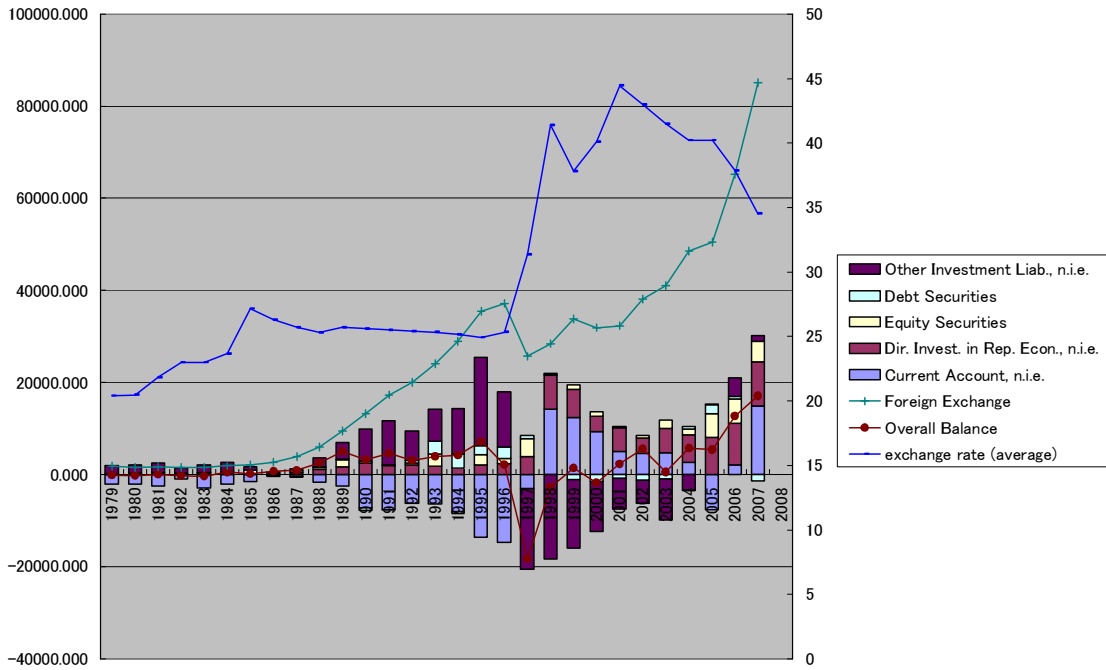


Figure 2-3 Borrower of other investment: Thailand

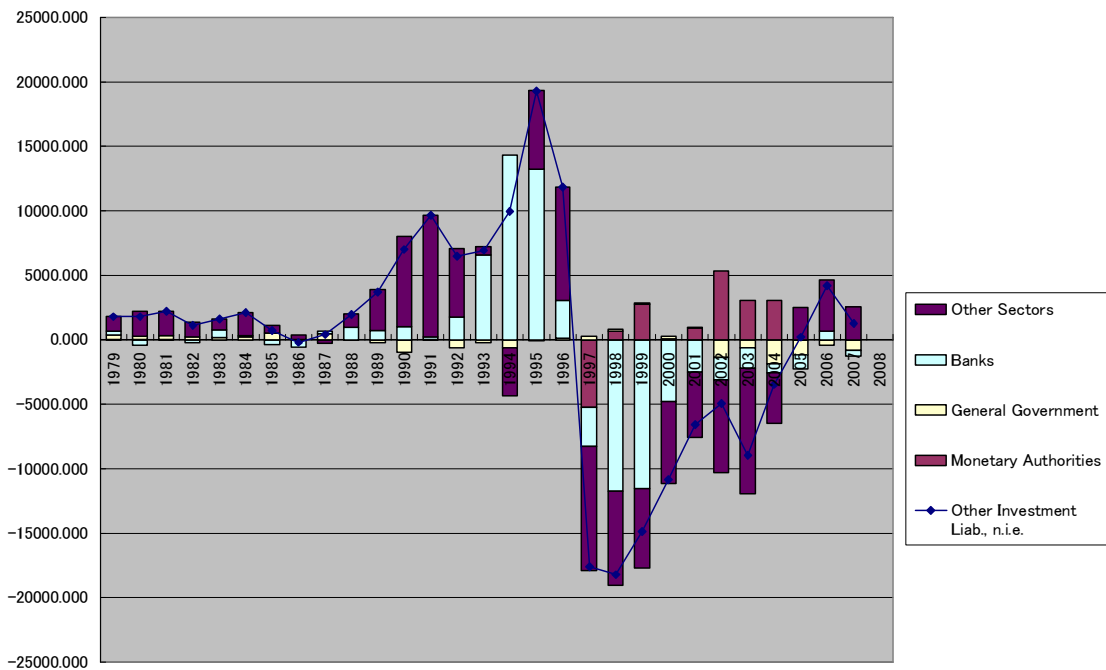


Figure 2-4 Foreign liability and domestic credit growth: Thailand

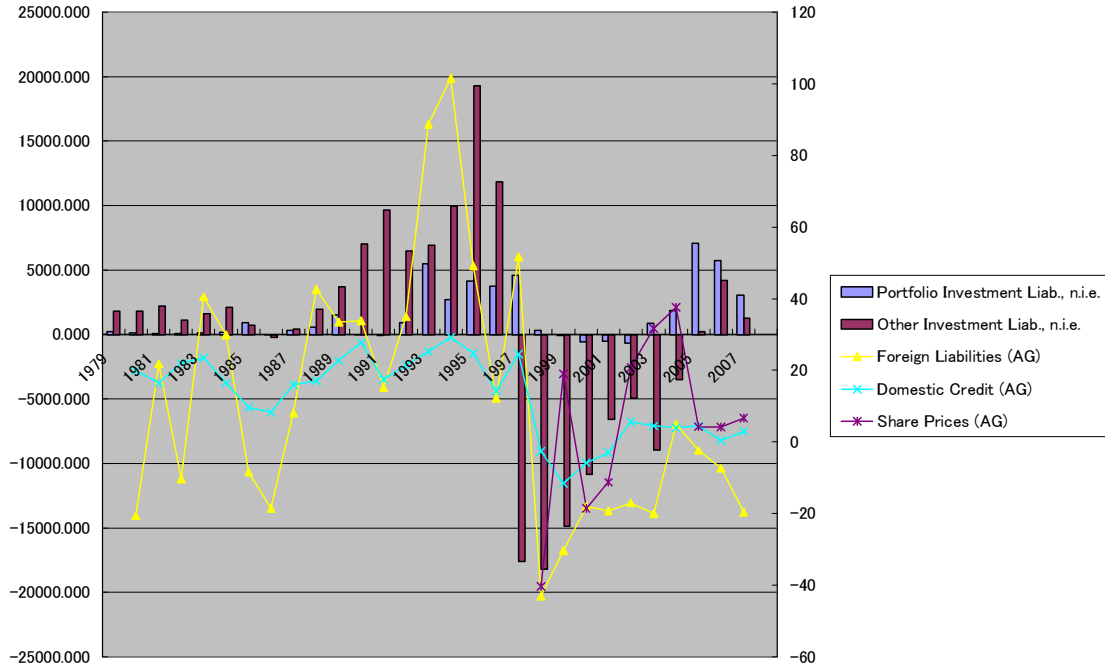


Figure 2-5 Current account balance, capital inflow, and foreign exchange reserve: Korea

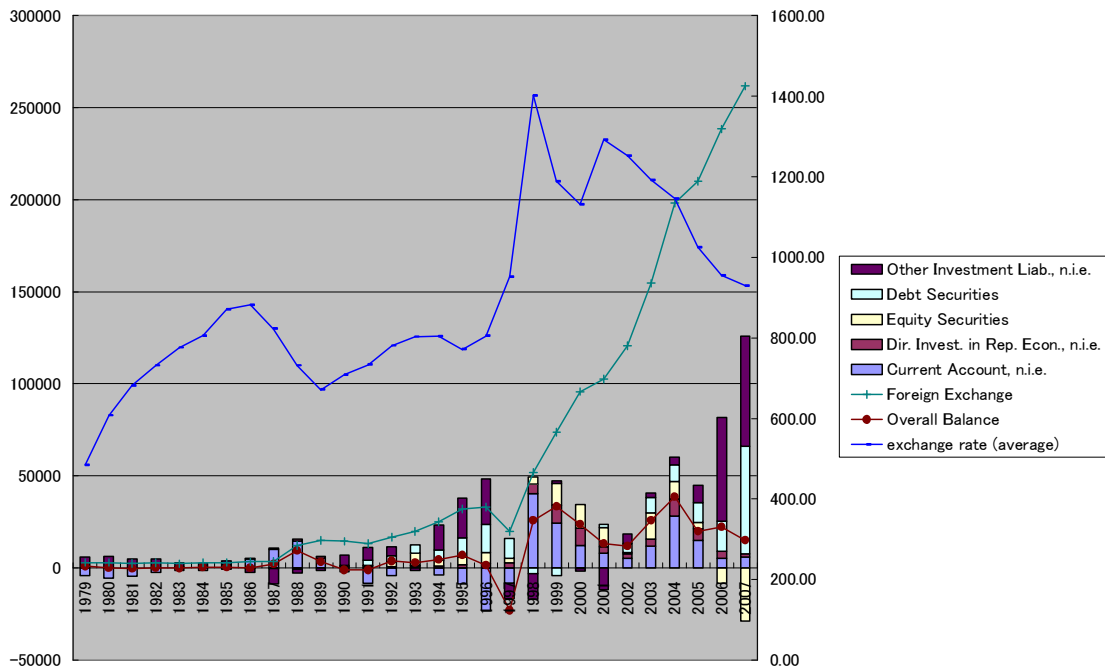


Figure 2-6 Borrower of other investment: Korea

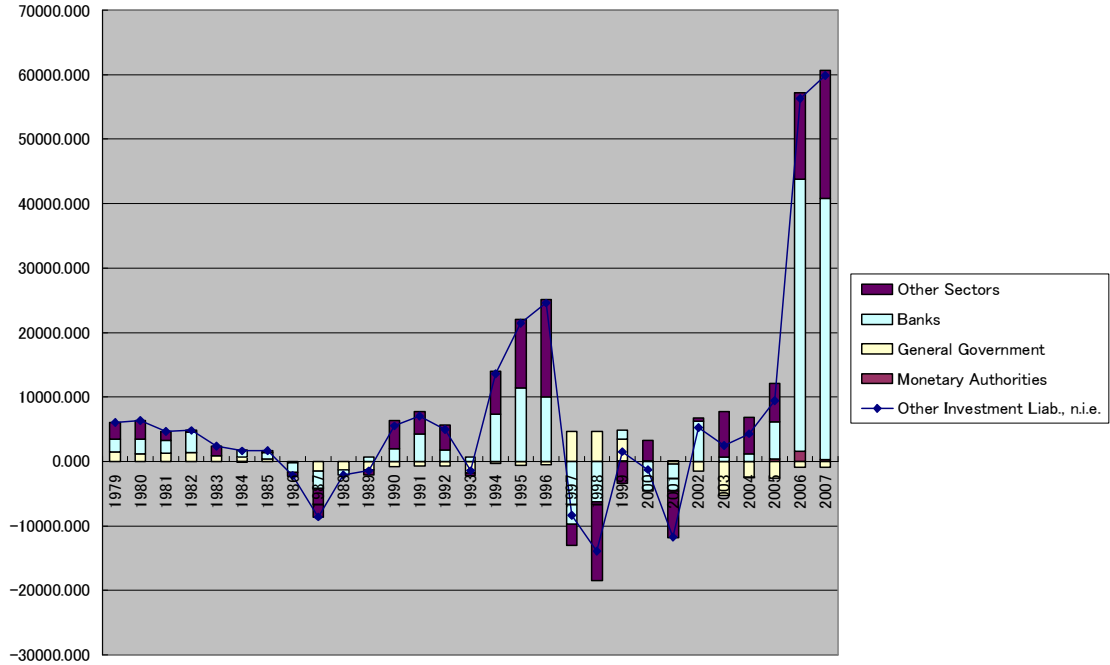


Figure 2-7 Foreign liability and domestic credit growth: Korea

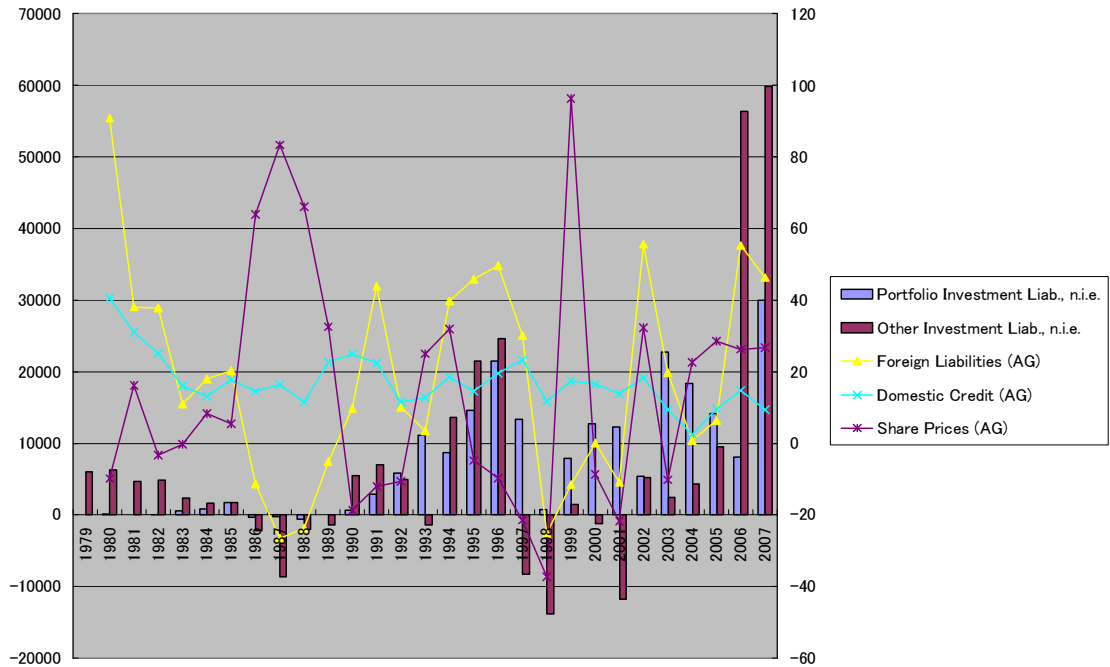


Figure 2-8 Current account balance, capital inflow, and foreign exchange reserve: Indonesia

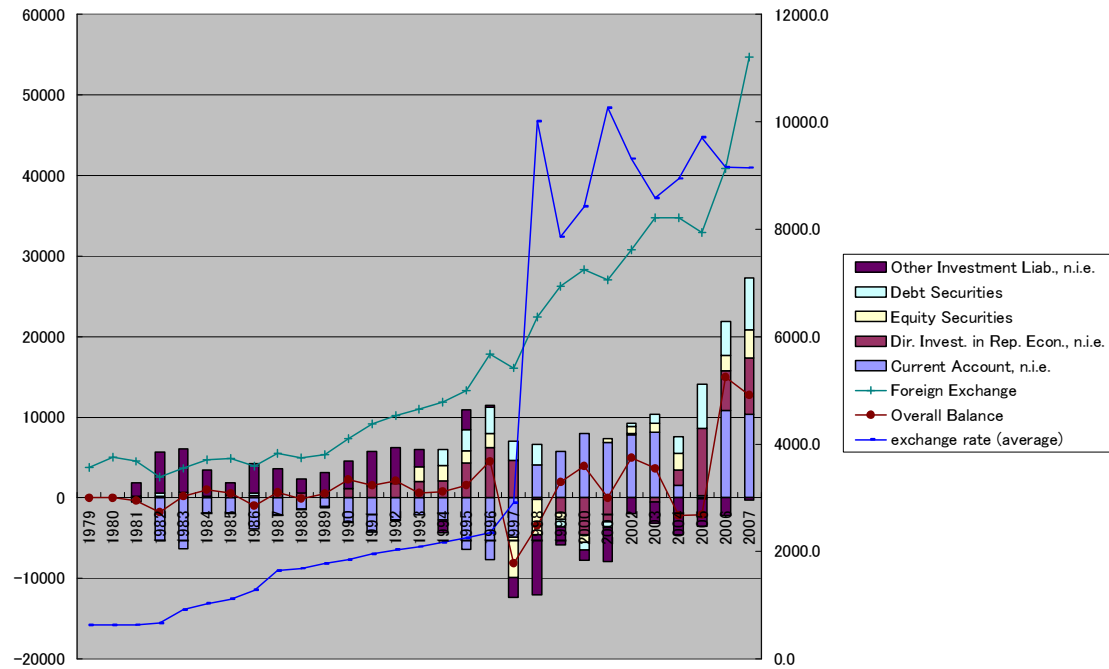


Figure 2-9 Borrower of other investment: Indonesia

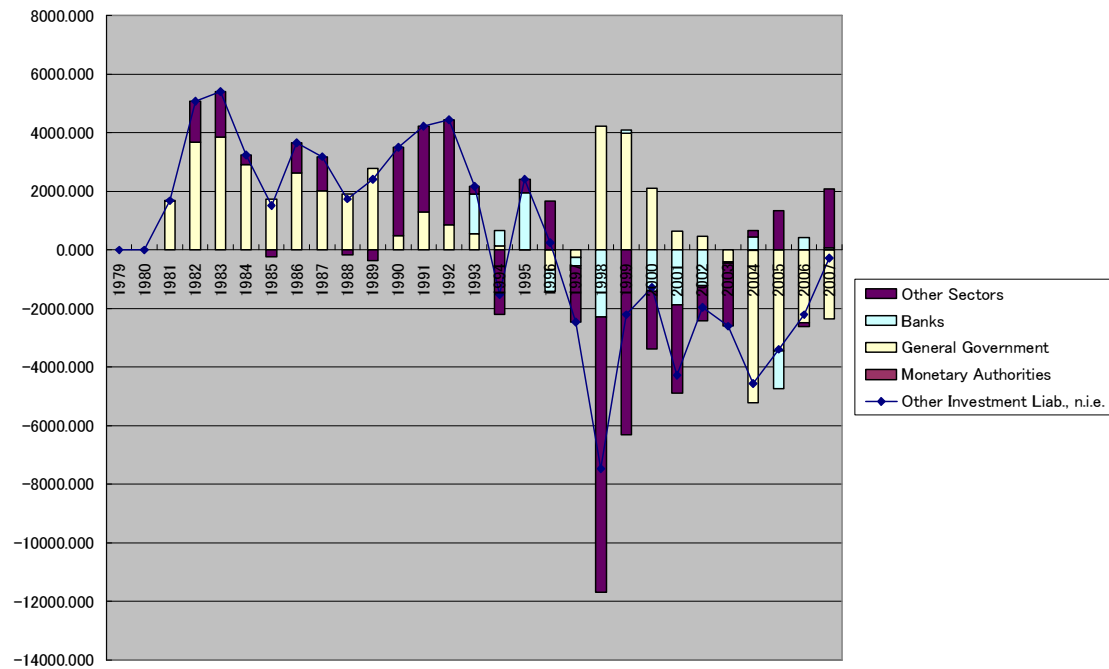
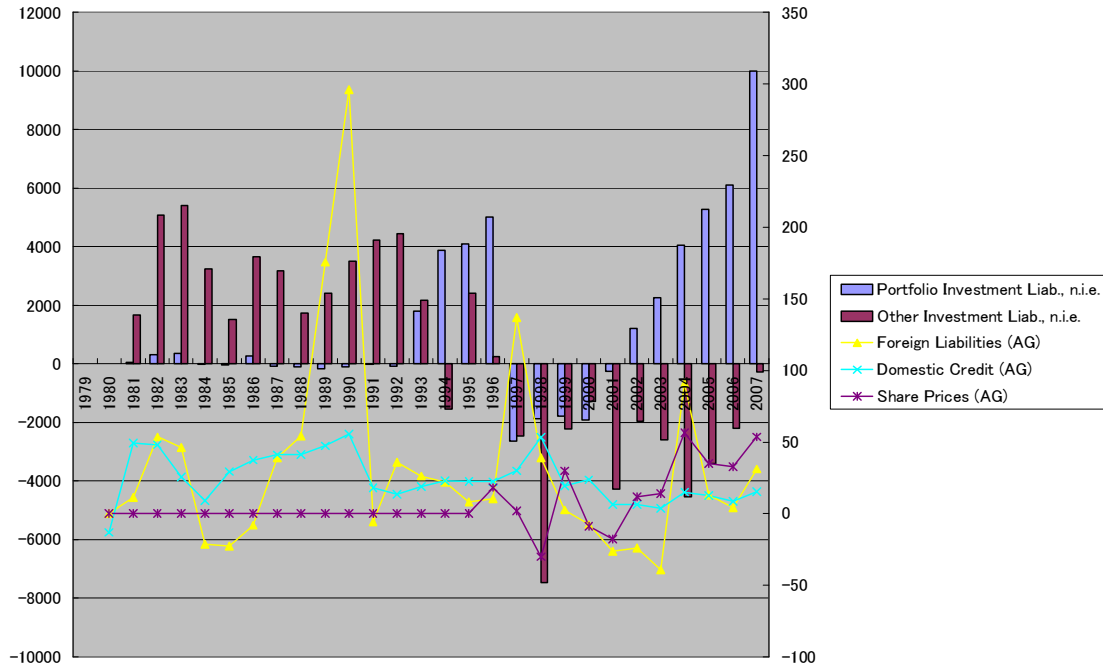


Figure 2-10 Foreign liability and domestic credit growth: Indonesia



2.2. Correlation among capital markets

This section observes and analyzes correlations between external market/capital flow and domestic money and credit market/asset market/economic growth.

2.2.1. Overview of the historical data

We analyzed the impact of global markets, and expectedly following capital flow into the ASEAN+3 countries, then domestic financial market, asset market and macro economic growth based on historical data from 1980 to 2007 for ASEAN + 3 countries and US financial market.

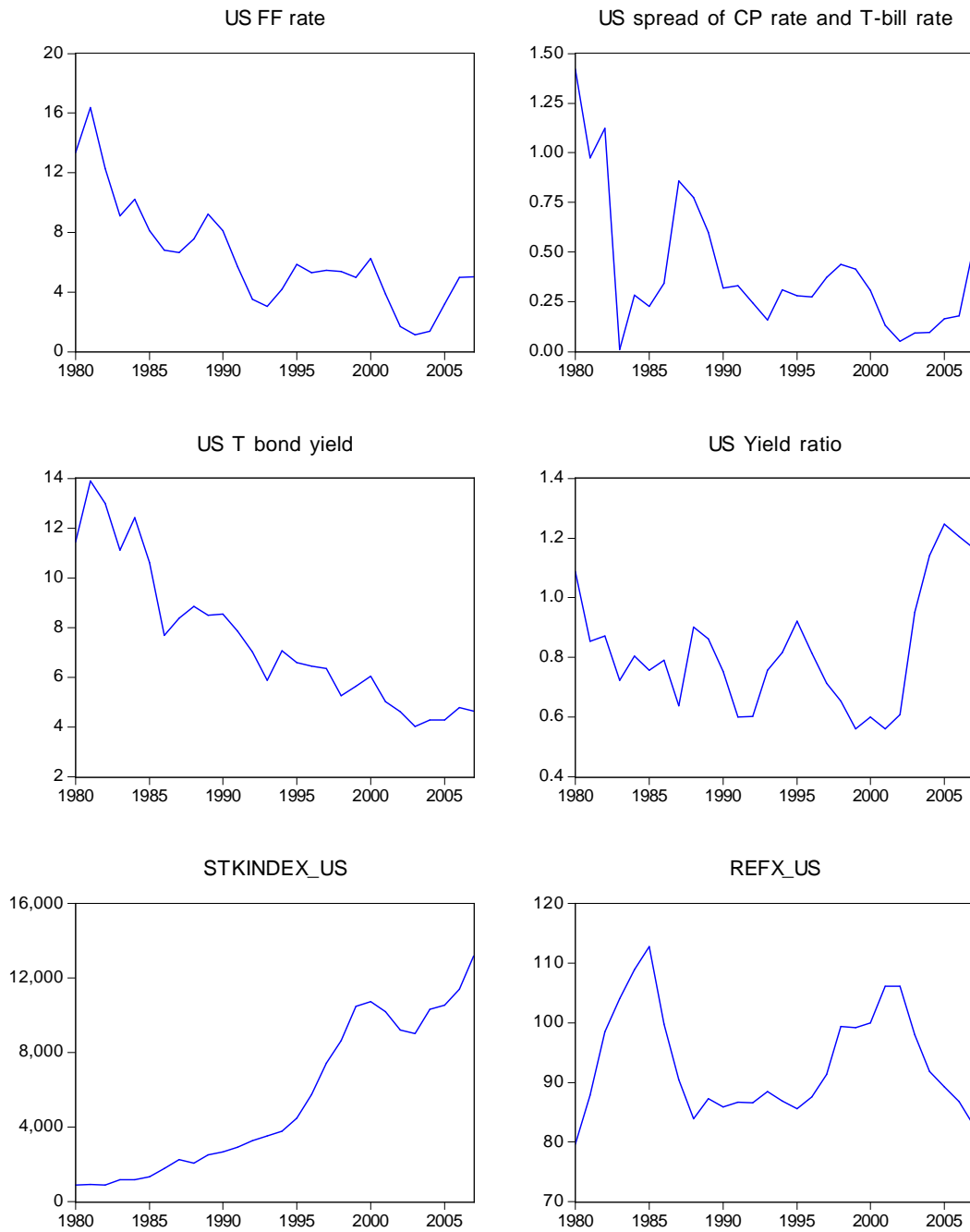
category	indicators	variable name
US financial market	annual change of stock index	stk_gr_us
	ratio of domestic credit to GDP	d_credit_to_gdp_us
	yield ratio	yield_r_us
exchange rate	change of exchange rate	forexca_gr
	change of real exchange rate	r_fx_gr
	change of effective exchange rate	efx_gr
	change of real effective exchange rate	refx_gr
capital flow	ratio of current account to GDP	Current_to_GDP
	capital inflow (liability) to GDP	Flow_to_GDP
	ratio of Dir. Invest. To GDP	DI_Li_to_GDP
	portfolio inflow (liability) to GDP	Port_to_GDP
	ratio of Equity Securities (Liab.) to GDP	Eq_Li_to_GDP
	ratio of Debt Securities (Liab.) to GDP	Debt_Li_to_GDP
	ratio of Other Investment Liab., n.i.e. to GDP	Other_Li_to_GDP
	ratio of Overall Balance to GDP	OAB_to_GDP
money and credit	ratio of change of Foreign Exchange to GDP	Change_FXR_to_GDP
	M2 / foreign exchange reserve	M2_to_FXR
	ratio of foreign exchange reserve to import	FXR_to_Im
	growth of foreign exchange reserve	FXR_gr
	growth of M2	M2_gr
	growth of base money	B_Money_gr
	M2 money multiplier	M2_Multiplier
	ratio of domestic credit to GDP	D_Credit_to_GDP
	real interest rate	Real_Int
	lending and deposit rate spread	Spread_Ln_Dep
	Domestic private credit to deposit ratio	D_Priv_Credit_to_Dep
	ratio of bank reserve to bank asset	Bank_Rsv_to_Bnk_Ass
	investment and economic growth	change in stock prices
Yield ratio		Yield_R
growth of real GDP		RGDP_gr
growth of industrial production		IIP_gr
fundamentals	inflation rate	CPI_gr
	ratio of fiscal balance to GDP	Fiscal_Bal_to_GDP
	ratio of public debt to GDP	Pub_Debt_to_GDP
	growth of revenue of central government	gov_rev_gr

(注) IMF, Bloomberg

First, we observed the data with attention to the time ahead to two financial crisis period which is 1997 and 2008.

Looking at US financial market, since early 1980s, US interests rate was under long declining trend until the present super-loosening monetary policy. Spread between CP and T-bill rate has been shrinking in the long term view towards the very low level observed in early 2000s. US dollar, in terms of real effective exchange rate, has been on depreciation trend since 2002 until recently.

Figure 2-11 US financial markets from 1980 to 2007



(Source) IMF, Bloomberg

(Note) Stkindex_us =s Dow Industrial Index.

Refx_us = real effective exchange rate of US dollar.

Yield ratio = (1/Price Earning Ratio) / bond yield

Looking at capital inflow of individual ASEAN+3 markets, while current account turned to surplus in most countries of ASAN+3, types of capital inflow such as direct investment, debt portfolio, equity portfolio, and other investment (mostly short-term borrowing) vary among the ASEAN+3.

Table 2-1 Summary of capital flow before 1997/2008

	Current account	FDI(in)	Debt investment (in)	Other investment (in)	FX reserve to import
US	Minus Minus	Growing Growing	N/A Growing	Growing Growing	Declining Stable
BR	N/A Plus	N/A Growing	N/A Growing	N/A Growing	N/A N/A
KA	Plus Plus	Growing Growing	N/A N/A	Growing Growing	Growing Growing
HK	N/A Plus	N/A Growing	N/A Growing	N/A Growing	N/A Declining
ID	Minus Plus	Growing Growing	Growing Growing	Declining Declining	Stable Growing
JP	Plus Plus	Growing Growing	Growing Growing	Growing Growing	Growing Declining
KR	Minus Plus	Growing Declining	Growing Growing	Growing Growing	Stable Declining
LA	Minus Plus	Growing Growing	N/A N/A	Declining Growing	Growing Growing
MY	Minus Plus	Declining Growing	Declining Growing	Declining Declining	Declining Growing
PH	Minus Plus	Growing Growing	Growing Declining	Growing Growing	Stable Growing
CN	Plus Plus	Growing Growing	Declining Sgtable	Growing Growing	Growing Growing
SG	Plus Plus	Growing Growing	Stable Growing	Growing Growing	Growing Sable
TH	Minus Plus	Declining Stable	Growing Declining	Growing Declining	Grpwing Growing
VN	Minus Minus	Growing Growing	N/A N/A	N/A Growing	N/A Growing

Note1: upper is observation right before 1997, lower is observation right before 2008

Note2: Country abbreviations correspond as follows. BR: Brunei Darussalam, KA: Cambodia, CN: China, HK: Hong Kong, China, ID: Indonesia, JP: Japan, KR: Korea, LA: Lao PDR, MY: Malaysia, PH: Philippines, SG: Singapore, TH: Thailand, US: United States, VN: Vietnam.

Viewing money, credit, and asset price of individual ASEAN+3 markets, credit of US continued to accelerate and stock price had reached higher range and yield ratio started to rise before the two crisis periods. In the time previous to the 1997 crisis, domestic credit tended to accelerate over broad money growth, and real interest rates increased, while credit has been kept moderate in the pre-time of the latest crisis.

Table 2-2 Summary of money, and asset price

	Growth of M2	Domestic credit to GDP	Real interest rate	Yield ratio	Growth of stock price
US	Growing Growing	Growing Growing	Declining Declining	Rising Rising	Rising Rising
BR	N/A Stable	N/A N/A	N/A N/A	N/A N/A	N/A N/A
KA	Growing Growing	Growing Growing	N/A Declining	N/A N/A	N/A N/A
HK	Declining Growing	Growing Declining	Rising Declining	Declining Declining	Declining Rising
ID	Growing Growing	Growing Declining	Rising Declining	N/A Rising	N/A Rising
JP	Stable Stable	Growing Declining	Declining Declining	Rising Rising	Rising Declining
KR	Declining Declining	Growing Growing	Rising Declining	Rising Declining	Declining Rising
LA	Growing Growing	Growing Declining	N/A N/A	N/A N/A	N/A N/A
MY	Declining Stable	Growing Declining	Rising Rising	Rising Rising	Declining Rising
PH	Declining Declining	Growing Declining	Stable Rising	Rising Rising	Declining Rising
CN	Declining Growingn	Growing Growing	Rising Declining	Risinig Declinig	Declining Rising
SG	Stable Growingn	Growing Growing	Rising Declining	Declining Declining	Declining Rising
TH	Declining Declining	Growing Declining	Rising Rising	Declining Declining	N/A Rising
VN	N/A Growing	N/A growing	N/A N/A	N/A N/A	N/A Rising

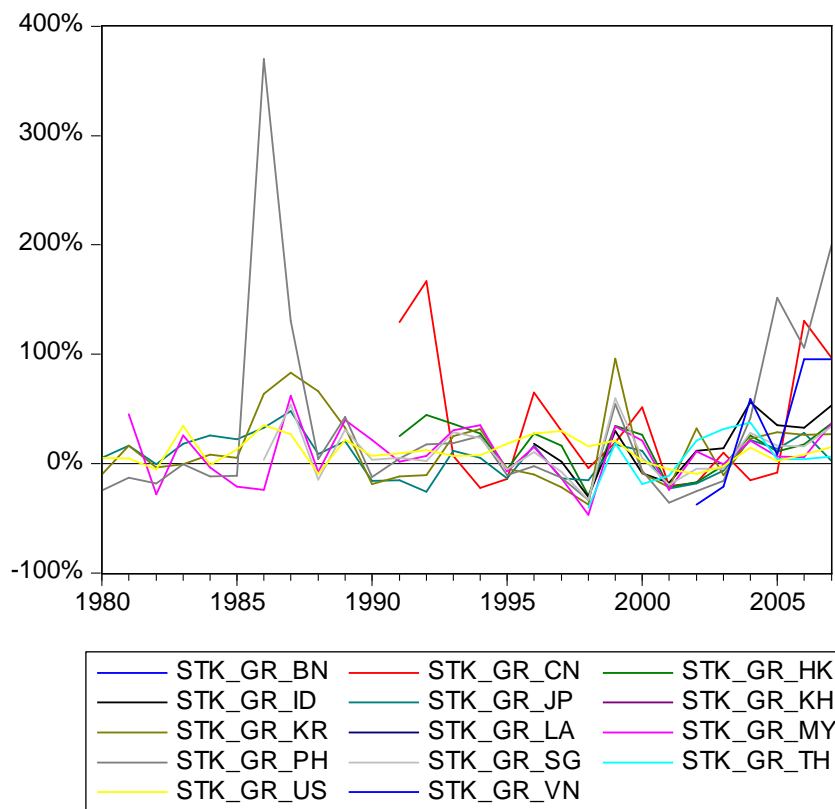
(Note) upper is observation right before 1997, lower is observation right before 2008

2.2.2. Verification of impact of global factors

2.2.2.1. Correlation of financial markets data between US and ASEAN+3

Overview of stock market in ASEAN+3 and US markets seems to imply some correlation among one another.

Figure 2-12 Annual change of stock indices of ASEAN+3 and US markets



(Source) IMF

We examined correlation of financial and stock market statistics between US and ASEAN+3 countries using least square equation of panel data of ASEAN+3 countries. Significant positive correlations of growth of stock index and yield ratio are observed between US and ASEAN+3 panel data.

Table 2-3 Correlation of financial markets between US and ASEAN+3 Estimated coefficient in equation of least squares

dependent variable	constant	us equivalent variable	Adjusted R-squared	Durbin-Watson stat
STK_GR?	6.437124 *	0.995037 ***	0.077478	1.317741
D(STK_GR?)	2.245277	1.328354 ***	0.102471	2.719795
D_CREDIT_TO_GDP?	18.89471 *	0.783556 ***	0.897089	0.217602
LOG(D_CREDIT_TO_GDP?)	-1.23891 *	1.20028 ***	0.891182	0.222487
YIELD_R?	0.035194	0.955673 ***	0.210616	0.4908
D(YIELD_R?)	0.042482	0.162167	-0.04211	2.011184

(Note) ***, **, * is significant at 1%, 5%, and 10% confidence interval.

“?” means panel data

Behind these observed correlations, there might be transmission mechanism from global financial markets such as US markets towards ASEAN+3 financial markets through capital flow, with further impact onto asset price such as stock market, and macro economy such as real GDP.

In order to clarify such transmission mechanism with focusing on capital inflow to ASEAN+3, we implemented the following regression analysis (least square estimation) for Panel data of ASEAN+3.

- Correlation among US financial markets and capital inflow to ASEAN+3
- Correlation among capital inflow and various domestic variables such as exchange rate/foreign reserve, money/credit, stock market, and real GDP/industrial production/ CPI inflation

2.2.2.2. Correlation between US financial markets and capital inflow to ASEAN+3

Capital inflow data is composed by portfolio investment, direct investment, other investment, and the total of those inflows as percentage of GDP. We estimated coefficient of US with two variables, ratio of domestic credit to GDP and growth of stock market index, to each item of the capital inflows in panel data of ASEAN+3.

Table 2-4 Correlation between US financial markets and capital inflow to ASEAN+3 Estimated coefficient in equation of least squares

dependent variable	constant	D_CREDIT_TO_GD P_US	STK_GR_US	Adjusted R- squared	Durbin-Watson stat
FLOW_LI_TO_GDP?	-15.04559 **	0.241524 ***	0.066726 *	0.26014	0.874737
FLOW_LI_TO_GDP?	-12.50048 **	0.219939 ***		0.258336	0.879787
PORT_LI_TO_GDP?	-4.298328 **	0.06076 ***	0.025301 **	0.280006	1.496394
PORT_LI_TO_GDP?	-3.351154 **	0.052775 **		0.274238	1.486419
DI_LI_TO_GDP?	-3.068849 **	0.07148 ***	0.022153 **	0.690895	1.138879
DI_LI_TO_GDP?	-2.238676	0.064475 ***		0.688779	1.114494
OTHER_LI_TO_GDP?	-7.841865 *	0.110811 *	0.018948	0.072727	0.626264
OTHER_LI_TO_GDP?	-7.132516	0.104831 *		0.075131	0.630398

(Note) ***, **, * is significant at 1%, 5%, and 10% confidence interval.

“?” means panel data

Estimated coefficient implies that higher credit expansion of US coincides with larger capital inflow to ASEA+3 countries through channels of portfolio investment and direct investment.

Estimated fixed effects of the sample countries show individual strong positive factors for Hong Kong and Singapore, which might imply their unique position as regional financial hubs.

Table 2-5 Fixed effects in the estimation

Fixed Effects (Cross)				
	total capital inflow	direct investment	portfolio investment	other investment
_BN--C	-3.76	-0.81	-2.03	-0.89
_CN--C	-2.66	-0.84	-0.79	-1.12
_HK--C	15.55	14.50	9.54	-8.47
_ID--C	-4.22	-2.61	-0.70	-0.88
_JP--C	-4.08	-3.12	0.57	-1.48
_KH--C	-1.39	-0.43	-1.10	0.18
_KR--C	-2.45	-2.66	0.35	-0.11
_LA--C	-3.06	-1.51	-1.09	-0.44
_MY--C	0.12	0.93	-0.36	-0.42
_PH--C	-1.20	-1.89	0.17	0.55
_SG--C	18.31	8.83	0.52	9.00
_TH--C	-1.77	-0.86	-0.03	-0.84
_VN--C	-2.60	-0.86	-0.65	-1.05

2.2.2.3. Correlation between capital inflow and various domestic variables

We examined coefficient of the same capital inflows and ratio of current account to GDP to those dependent variables such as annual change of exchange rate, change amount of foreign reserve to GDP, annual change of real exchange rate, annual growth rate of M2, ratio of domestic credit to GDP, M2 multiplier (M2/bank reserve), annual growth of stock market index, yield ratio, annual growth of real GDP, annual growth of industrial production, and annual inflation of CPI.

Table 2-6 Correlation between capital inflow and domestic variables of ASEN+3 Estimated coefficient in equation of least squares

dependent variable	constant	DI_LI_TO_GDP?	PORT_LI_TO_GDP?	OTHER_LI_TO_GDP?	CURRENT_TO_GDP?	Adjusted R-squared	Durbin-Watson stat
FOREXCA_GR?	-9.764141 ***	1.0457 **	-0.58261	-0.237662 *	0.246289	0.247541	1.54165
CHANGE_FXR_TO_GDP?	1.816436 ***	0.061014	0.226157 ***	0.022211	0.168705 ***	0.336249	1.403149
R_FX_GR?	-11.41271 ***	0.951449 *	-0.582235	-0.253635 *	0.192087	0.246535	1.549014
M2_GR?	16.88523 ***	0.193723	0.008465	0.072745	-0.103729	0.409987	1.448271
D_CREDIT_TO_GDP?	88.26316 ***	-0.513955	-0.154209	-0.029229	-0.665203 ***	0.937585	0.349083
M2_MULTIPLIER?	6.865584 ***	0.022772	0.012493	-0.049587 ***	0.094965 ***	0.773935	0.373223
STK_GR?	7.923955	1.31692	-0.199023	-0.392725	1.379299 **	0.275459	1.482648
YIELD_R?	0.686632 ***	0.016889	-0.004494	-0.013653 ***	0.040946 ***	0.519158	0.841578
RGDP_GR?	5.160506 ***	0.198315 **	-0.051584	0.047867 **	-0.066321 **	0.505805	1.241147
IIP_GR?	4.857453 ***	0.471485 **	-0.26577 *	-0.00503	-0.065391	0.415224	1.566407
CPI_GR?	7.900598 ***	-0.388344 *	-0.006049	0.123266 **	-0.238806 **	0.306977	1.081793

(Note) ***, **, * is significant at 1%, 5%, and 10% confidence interval. “?” means panel data

Direct investment correlates with depreciation of exchange rate, positive change in real GDP growth and industrial production. Portfolio investment does not have much relationship with domestic market variables except for its correlation with positive change of foreign reserve.

Other investment correlates with appreciation of exchange rate, negative change of M2 multiplier (hence, possible positive correlation with bank reserve), negative change of yield ratio, positive change of real GDP growth and CPI inflation. One interpretation of the impact of other investment towards yield ratio is that shorter-term capital flow into domestic banking system and/or government sector may accelerate when there is upward momentum of both interest rates and stock price.

Overall, real economic growth seems to correlate with direct investment while other investment correlates as well other than industrial production.

We will, based on consideration of results of above estimation, further analyze impacts of capital inflows by estimation of Vector Autoregressive Model (VAR model) in chapter 5.

3. Evaluation of the effect of trade/FDI policies

3.1. Trade and FDI Policies by East Asian Countries

In the 1980s and 1990s, East Asian developing countries embarked on unilateral liberalization of trade and FDI policies and deregulation in domestic economic activities as part of more comprehensive structural reform policies. Such policy changes were induced partly by their commitments to the World Bank and the IMF for obtaining economic assistance and largely by the realization by the East Asian countries that these changes would promote economic growth. Liberalization of trade and FDI regimes led to the expansion of exports and inward FDI because they shifted the incentives from import-substituting production to export production and increased the attractiveness of these economies to foreign multinational corporations (MNCs).

3.1.1. Trade Liberalization

Many East Asian countries liberalized their import regimes by lowering high tariff rates from the early 1980s to the mid-2000s. Figure 3-1, 3-2, 3-3 show the changes in the average tariff rates, which are computed by dividing tariff revenue by import value, for East Asian countries. Figure 3-1 show that Indonesia, Malaysia, the Philippines, and Thailand all experienced a steady decline in the average tariff rates starting in the 1980s. The average tariff rates of Indonesia, Malaysia and the Philippines came down in tandem from around 15-30 percent in the mid-1980s to register around 5-6 percent in the early 2000s. The average tariff rate of Thailand came down sharply in the early 1990s but it remained high around 10 percent in the mid-2000s, when compared to the rate recorded by Indonesia, Malaysia, or the Philippines. Singapore has virtually a free trade regime as the average tariff rate has been zero throughout the period under study.

Figure 3-1 Tariff Rates for ASEAN5 Countries (%)

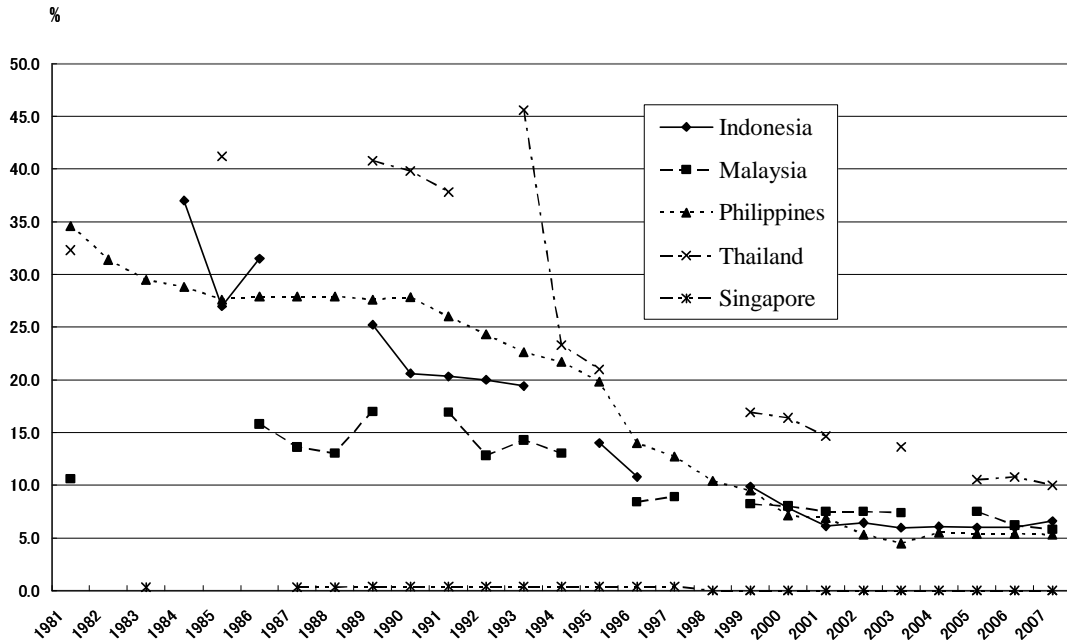


Figure 3-2 Tariff Rates for New ASEAN Members (%)

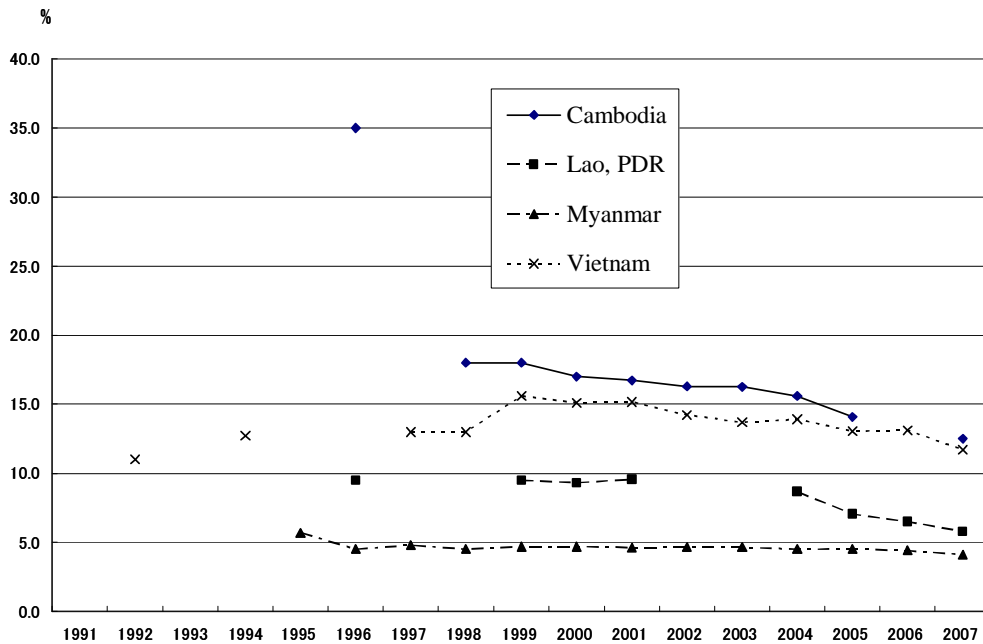
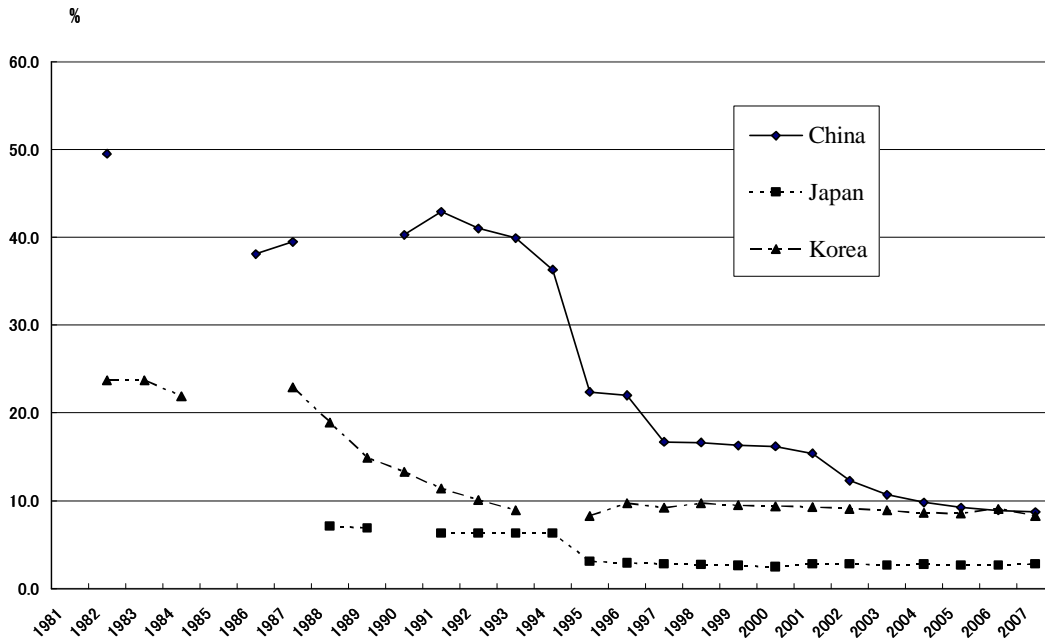


Figure 3-3 Tariff Rates for China, Japan, and Korea (%)



New ASEAN member countries also experienced steady decline in their average tariff rates, although there are notable differences in their rates. Myanmar registers the lowest average tariff rate below 4 percent in 2007 among the new ASEAN member countries. Myanmar is followed by Lao, PDR, which recorded 6 percent in 2007. Compared to Myanmar and Lao, PDR, the average tariff rates of Vietnam and Cambodia are higher as they registered around 12 percent in 2007 after experiencing a steady decline.

Figure 3-3 shows a sharp decline in the average tariff rate for China as it declined from over 40 percent in the early 1990s to around 20 percent in the mid-1990s. Since the mid-1990s the average tariff rate declined steadily and gradually to come down to below 10 percent in 2007. A major reason for the decline through the end of 1990s was intensive negotiations with World Trade Organization (WTO) members on trade liberalization for China's accession to the WTO in 2001. Korea experienced a reduction in the average tariff rate from around 20 percent in the mid-1980s to around 10 percent in the early 1990s. Since the early 1990s Korea's average tariff rate remained at around the same level. As for Japan, after experiencing a slight decline in the mid-1990s, the average tariff rate remained at around 3 percent.

So far we examine the average tariff rates for East Asian countries. An examination of tariff rates of different products reveals wide variations. Table 3-1 shows tariff rates on selected products. Two types of tariff rates are shown in the table, one is bound rate and the other is

East Asia is the rapid expansion of free trade agreements (FTAs), under which trade barriers on trade among FTA members are removed⁷. Compared to the rest of the world, East Asia was rather slow in establishing FTAs. It was ASEAN that set up an FTA, or the ASEAN Free Trade Area, first in East Asia in 1992. The AFTA did not trigger the wave of FTAs in East Asia. It was toward the end of 1990s when several East Asia countries became interested in FTAs. Entering the 21st century, East Asia started to see the proliferation of FTAs involving East Asian countries (Table 3-2). These FTAs appear to have contributed to the expansion of foreign trade in East Asia⁸.

Table 3-2 Major FTAs Involving East Asian Economies (March 2008)

In effect		In negotiation	
Bangkok Treaty(1976)	Singapore-India(2005)	Japan-Korea	China-Singapore
AFTA(1992)	China-Chile (2006)	Japan-GCC	Malaysia-Australia
Singapore-NZ (2001)	Korea-Singapore(2006)	Japan-Vietnam	Malaysia-NZ
Japan-Singapore (2002)	Japan-Malaysia(2006)	Japan-India	Malaysia-Pakistan
Singapore-Australia (2003)	Korea-EFTA(2006)	Japan-Australia	Malaysia-US
Singapore-EFTA (2003)	Korea-ASEAN(2006)	Korea-US**	Singapore-Canada
Singapore-US (2004)	Singapore-Panama(2006)	Korea-Canada	Singapore-Mexico
Korea-Chile (2004)	Japan-Chile (2007)	Korea-India	Singapore-Egypt
China-Hong Kong (2004)	Japan-Thailand (2007)	Korea-Mexico	Singapore-Qatar
China-Macao(2004)	China-Pakistan (2007)	Korea-EU	Singapore-Peru
Singapore-Jordan(2004)	Japan-Philippines(2008)	China-Australia	Thailand-EFTA
Japan-Mexico (2005)	Japan-ASEAN(2008)	China-NZ	Thailand-Australia
China-ASEAN(2005)	Japan-Indonesia(2008)	China-GCC	Thailand-India*
Thailand-Australia(2005)	Japan-Brunei(2008)	China-Pakistan	Thailand-US
Thailand-NZ(2005)		China-SACUFTA	

Notes: ** indicates that treaty has been signed and waiting for the ratification by the legislative bodies. * indicates that the negotiation reached an agreement.

Source: WTO website and respective government sources.

In addition to trade liberalisation through reduction in tariff rates and non-tariff barriers, several other policies adopted by East Asian countries promoted exports. One is the duty drawback system that returns to the producers tariffs paid on imported parts and components used for the production of exports. This system has virtually the same effect as free trade for the producers of exported products. Another is export-processing zones (EPZs) or free-trade zones (FTZs), wherein exporters or producers of export products can take advantage

⁷ On FTAs in East Asia, see Aggarwal and Urata (2005), Lincoln (2004), Munakata (2006), and Park et. al (2007) .

⁸ See Urata and Okabe (2007) for the positive impacts of FTAs on foreign trade.

of free trade on imported inputs. Many EPZs offer incentives to foreign producers such as income tax holidays to attract export-oriented FDI. Many East Asian countries established EPZs and FTZs in the 1980s and 1990s after seeing the success in Taiwan and Korea in the 1960s and 1970s. It should also be noted that trade liberalisation promoted inflows of FDI with an export motive.

The analysis in this section found that East Asian countries have liberalized their trade regimes in terms of import tariffs substantially in recent decades. However, it is very important for policy makers to be reminded that there still exist a lot of room for tariff reduction and furthermore that the number of non-tariff barriers including quantity restrictions and technical standards appears to be increasing although it is difficult to obtain the accurate picture of the current situation. These observations lead us to recommend policy makers to increase efforts to further trade liberalization.

3.1.2. FDI Liberalization

In the mid-1980s many East Asian countries began to liberalise their policies towards FDI inflows.⁹ FDI liberalisation has continued, because they realised that FDI inflows promote economic growth. Restrictions on FDI take various forms, including restrictions on market access, most-favoured-nation treatment, and national treatment. Many East Asian countries reduced restrictions on market access by reducing the number of sectors and industries on the negative list and by relaxing the limits on foreign equity ownership. A number of countries introduced incentives such as tax breaks to attract FDI. Indeed, there has been keen competition in the region to attract FDI by reducing barriers and providing incentives.

East Asian countries enacted bilateral investment treaties (BITs) and double taxation treaties (DDTs), in order to attract FDI by providing FDI friendly environment. As can be seen from Table 3-3, East Asian countries stepped up their efforts in enacting BITs and DDTs in the 1990s. Among the East Asian countries, China has been the most active country in enacting these treaties. Other countries which are also active include Korea, Malaysia and Indonesia. As for the BITs between and among East Asian countries, China has enacted BITs with all the ASEAN+3 countries and Vietnam has enacted BITs with all of them except Brunei. Japan has BITs with relatively few East Asian countries but Japan used FTAs to deal with FDI issues by including an investment chapter in its FTAs with East Asian countries.

⁹ Japan PECC (2002) examined the impediments to FDI in APEC economies and found that many East Asian economies reduced the number and the level of impediments by liberalizing FDI policies.

Table 3-3 Bilateral Investment Treaties and Double Taxation Treaties (number)

	Bilateral Investment Treaties				Double Taxation Treaties			
	1980-88	1989-97	1998-2006	1980-2006	1980-88	1989-1997	1998-2006	1980-2006
World	155	1197	1108	2460	387	857	880	2124
East Asia	39	270	208	517	100	220	191	511
Brunei	-	-	5	5	-	1	1	2
Cambodia	-	6	10	16	-	-	-	-
Indonesia	-	33	22	55	12	28	16	56
Lao, PDR	-	16	5	21	-	2	2	4
Malaysia	9	37	14	60	11	29	22	62
Myanmar	-	-	4	4	-	-	6	6
Phillipines	3	19	13	35	10	16	10	36
Singapore	2	11	11	24	7	17	22	46
Thailand	1	15	20	36	11	17	26	54
Vietnam	-	36	13	49	-	31	14	45
China	16	59	44	119	25	38	31	94
Japan	2	2	7	11	8	14	11	33
Korea	6	36	40	82	16	27	30	73

Source: UNCTAD, World Investment Report 2007

FDI regimes of many East Asian countries have been liberalized but having liberalized FDI regime does not necessarily ensure open and free FDI environment. Indeed, a number of studies have pointed out problems which require FDI facilitation measures to deal with. These problems include a lack of transparency in FDI laws and complicated FDI application procedures. The presence of impediments to FDI in some East Asian countries may be found in the study conducted by the World Bank regarding business environment (Table 3-4). Out of 181 countries in the sample, five countries out of 12 sample East Asian countries are ranked below average. A simple average of 12 East Asian countries shows that “starting business” is most problematic.

Table 3-4 Business Environment April 2007-June 2008

	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Japan	Korea	Average
Total Ranking	88	135	129	165	20	140	1	13	92	83	12	23	75
Starting a Business	130	169	171	92	75	155	10	44	108	151	64	126	108
Dealing with Construction Permits	72	147	80	110	104	105	2	12	67	176	39	23	78
Employing Workers	5	134	157	85	48	126	1	56	90	111	17	152	82
Registering Property	177	108	107	159	81	97	16	5	37	30	51	67	78
Getting Credit	109	68	109	145	1	123	5	68	43	59	12	12	63
Protecting Investors	113	70	53	180	4	126	2	11	170	88	15	70	75
Paying Taxes	35	24	116	113	21	129	5	82	140	132	112	43	79
Trading Across Borders	42	122	37	165	29	58	1	10	67	48	17	12	51
Enforcing Contracts	157	136	140	111	59	114	14	25	42	18	21	8	70
Closing a Business	35	181	139	181	54	151	2	46	124	62	1	12	82

Note: The sample consists of 181 countries. The average is simple average of the East Asian countries.

Source: World Bank, Doing Business 2009 <http://www.doingbusiness.org/economyrankings/>

Similar to the situation for foreign trade regime, our analysis of FDI regimes has found that FDI policies have been liberalized but there still is an ample room for improvement. This is especially the case concerning FDI facilitation measures such as FDI application and approval procedures, protection of investors, etc.

3.2. Production Network and Foreign Direct Investment: An Empirical Analysis

In this section, we statistically analyze the characteristic of the trade structure in East Asian countries comparing with other economic regions, such as EU and NAFTA. As we have seen in the previous sections, East Asian countries feature remarkably high parts and components trade, especially in general, electrical, and transportation machinery industries. We, henceforth, focus on the parts and components trade and study the effects of FDI on the trade structures. Our analysis is expected to shed light on the presence of production network in East Asia and to identify the role of foreign direct investment (FDI) in the creation of production network.

3.2.1. Estimation Method

1) Parts and Components Trade by Region

We use modified gravity equation which enables us to see the differences in trade performances across regions. The only difference from the common gravity equation is that the dependent variable is the share of parts and component exports to the total exports.¹⁰ The gravity equation used in this study is as follows:¹¹

$$\ln X_{ijt} / (X_{ijt} + V_{ijt}) = \beta_0 + \beta_t + \beta_1 \ln(Y_{it} + Y_{jt}) + \beta_2 \ln s_{ij} s_{ji} + \beta_3 \ln Dist_{ij} + \beta_3 Adj_{ij} + \beta_5 Lang_{ij} + \beta_6 Asia_t + \beta_7 NAFTA_t + \beta_8 EU_t + \beta_9 MERCOSUR_t + \gamma_1 Z_c + \varepsilon_{ijt}, \quad (1)$$

where X_{ijt} and V_{ijt} are real parts and components and total trade flows from country i to

country j at time t , Y_{it} (Y_{jt}) is real GDP of country i (j) at time t , $Dist_{ij}$ is a distance in kilo

¹⁰ Total trade composed of the sum of parts and components trade and final goods (consumption and capital goods).

¹¹ See Anderson and van Wincoop (2003), Baier and Bergstrand (2007), and also Feenstra (2004, pp.152-163) for recent developments of gravity equation.

meters between country i and country j . Adj_{ij} stands for the adjacent dummy variable that takes unity if country i and j have common land border, zero otherwise, $Lang_{ij}$ is a binary variable which takes unity if countries i and j have common official language, zero otherwise. Four regional dummies are included in the estimation; East Asia (Asia), North American Free Trade Area (NAFTA), European Union (EU), and Mercado Común del Sur (MERCOSUR). East Asia includes Japan, China, Korea, Hong Kong, Taiwan, Singapore, Indonesia, Malaysia, Philippines, and Thailand. NAFTA consists of the U.S.A., Canada and Mexico. EU consists of 27 EU members (see the note of Table 1-3 for the names of EU members). MERCOSUR includes Argentina, Brazil, Paraguay, and Uruguay.

2) Impact of FDI on Parts and Components Trade

In the second stage of our investigation, we will examine the impact of FDI inflow (stock) on the bilateral trade flows with the FDI variables. Real FDI inflow in country i is included in the estimated equation. FDI_{it} stands for the FDI stock in country i at time t . Estimated equation is as follows:

$$\begin{aligned} \ln X_{ijt} / (X_{ijt} + V_{ijt}) = & \beta_0 + \beta_t + \beta_1 \ln(Y_{it} + Y_{jt}) + \beta_2 \ln s_{ij} s_{ji} + \beta_3 \ln Dist_{ij} + \beta_4 Adj_{ij} \\ & + \beta_5 Lang_{ij} + \beta_6 \ln(FDI_{it} * FDI_{jt}) \\ & + \sum_{m=7}^{10} \beta_m Block_{mt} \ln(FDI_{it} * FDI_{jt}) \\ & + \gamma_1 Z_c + \varepsilon_{ijt} \end{aligned} \quad (2)$$

$Block$ is a vector of dummy variables that consists of four regions. Independent variable, log of the sum of FDI of countries i and j is included to test the impact of FDI stock on parts and components trade. The interaction terms between FDI and regional dummies are also included in the equation in order to test if there are differences in the effects by region. The estimated effect of FDI for region m on the share of parts and components bilateral trade is captured by $\beta_6 + \beta_m$ or $(\beta_6 + \beta_m) * 100\%$. Other control variables are the same as in equation (1).

3.2.2. Data

Trade data are obtained from the Research Institute of Economy, Trade and Industry (RIETI) database (<http://rieti.imari.co.jp/>). RIETI data cover 50 countries/regions, 13 industries, five production stages, and 26 years (1980-2005). We use three production stages (parts and

components, capital goods, and consumption goods), four industries (textiles, general machinery, electrical machinery, and transportation machinery) 50 countries over 26 years (1980-2005). These nominal trade flow data are deflated by exporters' GDP deflator. The data of inward FDI stock are taken from UNCTAD's foreign direct investment database. GDP, GDP deflators, and population for each country for each year are from the International Monetary Fund (various issues). Other variables such as distance, contiguous information, and common official language dummies are available from Mayer and Zignago (2006).

3.2.3. Estimation Results

1) Parts and Components Trade by Regions

Table 3-5 reports the estimated results of equation (1) by industry. Four industries are textile, general machinery, electrical machinery, and transportation machinery. The results show that the sum of GDPs of exporter and importer countries has positive and statistically significant coefficient in all four industries. In some industries, other common gravity variables, such as distance, contiguity, and language, have signs opposite from our expectation although we focus on the coefficients for regional dummies.

Table 3-5 Parts and Components Trade by Regions

	(1)	(2)	(3)	(4)
	Textile Exports	General Machinery	Electrical Machinery	Transportation
ln(GDPi+GDPj)	0.097 (0.030)***	0.074 (0.010)***	0.051 (0.011)***	0.044 (0.017)**
ln (si sj)	0.225 (0.031)***	0.028 (0.011)**	-0.009 -0.012	0.135 (0.018)***
ln (Distance)	0.383 (0.026)***	-0.114 (0.010)***	-0.040 (0.010)***	0.091 (0.017)***
Contiguity	0.413 (0.073)***	-0.163 (0.029)***	0.248 (0.030)***	0.140 (0.048)***
Langage	-0.527 (0.065)***	0.241 (0.023)***	0.241 (0.026)***	0.328 (0.042)***
Asia	0.127 (0.124)	0.204 (0.047)***	0.568 (0.043)***	0.888 (0.095)***
NAFTA	-0.021 (0.206)	0.077 (0.049)	-0.104 (0.060)*	-0.707 (0.121)***
EU27	0.091 (0.067)	-0.048 (0.025)*	-0.266 (0.029)***	-0.283 (0.045)***
MERCOSUR	-1.090 (0.260)***	-0.425 (0.102)***	-0.190 (0.129)	-0.277 (0.140)**
Constant	-8.016 (0.811)***	-1.219 (0.293)***	-2.470 (0.350)***	-2.173 (0.573)***
Observations	22594	38956	39275	32166
Adjusted R-squared	0.11	0.06	0.15	0.08
beta6=beta7	0.39 [0.5306]	3.79 [0.0514]	88.13 [0.0000]	112.80 [0.0000]
beta6=beta8	0.08 [0.7806]	26.21 [0.0000]	308.51 [0.0000]	140.49 [0.0000]
beta6=beta9	18.54 [0.0000]	32.23 [0.0000]	31.64 [0.0000]	49.71 [0.0000]

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

p-values are in the bracket

The coefficients for regional dummies clearly show that East Asian has unique performance among other regions. A notable finding is that the estimated coefficients for Asia are much larger than those of other regions in general, electrical, and transportation machinery industries. In fact, the coefficients for NAFTA, EU, MERCOSUR are either not statistically significant or even negative. Negative signs of coefficients for regional dummies indicate that these regions export less parts and components than the world average. These findings suggest that Asia exports more parts and components than other regions do. Actually an F-test in the lower panel of the table assures that we can reject the null hypotheses in which there is no difference between Asia and other three regions.

2) Impact of FDI on Parts and Components Trade

We turn to the estimation results of the effects of FDI on the parts and components trade by industry as well as by regions. We apply instrumental variable (IV) method to deal with the simultaneity problem between parts and components trade in LHS and FDI variables in RHS¹². All lagged FDI-related variables are used for instrumental variables. However, estimation results with IV are not much different from OLS results.

Table 3-6 provides the results of our estimation by industry. Estimation includes two kinds of FDI-related variables separately: the FDI stock in country *i*, and the FDI stock in country *j*. A notable finding is that in textile industry, the estimated coefficients for the calculated coefficients for log of exporter's FDI (FDI stock of country *i*) are all positive for all regions while the calculated coefficients of the log of importer's FDI (FDI stock of country *j*) are all negative¹³. On the other hand, in three machinery industries (general, electrical, and transportation), the signs of coefficients for FDI are exactly opposite. That is, coefficients for exporter's FDI for all regions are negative while coefficients for importer's FDI are all positive.

¹² Other possible simultaneity problem between the LHS and GDP-related variables may arise as Baier and Bergstrand (2001), for example, point out. However, we should address the simultaneity problem on trade policy more and concentrate our arguments on these FDI issues in this paper.

¹³ For example, the coefficient estimates for the elasticity of FDI_{*i*} in Asia is calculated from adding the coefficient estimate for ln (FDI_{*i*}) and that of Asia, which becomes 0.607 (0.601+0.006).

Table 3-6 The Impacts of FDI on Part and Components Trade

	Textile		General Machinery		Electrical Machinery		Transp.Machinery	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln (GDPi+GDPj)	-0.153 (0.032)***	0.590 (0.032)***	0.124 (0.012)***	0.018 (0.012)	0.100 (0.012)***	-0.006 (0.012)	0.139 (0.020)***	-0.068 (0.020)***
ln (si sj)	0.213 (0.031)***	0.681 (0.034)***	0.043 (0.012)***	-0.028 (0.013)**	-0.010 (0.013)	-0.052 (0.014)***	0.142 (0.020)***	0.065 (0.021)***
ln (Distance)	0.291 (0.028)***	0.394 (0.028)***	-0.116 (0.011)***	-0.127 (0.010)***	-0.043 (0.011)***	-0.031 (0.011)***	0.099 (0.019)***	0.113 (0.019)***
Contiguity	0.495 (0.074)***	0.389 (0.074)***	-0.170 (0.031)***	-0.138 (0.029)***	0.231 (0.031)***	0.273 (0.031)***	0.116 (0.048)**	0.174 (0.049)***
Langage	-0.730 (0.063)***	-0.282 (0.062)***	0.275 (0.023)***	0.198 (0.024)***	0.257 (0.027)***	0.213 (0.027)***	0.358 (0.042)***	0.252 (0.043)***
ln (FDIi)	0.601 (0.019)***		-0.084 (0.006)***		-0.048 (0.007)***		-0.147 (0.011)***	
ln (FDIi)*Asia	0.006 (0.006)		0.007 (0.002)***		0.022 (0.002)***		0.032 (0.004)***	
ln (FDIi)*NAFTA	-0.011 (0.007)		0.003 (0.002)		-0.003 (0.002)		-0.022 (0.005)***	
ln (FDIi)*EU	-0.008 (0.003)**		-0.002 (0.001)**		-0.010 (0.001)***		-0.010 (0.002)***	
ln (FDIi)*MERCOSUR	-0.035 (0.011)***		-0.024 (0.004)***		-0.006 (0.005)		-0.016 (0.006)***	
ln (FDIj)		-0.822 (0.019)***		0.121 (0.006)***		0.070 (0.007)***		0.173 (0.011)***
ln (FDIj)*Asia		-0.001 (0.005)		0.007 (0.002)***		0.024 (0.002)***		0.036 (0.004)***
ln (FDIj)*NAFTA		0.004 (0.007)		0.001 (0.002)		-0.005 (0.002)**		-0.027 (0.005)***
ln (FDIj)*EU		0.015 (0.003)***		-0.006 (0.001)***		-0.011 (0.001)***		-0.014 (0.002)***
ln (FDIj)*MERCOSUR		-0.052 (0.011)***		-0.019 (0.004)***		-0.006 (0.006)		-0.017 (0.007)**
Constant	-14.199 (0.830)***	-1.628 (0.841)*	0.220 (0.407)	-1.601 (0.397)***	-2.696 (0.377)***	-2.643 (0.376)***	-2.607 (0.678)***	-4.401 (0.678)***
Observations	21504	21026	35781	35599	36139	35824	29685	29431
Adj. R-squared	0.154	0.198	0.069	0.072	0.162	0.155	0.085	0.089
RSME	2.7834	2.7043	1.3302	1.3300	1.4346	1.4460	2.1446	2.1525
Asia=NAFTA	3.55 [0.0596]	0.30 [0.5860]	2.87 [0.0904]	7.02 [0.0081]	70.83 [0.0000]	98.03 [0.0000]	70.37 [0.0000]	96.76 [0.0000]
Asia=EU	5.13 [0.0236]	8.30 [0.0040]	18.23 [0.0000]	36.04 [0.0000]	251.41 [0.0000]	300.07 [0.0000]	105.18 [0.0000]	136.15 [0.0000]
Asia=MERCOSUR	12.20 [0.0005]	19.61 [0.0000]	44.29 [0.0000]	29.00 [0.0000]	25.34 [0.0000]	22.50 [0.0000]	46.05 [0.0000]	44.05 [0.0000]

Notes: Dependent variable is the share of parts and componenst trade flows from country I to country j to the total trade flow
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
p-values are in the bracket

These findings indicate that if importer (country *j*) owns relatively large amount of FDI stock (no matter how much exporter holds FDI stock), the share of parts and components bilateral trade flow from country *i* to country *j* tends to increase in machinery industries. On the other hand, if exporter (country *i*) owns relatively large amount of FDI stock (no matter how much importer holds FDI stock), the share of final goods bilateral trade flow from country *i* to country *j* tends to increase in machinery industries. In other words, country with large FDI stock

is more likely to imports parts and components and is more likely to export final good. It is deduced from this finding that in machinery industries, trade flows follow the idea of vertical production network in which the FDI host country imports parts and components from the parent company in host country and assembles and exports final goods to the world.

Figure 3-4 FDI Outflows of East Asian Countries

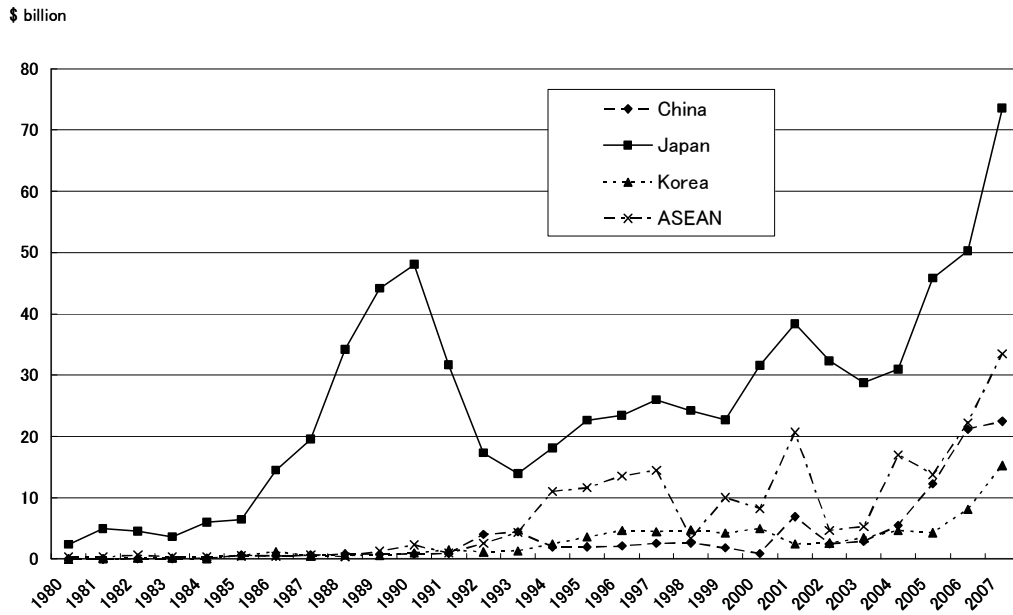


Figure 3-5 Composition of FDI Outflows to East Asia

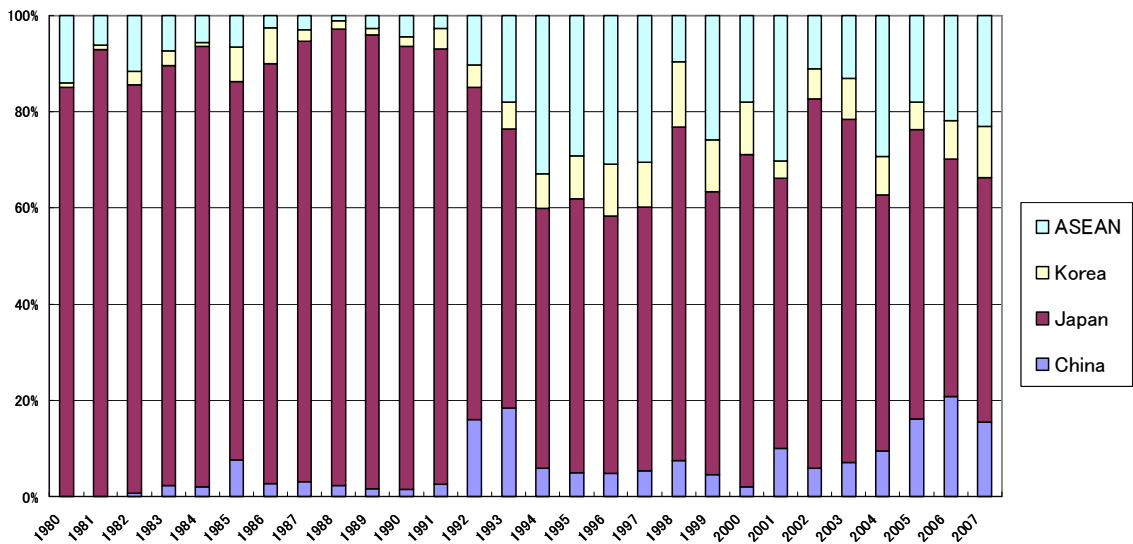


Figure 3-6 FDI Inflows to East Asia

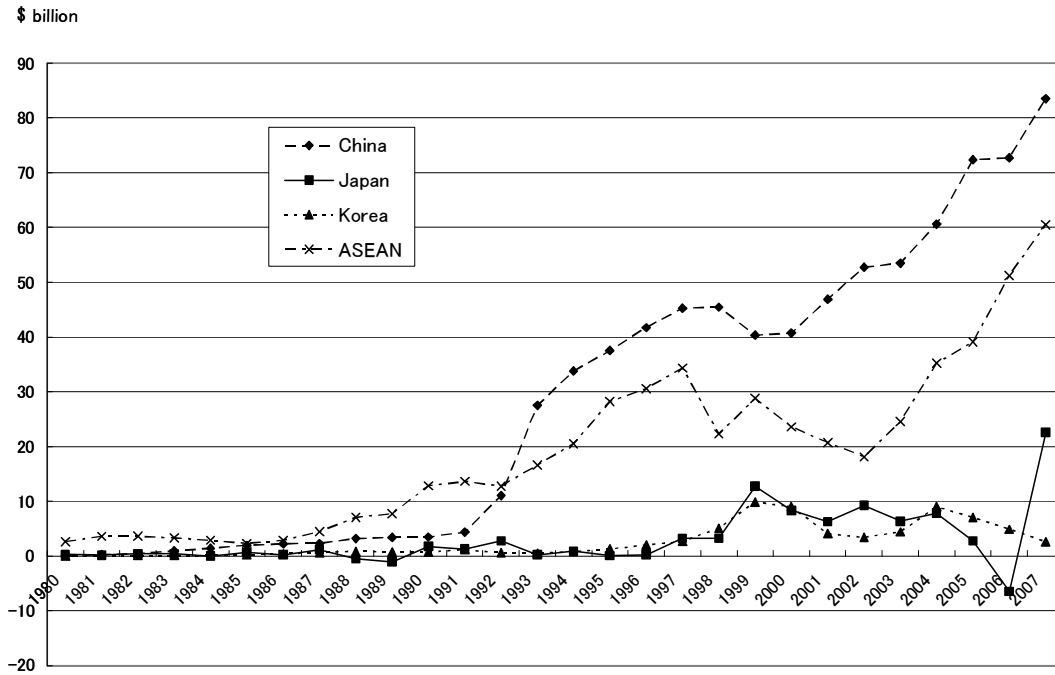


Table 3-7 Bilateral investment treaties among ASEAN+3

(As of August 2008)

	Brunei	Cambodi	Indonesia	Laos	Malaysia	Myanmar	Philippin	Singapor	Thailand	Viet Nam	China	Japan	Korea
Brunei	●										○		●
Cambodi		○									○	△	●
Indonesia		○	●								○		●
Laos			●	○								△	●
Malaysia		○	○		●								●
Myanmar						●							
Philippin		○	○				●						●
Singapor		○	●					●				●	
Thailand		●	●	●					●			●	●
Viet		○	●	●	●					●		●	●
China	○	●	●	●	●	●	●	●	●	●	●	●	●
Japan		△	△					●		●	●	●	●
Korea	●	●	●	●	●		●	●	●	●	●	●	●

Data source: UNCTAD website (<http://www.unctad.org/Templates/Page.asp?intItemID=2344&lang=1>); ICSID website (<http://icsid.worldbank.org/ICSID/FrontServlet?requestType=ICSIDPublicationsRH&actionVal=ViewBilateral&requestFrom=Main>); bilaterals.org website

Notes: ●: in force; ○: signed; △: under negotiation
 Blue cells indicate BITs signed before or in the 1980s, light blue cells BITs signed in the 1990s, and pink cells BITs signed in the 2000s.

4. Analysis of the factors that affect trade and FDI

4.1. Factors that affect FDI

We examine factors that affect inward FDI of ASEAN+3. countries.

UNCTAD publishes inward FDI performance Index. And they use eight variables as key FDI determinants. Eight variables are 1)GDP per capita, 2)real GDP growth, 3)exports as a percentage of GDP, 4)Number of telephone lines per 1000 inhabitants, 5)Commercial energy use per capita, 6)R&D expenditures as a percentage of gross national income, 7)Student tertiary education as a percentage of total population and 8)country risk. GDP is also important determinant but they omitted because it is factored into the FDI Performance Index.

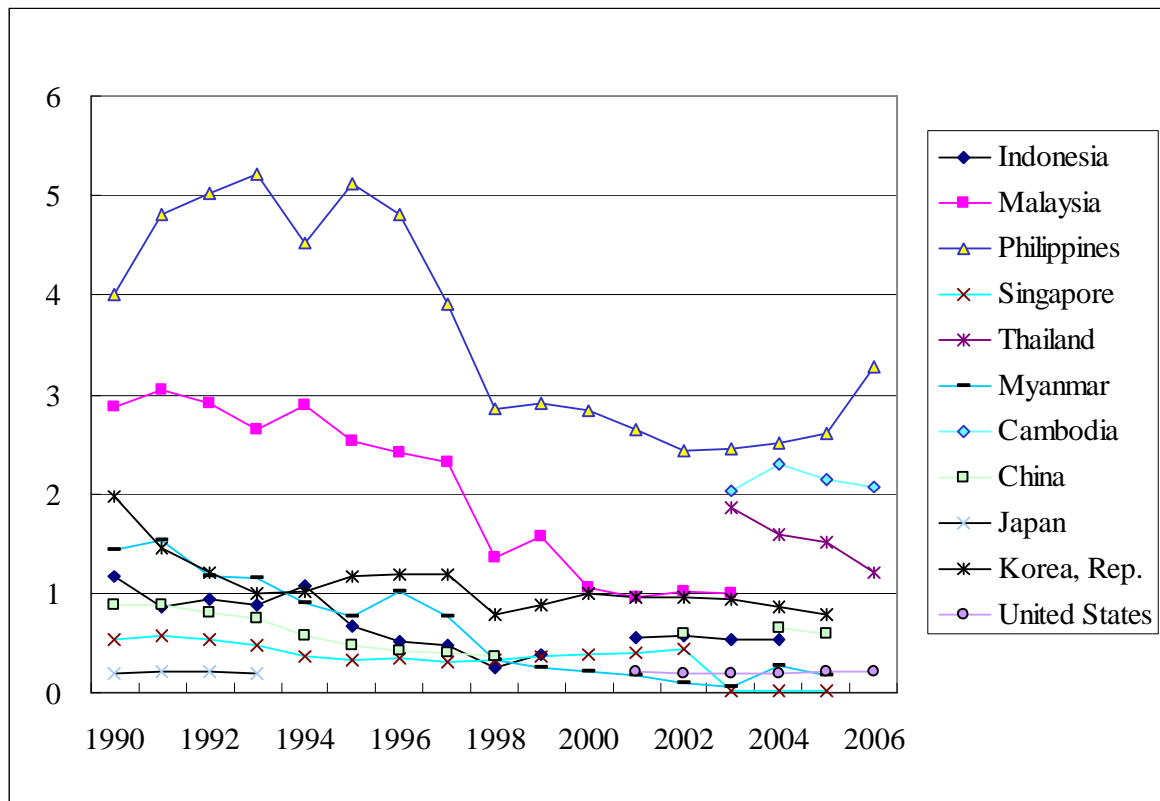
Regarding ASEAN+3 countries, we are not able to use all the data above. We choose the following variables as candidates of the basic factor. GDP indicates economic size as well as the economic wealth. In order to part two factors, we divide GDP into population and GDP per capita. We used World Development Indicators of World Bank as data source.

- *Population* We choose population as a proxy for the market size.
- *GDP per capita* GDP per capita shows the level of economic development.
- *Real GDP growth* This variable shows a future size of economy.
- *Exports(% of GDP)* This variable indicates the degree of international exposure of a country
- *Telephone mainlines(per 100 people)* This variable shows the availability of the basic infrastructure.
- *Energy use (kg of oil equivalent per capita)* This variable is a proxy for the availability and cost of energy.

We tried to find another factors by adding the following variables.

- *Volatility of exchange rate* This variable show the stability of the exchange rate.
Volatility coefficient=Standard deviation /Mean
- *Customs and other import duties* Customs and other duties as a percentage of GDP is proxy for the policy aids forwards trade/FDI.
- *Inflation rate* This variable indicates of stability of the economy.

Figure 4-1 Customs and other duties as a percentage of GDP



(Source) World Development Indicators

4.1.1. Estimation Results

We estimate FDI function. Independent variable is real inward FDI (=Nominal FDI/GDP deflator).As explanatory variables, the variables mentioned above were selected. We estimated by panel data with period dummy. Estimation period is from 1982 to 2005. Number of countries is 12.

In a level estimation, population, GDP per capita, exports as a percentage of GDP, telephone mainlines per 100 people are significant at 1% level. Real GDP growth is significant at 10% level. Energy use per capita is a proxy for the availability and cost of energy. Expected sign is positive but our result is negative.

We add the volatility of exchange rate, but it is positive and not significant.

Customs and other import duties as a percent of GDP effects negative, while it is not significant.

Table 4-1 Level estimation

Dependent Variable: FDI inflow/ GDP deflator

	Coefficient	Coefficient	Coefficient
constant	-32.5 ***	-33.4 ***	-43.0 **
Population	0.3 ***	0.3 ***	0.3 ***
GDP per capita	3.4 ***	3.4 ***	5.1 *
Real GDP growth	213.3 *	217.7 *	524.0 **
Exports(% of GDP)	0.4 ***	0.4 ***	1.0 ***
Telephone mainlines (per 100 people)	0.9 ***	0.9 ***	5.1 ***
Energy use (kg of oil equivalent per capita)	-0.024 ***	-0.024 ***	-0.086 ***
volatility of exchangerate		10.63	
Customs and other import duties (% of GDP)			-4.45
Adjusted R-squared	0.627	0.626	0.818
total obserbations	260	260	94

Note:***,**,*is significant at 1%,5%,10% level respectively. We also use period dummy variables as explanation variables.

Differential model is more appropriate when variables have unit root. In this model, population, GDP per capita and Real GDP growth are significant at 1% level. Exports as a percentage of GDP and telephone mainlines per 100 people are positive, but not significant. Energy use per capita is negative and significant at 1% level.

Table 4-2 Differential EstimationDependent Variable: Δ FDI inflow/ Δ GDP deflator

	Coefficient	Coefficient	Coefficient
constant	-5.0	-5.0	-8.3
Population	1.9 ***	1.9 ***	4.0 ***
GDP per capita	18.6 ***	18.6 ***	15.2
Real GDP growth	253.5 ***	253.8 ***	163.4
Exports(% of GDP)	0.8	0.8	0.1
Telephone mainlines (per 100 people)	1.3	1.3	3.2
Energy use (kg of oil equivalent per capita)	-0.046 ***	-0.046 ***	-0.060 *
volatility of exchange rate		2.1	
Customs and other import duties (% of GDP)			-16.8
Adjusted R-squared	0.138	0.134	0.396
total obserbations	245	245	82

Note:***,**,*is significant at 1%,5%,10% level. Each variable is differential. We also use period dummy variables as explanation variables.

We also tried to estimate adding some variables such as inflation rate. But it is not significant.

4.1.2. Residual analysis

We examine the residuals of the differential estimation. If there are incidents that affect FDI, the residuals increase or decrease sharply.

In 1993, China's residual increase sharply. It is affected by Deng Xiaoping's 1992 speeches in China's southern region, known as the Southern Lectures.

In 1995, Indonesia's residual increase. It is supported by the Asia-Europe Investment Promotion Action Plan. Siemens, the Germany TNC, announced 1700 Million dollars Investment into Indonesia.

The Asian financial crisis that hit the region in 1997-1998 has affected FDI inflows to ASEAN countries. Indonesia's residual showed steep decline in 1998 because of the political instability. Residual of Thailand increased in 1998, but decrease sharply in 1999 due to the recapitalizations in the banking industry. Residual of Korea rose in 1998 due to the increase in cross-border M&A.

In 1999, Japan's residual increased sharply. Most of the new FDI inflows came through a large M&As. This is encouraged by a series of incentives and deregulation measures related to M&A FDI.

In 2000, Hong Kong residual surge because of China's imminent accession to WTO. The increase in FDI was also boosted by big cross border M&A deal in the telecommunication sector.

In 2001, a worldwide FDI flows slowdown following the "dotcom crash". It makes the coefficient of period dummy negatively large. Although FDI inflows to Malaysia and Philippines dropped in 2001, residuals of Malaysia and Philippines became large in order to offset the large negative dummy effect. In contrast, China 's FDI inflow increase actually in 2001 thanks to the accession to the WTO. FDI in Thailand also increased because of the global movement of consolidation in the auto-manufacturing industry.

Many residual changes are caused by international economic incidents such as Asian financial crisis and IT boom in 2000. For the small countries, the international shocks are bigger than the effect of policy change. But, policy can change FDI inflow, when we see the increase in China's inflow in 1993 and 2001. And the increase in Japan's FDI inflow in 1999 is another sample of effect of deregulation.

Figure 4-2 residuals of the differential estimation (1)

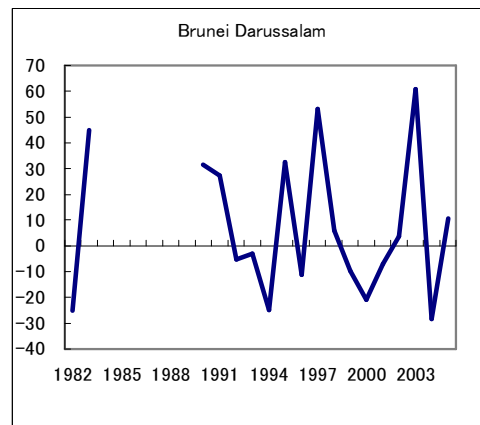
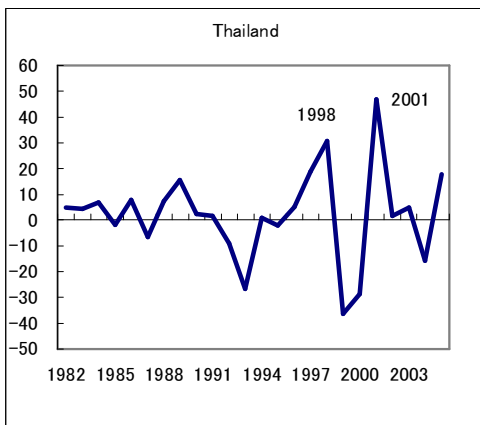
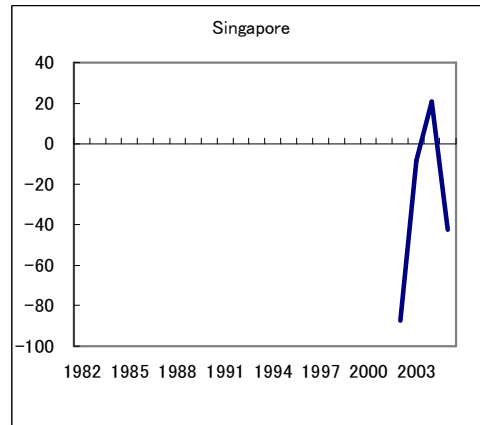
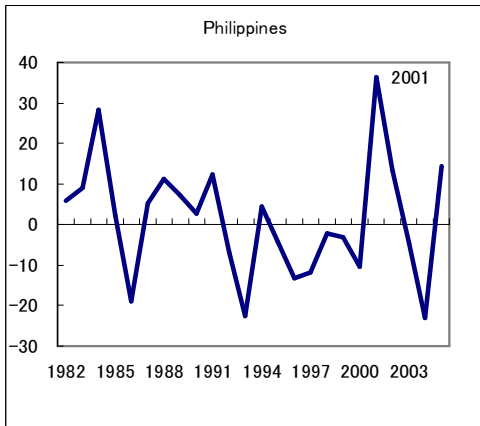
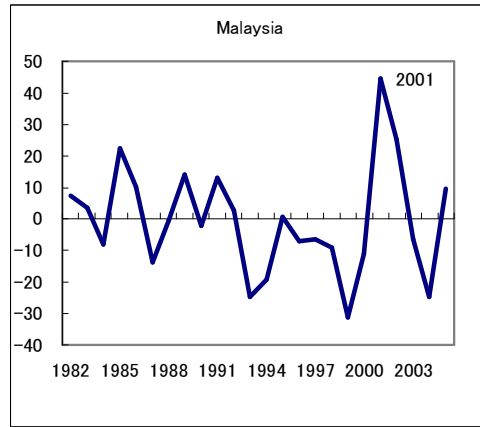
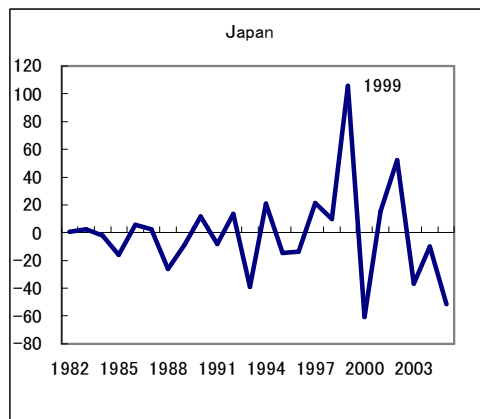
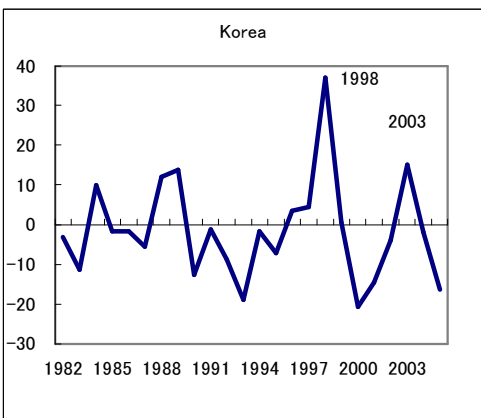
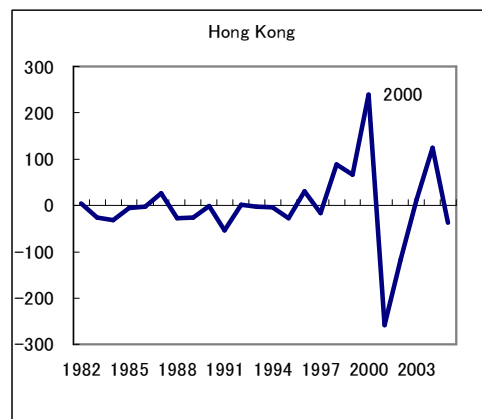
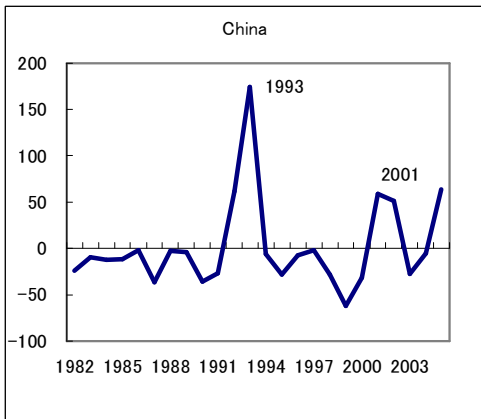
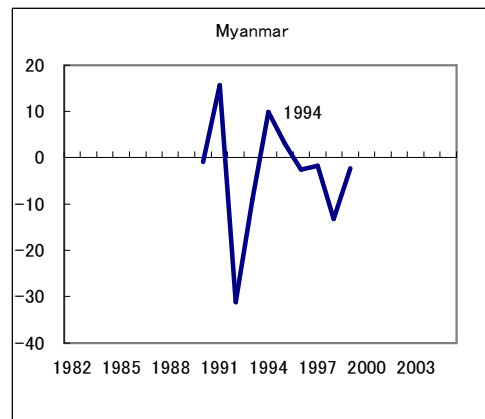
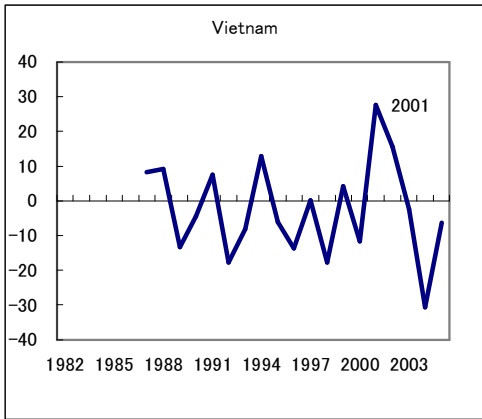


Figure 4-3 residuals of the differential estimation (2)



4.2. Export function

We developed a partial equilibrium model to estimate and import volumes for the ASEAN+3 countries.

4.2.1. Model and Data

We developed the following three models. Dependent variable is export volume calculated by dividing export value by export price. Basic model has income variable and price variable. Differential model is the same specification as basic model, but variables are generated by differential form. Partial adjustment model has two variables above (not differential) and lag of the dependent variable.

In the basic model and differential model, coefficient a_1 indicates income elasticity and a_2 indicates price elasticity. In the partial adjustment model, long term income elasticity is calculated by $a_1/(1-a_3)$ and long term price elasticity is calculated by $a_2/(1-a_3)$.

basic model

$$\log(EX_{it}/PEX_{it})=a_0+a_1\log(GDPWDt/PEXWD_t)+a_2\log(PEX_{it}/PEXWD_t)+u_{it}$$

differential model

$$\Delta\log(EX_{it}/PEX_{it})=a_0+a_1\Delta\log(GDPWDt/PEXWD_t)+a_2\Delta\log(PEX_{it}/PEXWD_t)+u_{it}$$

partial adjustment model

$$\log(EX_{it}/PEX_{it})=a_0+a_1\log(GDPWDt/PEXWD_t)+a_2\log(PEX_{it}/PEXWD_t)+a_3\log(EX_{it-1}/PEX_{it-1})+u_{it}$$

EXit : export value of country i PEXit: export price of country i
GDPWDt: world GDP PEXWDt: world export price $\Delta X_t=X_t-X_{t-1}$

4.2.2. Data

Variables related to export are from IFS(International Financial Statistics) , GDP are from WDI(World Development Indicators). In case export price is not available, we substitute GDP deflator for export price.

4.2.3. Results of Estimation

Estimation period depends on the data availability. Full sample begins in 1980 end in 2006. Income elasticity is expected positive and price elasticity is expected negative. In basic model, four countries are satisfied this condition. In differential model, all the countries' income elasticity is not significant. In partial adjustment model, six countries are satisfied this condition.

Relatively, partial adjustment model 's performance is good.

Table 4-3 Basic model estimation

Dependent Variable: $\log(\text{EXit}/\text{PEXit})$
Method: Least Squares

	Coefficient			Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	$\log(\text{GDPDWDt}/\text{PEXWDt})$	$\log(\text{PEXit}/\text{PEXWDt})$				
id	-21.3 ***	1.57 ***	-0.15	0.957	1.00	0.1	26
ma	-35.3 ***	2.15 ***	0.15	0.982	0.50	0.1	27
ph	-26.6 ***	1.83 ***	-0.09	0.862	0.16	0.3	27
si	-40.6 ***	2.31 ***	0.19	0.980	0.51	0.1	27
th	-42.9 ***	2.39 ***	0.21	0.986	0.62	0.1	27
br	20.2 ***	-0.07	0.47 ***	0.473	0.91	0.1	27
vi	-123.7 ***	5.30 ***	-1.22 ***	0.988	0.95	0.2	21
ca	-144.9 ***	6.61 ***	0.68	0.978	1.34	0.2	14
ch	-65.9 ***	3.35 ***	-0.70 ***	0.993	0.67	0.1	27
hk	-7.5 ***	1.04 ***	-0.23	0.842	0.42	0.2	27
ko	-35.2 ***	2.13 ***	-1.10 ***	0.992	0.98	0.1	27
jp	-8.2 ***	1.15 ***	-0.44 ***	0.982	0.89	0.1	27

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***, **, * is significant at 1%, 5%, 10% level respectively.

Table 4-4 Differential model estimation

Dependent Variable: $\Delta \log(\text{EXit}/\text{PEXit})$
Method: Least Squares

	Coefficient			Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	$\Delta \log(\text{GDPDWDt}/\text{PEXWDt})$	$\Delta \log(\text{PEXit}/\text{PEXWDt})$				
id	0.100 **	-0.924	-0.68 ***	0.629	1.33	0.1	25
ma	0.059	0.651	-0.02	-0.052	1.52	0.1	26
ph	0.064	0.287	-0.63 **	0.146	1.09	0.1	26
si	0.118 ***	-0.319	0.05	-0.075	1.47	0.1	26
th	0.100 **	0.159	-0.30	-0.044	1.53	0.1	26
br	-0.070	1.467	0.21	0.044	1.92	0.1	26
vi	0.009	4.894 *	-1.27 ***	0.872	2.37	0.2	20
ca	-0.145	9.767 **	-0.32	0.338	3.08	0.2	13
ch	0.153 ***	0.002	-0.94 ***	0.706	2.24	0.1	26
hk	-0.027	1.507	-0.91	0.045	1.69	0.1	26
ko	0.115 ***	0.321	-0.06	-0.076	1.35	0.1	26
jp	0.076 **	-0.303	-0.03	-0.067	1.89	0.1	26

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***, **, * is significant at 1%, 5%, 10% level respectively.

Table 4-5 Partial adjustment model estimation

Dependent Variable: $\log(\text{EXit}/\text{PEXit})$
Method: Least Squares

	Coefficient				Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	$\log(\text{GDPDWDt}/\text{PEXWD})$	$\log(\text{PEXit}/\text{PEXWDt})$	$\log(\text{EX}_{t-1}/\text{PEX}_{t-1})$				
id	-9.9 *	0.76 **	-0.26 **	0.49 **	0.966	1.45	0.1	25
ma	-12.1 ***	0.73 ***	-0.09	0.67 ***	0.994	1.60	0.1	26
ph	-5.9 *	0.36 **	0.07	0.84 ***	0.983	1.81	0.1	26
si	2.8	-0.05	-0.47 **	0.93 ***	0.995	1.94	0.1	26
th	-6.5	0.35	-0.43 **	0.86 ***	0.996	1.98	0.1	26
br	5.1	0.05	0.17 *	0.65 ***	0.714	2.13	0.1	26
vi	-108.2 ***	4.63 ***	-1.12 ***	0.12	0.985	1.25	0.2	20
ca	-136.9 **	6.26 **	0.68	0.06	0.969	1.38	0.2	13
ch	-28.8 ***	1.48 ***	-0.42 ***	0.53 ***	0.996	1.69	0.1	26
hk	0.7	0.14	-0.28	0.78 ***	0.930	1.72	0.1	26
ko	-10.7 **	0.66 **	-0.40 **	0.68 ***	0.997	1.37	0.1	26
jp	-3.2 **	0.52 **	-0.38 ***	0.52 ***	0.990	2.07	0.0	26

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***, **, * is significant at 1%, 5%, 10% level respectively.

4.2.4. Stepwise Chow Test

Stepwise Chow test can verify statistically possibility of structural breaks. This test's null hypothesis is coefficient is the same over period.

There are many break points in Indonesia and Hong Kong. It means the coefficient is not stable.

In Malaysia, Philippines, Brunei and Vietnam, there are break points somewhere in the 1990's. In China, the foreign exchange rate management system was reformed in 1994. Eventually the exchange rate of Yuan to dollar depreciated. It may cause the export behavior of Malaysia and Philippines.

In Thailand, break point is 1987 or 1988. For Korea, break point is 1989.

It is difficult to find the link between policy and export behavior. Both income elasticity and price elasticity become large gradually. It is one of the evidences that free trade policy makes market mechanism work well.

Table 4-6 Stepwise Chow test

	id	ma	ph	si	th	br	vi	ca	ch	hk	jp	ko
1986	***						na	na	***			
1987	***	*			**		na	na	***	**		
1988	***				***		na	na	***	***		
1989	***							na	***	***		*
1990	***							na	***	**		
1991	***						**	na	***	**		
1992	***					*	**	na	***	***		
1993	***					*	***	na	***	***		
1994	***	*				**	**	na	***	***		
1995	***	*	*			**	**	na	*	***		
1996	***	*	**			*	*	na	*	**		
1997	***	*	**			**	*	na	*	**		
1998	***	*	**			***	*	***	*	**		
1999	***	*	**			***			*	**		
2000	***	*				***				**		
2001	**	**				**				**		
2002	**									**		
2003	na									**		

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan. Null hypothesis is "the coefficient is the same before and after the break point. ***, **, * is significant at 1%, 5%, 10% level respectively. .

Table 4-7 Results of Chow Test (Export 1)

	Indonesia					Malaysia				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.000	0.259	1.96	-0.23	-1.35	0.380	2.33	2.03	-2.21	-0.91
1987	0.000	0.269	1.96	-0.22	-1.36	0.057	0.98	1.95	0.44	-0.28
1988	0.000	0.420	1.94	-0.91	-1.33	0.178	1.16	1.98	0.11	-0.16
1989	0.000	1.539	1.88	-3.42	-1.30	0.744	3.08	1.97	0.33	-0.16
1990	0.000	0.306	1.86	-1.21	-1.34	0.713	3.33	1.94	0.39	-0.22
1991	0.000	-0.334	1.79	-1.08	-1.39	0.625	3.02	1.88	0.31	-0.49
1992	0.000	0.575	1.74	-0.72	-1.33	0.585	3.09	1.86	0.34	-0.68
1993	0.000	1.078	1.69	-0.55	-1.28	0.155	2.21	1.61	-0.19	-1.16
1994	0.000	1.295	1.63	-0.47	-1.23	0.080	2.30	1.73	-0.10	-0.69
1995	0.000	1.557	1.59	-0.39	-1.20	0.064	2.50	1.79	0.06	-0.37
1996	0.000	1.425	1.49	-0.39	-1.21	0.074	2.65	1.79	0.14	-0.37
1997	0.000	1.467	1.53	-0.36	-1.23	0.095	2.50	1.78	0.03	-0.36
1998	0.000	1.577	2.13	-0.29	-1.65	0.092	2.50	1.71	0.03	-0.20
1999	0.000	1.702	2.85	-0.26	-2.03	0.093	2.54	1.70	-0.03	-0.37
2000	0.000	1.891	1.84	-0.57	-1.85	0.081	2.50	1.64	-0.01	-0.89
2001	0.014	1.502	1.54	-0.44	-1.46	0.020	2.54	2.30	0.01	-1.15
2002	0.014	1.475	2.42	-0.47	-1.58	0.434	2.35	2.23	-0.07	-0.44
2003						0.829	2.28	1.77	-0.19	0.62
	Philippines					Singapore				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.210	2.963	2.48	-16.26	0.27	0.401	0.93	0.38	20.28	-3.21
1987	0.381	-0.152	2.41	-2.37	0.38	0.355	-22.53	1.08	-25.38	-1.77
1988	0.366	-0.157	2.50	-1.94	0.30	0.372	2.34	1.17	1.54	-1.60
1989	0.266	-1.930	2.71	-57.09	0.30	0.396	2.77	1.20	2.12	-1.55
1990	0.245	-3.025	2.82	-89.34	0.14	0.413	3.30	1.23	2.93	-1.51
1991	0.163	-0.209	2.98	-11.57	0.17	0.494	6.92	0.95	8.40	-1.85
1992	0.113	-0.171	3.13	-17.17	0.34	0.410	6.01	0.89	7.34	-1.82
1993	0.166	1.034	3.11	-6.40	0.34	0.181	5.87	0.73	7.16	-1.92
1994	0.260	1.073	2.84	-1.39	0.02	0.268	6.50	0.78	10.89	-1.72
1995	0.066	1.068	2.43	-0.69	-0.48	0.443	5.11	0.77	10.62	-1.77
1996	0.030	1.144	1.91	-0.25	-1.02	0.413	6.04	0.91	13.82	-1.71
1997	0.011	1.372	1.80	0.01	-0.84	0.399	-44.98	1.23	-156.87	-1.47
1998	0.048	-84.844	2.23	16.87	-0.32	0.153	-61.71	1.73	-197.11	-1.14
1999	0.041	-0.797	1.99	1.09	-0.56	0.686	-3.39	1.25	-13.93	-1.53
2000	0.192	15.016	1.80	-6.03	-0.56	0.686	-5.02	1.00	-17.67	-1.69
2001	0.214	-13.462	1.78	7.37	-0.69	0.130	0.85	3.21	-3.92	-0.63
2002	0.753	3.364	1.64	-0.11	-0.75	0.908	-33.83	2.93	-81.21	-0.78
2003	0.825	2.831	0.68	0.11	-0.81	0.948	-2.52	4.54	-11.11	0.34
	Thailand					Burunei				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.133	1.121	2.00	-0.75	-1.97	0.575	-0.60	-0.56	-1.53	1.21
1987	0.010	1.070	2.04	-0.72	-1.05	0.334	-0.12	-0.41	-0.11	1.08
1988	0.002	1.146	2.07	-0.95	-0.71	0.436	-0.57	-0.59	-0.10	1.25
1989	0.254	6.933	2.08	-7.90	-0.58	0.182	-0.56	-0.52	-0.10	1.26
1990	0.269	-0.117	2.08	2.32	-0.60	0.144	-0.51	-0.43	-0.08	1.21
1991	0.366	4.509	2.05	-0.91	-0.75	0.144	-0.42	-0.38	-0.03	1.17
1992	0.366	4.298	2.04	-1.07	-0.76	0.073	-0.10	-0.09	0.14	1.00
1993	0.402	3.509	2.00	-1.43	-0.92	0.078	-0.20	-0.08	0.09	0.99
1994	0.291	3.147	1.89	-4.00	-1.12	0.048	-0.15	0.24	0.12	0.78
1995	0.358	3.306	1.89	-2.37	-1.12	0.035	-0.18	0.40	0.11	0.69
1996	0.325	3.195	2.16	-2.32	-0.36	0.071	-0.24	0.43	0.07	0.67
1997	0.475	3.149	2.35	-4.90	0.05	0.016	-0.23	1.08	0.08	0.39
1998	0.433	3.081	2.41	-3.64	-0.13	0.004	-0.24	2.28	0.07	-0.20
1999	0.464	3.109	2.48	-4.48	-0.03	0.007	-0.28	2.50	0.06	-0.25
2000	0.461	3.050	2.85	-3.29	0.36	0.000	-0.29	2.43	0.04	-0.43
2001	0.203	3.042	2.59	-2.99	-3.43	0.012	-0.23	2.23	0.15	-0.36
2002	0.544	2.896	3.20	-3.16	-0.39	0.118	-0.09	3.22	0.28	-0.64
2003	0.902	2.812	3.21	-3.72	-0.43	0.134	0.01	8.02	0.36	-1.85

Table 4-8 Result of Chow Test(Export 2)

	Vietnam					Cambodia				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986										
1987										
1988										
1989	0.453	0.14	4.12	0.49	-0.41					
1990	0.382	0.14	4.09	0.49	-0.38					
1991	0.022	-0.42	3.91	-1.62	-0.10					
1992	0.013	2.73	3.72	-1.46	0.24					
1993	0.000	1.62	4.51	-1.54	-1.40					
1994	0.026	5.23	4.50	-1.22	-1.37					
1995	0.048	5.86	4.62	-1.16	-1.90					
1996	0.059	6.19	4.76	-1.13	-3.01					
1997	0.073	6.39	4.74	-1.11	-3.49					
1998	0.062	6.38	4.89	-1.11	-3.00	0.002	2.89	3.90	3.18	-0.46
1999	0.124	6.14	4.98	-1.14	-2.69	0.222	6.91	4.02	-1.95	-0.53
2000	0.347	5.84	4.57	-1.18	-3.63	0.214	7.18	4.04	-1.87	-0.51
2001	0.499	5.66	5.03	-1.21	-3.10	0.203	6.93	3.49	-1.92	-0.83
2002	0.784	5.48	5.51	-1.23	-2.88	0.202	6.87	3.44	-2.01	-0.83
2003	0.948	5.35	6.02	-1.25	-4.26	0.243	6.66	3.05	-2.39	-1.49
	China					Hong Kong				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.001	1.61	3.60	-1.47	-1.59	0.121	0.83	0.37	1.59	-0.72
1987	0.003	2.22	3.57	-0.62	-1.53	0.029	0.73	0.39	1.73	-0.44
1988	0.006	1.69	3.58	-1.16	-1.55	0.001	1.30	0.37	-1.54	-0.39
1989	0.009	1.78	3.56	-1.27	-1.52	0.002	0.51	0.43	4.16	-0.30
1990	0.002	2.42	3.88	-0.99	-2.00	0.011	1.93	0.44	-4.59	-0.29
1991	0.005	1.09	4.04	-2.35	-2.20	0.019	1.75	0.49	-3.34	-0.22
1992	0.004	0.38	4.14	-3.13	-2.27	0.008	1.79	0.64	-3.33	-0.09
1993	0.004	0.55	4.16	-2.91	-2.27	0.001	1.74	0.79	-3.33	0.02
1994	0.001	0.91	4.43	-2.66	-2.51	0.006	1.45	0.80	-4.44	0.01
1995	0.073	2.27	4.41	-1.75	-2.52	0.009	1.27	0.77	-5.48	0.01
1996	0.063	2.39	4.42	-1.59	-2.82	0.016	1.05	0.87	-6.22	0.09
1997	0.057	2.39	4.43	-1.60	-3.08	0.028	0.82	0.97	-7.12	0.15
1998	0.062	2.79	4.48	-1.24	-2.75	0.029	0.91	1.05	-6.57	0.20
1999	0.063	2.62	4.38	-1.40	-3.18	0.025	0.96	0.55	-6.16	-0.05
2000	0.120	3.00	4.80	-1.04	-2.51	0.031	1.08	-0.38	-5.32	-0.52
2001	0.111	3.00	5.41	-1.04	-1.49	0.034	1.15	-2.00	-4.80	-1.20
2002	0.134	2.93	5.10	-1.11	-1.87	0.037	1.13	-1.89	-4.98	-1.11
2003	0.152	2.98	5.05	-1.06	-2.07	0.039	1.15	-2.49	-4.85	-1.51
	Korea					Japan				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.563	1.68	1.61	0.76	-1.74	0.158	1.85	1.11	-0.10	-0.65
1987	0.563	1.84	1.52	0.33	-1.80	0.317	2.04	1.10	-1.31	-0.66
1988	0.215	4.75	3.20	-5.58	-0.45	0.613	2.02	1.09	-2.35	-0.69
1989	0.062	3.08	3.39	-2.71	-0.28	0.565	2.03	1.07	-2.44	-0.69
1990	0.113	2.59	3.24	-1.72	-0.40	0.528	1.97	1.09	-2.50	-0.68
1991	0.443	2.26	3.25	0.03	-0.39	0.903	1.29	1.07	-1.57	-0.71
1992	0.779	2.11	3.11	0.15	-0.49	0.909	1.24	1.06	-1.52	-0.72
1993	0.727	2.05	1.40	0.45	-1.68	0.900	1.15	0.98	-1.38	-0.81
1994	0.584	2.02	0.80	0.50	-1.95	0.873	1.15	0.95	-1.37	-0.83
1995	0.520	2.04	1.63	0.46	-1.26	0.922	1.17	0.97	-1.17	-0.84
1996	0.986	2.09	1.72	-0.49	-1.42	0.835	1.20	1.04	-1.17	-0.82
1997	1.000	2.07	1.85	-1.38	-1.35	0.866	1.15	1.05	-1.06	-0.81
1998	1.000	2.06	1.89	-1.46	-1.33	0.626	1.19	1.42	-1.14	-0.59
1999	0.998	2.06	2.96	-1.47	-0.72	0.866	1.07	-0.10	-0.71	-1.62
2000	0.528	2.05	6.85	-1.58	1.28	0.949	1.10	1.08	-0.68	-0.95
2001	0.182	2.05	3.74	-1.77	-1.26	0.137	1.12	3.50	-0.69	0.23
2002	0.830	2.11	4.76	-1.13	-0.54	0.642	1.06	3.61	-0.47	0.24
2003	0.855	2.13	5.25	-1.03	0.06	0.618	1.04	3.64	-0.44	0.35

4.3. Import function

We developed the following three models. Dependent variable is import volume calculated by dividing import value by import price. Basic model has income variable and price variable. Differential model is the same specification as basic model, but variables are generated by differential form. Partial adjustment model has two variables (not differential) above and lag of the dependent variable.

In the basic model and differential model, coefficient a_1 indicates income elasticity and a_2 indicates price elasticity. In the partial adjustment model, long term income elasticity is calculated by $a_1/(1-a_3)$ and long term price elasticity is calculated by $a_2/(1-a_3)$.

basic model

$$\log(MX_{it}/PMX_{it})=a_0+a_1\log(RGDP_{it})+a_2\log(PMX_{it})+u_{it}$$

differential model

$$\Delta\log(MX_{it}/PMX_{it})=a_0+a_1\Delta\log(RGDP_{it})+a_2\Delta\log(PMX_{it})+u_{it}$$

partial adjustment model

$$\log(MX_{it}/PMX_{it})=a_0+a_1\log(RGDP_{it})+a_2\log(PMX_{it})+a_3\log(MX_{it-1}/PMX_{it-1})+u_{it}$$

MX_{it} : export value of country i PMX_{it} : export price of country i

$RGDP_{it}$: real GDP of country i $\Delta X_t=X_t-X_{t-1}$

4.3.1. Data

Variables related to import are from IFS(International Financial Statistics) , GDP are from WDI(World Development Indicators). In case import price data is not available, we substitute GDP deflator for export price.

4.3.2. Estimation result

Estimation period depends on the data availability. Full sample begin in 1980 end in 2006. Income elasticity is expected positive and price elasticity is expected negative. In basic model, two countries are satisfied this condition. In differential model, almost all the countries' price elasticity is not significant. In partial adjustment model, three countries are satisfied this condition. Relatively, performance of partial adjustment model is good.

Table 4-9 Basic model estimation

Dependent Variable: $\log(\text{MXit}/\text{PMXit})$
 Method: Least Squares

	Coefficient			Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	$\log(\text{RGDPit})$	$\log(\text{PMXit}*\text{FXit})$				
id	-18.8 **	1.37 ***	-0.13	0.879	1.54	0.2	27
ma	-23.5 ***	1.86 ***	-0.77 **	0.980	0.79	0.1	27
ph	-57.2 ***	2.88 ***	-0.06	0.914	0.44	0.2	27
si	-6.6 ***	1.07 ***	-0.02	0.980	0.61	0.1	27
th	-26.2 ***	1.76 ***	-0.53 ***	0.969	0.94	0.1	27
br	187.6	-7.51	0.20	0.104	1.73	2.0	21
vi	21.7	-0.26	2.71 ***	0.797	0.85	0.8	18
ca	-71.2	1.96	7.53	0.591	0.65	1.3	14
ch	-9.5	0.90	1.30	0.719	1.27	0.6	21
hk	-41.5 ***	2.23 ***	0.18	0.979	0.32	0.1	27
ko	-24.4 ***	1.26 ***	0.22	0.986	1.17	0.1	27
jp	-63.5 ***	2.39 ***	0.46 ***	0.897	0.42	0.1	27

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***, **, * is significant at 1%, 5%, 10% level respectively.

Table 4-10 Differential model estimation

Dependent Variable: $\Delta \log(\text{MXit}/\text{PMXit})$
 Method: Least Squares

	Coefficient			Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	$\Delta \log(\text{RGDPit})$	$\Delta \log(\text{PMXit}*\text{FXit})$				
id	-0.3 *	2.97 **	1.51 **	0.137	2.08	0.2	26
ma	0.0	1.54 ***	0.64	0.411	1.51	0.1	26
ph	-0.1	3.24 ***	0.13	0.394	1.89	0.1	26
si	-0.1 **	1.83 ***	0.28	0.633	2.41	0.1	26
th	-0.1	2.43 ***	-0.23	0.521	2.03	0.1	26
br	0.5	-12.51	-5.00	-0.069	1.72	2.6	20
vi	0.8	-10.78	2.04	0.065	2.22	0.8	17
ca	2.2 **	-21.74 **	-5.53	0.219	2.04	0.8	13
hk	0.0	1.35 ***	0.11	0.391	1.09	0.1	26
ch	-0.1	2.18	2.72	-0.050	1.09	0.7	19
hk	0.0	1.35 ***	0.11	0.391	1.09	0.1	26
ko	0.0	1.94 ***	-0.28	0.517	2.15	0.1	26
jp	0.0	1.11	0.24 *	0.179	1.33	0.1	26

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam,

ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***,**,*, is significant at 1%,5%,10% level respectively.

Table 4-11 Partial adjustment model estimation

Dependent Variable: $\log(MX_{it}/PMX_{it})$

Method: Least Squares

	Coefficient			Adjusted R-squared	Durbin-Watson stat	S.E. of regression	Number of Observations
	Costant	log(RGDPit)	log(PMXit*FXit)				
id	-12.6 *	0.89 ***	-0.11	0.879	2.15	0.2	26
ma	-13.5 ***	1.04 ***	-0.63 *	0.984	1.25	0.1	26
ph	-21.6 **	1.11 **	0.05	0.955	1.11	0.1	26
si	-4.4 **	0.68 ***	0.01	0.982	1.13	0.1	26
th	-22.9 ***	1.51 ***	-0.49 ***	0.971	1.22	0.1	26
br	183.7	-7.55	0.83	0.041	1.78	2.1	20
vi	-4.4	0.41	-0.19	0.802	1.99	0.7	17
ca	47.5	-2.00	3.54	0.782	2.35	0.9	13
ch	-26.2 ***	1.77 ***	-1.04 ***	0.953	0.90	0.1	19
hk	-13.4 ***	0.66 ***	0.36 ***	0.996	1.59	0.1	26
ko	-16.8 **	0.93 ***	-0.02	0.985	1.69	0.1	26
jp	-14.3	0.60 *	0.02	0.968	1.61	0.1	26

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan.

***,**,*, is significant at 1%,5%,10% level respectively.

4.3.3. Stepwise Chow Test

There is one break point in 1999 for Indonesia. For Malaysia, there is breakpoint around 1990.

Coefficient of Philippines, Singapore, China are not stable.

In Thailand, there are break points in late 1980's and mid 1990's.

In Brunei and Vietnam, There are break points around 2000.

For many countries, it is difficult to distinguish break points.

Table 4-12 Stepwise Chow test

	id	ma	ph	si	th	br	vi	ca	ch	hk	jp	ko
1986						na	na	na	na	*	**	***
1987			**	**	*	na	na	na	na	**	***	***
1988		**	**	**	*	na	na	na	na	**	***	***
1989		***	**	*		na	na	na	na	**	**	***
1990		*	**	*		na	na	na	na	**	**	***
1991		*	**	*		na	na	na	na	***	***	***
1992		*	**	**		na	na	na	**	**	***	***
1993			***	**			na	na	**	**	***	***
1994			***	*	*			na	***	**	***	***
1995			***		*			na	***	**	*	***
1996			***		**			na	***	**		**
1997			***	**		**	*	na	***	**		**
1998			***	***		*	**	**	***	*		**
1999	*		***	**		**	**	**	***			*
2000			***	**		*	**	**	**			
2001			***	**		**	**		**			
2002			***				***	*	*			
2003			**				***	*	*	na		

Note: id: Indonesia, ma: Malaysia, ph: Philippines, si: Singapore, th: Thailand, br: Brunei Darussalam, vi: Vietnam, ca: Cambodia, ch: China, hk: China, Hong Kong, ko: Korea, jp: Japan. Null hypothesis is "the coefficient is the same before and after the break point. ***, **, * is significant at 1%, 5%, 10% level respectively.

Table 4-13 Results of Chow Test(Import 1)

	Indonesia					Malaysia				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.222	32.31	1.55	-13.32	-0.21	0.808	0.32	2.08	-0.02	-1.19
1987	0.395	-2.94	1.39	1.77	-0.18	0.107	-0.57	1.80	1.10	-0.94
1988	0.434	-3.84	1.43	3.17	-0.18	0.018	0.08	1.52	0.71	-0.56
1989	0.292	-3.51	1.16	2.83	-0.14	0.001	0.40	1.38	0.56	-0.34
1990	0.336	-3.44	1.00	2.91	-0.11	0.092	1.73	1.32	0.27	-0.25
1991	0.878	-0.94	0.94	1.39	-0.10	0.099	5.15	1.27	-0.82	-0.18
1992	0.979	1.59	0.99	-0.26	-0.11	0.079	3.99	1.43	-0.44	-0.36
1993	0.977	1.56	0.95	-0.24	-0.11	0.293	1.80	1.15	0.57	-0.10
1994	0.943	1.06	0.76	0.10	-0.10	0.137	1.71	0.77	0.47	0.26
1995	0.865	1.01	0.60	0.13	-0.12	0.128	1.71	0.65	0.60	0.35
1996	0.895	1.36	0.59	-0.11	-0.12	0.116	1.71	0.72	0.59	0.33
1997	0.869	1.20	0.70	0.00	-0.18	0.453	1.61	0.76	0.39	0.24
1998	0.317	1.21	4.24	-0.01	-1.71	0.567	1.69	0.94	0.03	-0.05
1999	0.059	0.39	-0.27	0.68	0.57	0.639	2.09	0.55	-1.12	0.34
2000	0.960	1.19	4.11	0.02	-1.72	0.528	2.07	-0.43	-1.07	1.22
2001	0.368	1.18	-7.93	0.03	4.78	0.571	1.93	-0.06	-0.69	0.94
2002	0.403	1.25	-8.72	-0.03	5.15	0.889	1.94	0.05	-0.81	0.84
2003	0.511	1.36	-15.94	-0.13	8.40	0.924	2.00	0.36	-0.99	0.62
	Philippines					Singapore				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.157	2.04	0.52	-0.35	1.04	0.404	-1.08	1.11	2.91	-0.49
1987	0.023	2.41	1.06	-0.63	0.60	0.049	-1.07	1.06	2.69	-0.56
1988	0.013	2.72	1.07	-0.47	0.56	0.032	0.73	1.04	0.90	-0.52
1989	0.011	3.77	1.20	-0.33	0.49	0.099	1.29	1.06	1.42	-0.59
1990	0.011	5.63	0.57	-0.16	0.86	0.068	1.14	1.01	1.19	-0.37
1991	0.011	5.05	0.24	-0.21	1.07	0.058	1.16	0.98	1.21	-0.23
1992	0.012	5.42	0.05	-0.17	1.21	0.047	1.23	0.89	1.30	0.09
1993	0.001	4.95	2.97	-0.22	-1.13	0.038	1.31	0.72	1.36	0.56
1994	0.002	5.16	2.89	-0.19	-1.09	0.084	1.42	0.64	1.43	0.72
1995	0.001	5.02	2.63	-0.20	-1.07	0.119	1.52	0.60	1.59	0.79
1996	0.000	4.81	1.97	-0.20	-0.66	0.101	1.56	0.95	1.69	0.09
1997	0.000	4.97	1.92	-0.21	-0.63	0.038	1.54	1.97	1.63	-1.90
1998	0.000	4.88	2.73	-0.20	-1.33	0.009	1.52	2.21	1.59	-2.08
1999	0.000	4.86	1.68	-0.20	-0.33	0.024	1.47	2.16	1.52	-1.98
2000	0.000	4.60	2.54	-0.20	-1.31	0.025	1.44	0.43	1.48	2.41
2001	0.001	4.33	18.48	-0.18	-17.51	0.041	1.31	7.74	0.94	-13.43
2002	0.005	4.10	17.42	-0.16	-16.91	0.487	1.17	0.46	0.32	2.36
2003	0.013	3.92	55.30	-0.14	-53.38	0.924	1.08	0.33	0.00	2.66
	Thailand					Burunei				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.344	1.52	2.03	-3.48	-0.67					
1987	0.064	0.32	1.85	-2.01	-0.61					
1988	0.085	0.59	1.77	0.13	-0.57					
1989	0.276	0.83	1.73	0.99	-0.55					
1990	0.367	0.99	1.74	1.25	-0.55					
1991	0.261	1.12	1.87	1.32	-0.59					
1992	0.135	1.08	1.99	1.32	-0.59					
1993	0.102	1.02	2.06	1.37	-0.59	0.995	2.61	-3.77	1.08	-0.52
1994	0.084	1.06	2.10	1.32	-0.57	0.850	5.33	16.76	0.21	-6.51
1995	0.073	1.10	2.10	1.26	-0.53	0.304	5.21	36.33	0.27	-11.38
1996	0.022	1.12	2.02	1.17	-0.31	0.627	25.62	34.17	-5.06	-11.06
1997	0.363	1.78	1.92	-0.45	-0.17	0.026	-26.80	44.37	8.18	-15.82
1998	0.459	2.14	1.85	-1.20	-0.08	0.066	-13.73	46.77	11.07	-16.07
1999	0.383	2.13	2.10	-1.19	-0.66	0.012	-10.11	51.05	12.46	-15.67
2000	0.519	1.99	2.29	-0.91	-1.23	0.051	-13.39	52.43	1.40	-15.65
2001	0.698	1.91	1.40	-0.75	1.79	0.049	-13.89	62.71	-3.53	-17.35
2002	0.791	1.87	1.48	-0.68	1.64	0.170	-11.58	58.34	-0.53	-16.99
2003	0.767	1.86	1.81	-0.66	1.40	0.274	-11.14	69.97	4.10	-16.85

Table 4-14 Results of Chow Test(Import 2)

	Vietnam					Cambodia				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986										
1987										
1988										
1989										
1990										
1991										
1992										
1993										
1994	0.872	13.75	-11.23	-5.03	12.44					
1995	0.839	2.93	-2.90	0.36	2.09					
1996	0.590	20.74	4.45	-11.79	-7.73					
1997	0.062	-0.44	11.21	1.89	-16.61					
1998	0.049	-4.94	16.09	4.96	-22.56	0.010	37.32	10.36	-23.26	-34.65
1999	0.020	6.69	14.74	-0.99	-21.42	0.014	19.99	10.82	-6.18	-35.76
2000	0.018	6.12	12.65	-0.71	-19.14	0.019	-4.44	8.97	14.91	-31.26
2001	0.017	7.39	22.51	-1.29	-29.69	0.101	11.00	7.25	-0.12	-26.76
2002	0.003	6.50	112.94	-0.80	-122.8	0.099	10.17	11.29	0.61	-35.76
2003	0.003	5.67	96.41	-0.39	-106.5	0.070	9.00	-116.63	1.86	238.85
	China					Hong Kong				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986						0.085	2.71	2.04	-0.86	1.77
1987						0.011	0.98	1.89	0.36	1.22
1988						0.022	1.62	1.88	-0.15	1.11
1989						0.037	2.40	1.86	-0.72	0.87
1990						0.031	3.28	1.81	-1.27	0.60
1991						0.007	3.66	1.72	-1.49	0.35
1992	0.043	2.47	2.55	-0.28	-2.16	0.012	4.30	1.69	-1.96	0.28
1993	0.032	-0.40	3.05	2.42	-3.69	0.010	3.94	1.63	-1.62	0.19
1994	0.001	1.30	35.58	-0.29	-110.9	0.012	3.44	1.54	-1.05	0.04
1995	0.001	0.21	8.36	1.08	-20.50	0.011	3.21	1.47	-0.79	-0.01
1996	0.001	0.79	135.93	0.39	-433.5	0.010	3.18	1.49	-0.77	-0.06
1997	0.004	0.64	4.53	0.40	-8.02	0.045	2.89	1.49	-0.43	-0.12
1998	0.006	-0.20	3.58	1.13	-4.76	0.058	2.60	1.53	0.02	-0.46
1999	0.006	-0.37	3.46	1.29	-4.50	0.250	2.27	1.55	0.51	-0.68
2000	0.014	0.20	3.38	0.73	-4.27	0.326	2.02	1.61	0.96	-0.85
2001	0.038	0.76	-2.93	0.16	12.87	0.321	2.21	2.53	0.61	-3.84
2002	0.058	0.97	-2.94	-0.07	12.81	0.709	1.95	2.72	1.09	-4.29
2003	0.063	1.18	-0.91	-0.30	5.23	0.000	2.02	2.72	0.95	-4.29
	Korea					Japan				
	p-value	income		price		p-value	income		price	
		before	after	before	after		before	after	before	after
1986	0.001	0.76	1.65	1.63	-0.44	0.027	0.19	2.63	-0.50	-0.45
1987	0.000	0.80	1.69	1.54	-0.47	0.008	0.77	1.53	0.37	-0.73
1988	0.000	0.84	1.87	1.42	-0.76	0.009	0.67	1.38	0.26	-0.76
1989	0.000	0.86	1.87	1.34	-0.76	0.039	1.14	1.68	0.32	-0.72
1990	0.000	0.98	1.89	0.45	-0.77	0.017	2.08	3.13	0.52	-0.81
1991	0.000	1.01	1.89	0.43	-0.77	0.004	1.90	3.97	0.48	-0.96
1992	0.000	1.06	1.96	0.63	-0.84	0.001	1.90	4.52	0.48	-1.17
1993	0.000	1.06	1.94	0.63	-0.84	0.001	1.89	4.40	0.48	-1.13
1994	0.000	1.06	1.81	0.59	-0.75	0.002	1.94	3.72	0.46	-0.83
1995	0.000	1.08	1.73	0.72	-0.69	0.051	2.02	3.41	0.41	-0.69
1996	0.013	1.17	1.73	0.80	-0.68	0.453	2.24	3.25	0.35	-0.62
1997	0.023	1.31	1.70	0.58	-0.54	0.609	2.54	3.41	0.39	-0.68
1998	0.020	1.30	1.51	0.16	0.35	0.641	2.40	3.36	0.35	-0.66
1999	0.083	1.65	1.48	-3.10	0.37	0.654	2.36	3.05	0.36	-0.59
2000	0.611	1.36	1.49	-0.46	0.37	0.797	2.36	2.76	0.30	-0.50
2001	0.761	1.33	1.64	-0.21	0.27	0.891	2.46	2.36	0.30	-0.37
2002	0.721	1.34	1.22	-0.25	0.65	0.894	2.47	2.34	0.30	-0.36
2003	0.824	1.34	1.24	-0.18	0.58	0.898	2.49	2.39	0.30	-0.37

5. Analysis of relations between global financial markets and domestic financial and asset markets

Asian economies have gradually removed the restrictions on capital accounts and controls on exchange rate. This has raised major debate as to the positive and adverse impacts of such liberalization on domestic financial and asset markets, as well as on domestic output.

As identified by our regression estimation in Chapter 4, global financial market situations do affect the capital inflows into Asian countries. In this chapter, we assess the relationship between global financial markets and domestic economy, channeled by cross-border capital flows.

5.1. Impacts of global markets, capital flow on domestic financial and asset markets

5.1.1. Methodology

Channeling of global financial market movements into domestic economy is made through cross border capital flows. Thus, the degree of influence differs depending on the integration into international financial/capital markets, or each market's "financial openness."

There are numerous measures to assess the financial openness of a country and economy. According to Kose, Prasad, Rogoff and Wei (2006), who summarized such previous works, two types of measurement methods have been proposed and developed, namely "de jure" measures and "de facto" measures. However, consensus has yet to be reached as to which indicators shall be most relevant, since each type of measurements have certain shortcomings.

5.1.2. Estimation results

"De jure" measurement is based on formal regulations and restrictions on current and capital accounts. Most of the measures developed use IMF's "Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)" as the basic reference. Although AREAER measures the degree of openness in binary ("0" or "1") terms, some literatures have refined the indicators to allow more detailed scales.

Major shortcomings of such measures primarily come from the difficulty of identifying which restrictions are relevant in determining the degree of financial integration. For example, even if there are certain capital controls, there may be alternatives that inevitably allow some financial flows, including the existence of loopholes. In addition, difficulty of distinguishing different types of controls (such as portfolio flows, FDI and currency exchange) is also a bottleneck.

5.1.3. “De facto” measurement

“De facto” measures are based on the actual integration into global markets, using the actual flows of the current and financial accounts. Due to the volatility of annual volume of flows, Kose, Prasad, Rogoff and Wei (2006) proposes to use the stock data, which is the sum of external asset and liability as ratio against GDP.

This measure may not be perfect either, as the level and changes of this indicator are affected by various factors, and not necessarily related to regulatory changes. Thus, low degree of this ratio does not necessarily mean that the *integration* with global markets is low, because this ratio (and thus the flow) may fluctuate without changes of formal restrictions, reflecting the domestic and global financial conditions.

However, overall, this indicator can be deemed to be relevant in measuring the level of *exposure* to the foreign capital markets, and thus the relative degree of impacts from overseas markets. Thus, in this chapter, we applied this ratio for the basis of quantitative analysis.

5.1.4. Historical paths of Asian economies

5.1.4.1. Dataset

Historical data on the external capital flows and stocks are not necessarily available in every country for a long time series, and the available data in IMF’s “International Financial Statistics (IFS)” are limited. Addressing this issue, Lane and Milesi-Ferretti (2006) have constructed the “External Wealth of Nations” database that estimates each country’s external stock positions from “International Investment Position” and capital flow data, taking into account capital gains and losses for the time series between 1970 and 2004. We used the same dataset for the following analysis, and for more recent years (2005 until 2007), we used the IFS data.

5.1.4.2. Historical developments

Combined financial openness, which represents the total of FDI, equity and debt stocks in gross terms, are shown in the below chart. Many countries/economies have experienced increase of external positions especially after 1980s, and slowdown (or stabilization) after the Asian financial crisis.

Figure 5-1 Combined financial openness (all countries and economies)

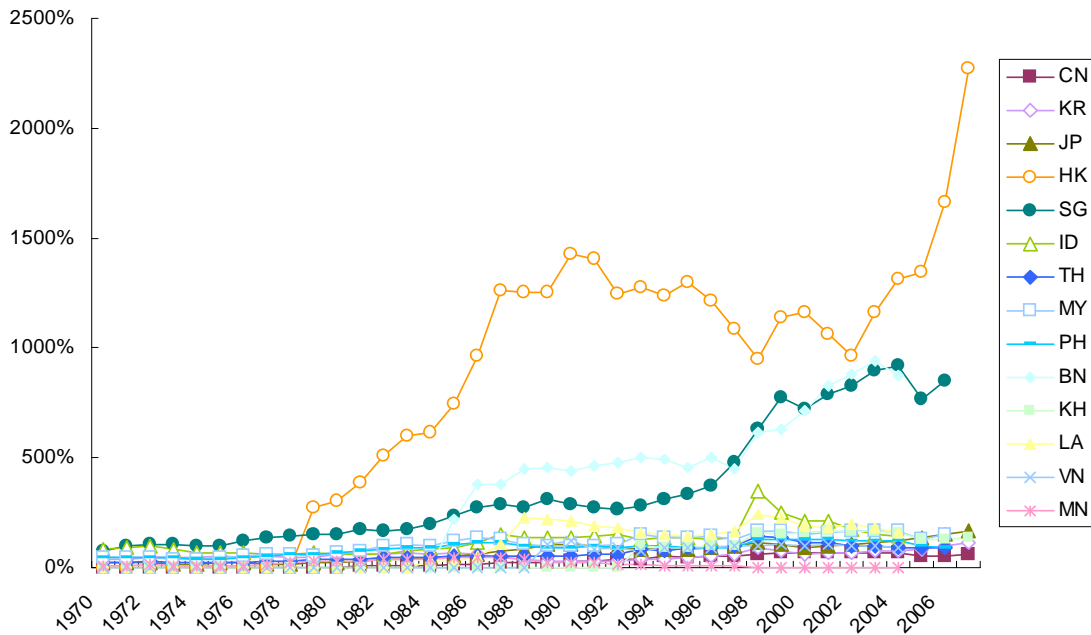
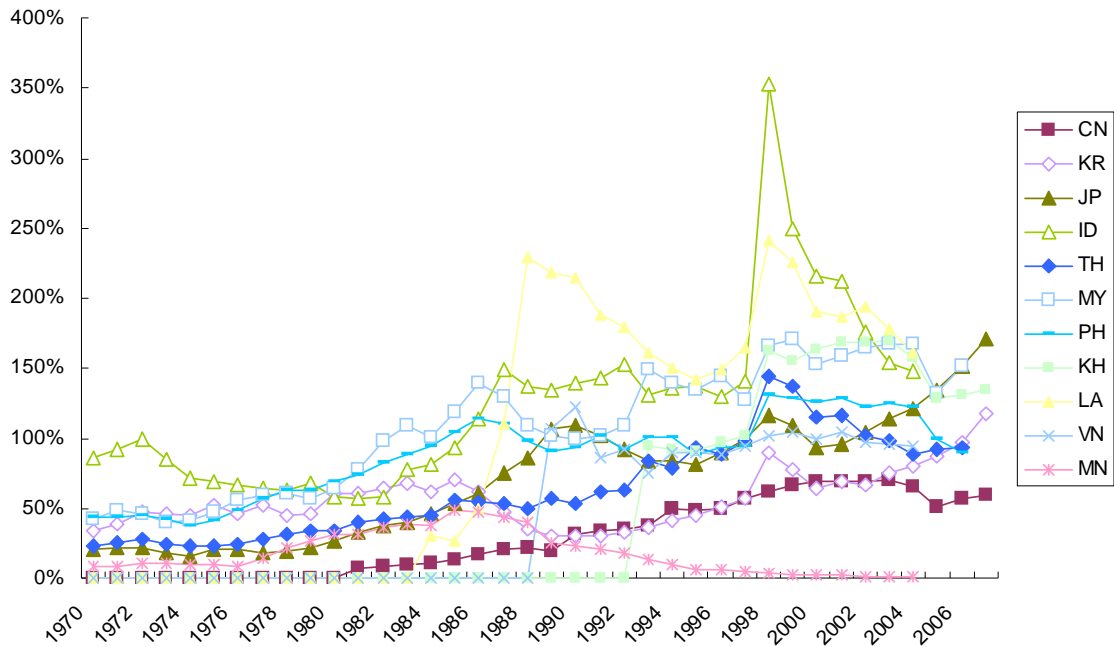


Figure 5-2 Combined financial openness (countries and economies excluding Singapore and Hong Kong)



Source: Lane and Milesi-Ferretti (2006) and International Financial Statistics.

As of 2007, Hong Kong, Singapore and Brunei, among others, are most significantly exposed to foreign capital markets.

Table 5-1 Degree of financial openness as of 2007

High	Hong Kong, Singapore, Brunei
Middle	Japan, Indonesia, Malaysia, Lao PDR, Cambodia, Korea, Philippines, Thailand, Vietnam
Low	China, Myanmar

Since this indicator includes FDI, portfolio equity and debt stocks, which differ in volatility and influential patterns, we also captured the openness ratio for each type of stocks¹⁴.

Following is the summary of financial openness ratios in terms of portfolio equity and debt for the time series of 1980s, 1990s and 2000s. In terms of the magnitude, debt stocks are of more importance in comparison with portfolio equity. We may conclude that countries and economies with higher debt stock ratio against GDP are more exposed to global capital market shocks. Also, it shall be noted that external debt stocks have been accumulated from as early as 1980s, while portfolio equity flows have largely increased in 1990s and 2000s.

Table 5-2 History of portfolio equity and debt positions

	Portfolio equity			Debt		
	1980s Average	1990s Average	2000s Average	1980s Average	1990s Average	2000s Average
Brunei	0%	0%	0%	314%	475%	717%
Cambodia	0%	0%	5%	0%	59%	100%
Indonesia	0%	0%	6%	48%	84%	87%
Lao PDR	0%	0%	0%	110%	165%	146%
Malaysia	6%	20%	22%	68%	61%	70%
Myanmar	0%	0%	0%	38%	10%	1%
Philippines	1%	7%	6%	86%	81%	90%
Singapore	14%	75%	158%	137%	191%	418%
Thailand	2%	11%	14%	39%	63%	55%
Vietnam	0%	0%	0%	106%	70%	48%
Japan	4%	10%	26%	49%	80%	87%
China	0%	1%	3%	11%	27%	31%
Hong Kong SAR	14%	39%	217%	697%	933%	559%
Korea	0%	4%	24%	53%	38%	41%

¹⁴ In Lane and Milesi-Ferretti (2006), external positions are categorized into “FDI,” “portfolio equity,” and “debt.” “Debt” is the combination of “debt securities” and “other investments” in the IFS categories.

5.2. Impacts of global markets, capital flow on domestic financial and asset markets

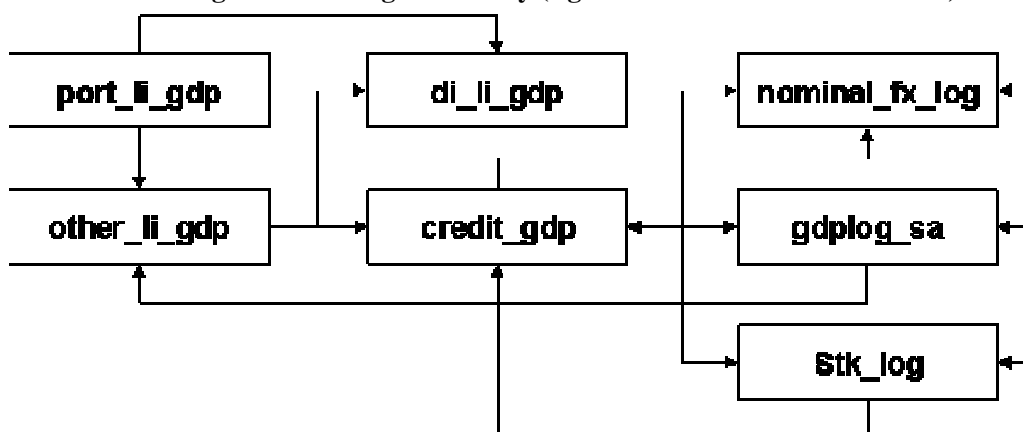
In this section, we assess the influence paths of global market fluctuations to domestic financial and asset markets, in order to see how the external exposure is linked to domestic financial/economic conditions.

5.2.1. Granger causality analysis

We first conducted granger causality analysis to identify the sequences of various indices, including direct investment (flow) to GDP (DI_LI_GDP), portfolio investment (flow) to GDP (PORT_LI_GDP), other investment (flow) to GDP (OTHER_LI_GDP), seasonally-adjusted domestic credit to GDP (CREDIT_GDP_SA), log of seasonally-adjusted GDP (GDPLOG_SA), log of nominal exchange rate (NOMINAL_FX_LOG) and log of stock indices (STK_LOG). We used the quarterly panel data from 1979Q1 2008Q4 covering 5 countries (Indonesia, Malaysia, Philippines, Thailand and Korea)¹⁵, and took 8 lags (i.e. 8 quarters, or 2 years).

The results are shown in the below chart and table. Overall, portfolio and other investment flows do not granger-cause various domestic indicators, except for domestic credit. We may conclude that capital flows are channeled to domestic markets through the influences on domestic credit. Domestic credit in turn has mutual influences among various other factors, including exchange rate, GDP and stock market. It shall also be noted that FDI flows does not granger-cause other factors during the 8 quarter period.

Figure 5-3 Granger causality (significant at 1% confidence level)



¹⁵ For other countries, comparable data was not available.

Table 5-3 Results of the Granger causality estimations

From \ To	DI_LI_GDP	PORT_LI_GDP	OTHER_LI_GDP	CREDIT_GDP_SA	GDPLOG_SA	NOMINAL_FX_LOG	STK_LOG
DI_LI_GDP	--						
PORT_LI_GDP	***	--	***	**			**
OTHER_LI_GDP	***	**	--	***			**
CREDIT_GDP_SA	**		**	--	***	***	***
GDPLOG_SA			***	***	--	***	***
NOMINAL_FX_LOG				***	***	--	***
STK_LOG			**	***	***	***	--

Note: ***, **, * is significant at 1%, 5%, 10% level respectively

5.2.2. VAR analysis

5.2.2.1. Existing literatures

There are many existing studies as to the impact of capital flows to domestic GDP, consumption or stock market volatility. However, studies on the effects on monetary conditions and asset prices are relatively limited¹⁶. Among others, Kim and Yang (2008) have conducted panel VAR analysis, concluding that capital inflows do explain the asset price appreciation in the region, but to a relatively small extent in comparison with other factors. Similarly, Kim, Kim and Wang (2003) concludes that capital account liberalization in Korea has led to capital surges, real exchange rate appreciation and asset price bubbles.

In order to identify more detailed pictures, we conducted separate analyses for three types of flows, namely direct investment, portfolio investment and other investment. Our findings also suggest that capital flows do influence domestic variables.

5.2.2.2. Dataset and methodology

The methodology we adopted is the panel VAR (vector auto-regression) analysis for 5 countries (Indonesia, Malaysia, Philippines, Thailand and Korea) with sufficient dataset from 1993Q1 to 2007Q4 on quarterly basis, which includes the Asian financial crisis period.

VAR analysis is useful to identify the dynamic time-series influence patterns from certain shocks. We followed the methodology taken by existing literatures. Especially, Kim and Yang (2008) conducted a similar panel VAR estimation, covering the same 5 countries from 1999Q1 to 2006Q1. The model applied in this study is as follows:

$$y_t^i = c^i + B(L)y_{t-1}^i + u_t^i,$$

where i denotes an economy, y_t^i is an $m \times 1$ data vector, c^i is an $m \times 1$ constant matrix, $B(L)$ is a

¹⁶ Studies on impacts on GDP and consumptions are summarized in Kose, Prasad, Rogoff and Wei (2006). For studies on impacts on stock market volatilities, see Froot, O'Connell and Seasholes (2000), for example.

matrix polynomial in the lag operator L , and $\text{var}(u_t^i) = \Sigma$.

For the number of lags, we applied 8 lags (8 quarters), based on Akaike Information Criterion and our assumption that responses of shocks would be materialized within 2 years at maximum.

We selected variables based on existing literatures including Kim and Yang (2008), to include financial inflows (portfolio investment, direct investment and other investment accounts), monetary indicators (domestic credit), asset price (stock price) and production (real GDP)¹⁷.

5.2.2.3. Impacts of direct investment

First, we see the impacts from direct investment. FDIs are generally expected to increase production, and thus GDP. Our study results¹⁸ show that GDP is actually affected by FDI flows along with nominal exchange rate¹⁹, which in turn is also affected by FDI flows. On the other hand, direct investment flow is more or less neutral to domestic credit, and only small impact to stock price with shorter period, thus neutral to monetary and asset bubbles. Overall, impacts are moderate and stable over time.

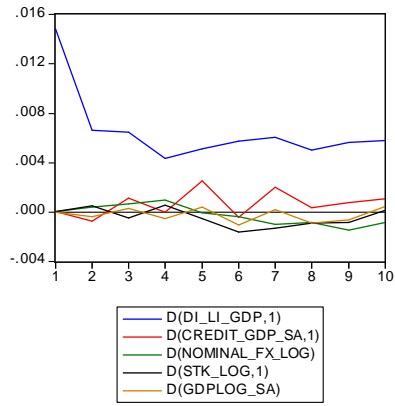
¹⁷ DI_LI_GDP is direct investment inflow to GDP, PORT_LI_GDP is portfolio investment inflow to GDP, OTHER_LI_GDP is other investment inflow to GDP, CREDIT_GDP_SA is domestic credit to GDP, NOMINAL_FX_LOG is log of nominal exchange rate, STK_LOG is log of stock price, and GDPLOG_SA is log of GDP. Since these variables have unit roots, we applied difference (denoted by letter D) from previous quarter.

¹⁸ Our results are shown in the “impulse response” graphs. For Cholesky ordering, we adopted the order of {DI_LI_GDP, CREDIT_SA_GDP, NOMINAL_FX_LOG, STK_LOG, GDPLOG_SA}, taking into consideration the results from our Granger causality analysis.

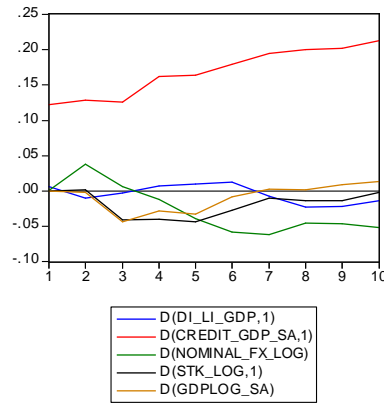
¹⁹ Note that *negative* or *declining* line in the graph for nominal exchange rate indicates currency *appreciation*, as it is denominated in units per US dollars.

Figure 5-4 Impulse responses: Direct investment inflow

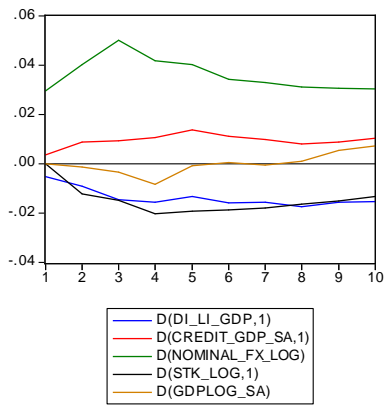
Accumulated Response of D(DI_LI_GDP,1) to Cholesky
One S.D. Innovations



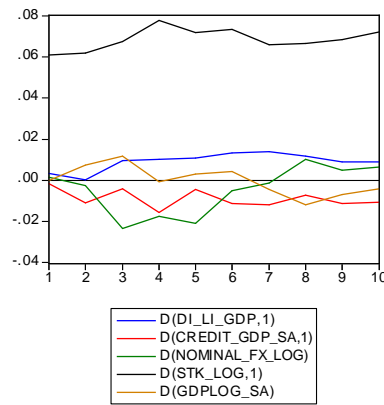
Accumulated Response of D(CREDIT_GDP_SA,1) to Cholesky
One S.D. Innovations



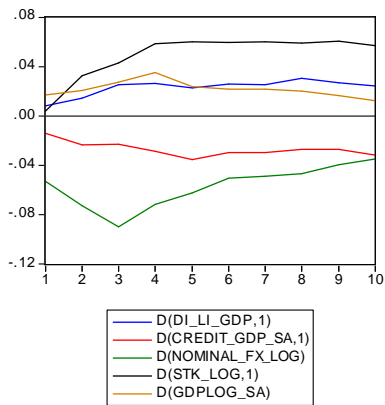
Accumulated Response of D(NOMINAL_FX_LOG) to Cholesky
One S.D. Innovations



Accumulated Response of D(STK_LOG,1) to Cholesky
One S.D. Innovations



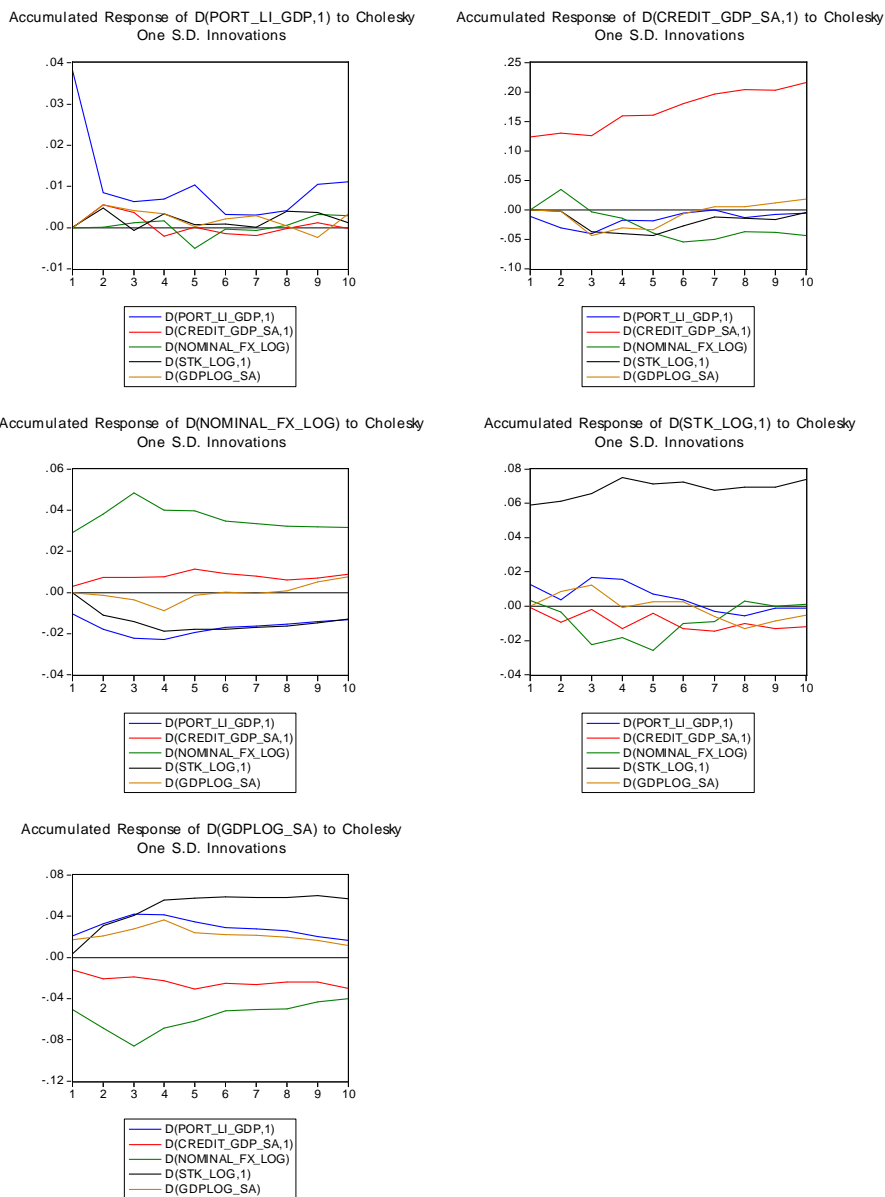
Accumulated Response of D(GDPLOG_SA) to Cholesky
One S.D. Innovations



5.2.2.4. Impacts of portfolio investment

Portfolio inflows are often thought to increase domestic credit and money, and thereby push up the asset price. Our results show that they affect nominal exchange rate and stock price, but not domestic credit. Impact on stock prices is, in contrast to expectation, more or less neutral to portfolio flows, and mostly reflects their own innovations (of the stock prices themselves). Here, too, we may observe that monetary and asset bubbles are independent from portfolio inflows.

Figure 5-5 Impulse responses: Portfolio investment inflow

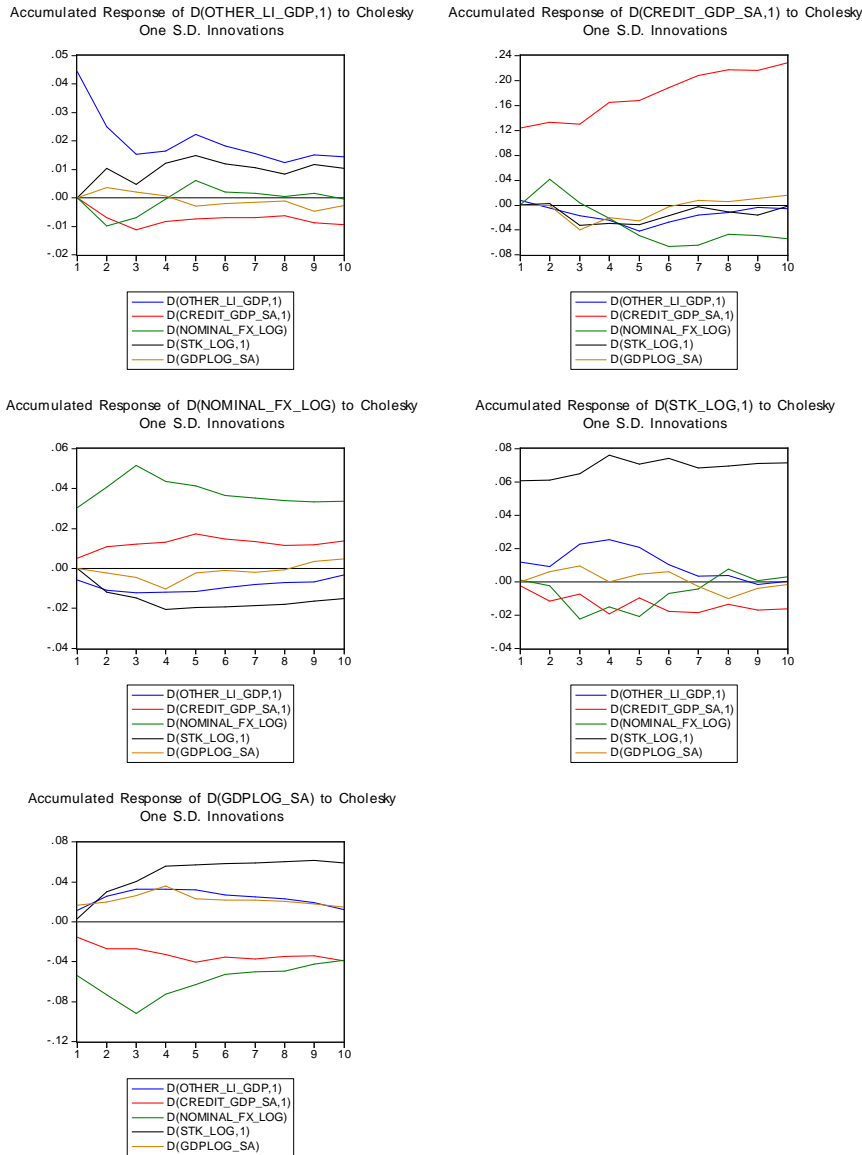


5.2.2.5. Impacts of other investment

As shown in the financial openness ratio, quantity of other investment flow is larger than portfolio equity flows. This flow is considered to be volatile, and may have stronger impact on domestic credit and asset price.

However, again, we do not detect much influence on domestic credit fluctuations caused by other investment flow innovations, while influence on stock price seems to be larger than the case of portfolio investment in shorter term. Influence of other investment appears on GDP, as do the portfolio and direct investment flows.

Figure 5-6 Impulse responses: Other investment inflow



5.2.2.6. Implications

Overall, impacts of financial inflows may have been exaggerated in terms of duration of such impacts; from our analysis, although the flow may have volatile impact for a short period, these effects would stabilize in several quarters. It shall be noted that, although major change of investment strategy by foreign players often affect the domestic market sentiment, it is difficult to detect such impact in this quarterly data analysis.

Another implication is that the impacts in the long run are mostly on GDP and exchange rate (in nominal terms), rather than domestic credit or stock price. Thus, we may conclude that authorities would need to deal with financial inflows to facilitate economic growth, but also take into consideration the effect on exchange rate appreciation.

5.3. Implication on policy mix and market monitoring

The assessment of impacts of capital flow innovations towards domestic credit, stock price, and economic growth reveals existence of certain influence patterns.

However, currently, the extent of financial account openness differ among countries, as discussed in previous sections; and thus, influence patterns would be different depending on the degree of openness.

Especially, in many Asian countries, the authorities are generally considered to be cautious on fully lifting the restrictions on financial flows, due to the experience of massive capital flow reversals during the Asian crisis, and also due to the considerations on exchange rate.

The former concern, the reversal of flows, is also the center of attention in this chapter. In order to address this issue, we conduct a probit model analysis to identify the early-warning indicators that precede capital outflow shocks.

5.3.1. Existing literatures

There are many literatures that analyzed the early-warning indicators for financial shocks and crises, including currency crises, debt crises and banking crises. The summary of such previous studies are detailed in Lestano and Kuper (2003). For the studies that focused on the indicators for sudden capital outflows, Edwards (2005) is one of the pioneering works, which revealed that current account reversals (defined as reduction in the current account deficit of at least 4% of GDP in one year) are explained by current account deficit to GDP, sudden stop²⁰ and sudden stops in region at 1% significant levels, and not by capital mobility (i.e.

²⁰ Sudden stop is defined as reduction of net capital inflows of at least 5% of GDP in one year. The country in

financial openness).

Although Edwards (2005) uses the “de jure” measures (scored from 0 to 100) to assess capital mobility, we will use “de facto” measures to estimate the probability of capital outflow shock. Also, in our model, “capital outflow shock” is defined as change of net capital outflow (sum of portfolio investment (net flow of asset and liability) and other investment (net flow of asset and liability) under IFS) of less than the first quartile of the observed period in each country. We used the quarterly panel data for three crisis-affected ASEAN countries, namely Indonesia, Malaysia and Thailand, for the time series between 1994Q1 and 2007Q4, where longest data is available (however, for Malaysia, data on financial accounts are only available after 2001Q1, which limits to some extent the results of our study).

5.3.2. Probit model estimation

Based on the previous work by Edwards (2005), we employ the following equations to estimate the probability of a capital outflow shock.

$$u_{ij} = \begin{cases} 1, & \text{if } (u_{ij}^* > 0) \\ 0, & \text{otherwise} \end{cases}$$

$$u_{ij}^* = w_{jt}\alpha + \varepsilon_{jt},$$

where u_{ij} is a dummy variable, which takes “one” if country j experienced a capital outflow shock, and “zero” for otherwise. u_{ij}^* is an unobserved latent variable. w_{jt} is the degree of financial openness. ε_{jt} is error terms.

In addition to financial openness, we employed the following explanatory variables, with expected signs of either + or -. We expect debt and equity liabilities to affect the probability of shocks positively, based on the view that larger degree of financial openness may trigger larger shocks. We expect that *both* upward and downward changes of domestic credit, CPI and stock indices to affect shocks positively, considering the boom-bust cycles. We expect real effective exchange rate, reserve stock and balance of trade and services to affect shocks negatively, since decline in current account and reserves may trigger concerns on exchange rate sustainability, and thus capital outflow.

question must have received an inflow of capital larger to its region’s third quartile during the previous two years prior to the “sudden stop.”

Table 5-4 Variables employed for probit analysis

Name	Variable Meaning	Expected signs
DEBT_LI_STOCK_GDP	Debt liability (stock) as ratio against GDP	+
PORT_EQUITY_LI_STOCK_GDP	Portfolio equity liability (stock) as ratio against GDP	+
REFX_GR	Change of real effective exchange rate	-
CREDIT_DUMMY	Dummy variable for significant change of domestic credit	+
CPI_DUMMY	Dummy variable for significant change of CPI	+
STK_DUMMY	Dummy variable for significant change of stock indices	+
TRADE_SERVICE_DEF_DUMMY	Dummy variable for the significant deficit of trade and services balances	+
RESERVE_STOCK_GR	Change of international reserve (stock)	-

For variables “RESERVE_STOCK_GR,” “CREIT_DUMMY,” “CPI_DUMMY,” “TRADE_SERVICE_DEF_DUMMY,” “STK_DUMMY,” we calculated with 4 lags (which in this case means one year; we assumed that it would be enough for changes or shocks in some variables to affect other variables within one year). In order to include lags in our model, we applied linear almon lag or PDL (polynomial distributed lag).

For variables “CREIT_DUMMY,” “CPI_DUMMY” and “STK_DUMMY” (all of which are in terms of annualized change rate), we used dummy variable, where, for “UP” variable, “1” for changes of more than the third quartile in observed period and “0” for otherwise; for “DOWN” variable, for changes of less than the first quartile in observed period and “0” for otherwise. This is because changes of credit, price and stock price usually correlate with normal business cycles, and we need to differentiate abnormal changes, this time using the first and third quartiles as threshold.

We applied another dummy variable for trade and services balance (“TRADE_SERVICE_DEF_DUMMY”), in which trade and balance deficit to GDP of more than -3% is denoted as “1,” and otherwise “0” (the figure -3% is based on the first quartile of trade and services balance in Thailand for the observed period, since Thailand has experienced longer and larger trade and services deficit to GDP in comparison with other two countries).

5.3.3. Estimation results

The estimation results are shown below. As expected, the level of debt liabilities does positively affect the probability of shocks, but not so much for portfolio equity liabilities. Similarly, foreign reserve stock affects negatively. Thus, we may be able to conclude that

financial openness is relevant to the probability of crisis.

Contrary to our expectations, impact of domestic credit on the probability of shocks (“UP”) is negative, and impact of trade and service balance is positive (although the latter is not significant at 10% confidence level). This would suggest that capital outflow shocks are not necessarily preceded by monetary and macro-economic boom-and-bust cycles.

However, it shall be noted that stock prices, both “UP” and “DOWN,” are affecting the probability of shocks, which means that stock market may be subject to boom-and-bust cycles that precede capital account shocks.

Also, trade and service balance affect positively to the probability of shocks directly, which means that increasing current account may be the signal of shocks. This may indicate that, in many cases, these countries have experienced current account surplus when capital flow shocks occurred. In this sense, traditional notion of “current account shocks” would not apply in case of ASEAN countries after 1990s.

Table 5-5 Estimation Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.20891	0.611	-3.61524	0.0003
DEBT_LI_STOCK_GDP(-1)	0.800661	0.25893	3.092188	0.002 ***
PORT_EQUITY_LI_STOCK_GDP(-1)	0.733029	0.586974	1.248829	0.2117
PDL(REFX_GR,4,1,2)	0.627457	0.620971	1.010445	0.3123
PDL(CREDIT_DUMMY_UP,4,1,2)	-0.2089	0.151444	-1.37936	0.1678
PDL(CREDIT_DUMMY_DOWN,4,1,2)	-0.06431	0.095126	-0.676	0.499
PDL(CPI_DUMMY_UP,4,1,2)	-0.29781	0.140377	-2.12151	0.0339 **
PDL(CPI_DUMMY_DOWN,4,1,2)	-0.14703	0.107405	-1.36889	0.171
PDL(STK_DUMMY_UP,4,1,2)	0.201434	0.096967	2.077339	0.0378 **
PDL(STK_DUMMY_DOWN,4,1,2)	0.219504	0.123844	1.772421	0.0763 *
PDL(TRADE_SERVICE_DEF_DUMMY,4,1,2)	-0.56275	0.256962	-2.19001	0.0285 **
PDL(RESERVE_STOCK_GR,4,1,2)	-0.03245	0.013564	-2.39252	0.0167 **
McFadden R-squared	0.313798	Mean dependent var	0.244048	
S.D. dependent var	0.430805	S.E. of regression	0.360633	
Akaike info criterion	0.905503	Sum squared resid	20.28876	
Schwarz criterion	1.128643	Log likelihood	-64.0623	
Hannan-Quinn criter.	0.996064	Restr. log likelihood	-93.3577	
LR statistic	58.59096	Avg. log likelihood	-0.38132	
Prob(LR statistic)	0			
Obs with Dep=0	127	Total obs	168	
Obs with Dep=1	41			

Note: Letters and numbers within the PLD parenthesis indicate (variable, lags, degree of polynomial, a numerical code to constrain the lag polynomial (where “2” means constrain the far end)).

5.3.4. Implications

Capital account openness does both good and bad to domestic economy. In order to avoid the adverse impacts of capital account liberalization, there are certain variables that authorities may need to monitor, based on the above estimation results. First, level of financial openness, especially in terms of debt liabilities, shall be closely monitored, as greater debt openness shall lead to increased probability of shocks. Secondly, abnormal growth of stock price would highly probably lead to capital outflow shocks, possibly due to boom-bust cycles. Thus, level of stock prices and existence of “bubbles” shall be closely monitored. Third, in the crisis-affected ASEAN countries, current account deficit may not have much influence on the probability of crisis. Finally, foreign reserves would work as a backstop to capital outflow shocks, and thus need to be managed and maintained carefully, possibly by preventing exchange rate depreciation at early stage.

6. Recommendation on regional policy coordination

Interdependence in the region increased in terms of trade, FDI and financial capital flow, which have brought positive effects such as mutually-beneficial and organic trade relationships and relatively stable capital flows that contribute to domestic economies in the region.

Trade Policy

- 1) East Asian countries have liberalized their trade regimes in terms of import tariffs substantially in recent decades. However, it is very important for policy makers to be reminded that there still exist a lot of room for tariff reduction and furthermore that the number of non-tariff barriers including quantity restrictions and technical standards appears to be increasing although it is difficult to obtain the accurate picture of the current situation.

FDI Policy

- 2) Similar to the situation for foreign trade regime, our analysis of FDI regimes has found that FDI policies have been liberalized but there still is an ample room for improvement. This is especially the case concerning FDI facilitation measures such as FDI application and approval procedures, protection of investors, etc.

Policy on Financial Flow

- 3) East Asian countries have increased financial openness in terms of “de facto” measures which are calculated as the total stock of inflow/outflow of FDI, equity

and debt stocks in gross terms. Impacts of financial inflows on domestic market and economy may have volatile impact for a shorter period, but these effects would stabilize in several quarters. Excessive dependence on external capital inflow shall be avoided, as global market fluctuation and/or unstable capital flow might affect in both positive and negative ways.

- 4) Financial openness shall be pursued as it could enhance flexibly-available financial resources, which contribute to economic growth. Meanwhile, policy makers may utilize certain warning signals in order to avoid/prepare for hard adverse impacts. The useful combination of those signals includes existence of dependence on debt position, domestic stock market, and foreign reserves according to our analysis.
- 5) On top of such monitoring scheme, (i) preparatory policy measures to control excessive market movement in a carefully accountable manner, as well as (ii) policy coordination such as CMI, would be useful.
- 6) Since the interdependence in the region has increased, economic or/and financial turbulences of one country might significantly affect others. Thus, it has become more important to implement regional surveillance coordination, which shall then be utilized and reflected into coordinated policy measures in the region.

Regional Cooperation Framework

- 7) In order to achieve the policy objectives noted above, ASEAN+3 countries may consider the formation of region-wide frameworks such as a region-wide comprehensive FTA, which include trade and FDI liberalization, facilitation, and various kinds of cooperation including financial and macro economic cooperation and coordination.

References

Aggarwal, Vonod K. and Shujiro Urata eds. (2005) *Bilateral Trade Agreements in Asia-Pacific*, Routledge, New York.

Anderson, James E. and Eric van Wincoop (2003) "Gravity with gravitas: a solution to the border puzzle," *American Economic Review*, 93, 170-192.

Baier, Scott L. and Jefferey H. Bergstrand (2007) "Do free trade agreement actually increase members' international trade?" *Journal of International Economics*, 71, 72-95.

Feenstra, Robert C., 2004, *Advanced International Trade: Theory and Evidence*, Princeton, NJ.
Gill, Indermit and Homi Kharas (2006) *An East Asian Renaissance: Ideas for Economic Growth*, The World Bank, Washington, D.C.

International Monetary Fund (various issues), *International Financial Statistics*.

Japan Center for Economic Research (2007) *ASEAN+6 Economic Partnership: Significance and Tasks*, Tokyo.

Japan PECC (2002) *An Assessment of Impediments to Foreign Direct Investment in APEC Member Economies*, Tokyo, Japan.

Lincoln, Edward J. (2004) *East Asian Economic Regionalism*, Brookings Institution, Washington, D.C.

Mayer, Thierry and Zignago, Soledad, 2006, "Notes on CEPII's distance measures",
<http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

Munakata, Naoko (2006), *Transforming East Asia: The Evolution of Regional Economic Integration*, Brookings Institution, Washington, D.C.

Park, Yung Chul, Shujiro Urata and Inkyo Cheong (2007) "The Political Economy of the Proliferation of FTAs," in Peter A. Petri and Sumner J. La Croix eds. *Challenges to the Global Trading System: Adjustment to Globalization in the Asia-Pacific Region*, Routledge, Oxton, U.K.

Stiglitz, Joseph E. and Shahid Yusuf (2001) eds., *Rethinking the East Asian Miracle*, Oxford University Press, New York.

Urata, Shujiro (2001) "Emergence of An FDI-Trade Nexus and Economic Growth in East Asia," in Joseph E. Stiglitz and Shahid Yusuf eds., *Rethinking the East Asian Miracle*, Oxford University Press, New York, 2001, pp. 409-460.

"The Changing Patterns of International Trade in East Asia" background paper prepared for the World Bank project titled *An East Asian Renaissance*. (2006)

Urata, Shujiro and Misa Okabe (2007) "The Impact of Free Trade Agreements on Trade Flows: An Application of the Gravity Model Approach," RIETI Discussion Paper Series 07-E -052, Research Institute of Economy, Trade and Industry, Tokyo.

World Bank (1993) *The East Asian Miracle: Economic Growth and Public Policy*, Oxford University Press, New York

UNCTAD World Investment Report

Bleaney, Michael, Paul Mizen and Lesedi Senatla (1999), "Portfolio Capital Flows to Emerging Markets," CREDIT Research Paper No. 99/12, Centre for Economic Development and International Trade, University of Nottingham.

Edwards, Sebastian (2005), "Capital Controls, Sudden Stops and Current Account Reversals," NBER Working Paper No. 11170, National Bureau of Economic Research, Cambridge.

Froot, Kenneth A., Paul G. J. O'Connell and Mark S. Seasholes (2000), "The Portfolio Flows of International Investors," NBER Working Paper No. 6687, National Bureau of Economic Research, Cambridge.

Hernández, Leonardo, Pamela Mellado and Rodrigo Valdés (2001), "Determinants of Private Capital Flows in the 1970s and 1990s: Is There Evidence of Contagion? (May 2001)," IMF Working Paper 01/64, International Monetary Fund, Washington DC.

Kim, Soyoung, Sunghyun Kim and Yunjong Wang (2003), "Macroeconomic Effects of Capital Account Liberalization: The Case of Korea," of *Review Development Economics*, Vol. 8, No. 4,

624-639.

Kim, Soyoung and Doo Yong Yang (2008), "The Impact of Capital Inflows on Emerging East Asian Economies: Is Too Much Money Chasing Too Little Good?," Working Papers on Regional Economic Integration 15, Asian Development Bank, Manila.

Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff and Shang-Jin Wei (2006), "Financial Globalization: A Reappraisal," IMF Working Paper 06/189, International Monetary Fund, Washington DC.

Lane, Philip R. and Gian Maria Milesi-Ferretti (2006), "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004," IMF Working Paper 06/69, International Monetary Fund, Washington DC.

Lestano, Jan Jacobs and Gerard H. Kuper (2003), "Indicators of financial crises do work! An early-warning system for six Asian countries," CCSO Working Papers 200313, University of Groningen, CCSO Centre for Economic Research, Groningen.

Mody, Ashoka and Mark P. Taylor (2004), "International Capital Crunches: The Time-Varying Role of Information Asymmetries," IMF Working Paper 02/43, International Monetary Fund, Washington DC.

Yap, Josef T. (2008), "Managing Capital Flows: The Case of the Philippines," ADB Institute Discussion Paper No.91, Asian Development Bank Institute, Tokyo.