Journal of Economic Integration
18(1), March 2003; 105-125

# Inter-Regional and Intra-Regional Trade in East Asia: Recent Developments and Aggregate Bilateral Trade Elasticities

**Mamoru Nagano**
*Mitsubishi Research Institute, Inc.*

## Abstract

*East Asian countries have experienced dynamic structural change in regional trade during the 1990s. While intra-regional trade rapidly progressed within the region after the financial crisis, Asia accounts for a large portion of inter-regional trade volume, even after the crisis. In this paper, examinations of how inter-regional and intra-regional trade in five selected crisis countries, i.e., Indonesia, Malaysia, Philippines, Thailand and Korea are evolved by looking at descriptive statistics, verifying the heterogeneity of trade composition, reviewing historical changes of international trade policies and some empirical analyses. This paper's empirical results show that elasticities of export to external demand are much larger than those of the changes in relative price ratio. Therefore, even though regional currencies fall causing the terms of trade to change, the decline in external demand might offset the effects of changes in relative price ratio. Another empirical result indicates that strengthening the supply side might contribute to the promotion of inter-regional trade of these countries.*

• **JEL Classifications:** F02, F13, F14, F15, F42

• **Key words:** Bilateral trade, Trade likage, Trade policy

*Corresponding address: Doctor Mamoru Nagano, Mitsubishi Research Institute, Inc. Tel: +813-3277-0594, Fax: +813-3277-0521, E-mail: nagano@mri.co.jp

## I. Introduction

This paper is a study on the post-crisis behavior of Asian trade by analyzing the trends in intra-regional and inter-regional trade in five selected Asian countries, *i.e.*, Indonesia, Malaysia, the Philippines, Thailand and South Korea. These countries have experienced dynamic structural change in regional trade during the 1990s. Not only has intra-regional trade rapidly progressed within the region especially after the financial crisis, but also, there is no doubt that Asia accounts for a large portion of inter-regional trade volume, even after the crisis. These developments warrant a deeper examination in order to determine the factors that contributed to the structural changes.

An examination of trade values, growth performance and direction of trade in both aggregate and disaggregated levels is shown in Section II. In the recent recovery of the Asian economies, export expansion accounted for a substantial portion of macroeconomic growth in the region. There are, however, new factors that might trigger serious problems for the Asian economies. For instance, the expected further downturn in the electronics market will ultimately adversely affect Asian economies. Accordingly, it is necessary to further explore the current situation in international trade in East Asia from several aspects. In this connection, a review of government trade policies for each country, and investigates how it affects intra-regional and inter-regional trade in Asia is also presented in Section III.

Section III provides empirical estimates of the determinants of bilateral trade among the selected Asian economies. Estimation is done using the bilateral trade model of Allen and Whitley (1994). While the model of Allen and Whitley was originally used for the industrialized countries, this paper applies it to intra-regional and inter-regional bilateral trades of the Asian countries. Each bilateral trade equation are estimated first, and then aggregated by region. By comparing the aggregated coefficients, this section discusses the implications of the results on inter- and intra-regional trade. Section IV summarizes these results and enumerates some policy implications.

## II. Recent Trends of Inter-Regional and Intra-Regional Trade

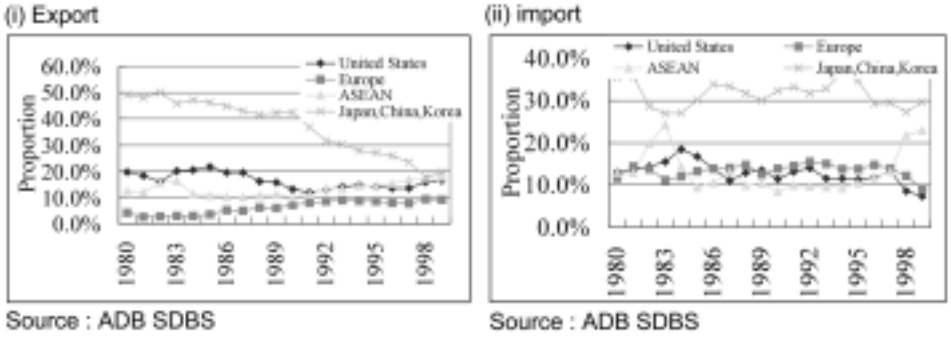
For this section, bilateral trade data from the Asian Development Bank's "A Data Retrieval Facility of The Statistical Database System", and International

Trade Centre UNCTAD/WTO United Nations Statistics Division's publication, "PC/TAS". Since the main interest in this paper is not bilateral trade but inter-regional and intra-regional trade, the trading partner data are aggregated by principal region, *i.e.*, United States, Europe, Northeast Asia (People's Republic of China (PRC), Korea, Japan) and ASEAN member countries. Annual data, from 1980 to 1999, are employed to examine long-term historical changes in trade by region (See Figure 1). As for trading partners, Europe represents four major OECD countries, *i.e.*, France, Germany, Italy, and the United Kingdom. Former East Germany is included in Germany while Hong Kong is included in PRC. ASEAN member countries consist of Cambodia, Indonesia, Malaysia, Myanmar, Lao PDR, the Philippines, Singapore, Thailand, and Viet Nam.

Export expansion in the past 20 years has enormously contributed to economic growth in East Asia. During this period, not only did structural changes in trade composition progress, but there were also changes in trade origin and destination. Even during the post-crisis period, exports were the engine of growth in the recovery process. It is considered that these countries would not have experienced

**Figure 1.** Shares of Major Destinations and Origins in Total Trade of the Crisis Countries

**1. Indonesia**




**2. Malaysia**

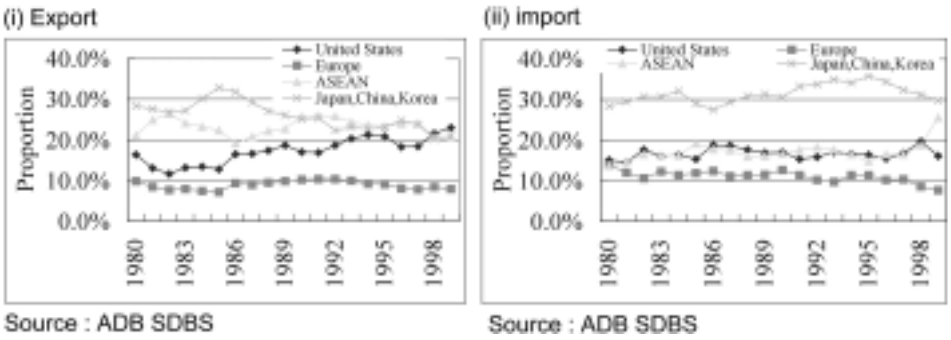
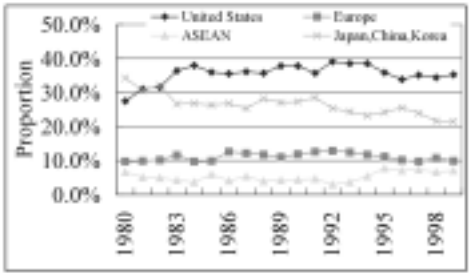


**Figure 1.** Continued

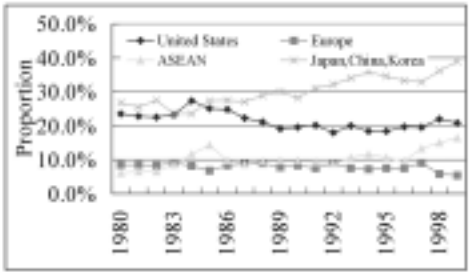
**3. Philipines**

(i) Export




Source : ADB SDBS

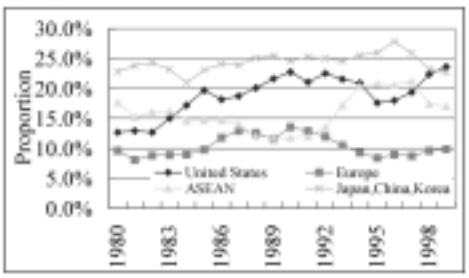
(ii) import




Source : ADB SDBS

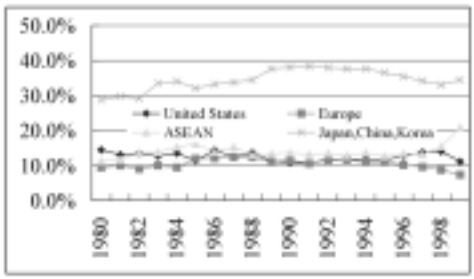
**4. Thailand**

(i) Export




Source : ADB SDBS

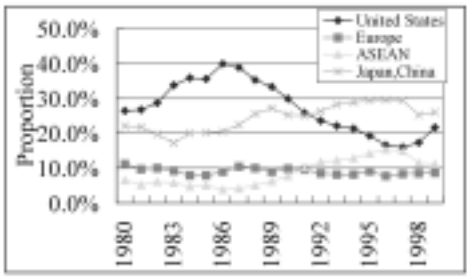
(ii) import




Source : ADB SDBS

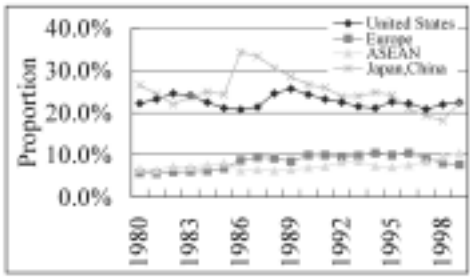
**5. Korea**

(i) Export




Source : ADB SDBS

(ii) import




Source : ADB SDBS

this pace of recovery without the increase in exports. Inter- and intra-regional trade contributed to the expansion for both exports and imports in these countries. As shown in Figure 1, it can be easily understood that each selected country has a different trade pattern. Some of the trade flows imply strong trends in the share of exports as compared to a relatively stable trend in the share of imports. For instance, the Philippines heavily depends on the US as an export market,

accounting for an average of 30-40 percent of its exports. Korea, on the other hand, notwithstanding that it was one of the countries that used to be dependent on the US for exports, has considerably reduced its dependence as its share of US exports dramatically declined starting in the early 1980s.

As Lipsey (1999) suggested, trade patterns in manufacturing in most East Asian countries have been transformed from industry distributions typical of developing countries to distributions more like those of advanced countries. Figure 2 depicts the concentration on intra-regional trade of five crisis countries by commodities. Definition of the trade statistics by commodity follows the 1-digit Standard

**Figure 2.** ASEAN Intra-Regional Trade Concentration by Commodity

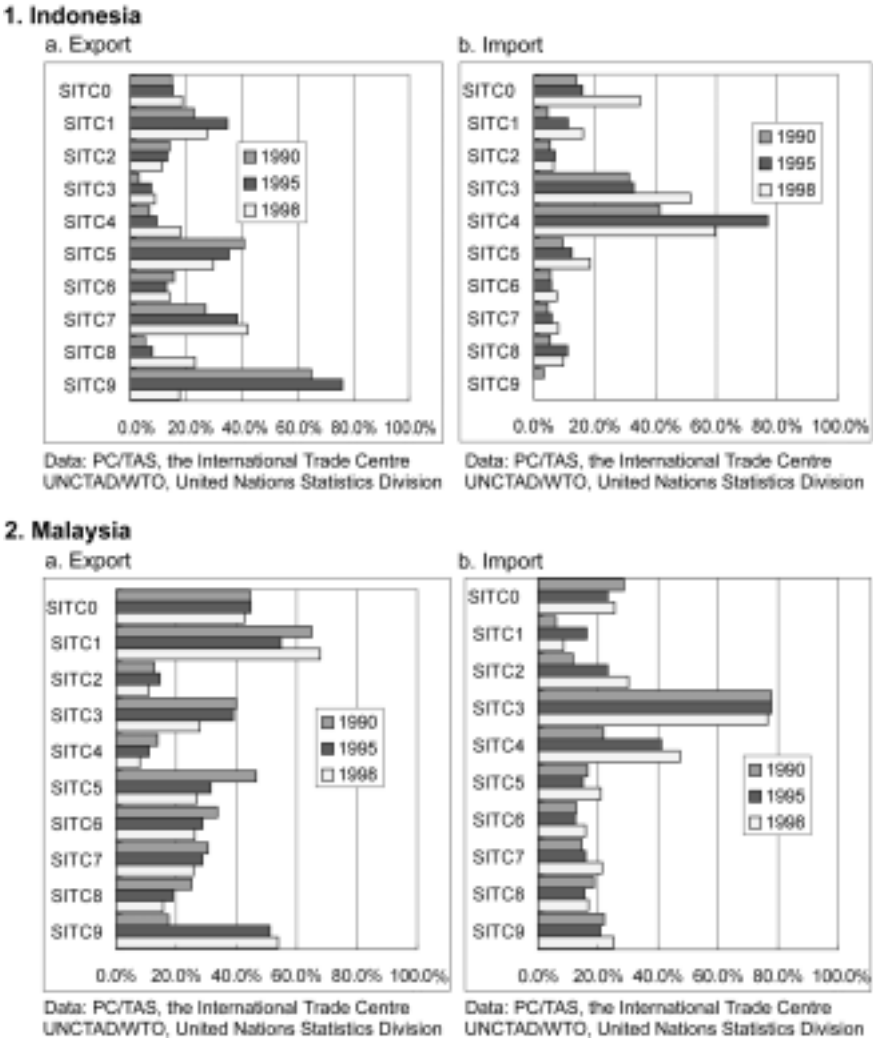
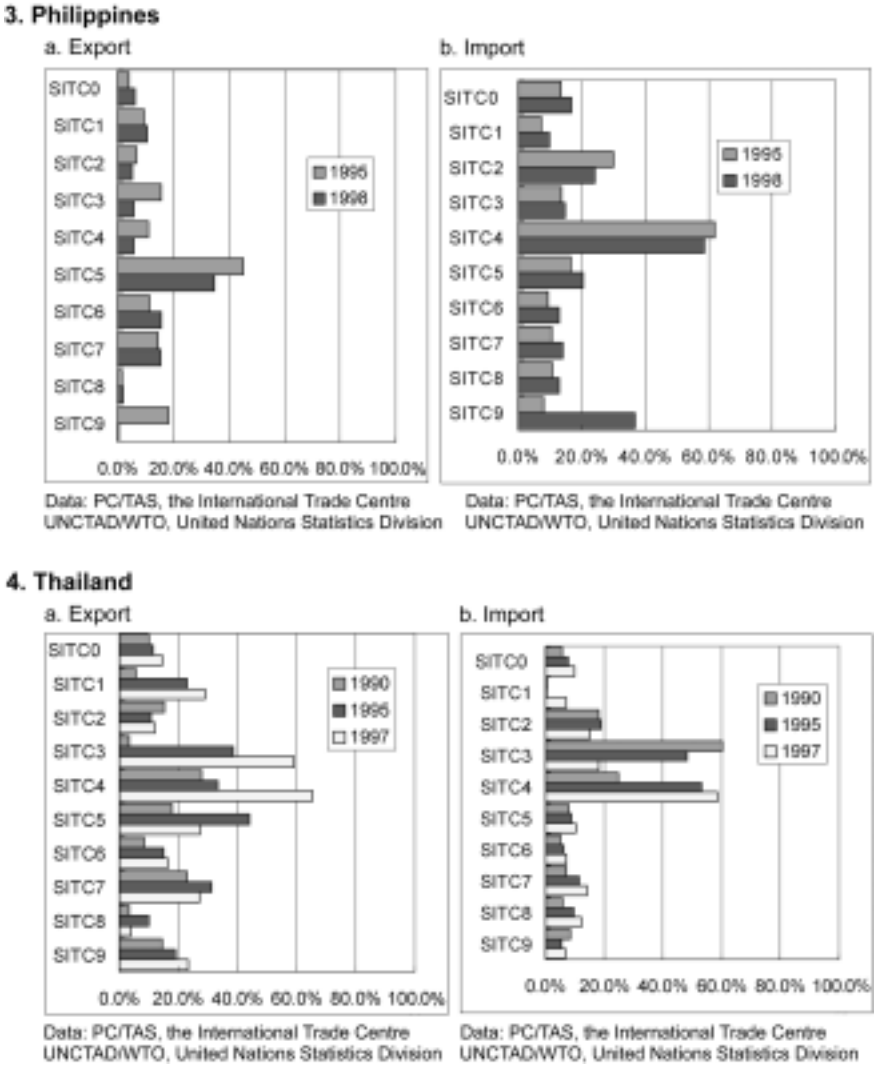


**Figure 2.** Continued



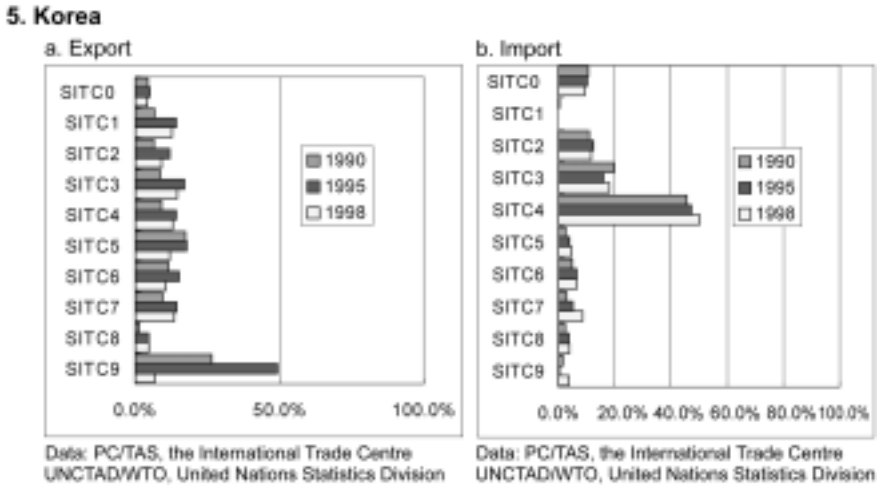

Industrial Trade Classification (SITC)[1].

## A. Indonesia

Indonesia's trade was $21,909 million in 1980 and $25,675 million in 1990.

[1]The definition is as follows; SITC0 Food and Live Animals, SITC1 Beverages and Tobacco, SITC2 Crude Materials, Inedible, Except Fuels, SITC3 Mineral Fuels, Lubricants and Related Materials, SITC4 Animal and Vegetable Oils, Fats and Waxes, SITC5 Chemicals and Related Products, SITC6 Manufactured Goods Classified Chiefly by Material, SITC7 Machinery and Transport Equipment, SITC8 Miscellaneous Manufactured Articles, SITC9 Commodities and Transactions not classified elsewhere in the SITC.

**Figure 2.** Continued




Through the first half of the 1980s, the export growth was relatively low, registering negative growth for several years. However, in the second half of the 1980s, this rapidly rose and exports expanded 15.9 and 17 percent in 1987 and 1990, respectively. Consequently, total trade became much larger during this period. The export expansion continued to register a double-digit growth in the first half of 1990s, although it fell to single-digit levels in the second half of the 1990s until the financial crisis hit Indonesia in 1997. In terms of export destination, Indonesia increasingly shipped exports to ASEAN and European countries in the late 1980s, and to the US and ASEAN countries in the early 1990s. After the crisis, exports to all destinations increased. As for Indonesiaís imports, import growth was negative in the early 1980s, but rapidly expanded after 1987. In particular, the growth rate was 22.1 and 33.6 percent in 1989 and 1991, respectively. It gradually declined since then, and even falling to negative levels once again in 1997. Imports have always been dependent on Japan and the US. In 1980, Indonesia's largest import partner was Japan with total imports amounting to $3,413 million. This was followed by imports from the US, totaling $1,409 million. One of the remarkable trends in Indonesia's imports is the value of imports from ASEAN countries in 1999 increased fivefold since 1980. Although the share of intra-regional import is not so high, the value steadily increased in the past twenty years.

In terms of intra-ASEAN trade, SITC9 exports (Commodities and Transactions Not Classified Elsewhere in the SITC) have the highest share among all commodities in 1990 and 1995, but this has rapidly declined in 1998. Recently,

intra-regional export of SITC7 (Machinery and Transport Equipment) commodities has been steadily increasing. On the other hand, the share of SITC5 exports (Chemicals and Related Products) has been decreasing. As for intra-regional imports, imports have been concentrated on SITC4 commodities. Imports of heavy and light industrial goods (SITC5, SITC6, SITC7 and SITC8) are always below 20 percent of total ASEAN imports, and even less than 10 percent in the case of SITC6 and SITC7 commodities. Noland (1997) finds that the commodity composition of Indonesia's trade is dissimilar from that of the other East Asian countries.[2] Since Indonesia's oil exports have an enormously large portion of total exports, it should be recognized that the share of intra-regional trade by other commodities might not represent Indonesia's overall trade.

In Indonesia, trade liberalization was promoted as early as 1983, although there were policy adjustments in response to changes in goals and priorities. Until the early 1990s, the trade policy was mainly on the reduction of tariffs and abolition of quantitative trade barriers. After 1993, the Indonesian government, worried that new emerging countries accepted foreign direct investment more aggressively, started easing restrictions on inward foreign investments on the production of exports and imports. This, coupled with deregulation of automobile imports, encouraged many foreign automobile makers to invest in Indonesia in 1993. Indonesia's trade policy was likewise affected by the AFTA and APEC. Since mid-1990s, Indonesia accelerated reduction of tariff rate and import surcharge to accomplish AFTA in 2002, and APEC trade liberalization in 2020. However, when the crisis hit Indonesia in 1997-1998, the government introduced a protectionist policy especially in the agricultural sector. Accordingly, the IMF program has pushed for government to carry out agricultural trade deregulation. Since 1999, Indonesia's trade policy returned to the original tariff and surcharge reduction policy and some other deregulation measures were announced such as the new automobile policy in 1999.

### B. Malaysia

In the past 20 years, Malaysia and Thailand experienced an increase in the shares of exports to the US as the share of the other four regions fell. Until 1986, Japan was the principal export market. Unexpectedly, Malaysian exports to the

[2]Noland (1997) which examined the commodity compositions of exports concludes that the export patterns of Hong Kong, Taiwan and Korea are very similar to that of Malaysia, Thailand and the Philippines.

ASEAN countries exceeded those to Japan in 1987, and then, those to the US in 1988. Consequently, ASEAN intra-regional exports are approximately two times as large as exports to Japan in 1999. For 20 years, the average share of exports to Europe has been ten percent of the total share. As for the share of intra-regional imports, Malaysia has raised it sharply for two years. This share had been at about 14 to 17 percent during 1980-1999, but it rose to 18.8 and 25.5 percent in 1998 and 1999, respectively. Imports from Europe, Japan and the US stagnated during these two years because of the expansion of intra-regional imports. In particular, the share of Japan, PRC and South Korea has kept decreasing every year since 1995.

Malaysia's direction of trade is highly concentrated on the ASEAN countries, and this tendency is more evident in manufacturing. As shown in Figure 2, except in 1990, more than 60 percent of Malaysia's SITC1 (Beverages and Tobacco) commodities were exported to ASEAN countries. In case of SITC3 (Mineral Fuels, Lubricants and Related Materials) commodities, less than 40 percent were also exported to the within the region. The concentration of export destination of manufactured goods is also remarkable. The ratio of SITC5, SITC6, SITC7 and SITC8 exports to the ASEAN countries are more than 20 percent, compared to the other four countries where such exports accounted for less than 20 percent. In particular, SITC7 commodities, which include electronics components and parts, were 20-25 percent.

The evolution of Malaysia's trade policy is very clear. Until 1992, the policy mainly addressed strengthening international competitiveness of domestic exporters and development of high value added and technology-intensive industry. With the establishment of the ASEAN Free Trade Area (AFTA) in the 4$^{th}$ ASEAN summit held in January 1992, the promotion of Malaysia's exports was handled by the newly established MATRADE (Malaysian Trade Development Corporation). The reduction of tariff rates and removal of import controls were likewise accelerated. However, after the financial crisis, trade policy shifted to the import controls in order to attain a balanced current account. Having achieved a balanced current account since 1999, the government also returned to the original trade policy to strengthen the domestic exporters and cut down tariff rates and surcharges.

To meet AFTA commitments in 2002, Malaysia also carried out tariff reductions in response to the Common Effective Preferential Tariff (CEPT). However, the tariff rates of capital goods and intermediate goods were raised in 1998 to balance the current account. Therefore, Malaysia's imports fell while exports

increased. For example, instead of imposing 0-30 percent tariffs for construction supplies, the tariff range of 10-30 percent was levied. Similarly, tariffs on automobile imports over 2,000 cc were raised from 140-200 percent to 140-300 percent. Current account surpluses were registered in 1999 and 2000. There appears, however, to be a resumption of trade liberalization in Malaysia. In 2000, although Malaysia requested to postpone reducing tariffs on the finished car imports until 2005, the government carried out 7,809 goods tariff reductions of 8,859 products covered by the CEPT.

### C. Philippines

In the Philippines, exports amounted to $32,705 million in 1999, five times as large as that in 1980. A recent significant development is intra-regional export has improved since 1992. Although it is still one fifth of exports to the US, and a half of that to Japan, intra-regional exports have grown at the annual average of 30 percent in 1980-1999. As for Philippine imports, import value in 1999 was over four times as large as that in 1980, but such is not as dramatic as exports. Until 1991, the imports were largely sourced from the US. In 1992, Japan overtook the US as the primary source of imports. In 1999, imports from the US were valued at $7.9 billion, while that from Japan at $9.1 billion. Surprisingly, imports from the ASEAN countries were $6.2 billion, which is substantially larger than that from Europe at $2.1 billion.

Since the Philippines was not a reporting country in the PC/TAS in 1990, Figure 2 contains only the ratio of concentration for 1995 and 1998. Twenty to thirty percent of SITC2 (Crude Materials, Inedible, Except Fuels) commodities are imported from ASEAN countries in the Philippines in 1995 and 1998. The Philippines also has a high ratio of concentration in SITC5 (Chemicals and Related Products) imports, compared with the other four countries. The Philippine SITC5 export concentration is also high, especially in 1995, and it looks plausible that the Philippines' export and import of chemicals and related products are closely related.

Like the other four crisis countries, the Philippines promoted trade liberalization, especially import deregulation since late 1980s. The Philippines accepted the IMF's recommendation regarding the abolition of import controls and implemented the second phase of the import liberalization in 1988-1990. These reforms continued until 1992 and the liberalization schedule was replaced by the CEPT. However, a specific issue arose with regard to the liberalization of agricultural

products. The government was concerned that the liberalization of agricul-tural products would lead to increased unemployment. Consequently, the shift from import quantity restrictions to tariffs became controversial in the legislature from 1995 to 1996.

The Philippines adopted a protectionist tariff rate policy during the crisis period. To protect domestic manufacturers, the government raised tariff rates in seven sectors representing the automobile and cement industries. While this tariff policy was obviously against the WTO and AFTA policy directions, the government requested to postpone the liberalization to the end-2000. On the other hand, as a part of its commitment to AFTA, the government is planning to reduce tariffs to 3-5 percent by 2003. Tariffs on 846 products were reduced as of June 2000.

**D. Thailand**

As the other crisis-affected countries expanded their exports over the past two decades, the value of Thailand's exports, by 1999, was approximately nine times as large as that in 1980. In 1980, Thailand's export to the ASEAN countries was $1.1 billion making it among the principal export destinations. Since then, US has become the largest export destination with exports to the US in 1999 valued at 16 times as large as that in 1980. Thailand's imports behaved similar to exports. The import partners are mainly Japan, the ASEAN countries and the Unites States. In 1999, Thailand imported $12 billion from Japan, $10.2 billion from the ASEAN countries and $5.4 billion from the US.

Thai exports to the US have kept increasing since 1995 while exports to PRC, Japan, and Korea declined after 1997. The intra-regional export from Thailand increased in early 1990s, but declined after the financial crisis. In 1994, the share of exports to the ASEAN countries exceeded that of the US, only to reverse in 1998. After the financial crisis, the share of intra-regional exports was partly replaced by the strong domestic demand of the US. The share of import from Japan, PRC and Korea was remarkably high, and has always been over 30 percent since late 1980s. In particular, Thai imports from Japan are so huge that it is more than double than that from the US, and more than triple than that from Europe. Under these circumstances, Thai imports from the ASEAN countries increased by 18.6 percent in 1999 and this share has been increasing the past two years.

The concentration on the manufactured goods is relatively high, compared with the Malaysia and the Philippines. The main characteristic of intra-regional trade is

the high concentration in SITC3 (Mineral Fuels, Lubricants & Related Materials) commodities, both in exports and imports. However, the concentration in the export of manufactured goods decreased in 1997, particularly in SITC5, SITC7 and SITC8 commodities. Therefore, the currency crisis might have affected Thailand's intra-regional trade during this period.

Thailand has been promoting trade liberalization for a decade, and this has not changed even with the financial crisis. With respect to tariff reduction, the Thai government reduced the tariff rates on 1,190 products to 0-5 percent in January 2000. In addition, 37 goods, including palm oil, which were not scheduled for liberalization had their tariffs reduced to below 20 percent. What makes the Thai trade policy different from the other four countries was that the tariff rates on precision equipment such as computers and cameras have initially been reduced. This has been executed according to the WTO's information technology agreements. As of January 2000, the number of the goods with reduced tariff rates numbered 153. In 1990, Thailand used to have the highest tariff rates, averaging at 36 percent, among APEC economies. Consequently, the US criticized Thailand. Efforts were made to reduce tariffs. Among tradable goods, tariffs on machinery and equipment were reduced in 1990 and subsequently subjected to more tariff cuts afterwards.

In addition to the 4,700 goods covered by the CEPT under the AFTA agreement in 1992, the Thai government also simultaneously promoted the simplification of tariff rates structure. Moreover, the frequent threats by the US to use the Super 301 against Thailand have led the government to voluntarily promoted trade liberalization beyond the WTO and AFTA schedules.

### E. Korea

While Indonesia experienced negative growth rates in both exports and imports in the past twenty years, Korea has steadily kept high levels of growth during the same period. It is sometimes pointed out that Korea's exports are dependent on the price competitiveness of its largest competitor, *i.e.*, Japan and the yen. Korea's exports experienced growth rates above 20 percent in 1981, 1987, 1988 and 1995. In fact, in 1987 and 1995, growth rates above 30 percent were registered. The Japanese yen has rapidly appreciated for a few years after the Plaza Agreement in 1985, and by 1995, the exchange rate rose to ¥80:$, which is the highest historically. Thus, Korea's export expansion was very consistent with the yen's appreciation. On the other hand, there have also been some structural changes in

1990s. Rapid increase of the export to PRC is one of them. As for intra-regional exports, while most of Korea's exports in 1999 were approximately five times as large as those in 1980, exports to the ASEAN countries was 17 times as large as that in 1980.

The Korean direction of exports has dramatically changed in 1980-1999. Korean trade had depended on the US with the share of exports to the US increasing during the early 1980s, and peaking at 40 percent. However, the share started declining, dropping 16.1 percent in 1997, although it rebounded slightly in the succeeding two years. During this period, the shares of exports to the ASEAN countries increased rapidly. The share of the exports to the ASEAN region rose from 4.2 percent in 1987 to 15.5 and 15.0 percent in 1997 and 1998, respectively. During these two years, export shares to the ASEAN countries were as high as that to the US. Until recently, Korean imports by trade origin did not have any big changes compared with export destination. Imports from ASEAN countries slightly increased to 10.4 percent in 1999, but the share was mostly less than 9 percent during 1990s. The share of imports from Japan is the only exceptional case by continuously decreasing since 1986.

Intra-regional trade by commodity in Korea did not exhibit any striking features. Like Indonesia, exports to the ASEAN countries were concentrated on SITC9 commodities and imports in SITC4 commodities. However, the ratios, by commodity, for both export destination and import origin were not as high as other crisis countries. In particular, the ratio of the manufactured goods exports was very low. As shown here, Figure 2 suggests that Koreaís trade in manufactured goods has been more dependent on inter-regional trade.

In a nutshell, Korean trade policy focused on liberalization of agricultural and fishery products in the early 1990s, and in the second half of the decade, legislative reforms to conform to international standards set by WTO and OECD. In addition, there existed an import ban that forbade manufactured imports from a specific country. However, the deregulation was accelerated after the crisis. Korea started liberalizing agricultural imports in 1992 with the liberalization of 13 agricultural products, 10 stock raising products and 20 fishery products. In 1993, another 45 products were liberalized and the import liberalization rate increased to 98.1 percent. As for the import ban on manufactured products, one of the controversial issues was that Korea traditionally restricted imports from a specific country based on the infant industry argument. When Korea joined the OECD, the government announced the abolition of such a restriction by the end of 1999. By July 1997,

240 products were eliminated from the list, but the IMF has urged the government to ease the restrictions faster than originally planned.

## III. Determinants of Inter- and Intra-Regional Trade

### A. Framework of Empirical Study

In this section, using bilateral trade models, we examine the determinants of inter-and intra-regional trade. Our approach is to determine how the demand and supply of exporters and importers, and the relative price ratio influence regional trade. Bilateral trade equations are estimated using regression analysis. Since the estimated coefficients measure the magnitude of relative price ratio and supply- and demand-side effects by each exporter/importer on bilateral trade, we aggregate these coefficients by region. Accordingly, the aggregated coefficients by region enable us to discuss both the homogeneity and heterogeneity between inter- and intra-regional trades in the crisis countries.

### B. Multi-regional Trade Model

Following Armington (1969) and Barten (1971), using data from the US, Japan, Germany, France, Italy, UK and Canada, Allen and Whitley (1994) studies the influence of domestic supply and demand factors, and the terms of trade on bilateral trade. Allen and Whitney modified the bilateral models such trade flows are explained by specific demand- and supply-side factors rather than exogenous shifts in export and import shares through time. Explanatory variables that they employed are the approximations of technology, investment, trade and growth. Basically, we also employ the same model and apply it to the bilateral combinations among the four crisis countries in ASEAN, South Korea, Japan, the US and European countries. The following equation is estimated:

$$\begin{aligned} ln\ m_{ij} &= a_0 + a_1 \ln (p_j / p_c) + a_2 \ln (p_i / p_c) + b_1 \ln (C_i / C) \\ &+ b_2 \ln (C_j / C_c) + c_1 \ln Y + d_1 Dum1 + d_2 Dum2 + d_3 Dum3 \end{aligned} \quad (1)$$

where $m_{ij}$ is imports of country $j$ from country $i$ (=exports from country $i$ to country $j$). Since this paper focuses on the five crisis countries of East Asia, we will use the crisis-affected economies as exporting countries and ASEAN, Japan, the US and Europe as their trade partners. From Equation (1), trade aggregates are given by:

$$\sum_{i=1}^{n} m_{ji} = M_i$$

$$\sum_{i=1}^{n} m_{ij} = X_i$$

where $M_i$ is total imports of country $i$ and $X_i$ total exports of country $j$. Relative price ratio is measured by the ratio of domestic prices to the world average price, $p_j/p_c$. The wholesale price index is used as domestic prices. $p_i/p_c$ is the ratio of the export price (j) to the world average. We use the unit value of export as the export price. Our hypothesis is that the coefficient of $p_j/p_c$ is expected to be positive, and that of $p_i/p_c$ is expected to be negative. It is because that a rise in domestic prices promotes higher imports in case of the former. In the latter case, an exporter becomes less price-competitive when the exporter has higher unit value of export than other exporters.

In addition to relative price ratios, there are three other explanatory variables. Two of them are cumulative investment variables measured as ratios to average world cumulative investment.[3] Here, the cumulative investment is calculated as historical aggregates of the fixed capital investments to capture innovative and technological improvement. $CI_i / CI_c$ represents the cumulative investment of the importer. This suggests that stronger domestic investment demand has historically encouraged capital accumulation and this lead to the reduction of imports because of high non-price competitiveness in the domestic sector. Accordingly, our hypothesis expects the coefficient to be negative. On the other hand, since $CI_j / CI_c$, represents the cumulative investment of the exporter, the coefficient is expected to be positive. Importers reduce import demand when there is an increase in domestic investment while importers increase import demand when the partner's domestic investment demand increases. The final term, $Y$, represents domestic demand. Since the expansion of domestic demand encourages imports, the coefficient is expected to be positive. Dum1, Dum2 and Dum3 are added as seasonal dummy variables to eliminate changes caused by seasonal factor.

### C. Estimation Results

The estimation results of Ordinary Least Squares are shown in Table 1. We

[3]Originally, world average of cumulative investment should be employed as Cc, but this study used an average of the countries that is picked up as a reporter or a trade partner.

dropped both insignificant coefficients that are not at least ten percent significant level and those whose signs were inconsistent with our hypotheses. As we previously expected, since this paper does not focus on the industrialized countries where trade liberalization has highly progressed, the number of the significant coefficients are much smaller than that of Allen and Whitley. Our estimation results for the intra-regional trade case show 12 equations with significant coefficients of importer's relative domestic price ($p_i/p_c$). In the case of the inter-regional trade equations, 13 had significant coefficients of importer's relative domestic price ($p_i/p_c$). The number of significant coefficients of exporter's and importer's relative cumulative investment, *i.e.*, $CI_j/CI_c$ and $CI_i/CI_c$, were 15 and 28, respectively. On the other hand, the number of significant parameters of exporter's relative export price, $p_j/p_c$, and importer's domestic demand, *Y*, were much larger than other parameters, reaching 39 for both variables. These results suggest that exporter's relative export price, $p_j/p_c$, and importer's domestic demand, *Y*, influence intra- and inter-regional trade more frequently than other explanatory variables, *i.e.*, exporter's and importer's relative cumulative investment and importer's relative domestic price. These also indicate that the number of significant parameters of importerís domestic relative cumulative investment, $CI_i/CI_c$, were extremely small suggesting that importer's non-price competitiveness was not important in promoting both intra- and inter-regional trade.

We calculated the weighted averages of the coefficients by region and compared the differences between those of the intra- and inter-regional trades (See Table 3). When comparing the weighted average coefficients of exporter's relative export price, $p_j/p_c$, and importerís domestic demand, *Y*, we find that the coefficients of importer's domestic demand (*i.e.*, income elasticities) were greater than one in most cases. Unfortunately, there were no significant differences between the average parameters of intra- and inter-regional exports. The Philippines and Thailand were strongly influenced by demands of other Asian trade partners. Korea and the Philippines were also highly affected by the demands of the US, Japan and EU. As for exporter's relative export price, $p_j/p_c$, the absolute values of the weighted average coefficients were relatively small compared with importer's domestic demand, *Y*, and most were less than one. The parameters for exporter's relative export price, $p_j/p_c$, did not indicate significant heterogeneity between intra- and inter-regional trades either. Based on these results, we derived two conclu-sions. First, the empirical analyses showed that the relative price ratios and external demands were two main factors that determined both intra- and inter-regional

**Table 1.** Results of Bilateral Export/Import Equations

**1. Indonesia**

| Exporter/Importer | Importer's Domestic Price ($p_i/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_i/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Importer's Domestic Demand (Y) |
|---|---|---|---|---|---|
| Indonesia | | | | | |
| Asia | | | | | |
| Korea | 1.832 | | | | 0.476 |
| Malaysia | 0.387 | | | | 1.411 |
| Philippines | | | | | 1.325 |
| Thailand | | | | | |
| Japan | | -0.281 | -0.414 | | 0.855 |
| United States | 1.400 | -0.277 | | | 1.679 |
| Europe | | | | | |
| France | | -1.317 | -1.734 | | 2.327 |
| Germany | | -0.894 | | 0.188 | 2.322 |
| Italy | 0.690 | -0.704 | -1.667 | 0.068 | 1.172 |
| United Kingdom | | -0.641 | | | 2.039 |

**2. Malaysia**

| Exporter/Importer | Importers' Domestic Price ($p_i/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_i/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Malaysia | | | | | |
| Asia | | | | | |
| Indonesia | 0.015 | -1.268 | -2.294 | 0.475 | 1.131 |
| Korea | | | | | |
| Philippines | 0.223 | -1.003 | | 0.123 | 0.787 |
| Thailand | | -0.884 | | | |
| Japan | | -0.695 | | | 2.990 |
| United States | | -0.824 | -1.197 | 0.337 | 1.177 |
| Europe | | | | | |
| France | | -0.585 | | 0.233 | |
| Germany | | -0.860 | | 0.162 | 0.568 |
| Italy | | -0.598 | | | 0.916 |
| United Kingdom | 0.384 | -0.696 | -1.954 | 0.117 | 1.412 |

**3. Philippines**

| Exporter/Importer | Importers' Domestic Price ($p_i/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_i/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Philippines | | | | | |
| Asia | | | | | |
| Indonesia | 0.714 | -2.387 | -1.976 | 0.643 | 0.880 |
| Korea | 0.920 | -0.895 | | 1.660 | 1.173 |
| Malaysia | 0.521 | | | | 2.974 |
| Thailand | | | | | |
| Japan | | | | | |
| United States | 0.492 | -1.022 | | 1.230 | 2.341 |
| Europe | | | | | |
| France | | -1.212 | | | 0.520 |
| Germany | 0.830 | -0.470 | -0.917 | 0.276 | 1.108 |
| Italy | 2.945 | -0.907 | -1.307 | 1.032 | 1.576 |
| United Kingdom | | | | 1.406 | 2.029 |

**Table 1.** Continued

**4. Thailand**

| Exporter/Importer | Importers' Domestic Price ($p_j/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_j/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Thailand | | | | | |
| Asia | | | | | |
| Indonesia | | -0.740 | | | 2.000 |
| Korea | 0.540 | -0.643 | | | |
| Malaysia | 0.475 | -1.502 | | | 1.901 |
| Philippines | | -1.625 | | 0.496 | 0.383 |
| Japan | 0.099 | -1.312 | | 0.170 | |
| United States | 0.217 | -0.894 | | 0.258 | |
| Europe | | | | | |
| France | | -0.558 | | 0.159 | 1.085 |
| Germany | | -1.041 | | | 1.335 |
| Italy | | -0.806 | | 0.209 | |
| United Kingdom | 0.327 | -0.598 | | 0.077 | 1.882 |

**5. Korea**

| Exporter/Importer | Importers' Domestic Price ($p_j/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_j/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Korea | | | | | |
| ASIA | | | | | |
| Indonesia | 0.247 | -1.032 | -1.135 | 1.818 | 1.612 |
| Malaysia | | -0.361 | -0.243 | 1.966 | 1.823 |
| Philippines | 0.657 | -0.204 | -0.487 | 1.619 | 0.631 |
| Thailand | 0.217 | | -0.314 | 2.753 | |
| Japan | 1.176 | -0.849 | | | 1.446 |
| United States | | | | 1.466 | 2.523 |
| Europe | | | | | |
| France | 1.902 | -0.651 | | 1.297 | 2.654 |
| Germany | 1.049 | -0.862 | | 1.351 | 2.595 |
| Italy | | -2.292 | -0.566 | 1.621 | 2.348 |
| United Kingdom | 0.360 | -1.401 | -0.871 | | 2.915 |

trade in East Asia, but there was no obvious heterogeneity of elasticities between intra-regional and inter-regional trades. Second, although there were no significant differences in elasticities between intra- and inter-regional trade, income elasticities were much larger than export price elasticities. Therefore, changes in the relative price ratio due to the foreign exchange rate does not influence both intra- and inter-regional export as well as the change in external demand does.

As for supply-side effects, unlike demand-side and relative price ratio factors, there were large differences between intra-regional and inter-regional trade. Significant coefficients of exporter's relative cumulative investments, $CI_j/CI_c$, were very small in many intra-regional equations, but were generally higher in most inter-

**Table 2.** Number of Significant Parameters per Exporting Country

| Export Country | Importers' Domestic Price ($p_i/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_i/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Intra-Regional Trade | | | | | |
| Indonesia | 2 | 0 | 0 | 0 | 3 |
| Korea | 3 | 3 | 4 | 4 | 3 |
| Malaysia | 2 | 3 | 1 | 2 | 2 |
| Philippines | 3 | 2 | 1 | 2 | 3 |
| Thailand | 2 | 4 | 0 | 1 | 3 |
| Sub-Total | 12 | 12 | 6 | 9 | 14 |
| Inter-Regional Trade | | | | | |
| Indonesia | 2 | 6 | 3 | 2 | 6 |
| Korea | 4 | 5 | 2 | 4 | 6 |
| Malaysia | 1 | 6 | 2 | 4 | 5 |
| Philippines | 3 | 4 | 2 | 4 | 5 |
| Thailand | 3 | 6 | 0 | 5 | 3 |
| Sub-Total | 13 | 27 | 9 | 19 | 25 |
| Total | 25 | 39 | 15 | 28 | 39 |

**Table 3.** Aggregate Export and Domestic Price Elasticity from the Bilateral Approach

| Export Country | Importers' Domestic Price ($p_i/p_c$) | Exporter's Relative Export Price ($p_j/p_c$) | Importer's Relative Domestic Cumulative Investment ($CI_i/CI_c$) | Exporter's Relative Foreign Cumulative Investment ($CI_j/CI_c$) | Domestic Demand (Y) |
|---|---|---|---|---|---|
| Intra-Regional Trade | | | | | |
| Indonesia | 1.302 | | | | 0.889 |
| Korea | 0.273 | -0.380 | -0.498 | 1.987 | 1.108 |
| Malaysia | 0.032 | -0.655 | -0.400 | 0.099 | 0.302 |
| Philippines | 0.255 | -0.087 | -0.072 | 0.023 | 1.340 |
| Thailand | 0.308 | -1.173 | | 0.074 | 1.316 |
| Inter-Regional Trade | | | | | |
| Indonesia | 0.524 | -0.391 | -0.290 | 0.016 | 1.385 |
| Korea | 0.540 | -0.750 | -0.249 | 0.954 | 2.819 |
| Malaysia | 0.300 | -0.305 | -0.531 | 0.477 | 1.052 |
| Philippines | 0.344 | -0.661 | -0.063 | 0.845 | 1.613 |
| Thailand | 0.109 | -0.505 | | 0.110 | 0.348 |

regional equations. Therefore, strengthening supply-side factors, while not contributing to the deepening of intra-regional trade, effectively developed of the inter-regional trade.

## IV. Concluding Remarks

In this paper, an examination of how inter-regional and intra-regional trade in East Asia evolved by looking at descriptive statistics. Each country's export growth according to trade origin and destination was addressed. Then, a verification of how the shares of the origins and destinations have changed in the past twenty years was made. Finally, after having recognized the export and import growth in terms of trading partner and product diversification, an examination of

which commodity helped develop intra-regional trade was effected. Specifically, a verification of whether the heterogeneity of trade composition determines the development of intra-regional trade was undertaken.

It is this paper's finding that all crisis-affected countries increased their exports to all the destinations, and especially exports to ASEAN member countries substantially increased in Korea and Thailand. On the other hand, the growth rate of exports to the US is also high in these countries and increased further during the crisis period, while the growth rate of exports to ASEAN countries declined during the period. With the US maintaining its high economic growth through the late 1990s, it appears that US imports from some of the crisis-affected countries, to some extent, fueled their recovery. However, the expansion of the US economy is not sustainable. In fact, it has rapidly slowed down since the second half of 2000. In this regard, our empirical result showed that elasticities of export to external demand were much larger than those of the relative price ratio. Therefore, even though regional currencies fall causing the terms of trade to change, the decline in external demand might offset the effects of relative price ratio and Asian countries will not be able to lessen the effect of the contraction in external demand.

However, another empirical result indicates that strengthening the supply side might contribute to the promotion of inter-regional trade of these countries. As seen in Section III in this paper, each selected country is still promoting reduction of tariff rates according to CEPT and AFTA. Therefore, since further development of trade liberalization in this region is expected to improve the supply side effects of the intra-regional trade, further promotion of trade deregulation and strengthening supply side might be one of very few choices.

Received 31 August 2001, Accepted 30 January 2002

## References

Armington, P. S. (1969), "*A Theory of Demand for Products Distinguished by Place of Production*", International Monetary Fund Staff Papers, 16, 159-178.

Allen, C. and J. Whitley (1994), "*Modelling Bilateral Trade*", Applied Economic Forecasting Techniques, in S. Hall, ed., Harvester Wheatsheaf.

Barten, A. P. (1971), "*An Import Allocation Model for the Common Market*", Cahiers Economiques de Bruxelles, 50, 152-164.

Caporale, G. and M. Chui (1999), "*Estimating Income and Price Elasticities of Trade in a Cointeglation Framework.*" Review of International Economics 7, no.2, 254-264.

Frankel, J.A. and D. Romer and T. Cyrus (1995), "*Trade and Growth in East Asian Countries: Cause and Effect* ?" Center for Pacific Basin Monetary and Economic Studies Economic Research Department Federal Reserve Bank of San Francisco, Working Paper No. PB9S-03, June.

Frankel, J.A. and D. Romer (1996), "*Trade and Growth: An Empirical Investigation*", National Bureau of Economic Research, Working Paper 5476, March.

Frankel, J.A. and A.K. Rose (2000), "*Estimating the Effect of Currency Unions on Trade and Output*", National Bureau of Economic Research, Working Paper 7857, August.

Goldberg, P. and M. Knetter (1997), "*Goods Prices and Exchange Rates: What Have We Learned* ?," Journal of Economic Literature 35, no 3, 1243-1272.

Higgins, M. and T. Klitgaard (1988), "*Viewing the Current Account Deficit as a Capital Inflow*," Federal Reserve Bank of New York Current Issues in Economics and Finance 4, no. 13.

Higgins, M. and T. Klitgaard (2000), "*Asiaís Trade Performance After the Currency Crisis*," Federal Reserve Bank of New York, FRBNY Economic Policy Review, September 2000.

Hooper, P., K. Johnson, and J. Marques (1988), "*Trade Elasticities for the G-7 Countries*", Board of Governors of the Federal Reserve System International Finance Discussion Paper, no.609.

Marquez, J. (1990), "*Bilateral Trade Elasticities*," Review of Economics and Statistics, 72, 70-77.

Marquez, J. (1998), "*Long-period Stable Trade Elasticities for Canada, Japan, and the United States*" Review of International Economics, 7, 102-116.

Noland, M. (1997), "Has Asian Export Performance Been Unique?", Journal of International Economics 43, 79-101.

Slaughter, M. (1998), International Trade and Per Capita Income Convergence: A Difference-in-Differences Analysis, National Bureau of Economic Research, Working Paper 6557, May.