Chapter IV Income Diffusion Effects in East Asia

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Income Diffusion Effects in East Asia

Introduction

In Chapter 1, an overview was provided of the deepening economic linkage in East Asia that has been brought about through international trade and investment. Also, in Chapter 3, we examined the deepening economic interdependence of the countries in the East Asian region, both with each other and with countries outside the region, through an analysis on induced production in the countries of East Asia. In this chapter, we will shift the direction of our analysis from that taken in Chapter 3 and look at the influence economic activity in East Asia (and the United States) has had and how that influence has changed. In order to accomplish this, we will simulate the effects (and changes in those effects) of economic growth in three representative countries, Indonesia, Thailand, and South Korea, on incomes in East Asia (and the United States) in the years 1985 and 1990. Note that in this chapter the term "East Asia" used here refers to nine countries: the ASEAN4 (Indonesia, Malaysia, the Philippines, and Thailand), China, the NIEs3 (Singapore, Taiwan, and South Korea), and Japan. The United States will also be included as a subject for the analysis. In the discussion that follows, the "region" will be understood to embrace the foregoing ten countries (including the United States) that are subjects of the analysis.

The aspects we will examine in this chapter will include observations on how East Asian economic interdependence became substantially deepened through international trade. In the sections that follow, we will attempt to provide quantitative proof of this based on the Asian International Input-Output Tables.

1. Income Linkage in the Countries of East Asia

In this section, we perform a simulation to examine to what extent incomes in the countries of East Asia and the United States would be affected through international trade if Indonesia, Thailand, and South Korea have each achieved economic growth of 10%. This forms the basis for an analysis of the strength of the income linkage between the countries of East Asia.

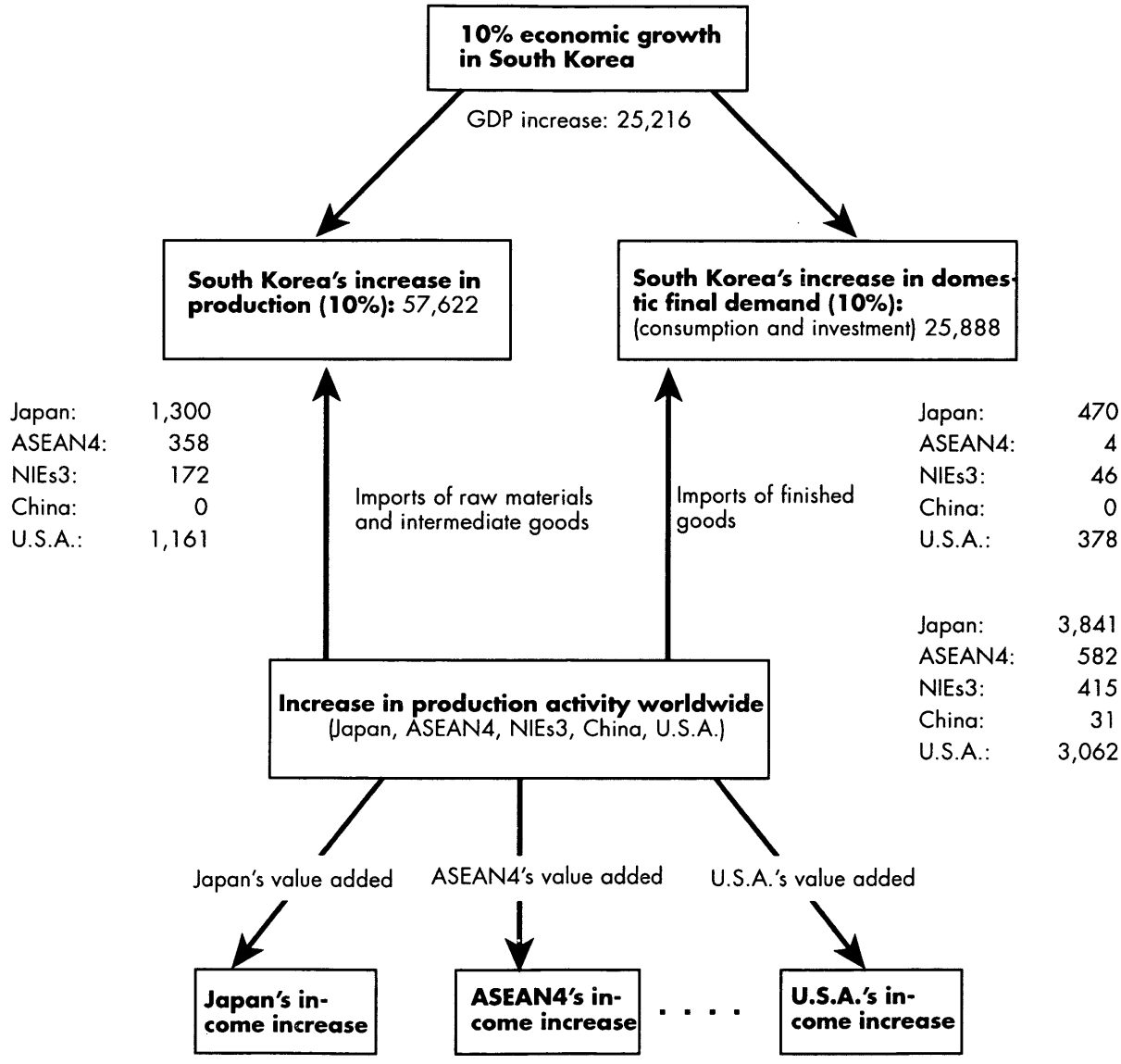
Figure 4-1 shows the effects that economic growth in one country can have on income in other countries, using South Korea's economic growth as an example. As this diagram shows, there are two channels through which economic growth in one country influences income in other countries. The first is through the effects of the increased production accompanying economic growth. An increase in production will be accompanied by a rise in imports of intermediate goods such as raw materials, component parts, and energy. This rise in imports will trigger an increase in production in other countries, both directly and indirectly, thereby causing income growth in those countries. The second channel is through the effects of increased domestic final demand brought on by a country's economic growth. This causes an increase in imports of finished goods. This rise in imports brings about growth in the income in other countries by the same mechanism as that involved with the first channel.

Figure 4-1 lists specific figures for South Korean increased GDP, increased production, increased imports, etc., in a hypothetical situation in which it is assumed that South Korea achieved economic growth of 10% in 1990. Based on these data, it is estimated that if the South Korean economy grew by 10%, South Korea's GDP would increase by $25.22 billion, production would increase by $57.62 billion, and domestic final demand would increase by $25.89 billion. This increase in production would bring about a total increase in imports from the region of $2.99 billion, and the growth in domestic final demand would trigger an additional $900 million in imports. The rise in imports would trigger production worth $3.84 billion in Japan, $580 million in the ASEAN4, and $3.06 billion in the United States. Finally, the increased production would give rise to income worth $1.93 billion in Japan, $300 million in the ASEAN4, and $1.66 billion in the United States, due to the linkages that exist.

2. Results of the Simulated Income Linkage

Table 4-1 lists the rises in income that would occur in various countries and regions in East Asia,

Figure 4-1 International Income Linkages
(Example of South Korea's economic growth: figures are for 1990 and are in million US$)



as well as the United States, if Indonesia, Thailand, and South Korea each achieved economic growth of 10%. The figures on the left side indicate income growth effects in 1985 and those on the right side income growth effects in 1990. On both sides, the value of income growth each year in the various countries and regions is also listed, as well as income growth rates to GDP (called the GDP comparative income rise effect) for the countries affected by the income growth.

To make it easier to compare the effects on income in East Asia and the United States of economic growth in the above-mentioned three countries, and to facilitate temporal comparison between the two points in time being considered, these results are shown by bar graphs in Figure 4-2.

Table 4-1 Results of the Simulated Income Linkage

Effects of 10% economic growth in Indonesia on the income in East Asia and the U.S.A.

(Million US$)

	1985		1990	
	Value of income rise	Per mill of GDP (‰)	Value of income rise	Per mill of GDP (‰)
Other ASEAN4	15.9	0.16	43.6	0.25
Malaysia	9.1	0.30	26.9	0.61
Philippines	2.4	0.08	4.0	0.09
Thailand	4.4	0.12	12.7	0.15
China	27.3	0.09	56.7	0.16
NIEs3	78.2	0.47	192.7	0.43
Singapore	38.9	2.27	50.1	1.39
Taiwan	21.9	0.37	73.5	0.47
South Korea	17.4	0.19	69.1	0.27
Japan	276.8	0.21	568.3	0.19
East Asia total	398.2	0.21	861.3	0.22
U.S.A.	186.5	0.05	213.2	0.04
East Asia + U.S.A. total	584.7(1)	0.10	1,074.5(2)	0.12

(1) Equivalent to 6.7% of Indonesia's economic growth (called the international sensitivity coefficient)
(2) Equivalent to 9.7% of Indonesia's economic growth

Effects of 10% economic growth in Thailand on the income in East Asia and the U.S.A.

(Million US$)

	1985		1990	
	Value of income rise	Per mill of GDP (‰)	Value of income rise	Per mill of GDP (‰)
Other ASEAN4	52.4	0.35	127.2	0.64
Indonesia	11.4	0.13	24.8	0.22
Malaysia	35.8	1.19	4.0	2.13
Philippines	5.2	0.17	8.4	0.20
China	26.6	0.09	121.4	0.34
NIEs3	66.5	0.40	354.3	0.80
Singapore	30.1	1.75	109.0	3.02
Taiwan	21.8	0.37	147.6	0.94
South Korea	14.6	0.16	97.7	0.39
Japan	243.1	0.18	1,115.0	0.38
East Asia total	388.6	0.20	1,717.9	0.43
U.S.A.	104.9	0.03	388.6	0.07
East Asia + U.S.A. total	493.5(1)	0.08	2,106.5(2)	0.23

(1) Equivalent to 13.5% of Thailand's economic growth
(2) Equivalent to 24.8% of Thailand's economic growth

Effects of 10% economic growth in South Korea on the income in East Asia and the U.S.A.

(Million US$)

	1985		1990	
	Value of income rise	Per mill of GDP (‰)	Value of income rise	Per mill of GDP (‰)
ASEAN4	143.3	0.78	294.9	1.04
Indonesia	53.7	0.61	126.6	1.14
Malaysia	67.4	2.24	111.8	2.54
Philippines	10.2	0.34	21.6	0.50
Thailand	12.0	0.33	34.9	0.41
China	7.4	0.03	12.6	0.04
Other NIEs3	46.3	0.61	171.8	0.89
Singapore	13.0	0.75	45.8	1.27
Taiwan	33.3	0.57	126.0	0.81
Japan	767.5	0.58	1,928.2	0.65
East Asia total	964.5	0.51	2,407.5	0.64
U.S.A.	678.3	0.17	1,663.2	0.31
East Asia + U.S.A. total	1,642.8(1)	0.28	4,070.7(2)	0.44

(1) Equivalent to 18.1% of South Korea's economic growth
(2) Equivalent to 16.1% of South Korea's economic growth

Based on Table 4-1, if we assume 10% economic growth in Indonesia in 1985, the result would be an increase in income of $400 million in East Asia (excluding Indonesia) and $190 million in the United States via the two channels already mentioned. These income increases would be equivalent to 0.21‰ of the GDP of East Asia (excluding Indonesia) and 0.05‰ of the GDP of the United States. The total income-raising effect within the region (East Asia + U.S.A.) divided by the amount by which the Indonesian economy grew (what is defined as the "international sensitivity coefficient" triggered by Indonesia's economic growth) is 6.7%.

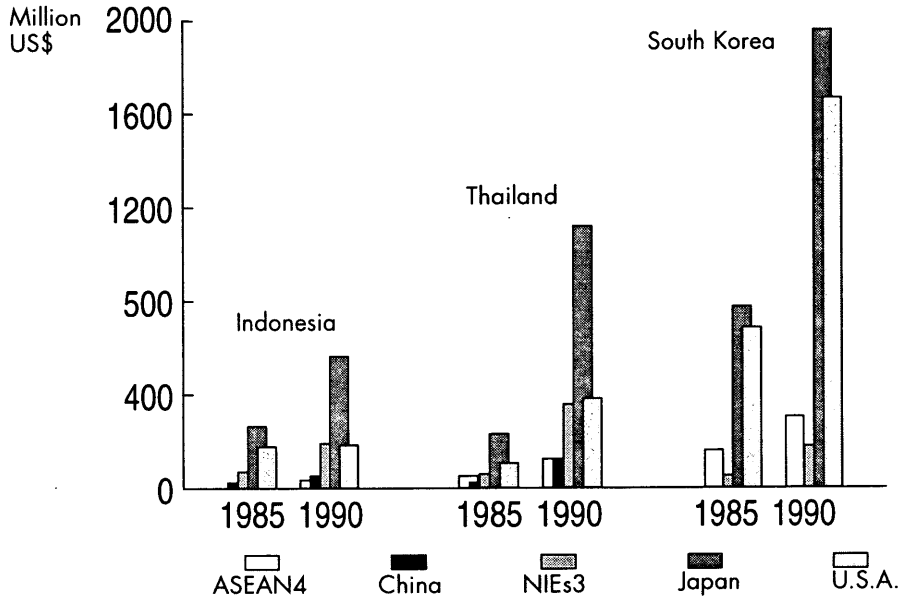
By making the same assumption for Thailand and South Korea in 1985, we can see that the income-raising effect for East Asia (excluding the country being used for the simulation) would be $390 million (GDP comparative income rise effect: 0.20‰; corresponding figures in parentheses below) in the former case and $960 million (0.51‰) in the latter. Also, the income-raising effect for the United States would be $100 million (0.03‰) in the former case and $680 million (0.17‰) in the latter. The international sensitivity coefficient triggered by economic growth in the two countries would be 13.5% for Thailand and 18.1% for South Korea.

It is natural that economic growth in South Korea, with its very large GDP, would have the largest effect on East Asia and the United States. This is followed by the effects of economic growth in Indonesia and Thailand, the former having approximately 40% of the income-raising effect of South Korea and the latter having roughly the same effect.

If we examine the change in the income-raising effect of economic growth in these countries on East Asia (excluding the country being used for the simulation) between 1985 and 1990, we see a rise of $400 million (0.21‰) to $860 million (0.22‰) for Indonesia; $390 million (0.20‰) to $1.72 billion (0.43‰) for Thailand; and $960 million (0.51‰) to $2.41 billion (0.64‰) for South Korea.

What stands out when we look at GDP comparative income rise effect is the sudden increase in 1990 of the presence of Thailand in East Asia. South Korea's effect on East Asia also grew substantially, while that of Indonesia increased only a little. The result is that, in the ranking of the size of the income-raising effect on East Asia of each of these three countries in 1990, Indonesia and Thailand have changed places, resulting in the ranking of South Korea followed by Thailand and then by Indonesia.

Figure 4-2 Simulated Effects of 10% Economic Growth in Indonesia, Thailand, and South Korea on Income in East Asia and the U.S.A.



An examination of international sensitivity coefficients also shows a big increase for Thailand, from 13.5% to 24.8%. In contrast, the international sensitivity coefficient of South Korea declined somewhat, from 18.1% to 16.1%. Finally, Indonesia's international sensitivity coefficient grew from an initially low level of 6.7% to 9.7%. Note that an increase in the international sensitivity coefficient indicates that the country's income-raising effect within the region grew more than the country's own economic growth rate. In contrast, if the international sensitivity coefficient decreases, it means that the country's income raising effect within the region lagged behind the country's own economic growth.

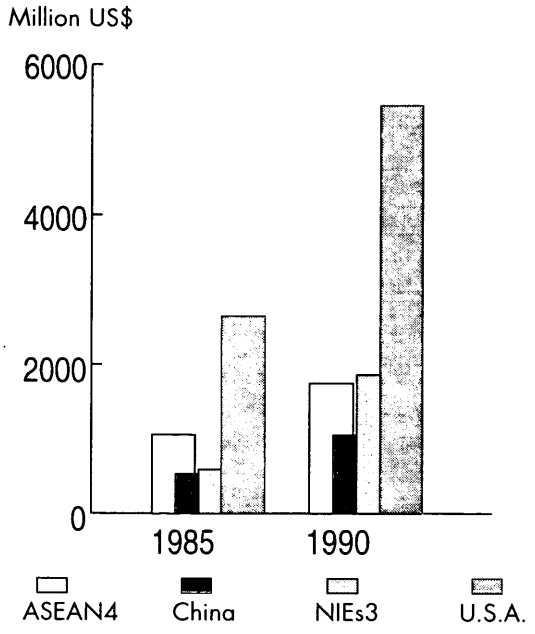
For comparison, we have performed a simulation for Japan by using the same hypothetical conditions, with the results shown in Figure 4-3. (Note that the scale used for the graph in Figure 4-3 is three times that used for the graphs in Figure 4-2.) If we look at the results for 1990, we can see that the income-raising effect of 10% economic growth in Japan on East Asia is equivalent to $4.79 billion, or $10.24 billion if the United States is added to the region being considered. In other words, the income-raising effect on all of East Asia is less than that on one country, the United States. If we compare the income-raising effect of Japan with that of South Korea, we can see that Japan's figures are approximately double those for South Korea for the income-raising effect on East Asia and two-and-a-half times those for South Korea for the income-raising effect on East Asia plus the United States. However, this is due to the large scale of Japan's economy. An examination of the international sensitivity coefficient for Japanese economic growth shows a figure of only 3.5% for 1990, far smaller than the corresponding figure for South Korea of 16.1%.

Next, we will examine the income-raising effect on East Asia of economic growth in Indonesia, Thailand and South Korea on a country-by-country basis.

Indonesia

In 1985, the country where the income-raising effect from Indonesian economic growth was greatest was Japan, followed by the NIEs3, China, and the rest of the ASEAN4, in that order. Among these, the income-raising effect on Japan was the largest by an overwhelming margin. Approximately 70% of the income-raising effect on all of East Asia was accounted for by the income-raising effect on Japan.

Figure 4-3 Simulation (reference) Effects of 10% Economic Growth in Japan on Income in East Asia and the U.S.A.



Next, let us examine the changes between 1985 and 1990. Although the income-raising effect of the Indonesian economic growth rose in nominal terms in both Japan and Singapore, the GDP comparative income rise effect dropped. However, the GDP comparative income rise effect rose for the total of all other countries in East Asia. As a result, the GDP comparative income rise effect for the NIEs3 dropped from 0.47‰ to 0.45‰. This was due largely to the large drop, from 2.27‰ to 1.29‰, in GDP comparative income rise effect for Singapore. For China and the remaining ASEAN4, the GDP comparative income rise effect rose substantially, from 0.09‰ to 0.16‰ in the former case and from 0.16‰ to 0.25‰ in the latter.

Thailand

An examination of the influence on income in East Asia of the economic growth in Thailand in 1985 shows that here also the effects were greatest by far in Japan, at $240 million. The effects were next largest in the NIEs3, but the scale here amounted to less than 30% of the income-raising effect on Japan. Also, the income-raising effect on China and the other ASEAN4 was even smaller.

As for the changes between 1985 and 1990, there was a significant rise in the GDP comparative income rise effect for all countries. Broken down by country, we can see that the effect increased most in Singapore and Malaysia.

As a result, the GDP comparative income rise effect of economic growth in Thailand increased substantially throughout the region. For the remaining ASEAN4, it rose from 0.35‰ to 0.64‰; for China, it rose from 0.09‰ to 0.34‰; for the NIEs3, it rose from 0.40‰ to 0.80‰; and for Japan, it rose from 0.18‰ to 0.38‰. This indicates how much Thailand's importance as an economic presence in East Asia has grown.

South Korea

If we look at the influence on income increase in East Asia of South Korea's 10% economic growth in 1985, here again, the effects were greatest in Japan, at $770 million. This works out to a GDP comparative income rise effect of 0.58‰ in the case of Japan. In the size of the effect, the ASEAN4 comes next, but the scale here amounted to just 19% of the figure for Japan. It is important to bear in mind that there were no imports from China in 1985 and 1990 (the figures were not recorded), but that, even so, there was an income-raising effect on China of $7 million, a small figure that had increased to $13 million by 1990. This is due to the indirect effects created when the growth of the South Korean economy triggered increased production in other countries, and that production in turn generated income in China.

Regarding changes between 1985 and 1990, GDP comparative income rise effect rose for all countries in East Asia: from 0.58‰ to 0.65‰ for Japan; from 0.61‰ to 0.89‰ for the other NIEs3 countries; and from 0.78‰ to 1.04‰ for the ASEAN4. Among the other NIEs3 countries, the rise in GDP comparative income rise effect was largest in Singapore, going from 0.75‰ to 1.27‰. Among the ASEAN4, the rise was largest in Indonesia, where GDP comparative income rise effect rose from 0.61‰ to 1.14‰.

3. Income Effects on Industry

The macro effects on East Asia of economic

growth in Indonesia, Thailand, and South Korea have been described in the preceding section. However, the industries that are affected by economic growth in these same countries can differ widely. In order to examine this aspect, we will now look at what effects 10% economic growth in South Korea in 1990 would have on industry in Malaysia (a representative ASEAN4 country), Taiwan (a representative NIEs3 country), and Japan (a representative developed country).

Table 4-2 shows the effects on industry in Malaysia, Taiwan, and Japan of such a hypothetical economic growth of 10% in South Korea. We have selected the six industries in each of these countries that would experience the largest increases in income.

The income-raising effect on Malaysia of 10% economic growth in South Korea would be equivalent to $110 million. For Taiwan, the corresponding figure would be $130 million, and for Japan, $1.93 billion. The fact that the income-raising effect would be so much greater for Japan than for the other countries have been set forth in the preceding section. However, due to the different size of GDP in each of these countries, the GDP comparative income rise effect would be 2.54‰ for Malaysia, but only 0.81‰ for Taiwan and 0.65‰ for Japan.

An examination of the industries for which the income boost is largest shows that two industries in Malaysia, agriculture-forestry-fisheries and mining, account for approximately 80% of the total income increase for the entire country. These are followed by trade and transport, light industry, services, and chemicals. This shows that the primary industries in Malaysia receive an overwhelmingly large proportion of the income boost, this being followed by services. The channels by which the income increase takes place are overwhelmingly weighted toward intermediate demand in South Korea, only a small amount being via the channel of final demand.

We will next look at the industries in Taiwan for which the income boost is largest. The benefit here is greatest in services, being followed by electrical equipment, textiles, metals, trade and transport, and chemicals. However, there is not a great deal of difference between the amount of income increase in each of these industries. These six top industries together account for only about 55% of the total income-raising effect experienced by Taiwan. This shows that, compared with Malaysia, the income- raising effect in Taiwan is spread relatively evenly among many different industries, with manufacturing industry at the core. As for the channels by which the income increase takes place, intermediate demand of South Korea is dominant, but final demand for products such as electrical equipment has a comparatively large share as well. The share of the income-raising effect due to South Korean final demand is larger in Taiwan than in Malaysia.

The Japanese industry for which the income-raising effect is largest is electrical equipment, this being followed by services, trade and transport, general machinery, metals, and chemicals. The list of Japan's industries experiencing the greatest income-raising effect is similar to that for Taiwan. The single biggest difference is the large income-raising effect on the general machinery industry in Japan. The only countries in the region being studied in which there is such a significant income-raising effect on the general machinery industry are Japan and the United States. Among the three countries being compared here, another distinguishing characteristic for Japan is the comparatively large share of the income-raising effect coming through the channel of South Korean final demand. In particular, the income-raising effect experienced by the general machinery industry, whose products are capital goods, is greater via the final demand channel than via the intermediate demand channel.

Generally speaking, one can say of income-raising channels that the overwhelming majority of the income-raising effect of industries whose products are raw materials and the like, such as textiles, chemicals, and metals, naturally comes via the intermediate demand channel. In contrast, the income-raising effect for the general machinery industry, whose products are generally capital goods, is mostly via the final demand channel.

Trade and transport, and services also both experience a significant income-raising effect in all three of the countries being compared. This is true not only for the three countries being examined, but is true for all countries. The trade and transport industry receives a boost because the exporting country's wholesale margin and transport costs on exported goods are always included in the cost of goods imported by South Korea. The income boost for the services industry arises due to the strong forward linkage to this sector within the exporting country.

Table 4-2 Income-raising Effect on Industries in Malaysia, Taiwan, and Japan of 10% economic growth in South Korea (1990)

(Million US$)

Malaysia

	Income-raising effect	GDP comparative income rise effect (‰)		
		Total	Intermediate demand	Final demand
Agriculture, forestry, and fisheries	45.5	5.86	6.84	-0.98
Mining	45.8	8.20	8.14	0.06
Light industry	9.0	2.69	2.60	0.10
Chemicals	4.8	2.06	1.87	0.20
Trade and transport	9.7	1.68	1.63	0.05
Services	6.7	0.61	0.61	0.00
All industries	111.8	2.54	2.58	-0.04

Taiwan

	Income-raising effect	GDP comparative income rise effect (‰)		
		Total	Intermediate demand	Final demand
Textiles	12.0	2.10	2.04	0.06
Chemicals	10.3	1.58	1.41	0.17
Metals	10.4	1.75	1.53	0.22
Electrical equipment	12.7	2.17	1.61	0.56
Trade and transport	10.3	0.39	0.31	0.08
Services	13.4	0.22	0.17	0.04
All industries	126.0	0.81	0.65	0.15

Japan

	Income-raising effect	GDP comparative income rise effect (‰)		
		Total	Intermediate demand	Final demand Chemicals
Chemicals	173.5	1.75	1.56	0.19
Metals	181.5	1.60	1.30	0.30
General machinery	206.7	2.35	0.90	1.45
Electrical equipment	269.0	1.92	1.59	0.33
Trade and transport	227.5	0.44	0.32	0.12
Services	246.6	0.20	0.15	0.05
All industries	1,928.2	0.65	0.48	0.17

Conclusion

In this chapter, we performed simulations of the effects of economic growth in three representative countries, Indonesia, Thailand, and South Korea, on income in East Asia. The results show that the income-raising effect for East Asia of economic growth in these three countries grew stronger between 1985 and 1990. This also indicates that, in this sense as well as that examined in the preceding chapter, economic interdependence in East Asia is growing. In particular, we noted that the economic presence of Thailand in this regard has greatly increased.

We observed the situation in 1985 and 1990, but it is probably valid to say that the same trend has continued since then. Due to the limitations of our analytical tools, we cannot state any definite conclusion, but we believe that it is instructive to examine changes in the ratio of the level of imports from East Asia by these three countries to their output (or GDP). From that, it can be pointed out that the income-raising effect in East Asia (excluding Japan) of economic growth in the three countries has increased. The income-raising effect for Japan has also increased in the case of economic growth in Indonesia, but has decreased somewhat in the case of economic growth in South Korea. However, we can state that the income-raising effect for whole East Asia, including Japan, on economic growth in these three countries has increased.