INDONESIA'S RECOVERY: EXPORTS AND REGAINING COMPETITIVENESS

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I. INTRODUCTION

T RADE has been an engine of growth for East Asia. The process began with Japan's era of high growth based on exports in the 1960s, followed by the newly industrialized East Asian economies of the Republic of Korea, Hong Kong, Singapore, and Taiwan in the 1970s and 1980s, the ASEAN4 in the 1980s, and China in the 1990s. Economic growth in East Asia, which for decades was above that of other developing countries, was driven by an export-oriented industrialization policy. Policy usually began with industrial-policy type instruments specific to target sectors or more general export incentives, such as subsidized export credit, duty free imports for manufacturing export products, and encouraging export-oriented foreign investment. In more recent years, due to restrictions on the use of these instruments under the World Trade Organization (WTO) and changes in policy stance, more general incentive structures for reforming trade and investment regimes, appropriate exchange rates, and macroeconomic policies have been adopted (World Bank 1998).

Indonesia embarked upon a strategy of export-oriented industrialization in the aftermath of the fall in oil prices in the mid-1980s. The government embarked upon a successful strategy to diversify the economic base away from oil, using both general export incentives and undertaking a substantive program of structural reform. The outcome was that the share of industrial exports in total exports increased from negligible in the early 1980s to close to 65 per cent by 1997 (including resource-based exports, such as plywood and palm oil).

Given the pattern of East Asian growth, when export growth declined a few years prior to the economic crisis of the late 1990s, there were concerns raised as to whether the East Asian countries were losing their competitiveness and whether the slowdown was cyclical or structural. Various studies since the crisis point out that the slowdown in exports and weakening of balance of payments positions increased vulnerability to the crisis, but did not cause it (see World Bank 1998, 2000; Ito 1999; Bhattacharya, Ghosh, and Jansen 1998). Furthermore, the research concluded

that the slowdown was more due to cyclical rather than structural factors, although structural and competitive factors were also important, and that there were variations among countries. Export performance during the crisis and the initial stages of recovery differed among the crisis economies, ranging from playing a major role in Korea to a very small role in Indonesia. This stands in marked contrast to the case of Mexico, which "exported" its way out of its crisis in 1994–95.

Therefore, the issues of the role played by exports in economic recovery and how to sustain growth in the more medium term are still very relevant ones. In the more medium term all the countries of East Asia, including Indonesia, will also have to confront the question of sustaining export competitiveness.

The aim of this paper is review the factors behind the decline in pre-crisis exports in Indonesia and other East Asian crisis countries, drawing information from a number of recent studies. In order to get a sense of the competitiveness issue which Indonesia will continue to face in the medium term, we offer a detailed analysis of Indonesia's pre-crisis export competitiveness. The paper closes with a section focusing on the longer-term issues facing Indonesia in order to maintain export competitiveness, recover, and sustain growth.

II. EXPLAINING THE EXPORT DECLINE: INDONESIA AND EAST ASIA

Exports and imports of goods and services in East Asia[1] increased dramatically during the last three decades preceding the economic crisis of the late 1990s at a growth rate of 11.5 per cent per annum over the period 1970–95, a figure over double the world trade growth of 5 per cent. As a result, the share enjoyed by East Asia in world trade increased from 4 to 16 per cent. As is well known, there were underlying structural factors behind these growth rates, with an evolving pattern of comparative advantage from resource- and/or labor-intensive sectors toward more capital-, technology-, and human capital–intensive sectors (World Bank 2000). The shift in comparative advantage migrated from Japan to the newly industrialized East Asian economies (NIEs) of Taiwan, Korea, Hong Kong, and Singapore, and then to the Southeast Asian economies in what has been popularly known as the "flying geese pattern." The outward flow of foreign direct investment (FDI) from Japan and the NIEs to Southeast Asia also led to close intra-regional links of trade and investment.

Thus, the unprecedented sharp decline in East Asian exports in 1995–96 caused alarm bells to ring and raised doubts about the region's ability to maintain competitiveness. Export growth in Thailand, Korea, Indonesia, Malaysia, and the Philip-

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[1] "East Asia" is comprised of China, Taiwan, Hong Kong, the Republic of Korea, and the five ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, and Thailand).

pines started to decline from first quarter 1995 and reached zero by first quarter 1996. "A sharp drop in export growth in 1996–97 was among the factors that triggered a sudden loss of confidence in the region's financially fragile firms and financial intermediaries. . . . Sharp declines in export revenues in 1998 heightened concerns about whether the weakness in export performance reflected cyclical factors or indicated deeper structural problems" (World Bank 2000, p. 46). Various studies done on this sharp decline in export growth conclude that the causal factors were mainly cyclical, although structural factors, such as increasing competition and declining productivity, also contributed.

A. *Decline in Export Growth and Cyclical Factors*

Prior to the crisis, Indonesia's export growth declined from 14.3 to 10.4 per cent over 1995–96 and dropped to only 2.4 per cent in 1997 (Table I). The decline was not as sharp as the other East Asian economies due to the buffer provided by oil exports. The sharpest decline in growth rates were experienced by Thailand and Korea, where export growth rates declined from 25.3 to 1.5 per cent and from 31.6 to 4.0 per cent, respectively, during 1995 and 1996. Thailand's figure in 1997 was 1.6 per cent, while Korea experienced a slight increase in growth to 7.5 per cent in 1997. The export growth rates of Malaysia and the Philippines also declined over the 1995–97 pre-crisis period, with the decline of the Philippines being the least steep. All the countries experienced a decline in the value of exports in 1998, the worst year of the crisis.

While there are differing patterns for each country, on the average East Asia's decline in its export value growth rate in 1996 was due to a halving of real growth in exports with the growth in the volume of exports declining from 14.3 to 6.3 per cent. In 1997, there was an increase in the volume of exports despite a fall in prices by 4.1 per cent. The fall in prices was most severe in 1998, with the growth rate of the value of exports declining by close to 9 per cent for the whole region, caused mainly by a sharp 11.6 per cent average decline in the prices of exports.

In the case of Indonesia, volume growth actually remained steady at around 8 per cent, but there was a sharp decline in the growth rate of the prices of exports from 6.0 per cent in 1995 to 2.0 per cent in 1996 and an absolute decline in prices of 5.0 per cent in 1997. In 1998 the value of Indonesia's exports declined by 4.1 per cent due to a fall in prices by 6.4 per cent, while volume growth was only 2.5 per cent. In contrast, the volume of Korean exports actually remained high and on the average increased by 16.6 per cent over the 1996–98 period, but most of this growth was eroded by an average price decline of 10.2 per cent, resulting in a low export value growth rate of 2.2 per cent. Over the same period, Thailand's export volume growth was much lower at 2.9 per cent, but it experienced a slower price decline.

The cyclical factors underlying the decline in the volume and price of exports prior to the crisis were the depreciation of the yen vis-à-vis the dollar; a decline in

TABLE I

TRENDS IN EAST ASIA'S VALUE, VOLUME, AND PRICE OF EXPORTS

(%)

Country	1991–95	1996–98	1995	1996	1997	1998
A. Value						
East Asia	16.6	1.7	22.3	8.0	5.8	−8.7
Indonesia	12.3	2.9	14.3	10.4	2.4	−4.1
Malaysia	20.7	0.6	25.8	9.6	1.6	−9.3
Thailand	19.3	−1.9	25.3	1.5	1.6	−8.9
Philippines	17.4	3.0	24.3	15.5	9.1	−15.7
Rep. of Korea	15.2	2.2	31.6	4.0	7.5	−5.0
World	8.2	2.3	18.6	5.0	3.9	−1.9
B. Volume						
East Asia	13.0	7.4	14.3	6.3	12.4	3.5
Indonesia	11.1	6.2	7.9	8.2	7.8	2.5
Malaysia	15.5	6.7	17.6	7.2	10.8	2.0
Thailand	14.3	2.9	15.5	−1.8	6.6	3.9
Philippines	9.5	12.6	12.0	8.6	20.9	8.3
Rep. of Korea	14.9	16.6	24.0	13.0	23.6	13.3
World	6.7	6.9	8.9	6.1	10.3	4.3
C. Price						
East Asia	3.2	−4.8	7.0	1.4	−4.1	−11.6
Indonesia	1.2	−3.1	6.0	2.0	−5.0	−6.4
Malaysia	4.6	−5.7	7.0	2.3	−8.3	−11.1
Thailand	4.4	−4.6	8.5	3.4	−4.7	−12.3
Philippines	7.2	−8.6	11.0	4.0	−7.8	−22.0
Rep. of Korea	0.1	−10.2	6.1	−6.0	−8.0	−16.5
World	1.4	−4.3	8.9	−1.0	−5.8	−5.9

Source: Adapted from World Bank (2000), Table 3.1.

the prices of semiconductors due to a slump in demand and surplus capacity; and a decline in demand also occurred during the crisis period. Being effectively pegged to the dollar, East Asian currencies strengthened as the dollar strengthened against the yen in 1996 and first half 1997. This meant that export prices, which were already being pressured downward due to increased competition, fell less than the fall in world prices and eroded the region's competitiveness. East Asian exports competed with Japanese products both in the Japanese and regional markets, and this contributed to a fall in the volume of exports during 1995–96. Weaker pre-crisis export prices and volume growth, as mentioned above, constituted one of the factors that triggered creditors' concerns about the ability of some East Asian economies to service their short-term debts. The ensuing capital outflow, panic, and massive devaluation of regional currencies in turn led to a cut in East Asian dollar export prices far below the fall in world export prices.

Despite the boost in price competitiveness in 1998, the volume of exports did not rise much due to a sharp fall in demand and imports in East Asia caused by the financial crisis. Very slight volume growth was maintained by increased exports to the United States and Europe; since the Philippines occupied a low share of intra-regional trade, it sustained far less volume growth decline.

In the case of Indonesia, there were additional factors contributing to declines in the volume and prices of exports. Oil prices fell dramatically in 1998, close to the level reached in 1986 of only twelve U.S. dollars per barrel. Oil exports still comprised one-quarter of Indonesia's exports. As for manufactured exports, there was a lag in the response of export growth to the increased price competitiveness due to disruptions in export supply resulting from political turmoil and problems with trade financing.

Intra-regional exports accounted for 40 per cent of East Asia's exports, so declines in aggregate demand and imports throughout the region due to the crisis had a significant impact on exports in the region. This factor had already contributed to the slowdown of 1996 brought about by the Japanese recession, and in the 1998 region-wide recession, the impact was even more dramatic. About two-thirds of the decline in East Asian exports can be accounted for by the global and regional cyclical factors mentioned above, and ironically contributed to the recovery in exports during 1999, as the region experienced a sharp turnaround (World Bank 2000).

Export growth in 1999 was also facilitated in Indonesia by a lag effect of price competitiveness gained from the large depreciation of the rupiah during 1997–98 (which has since been partially reversed). The recent weakening of the dollar against the yen has also helped to increase dollar prices of Indonesian exports. Unlike the other East Asian economies, Indonesia's export recovery only began to be felt in first quarter 2000 due to the lag effect and because the restoration of confidence has been the slowest in Indonesia and remains somewhat tenuous.

Another cyclical factor is the sharp decline in the prices of semiconductors due to surplus capacity and falling demand stemming from the recession in Japan. This decline affected a number of East Asian economies that depended heavily on electronic exports, such as Korea, Taiwan, Singapore, and Malaysia. The sharp depreciation of their currencies from second half 1997 into 1998 also kept prices down, as East Asian exporters cut prices to maintain their market shares. In anticipation of Y2K the demand for semiconductors rebounded sharply in 1999 and growth is expected to continue into 2000 and 2001 (World Bank 2000). This has been one of the main factors behind the sharp increase in Korea's exports, providing a major boost to its economic recovery process. Indonesia's electronic exports, including semiconductors, were just beginning to take off when the crisis occurred, and while it was not affected by the cyclical downturn, it did not enjoy the kind of upturn that other countries of East Asia did.

B. *Declining Exports and Structural Factors*

The main structural factors in declining exports were increased competition, trade diversion to regions set up by such arrangements as NAFTA (North American Free Trade Agreement), and the similarity in export structures among the East Asian economies.

There has been a sharp increase in the level of intra-regional trade in East Asia due to higher GDPs, leading to higher import growth rates in the region, and due to the links in trade and investment mentioned above. The share occupied by East Asia in East Asian imports rose from 21.3 to 37.0 per cent during 1985–98 period (World Bank 2000, p. 51).

According to the research, NAFTA brought about a trade diversion from East Asia to the North American market. Yeats (1999) decomposes the absolute diversion of each East Asian economy's exports to North America into a demand (i.e., increase in imports if the economy maintained a constant market share) and a competitiveness component (i.e., change explained by a change in market share) for the period of 1988–97. His findings indicate that for Hong Kong, Taiwan, and Korea demand gains were offset by losses in competitiveness. Meanwhile for China and Southeast Asia, demand gains were complemented by gains in competitiveness, although Thailand and Malaysia suffered declining market shares in 1995–97.

A growing similarity in the export structure of East Asia as a whole is confirmed by various studies looking at the cross-country correlation matrix of export structures (Yeats 1999; Lall, Albaladejo, and Aldaz 1999). In the case of Indonesia, the correlations were relatively low, even with China as its main competitor. While increased similarity in export structures could imply broader based competition, which was certainly being felt by Indonesia just prior to the crisis, it can also mean greater potential for intra-industry trade, which is often facilitated and complemented by foreign direct investment patterns of multinational corporations (MNCs).

The decline in Indonesia's export growth was due to the cyclical and structural factors mentioned above, but there were also specific factors to be explained in the following section.

C. *The Structure of Indonesia's Exports and Performance during the Economic Crisis: A Closer Look*

Table II provides a more detailed picture of Indonesia's non-oil exports. The growth of export value and volume was substantial at around 20 per cent per annum over the 1991–96 period. This growth was the result of an export-oriented drive that began in the middle and late 1980s, and was facilitated by a surge in export-oriented FDI in the early 1990s. The growth in volume was comparable to the growth in value for most products, indicating real growth rather than that due to price increases, the exceptions being agriculture- or resource-based products such as cof-

TABLE II

GROWTH OF INDONESIA'S NON-OIL EXPORTS, 1991–99

	1991–96		1997		1998		1999		Value Share (%)	
	Value	Volume	Value	Volume	Value	Volume	Value	Volume	1995	1999
Agriculture	5.5	−5.7	7.5	9.0	17.4	77.4	−18.4	−2.6	8.3	7.7
Coffee	12.4	−0.5	−14.5	−15.1	15.0	15.5	−20.8	−1.5	1.7	1.2
Shrimp	6.8	−0.1	−0.8	7.2	−0.1	−7.8	−11.9	52.6	3.0	2.3
Spices	0.5	−4.9	48.8	−3.5	18.3	47.8	34.6	−10.1	0.6	1.0
Cocoa beans	24.1	23.2	12.2	−19.9	29.7	26.6	−22.7	20.3	0.6	0.8
Fish	6.1	11.0	1.6	9.8	−6.3	0.0	12.7	7.2	1.1	1.0
Seeds	−9.6	−13.5	2.5	−11.3	36.6	184.5	−42.9	−27.2	0.0	0.0
Industrial	22.5	7.0	9.3	28.2	−1.1	40.7	−3.6	−3.6	84.0	85.6
Plywood	5.0	−1.7	−5.1	−5.0	−39.1	4.5	8.6	−15.3	9.9	5.8
Sawn wood	33.4	20.8	−19.7	−21.3	−56.9	−40.7	80.4	111.5	1.3	0.8
Other wood products	14.7	−2.8	42.4	26.3	44.3	45.8	−43.0	−29.8	3.1	3.2
Garments	11.2	13.2	−19.6	−5.1	−10.0	−7.9	47.5	67.0	9.7	9.8
Other textile	13.3	35.5	23.0	32.8	29.6	56.0	−27.9	−15.0	8.1	8.8
Processed rubber	26.4	6.0	−10.7	0.3	−22.1	19.3	−20.1	−8.2	6.3	3.2
Palm oil	29.2	8.6	75.2	73.0	−48.5	−48.8	49.5	123.0	2.1	2.9
Electrical apparatus	22.2	19.1	−2.9	130.2	8.8	−61.6	13.5	47.7	2.6	4.3
Processed food	29.2	4.2	−13.3	−0.1	−9.4	−22.6	26.8	56.7	2.3	2.5
Chemicals	55.0	56.3	30.6	38.3	39.9	117.9	−2.2	1.4	1.5	2.5
Fertilizer	−1.8	−6.2	15.1	65.6	−45.9	−25.0	10.7	30.9	0.8	0.5
Paper and paper products	51.4	82.6	−1.8	−15.0	51.9	48.9	37.9	37.4	2.9	5.0
Mining	47.9	43.2	2.9	17.0	−13.0	−1.5	−2.9	79.2	7.7	6.7
Copper ore	50.1	41.9	−14.3	−7.7	−12.7	17.4	−11.6	−3.4	4.4	3.0
Coal	61.6	59.5	32.5	31.9	−9.3	14.5	−2.4	14.4	3.0	3.4
Total	21.6	20.3	8.7	20.7	−0.6	16.3	−4.9	38.6	100.0	100.0

Source: BPS-Statistics Indonesia, *Economic Indicators* (various issues).

fee, plywood, processed rubber, and palm oil, where price increases explain a large part of value growth.

The depth and magnitude of the crisis was larger and the crisis period longer for Indonesia compared to the rest of East Asia, due to a complex interaction of economic with political and social troubles. This in turn has had a depressing impact on exports during 1997–99, despite a large depreciation of the rupiah.

Given that the crisis began to show its effects only in the last quarter of 1997, the export growth rate in terms of value and volume remained positive. Volume growth was still robust at 21 per cent, but the growth of value had declined to under 10 per cent, already indicating a decline in prices. The exception was agriculture, which experienced growth in value and volume due to a rise in the prices of some commodities. For example, the value of spice exports increased by 49 per cent, despite a slight decline in volume growth, in contrast to the growth in the volume of industrial exports, which remained substantial at 28 per cent, while the growth in value was slightly less than one-third of that figure at 9 per cent. This was mainly due to a decline in such major exports, in terms of both value and volume, as plywood and wood products, garments, and paper and paper products. On the other hand, products experiencing high growth included electrical apparatus, mainly comprised of consumer electronics and reflecting fruition of export-oriented foreign investment by Japanese and Korean firms during the early 1990s. However, since the share of such products in total exports remained small, export value was not affected much by their growth.

As the crisis began to deepen in Indonesia, and the exchange rate depreciated dramatically from Rp 2,500 to an average of around Rp 10,000 to the U.S. dollar during 1998, the volume of non-oil exports still increased by 16 per cent. However, due to a sharp decline in prices, the growth rate of export value actually declined slightly. The impact of the crisis differed from sector to sector, with agricultural exports increasing in volume by a spectacular 77 per cent, but only 17 per cent in value, indicating a sharp decline in prices especially the export of shrimp (fresh and frozen). As for industrial products, despite an increase in export volume of 41 per cent, the value of exports actually declined. This decline in value can be attributed to both a drop in demand precipitated by the crisis, which led to a decline in prices, and specific factors experienced by Indonesia during the crisis.

In 1999, both agricultural and industrial products experienced a decline in volume and value growth. The underlying factors appear to be a combination of price and volume declines. Volume declines continued in 1999 as the East Asian economies were just beginning to recover and demand had not been restored fully. Price declines appear to have continued into 1999.

According to Magiera (2000), the single most important factor behind Indonesia's weak performance was the decline in international prices. Declining prices for international primary commodities preceded the crisis and deepened during the slow-

down in demand caused by the crisis. There are several underlying reasons for the decline in manufactured goods prices in dollar terms. First, the collapse of domestic demand at the onset of the crisis led manufacturers to shift sales from domestic to export markets, and in order to do so they had to lower their prices. Secondly, where buyer markets exist, exporters were pressured by buyers to provide large discounts given the large depreciation of the rupiah. Discounts were also deemed necessary to offset the increased risk of doing business in Indonesia after the disruption of supplies during April–June 1998 at the height of political turmoil.

Another factor contributing to the decline of exports was trade financing problems.[2] The problems with the banking sector and its eventual collapse meant that exporters faced constraints in obtaining financing. The larger exporters, subsidiaries of multinational companies, and firms with buyer and supplier networks were able to overcome the problem by obtaining trade financing through their parent companies or suppliers and buyers. Some also relied on their own internal capital. Nevertheless, overcoming the issue of trade financing remains important in facilitating export growth. The crux of the problem is, of course, the breakdown in the banking sector and the fact that various schemes that have been introduced during the last two years have not worked, since they depend on the restoration of a banking system to issue letters of credit and a restoration of confidence in the government and government guarantees.

The real effective exchange rate also affected export growth prior to and during the crisis. Prior to the crisis, Indonesia adopted a policy of continuous depreciation at around 5 per cent per annum beginning in 1988 to compensate for inflation and other currency changes. Just prior to the crisis, in 1995 and 1996, the weakening of the yen, and a shift in policy to allow the exchange rate to appreciate as part of the response to the influx of capital inflows, led to a decline in the price competitiveness of Indonesian exports. During the crisis, despite a large nominal depreciation of the rupiah, the real effective depreciation was much less. The dramatic nominal depreciation up to last quarter 1998 was offset by inflation rates close to 100 per cent in 1998, and since last quarter 1998, a strengthening of the rupiah has occurred, although it is still subject to wide fluctuations. Thus, it is estimated that real effective depreciation is around 50 per cent of that in pre-crisis times.

D.   *The Varying Impact of the Crisis on the Manufacturing Sector*

The post-crisis competitiveness of a given sector of the economy will depend on whether it "survived" or, in fact, was strengthened during the crisis. Preliminary analysis of the sectors which survived in Indonesia will tell a lot about factors that will contribute to competitiveness and the ability to sustain export growth in the near future.[3]

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[2] See Magiera (2000) and Feridhanusetyawan, Pangestu, and Habir (1998) for more detailed information.

[3] The analysis of this subsection is drawn from Feridhanusetyawan, Aswicahyono, and Anas (2000).

The impact of the crisis on the manufacturing sector was diverse, and our analysis suggests that differences among industries were due to such factors as the degree of dependence on imported inputs, the ability to switch to export markets, and support from international networks in finance and marketing.[4] Table III shows trends of the impact of the crisis on various industries based on a quarterly index of industrial production published by the BPS-Statistics Indonesia from second quarter 1997 to second quarter 1999. The crisis was much more prolonged in Indonesia compared with other economies. There are eighty-eight industries at the ISIC five-digit level that were monitored by this index. The base year is 1993.

Nine clear patterns of production response during the crisis can be identified and in turn classified into the three groups of losers, survivors, and gainers. Losers are industries that suffered from the crisis through declines in output, or gains early on but declines in the end. Survivors are industries which experienced no change in production throughout the crisis, or experienced declines initially followed by a sharp gradual increases later on. Gainers are those industries which experienced production increases throughout the crisis.

This analysis is a preliminary one in that it is based on visual and descriptive analysis rather than rigorous quantitative analysis. However, some preliminary hypotheses about some possible causes for the different patterns of industrial production can be offered and hopefully shed some light on the overall competitiveness question being raised in this paper.

The first pattern of production is an immediate and sharp decline in production at the onset of the crisis, continued by falling production for the duration. The motor vehicle and dry cell battery industries boomed prior to the crisis, reaching an index level of 200–300 or doubling between 1993 and 1997. The demand for durables, such as motor vehicles, suffered a major collapse in domestic demand throughout the crisis, dropping to near zero in mid-1999. At the depth of the crisis it was reported that motor vehicle assembly plants were producing only at 10 per cent of capacity. Another industry which experienced similar sharp decline was powdered, condensed, and preserved milk, falling from around 350 in mid-1997 to around 80 in mid-1999. The main reason is that this industry had a high import content and prices increased sharply after the massive depreciation of the rupiah during the crisis.

The second pattern of production is a slow decrease throughout the crisis which describes the paper products (cardboard boxes and publishing), processed food (coffee, chocolate, and sugar confectionaries), cement products, chemicals, and motorcycle-related products industries. The level of production in these industries ranged from about 70 to 140 in 1997, then declined to from about 30 to 110 by mid-1999. Some possible explanations for the gradual decline are: (1) their production had

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[4] See Feridhanusetyawan, Aswicahyono, and Anas (2000) for more details.

TABLE III

THE CHANGING PATTERN OF MANUFACTURING DURING THE CRISIS

Category	Pattern of Production	Industry
Losers	Immediate and sharp decrease	Motor vehicles Powdered, condensed, and preserved milk Internal combustion Air conditioners, refrigerator, and the like Motor vehicle body Batik Dry cell batteries Industrial paper
	Slow decrease throughout crisis	Printing, publishing, and allied industries Peeling and cleaning seed other than coffee Structural cement products Motorcycles and motorized bicycles Food made of chocolate and sugar confectionaries Paper and cardboard boxes Bakery products Chemicals, nec Basic chemicals, nec Prepared animal feed
	No change or increase, but then decrease	Macaroni, spaghetti, noodle, and the like Furniture and fixtures made of bamboo or rattan Glass products for household use Bulb, spot light, and ultra violet lamps Sawmills Wheat flour Coconut cooking oil
Survivors	No change during crisis	Furniture, fixtures of wood Synthetic fibers Weaving mills, except gunny and other sacks Spinning yarn Plywood Adhesive Processed tea
	Relatively no change with a peak in Q3 1998	Pesticides Peeling and cleaning of coffee Basic inorganic chemicals, nec Sub-assembly of electronic components Record and cassette tapes Sports shoes Garments
	Decrease, then increase (Sharp V curve)	Electrical accumulators Soap and cleaning aids, including toothpaste Basic organic chemicals Plastic bags, containers Tires and tubes Metal pipes and fittings

TABLE III (Continued)

Category	Pattern of Production	Industry
Survivors	Decrease, then increase (Slow, wide U curve)	Structural materials made of porcelain Motor vehicle components and apparatus Clove cigarettes Finished textiles except garments Drugs and medicine Cement Footwear for daily use Wire
Gainers	No change, then increase	Paper products for cultural/social purposes Prefabricated metal products, nec Cigarettes Metal kitchenware other than aluminum Finished textiles Printed textiles Crumb rubber
	No change, then increase, followed by decrease more recently	Motorcycle, motorized bicycle components Plastic articles Molding and building components Tea seasoning Palm cooking oil

Source: BPS-Statistics Indonesia, *Quarterly Production Statistics of Selected Groups of Large and Medium Manufacturing Industries*, data from Q2 1997 to Q2 1999.

been relatively constant or increased only slightly prior to the crisis and, being more basic goods, were less subject to fluctuation; and (2) many of these goods are inputs or intermediate products, which means that declines in production come with some lag.

The third pattern of production is one where there is initially no change in production or an initial increase, followed by a decrease so that the index of production was lower in mid-1999 than in 1997. The composition of such industries is rather mixed, and includes wheat flour and noodle products, cooking oil, and household glass products. For wheat flour, macaroni, noodle, and spaghetti products, the lifting of the import subsidy on wheat in mid-1998 seemed to have had a significant effect, and given the depreciation of the rupiah, the cost of the imported wheat increased significantly, leading to price increases. For coconut cooking oil production increased up to first quarter 1998, before it declined sharply. The initial increase was due to its substitution for palm oil, whose price increased sharply at the beginning of the crisis.

The fourth, fifth, sixth, and seventh patterns of production describe those industries that survived the crisis. They include those with no change in production or those with a V- or U-shaped pattern. Industries which did not experience much

change in production include a wide range of products, such as textiles, garments, plywood, furniture, plastic articles, sports shoes, and basic inorganic chemicals, among others. One main reason for the trend is that production was more easily shifted from domestic market orientation to export market orientation. The industries which declined first and then increased production in mid-1998 are the most interesting ones. Some of them reached production levels by mid-1999 that were significantly higher than in 1997. Industries that experienced a sharp V curve pattern include basic organic chemicals, plastic bags and containers, soap, toothpaste and cleaning materials, battery accumulators, metal pipe and fittings, and tires and tubes. Those displaying a wide U pattern include cement, motor vehicle components, porcelain products, clove cigarettes, finished textile products, footwear, and wire. Most of these products are finished goods, and it would appear that a successful switch to exports came with a lag compared with the previous category of products.

Finally, there are industries that gained during the crisis with production not changing at the onset of the crisis, then increasing sharply starting in mid-1998. This category includes some paper and metal products industries, cigarettes, textiles, and crumb rubber. There are also industries mostly gained from the terms of trade effect of the crisis, had low import content, and suddenly faced an increasing demand for exports as the rupiah depreciated substantially. Those industries include palm oil, motorcycle components, tea seasoning, and some plastic articles.

A number of general observations can be put forth regarding the different response patterns to the crisis by different industries. Survival or gain by a particular industry due to the crisis depended on its ability to switch production from the domestic to the export market, as well as to find substitutes for imported components which became prohibitively expensive due to the depreciation of the rupiah. The ability to switch to exports was facilitated when an industry or company had financial and marketing support, either because it was a subsidiary of a multinational company, or had good relationships with buyers and suppliers. Since the breakdown in the banking system due to the crisis constrained access to trade financing from domestic banks, having buyers, suppliers, or joint venture partners to facilitate financing was important. Another reason is that access to export markets was facilitated by being part of an international network. In other words, industries that had extensive trade, investment, technology, and domestic production networks performed better during the crisis than those that did not. Intermediate products and inputs also fared better than final goods, especially if they could be substituted for imports. Industrial networks offer the most obvious advantage of economies of scale. A joint venture company is able to purchase intermediate inputs through its parent, obtaining lower prices and assistance in financing.

III.   MEASURING MANUFACTURED EXPORT COMPETITIVENESS

This section looks at the measurement and analysis of various standard measures of competitiveness in Indonesia's manufactured exports up to the occurrence of the crisis. It is important to gauge the competitiveness structure prior to the crisis as a basis for evaluating what happened later. This section begins by looking at the general structural picture of Indonesia's manufactured exports by factor intensity.

A.   *The Structure of Indonesian Exports by Factor Intensity*

Table IV shows that Indonesia's export growth began to take off only after 1987. The level of manufactured exports was negligible in 1987, and so the dramatic growth experienced in the 1987–92 period was predicated on a very low base at the starting point. Given Indonesia's rich endowment of natural resources and low-cost labor, it can be expected to have a comparative advantage in sectors which were natural resource– and unskilled labor–intensive. Indeed, in 1992 unskilled labor–intensive (ULI) products accounted for slightly more than half of manufactured exports, and natural resource–intensive exports accounted for around one-quarter.

The growth rate of natural resource–intensive (NRI) exports, such as wood, was high at around 20 per cent during 1987–92. Specific policy encouraging the processing of logs to plywood by the banning log exports and prioritizing the plywood and processed wood industries also contributed to this growth. Just prior to the crisis, the growth of NRI exports declined to only one-quarter of the average growth achieved in the previous period. As already explained, part of the reason for the decline was a fall in demand due to the recession in Japan and a drop in prices due to this soft demand. NRI export growth declines in the crisis period of 1996–98 can also be attributed to a fall in demand.

Indonesia's comparative advantage in unskilled labor–intensive (ULI) exports is clear from the extremely high growth that sector experienced during 1987–92. The takeoff in ULI exports in Indonesia occurred much later than in other Southeast Asian economies. As a result, the share of ULI exports increased substantially from 28 per cent of manufactured exports in 1987 to 54 per cent by 1992, and then declined to 42 per cent by 1996, as other types of exports began to take off. The growth rate of ULI exports fell substantially during 1996–98, especially garments and textiles. The growth of other ULI exports, such as footwear and furniture, also declined steadily. The underlying reasons for declining growth in the export of textiles and garments have been discussed elsewhere (see Pangestu 1997), but may be summarized a switch of sales toward booming domestic demand, increased competition with other low-cost producers, and declining price competitiveness due to the rise in the minimum wage, which had been higher than productivity increases.

TABLE IV

FACTOR INTENSITY OF MANUFACTURED EXPORTS, 1987–98

SITC	Description	Value (U.S.$ Million)				Average Growth (%)		
		1987	1992	1996	1998	1987–92	1992–96	1996–98
	Natural resource–intensive (NRI) industries	2,039	4,102	5,052	3,069	20.2	5.8	−19.6
63	Wood	1,922	3,826	4,843	2,736	19.8	6.6	−21.8
66	Cement	65	167	103	168	31.4	−9.5	31.5
61	Leather manufactures	47	61	37	76	6.3	−10.0	53.7
53	Dyeing/tanning materials	5	48	69	88	185.2	11.1	13.7
	Unskilled labor–intensive (ULI) industries	1,208	8,607	11,024	7,294	122.5	7.0	−16.9
84	Garments	596	3,164	3,591	2,630	86.2	3.4	−13.4
65	Textiles	469	2,837	2,835	2,359	101.1	0.0	−8.4
85	Footwear	22	1,324	2,195	1,206	1,164.3	16.5	−22.5
82	Furniture	27	490	952	355	340.2	23.5	−31.4
89	Miscellaneous manufactures	56	506	1,023	445	159.7	25.5	−28.2
	Physical capital–intensive (PCI) industries	679	1,072	2,152	2,899	11.6	25.2	17.4
68	Nonferrous metal	412	406	665	625	−0.3	15.9	−3.0
67	Iron and steel	189	269	335	614	8.5	6.1	41.6
51	Organic chemicals	20	217	514	762	89.9	34.2	24.1
74	Industrial equipment, nes	4	49	205	223	248.5	79.3	4.4
71	Power-generating equipment	1	18	144	332	347.8	177.3	65.4
	Human capital–intensive (HCI) industries	214	1,220	3,058	4,673	94.2	37.7	26.4
64	Paper/paperboard	98	341	942	1,415	49.6	44.1	25.1
89	Miscellaneous manufactures	11	101	528	1,665	164.4	105.2	107.6
69	Metal manufactures	10	223	432	364	445.4	23.5	−7.8
78	Road vehicles	3	182	348	312	1,099.4	23.0	−5.2
55	Perfume/cosmetic	44	161	199	222	53.9	5.7	6.0
	Technology-intensive (TI) industries	168	1,467	4,934	4,245	155.1	59.1	−7.0
76	Telecommunications equipment	8	599	2,068	1,361	1,574.7	61.4	−17.1
77	Electrical equipment	15	331	1,058	986	431.2	55.0	−3.4
75	Office/data processing machines	—	126	762	765	8,626.4	125.8	0.2
56	Manuf. fertilizers	86	184	270	168	22.9	11.7	−18.8
57	Plastics in primary form	—	45	312	494	44,561.7	149.6	28.9
	Total	4,307	16,468	26,219	22,179	56.5	14.8	−7.7

Source: Calculated from BPS-Statistics Indonesia, *Economic Indicators* (various issues).
Note: NRI industries comprise of SITC 53, 61, 63, 66 excluding 664, 665, 666.
    ULI industries comprise of SITC 65, 664, 665, 666, 81, 82, 83, 84, 85, 89 excluding 896 and 897.
    PCI industries comprise of SITC 51, 52, 67, 68, 71, 72, 73, 74, 751.
    HCI industries comprise of SITC 55, 62, 64, 69, 775, 78, 79, 885, 896, 897.
    TI industries comprise of SITC 54, 56, 57, 58, 59, 752, 759, 76, 77 excluding 775, 88 excluding 885.

The decline in the value of ULI exports during the crisis period can be linked to all the factors discussed above.

Other than ULI and NRI exports, from the early 1990s, Indonesia began to also develop comparative advantage in the human capital–intensive (HCI) and technology-intensive (TI) sectors, although a closer examination of subsectors reveals that they are still linked to NRI and ULI sources. In the HCI sector, for example, paper and paperboard is a major subsector, whereas in the TI sector, electrical and telecommunications products are the important subsectors, which are really still on the ULI end of the value chain (see Soesastro and Pangestu 1998). That is to say, they are mostly labor-intensive assembly operations in consumer electronics and basic telecommunications equipment, such as telephone handsets. Due to country specific factors, Indonesia suffered a late start in the electronic subsector compared to its Southeast Asian neighbors, and its industries were just taking off prior to the crisis. By 1996 the value of TI exports was almost the same as the share enjoyed by NRI exports.

During the crisis years, TI exports also experienced a decline, but was less than NRI or ULI exports. HCI exports had also increased steadily over the pre-crisis period, and continued to experience positive, high growth during the crisis years. Paper and pulp explains part of the story. They have been able to take advantage of the depreciation of the rupiah due to a low import content. Given that there was investment just prior to the crisis, the paper and pulp industry entered the crisis at the technological frontier and as a result, was able to use its capacity and provide very competitive prices after the sharp depreciation of the rupiah. A rich natural resource endowment, and thus no need to import raw materials, appears to explain the strong performance of HCI during the crisis.

B.   *Revealed Comparative Advantage*

One of the most widely used measures of trade competitiveness is the "revealed" comparative advantage (RCA) index. The RCA index of a given country for a given product is measured by the item's share in the country's exports relative to its share in world trade. This traditional measure has a simple interpretation. If the index exceeds unity, this implies the country has a revealed comparative advantage in the good. The index, therefore, reveals information regarding a country's competitive position in the world market. Based on this measure, we can answer several relevant questions. The first is obviously whether Indonesia has lost a comparative advantage in the manufacturing sector in general, or has it lost comparative advantage in traditional sectors, while at the same time gaining comparative advantage in other sectors with high growth potential.

Figure 1 provides summary statistics on major changes that have occurred in the Indonesia manufacturing sector's RCA during 1985–96. The figure shows the simple and weighted (by exports) average RCA. Several important points can be observed from this figure. First is the rapid increase in average RCA during the 1985–89

Fig. 1.   Simple and Weighted Average RCA, 1985–96

A. Simple Average

B. Average Weighted by Exports
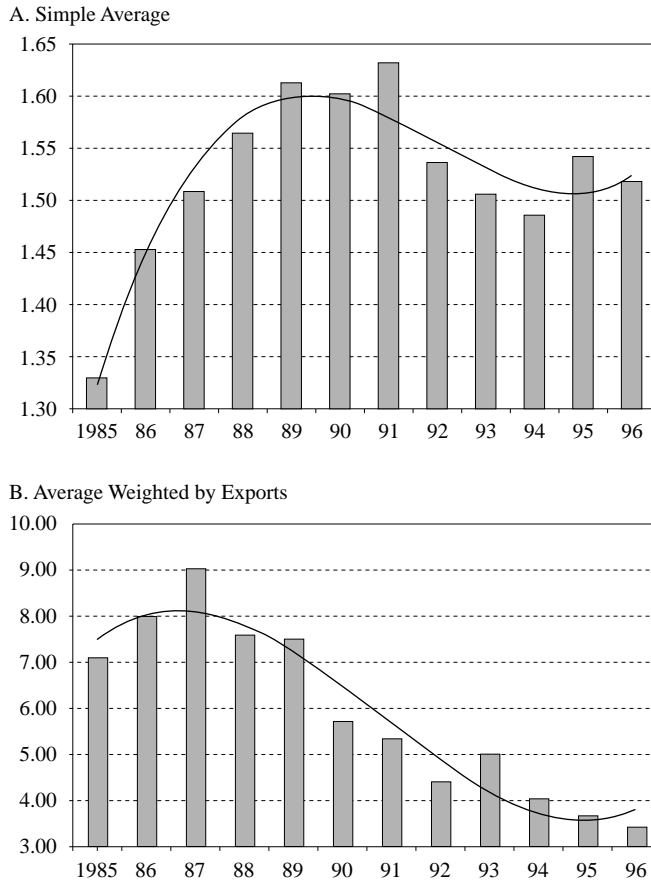
Source: Calculated from the United Nations, *International Trade Statistics*.

period, followed by a declining trend since 1990. The weighted average RCA figures are higher than the simple average figures throughout the period. For example, for 1989 the weighted average is around five times higher than the simple average. This difference implies that major exports items have higher RCAs than minor items. Table V shows that several major export items such as wood and wood products (ISIC 331), petroleum refineries (353), nonferrous metal (372), textiles (321), and wearing apparel (322) have very high RCAs. These five industries accounted for 74 per cent of Indonesia's total exports.

Secondly, weighted average RCA declined at an earlier period and at a faster rate than simple average figures, implying that the major export industries were losing

TABLE V

CHANGES IN REVEALED COMPARATIVE ADVANTAGE (RCA), 1986–89 AND 1989–96

A.   Sum of Export 1986–89

| RCA 1985 | ISIC | Description | Growth 1985–89 | | Grand Total (%) |
			Increasing (%)	Decreasing (%)	
High	331	Wood and wood products	31.2		31.2
	322	Wearing apparel	9.2		9.2
	321	Textiles	8.1		8.1
	314	Tobacco	0.4		0.4
	353	Petroleum refineries		15.4	15.4
	372	Nonferrous metal		10.5	10.5
	311	Food 1		8.1	8.1
		High total	48.9	34.0	82.8
Low	351	Industrial chemicals	2.8		2.8
	371	Iron and steel	2.8		2.8
	355	Rubber products	1.3		1.3
	381	Fabricated metal products	1.3		1.3
	341	Paper and paper products	1.2		1.2
	390	Other manufacturing	1.1		1.1
	356	Plastic products	0.9		0.9
	323	Leather and leather products	0.7		0.7
	362	Glass and glass products	0.6		0.6
	369	Nonmetallic mineral products	0.4		0.4
	384	Transport equipment	0.4		0.4
	332	Furniture	0.3		0.3
	385	Professional and scientific equipment	0.2		0.2
	361	Pottery and china	0.1		0.1
	342	Printing and publishing	0.1		0.1
	382	Machinery	0.1		0.1
	324	Footwear	0.0		0.0
	313	Beverages	0.0		0.0
	383	Electrical machinery		1.2	1.2
	352	Other chemicals		1.2	1.2
	312	Food 2		0.4	0.4
		Low total	14.3	2.9	17.2
Grand total			63.2	36.8	100.0

B.   Sum of Export 1989–96

| RCA 1989 | ISIC | Description | Growth 1989–96 | | Grand Total (%) |
			Increasing (%)	Decreasing (%)	
High	321	Textiles	11.5		11.5
	311	Food 1	6.6		6.6
	355	Rubber products	6.3		6.3

TABLE V (Continued)

| RCA 1989 | ISIC | Description | Growth 1989–96 | | Grand Total (%) |
			Increasing (%)	Decreasing (%)	
High	356	Plastic products	4.5		4.5
	390	Other manufacturing	2.6		2.6
	332	Furniture	1.3		1.3
	361	Pottery and china	0.4		0.4
	324	Footwear	0.3		0.3
	331	Wood and wood products		21.3	21.3
	322	Wearing apparel		11.8	11.8
	353	Petroleum refineries		6.4	6.4
	372	Nonferrous metal		3.7	3.7
	314	Tobacco		0.4	0.4
		High total	33.3	43.6	76.9
Low	383	Electrical machinery	6.8		6.8
	351	Industrial chemicals	2.9		2.9
	381	Fabricated metal products	2.6		2.6
	341	Paper and paper products	2.2		2.2
	382	Machinery	1.8		1.8
	384	Transport equipment	1.5		1.5
	385	Professional and scientific equipment	0.8		0.8
	342	Printing and publishing	0.4		0.4
	371	Iron and steel		1.6	1.6
	352	Other chemicals		0.9	0.9
	362	Glass and glass products		0.6	0.6
	312	Food 2		0.4	0.4
	323	Leather and leather products		0.4	0.4
	369	Nonmetallic mineral products		0.3	0.3
	313	Beverages		0.0	0.0
		Low total	18.9	4.3	23.1
Grand total			52.2	47.8	100.0

Source: Same as Figure 1

comparative advantage earlier and faster than other industries. The "dynamism" reflected in Table V supports the observation provided by Figure 1.

During 1985–89, there were seven industries (wood and wood products, wearing apparel, textiles, tobacco, petroleum refineries, nonferrous metal, and food 1) which had RCAs greater than unity. These seven industries accounted for 83 per cent of Indonesia's exports. Moreover, four out of the seven, which accounted for 49 per cent of all exports, were still experiencing a rise in their RCA at the end of the period.

The situation changed dramatically during 1989–96, however. During this period the number of industries with high RCA increased to thirteen, while five of

them (wood and wood products, wearing apparel, petroleum refineries, nonferrous metal, and tobacco), which accounted for 44 per cent of Indonesia's exports, experienced a decline in RCA. Several low RCA industries, such as electrical machinery, industrial chemicals, fabricated metal products, paper and paper products, and machinery currently still have low comparative advantage, but seem to have promise for the future, judging from the increases in RCA they are experiencing.

C. *Decomposing RCA and Trade Mapping*

Since the RCA index of a given country for a given product is measured by the products share in the country's exports relative to its share in world trade, it measures a combination of the trend of the product's share in the country's exports relative to the trend of the country's share in world trade. In other words, the index is a mixed measure of a country's ability to penetrate the world market (supply side) and attract international demand (demand side).

It would be useful to decompose these two sources of export growth further. The International Trade Centre of UNCTAD/WTO produces "trade maps" as tools for reviewing the performance of a country's product groups. The trade map compares export growth of a particular commodity with the growth of international demand for that commodity. The map classifies product groups into winners and losers in markets experiencing higher growth and markets experiencing growth decline, compared with the average growth of imports of all manufactured commodities:

Champions: winners in growth market $\delta_{ij} > r_i > r$

Underachievers: losers in growth markets $\delta_{ij} < r_i, r_i > r$

Losers in declining markets $\delta_{ij} < r_i < r$

Achievers in adversity: winners in declining markets $\delta_{ij} > r_i, r_i < r$

where δ_{ij} is the growth of a country's (j) exports of a commodity (i); r_i is the growth of world imports of commodity i, and r is the growth of world imports of all manufactured commodities.

Table VI classifies Indonesia's manufacturing exports into winners and losers in growing and declining markets. The table reveals that the decline in Indonesia's export competitiveness during 1985–89 was related to a demand constraint. During 1985–89, most of Indonesia's export products (nineteen industries) were from fast growth industries (63.4 per cent of total exports), including among others wood and wood products (31.2 per cent), wearing apparel (9.2 per cent), iron and steel (2.8 per cent), and nonferrous metal (10.5 per cent). In contrast, during 1989–96, only ten industries, accounting for 31.2 per cent of total manufacturing exports, enjoyed high import demand from the world market. The other industries suffered from slow world demand. These trends are consistent with the identification of cyclical factors contributing to the slowdown of export growth noted in the above section.

The declining trend in Indonesia's export growth appears to be in part due to selling in markets with declining demand, rather than declining competitiveness.

TABLE VI

Trade Map of Indonesia's Manufactured Exports, 1986–89 and 1989–96

A.   Sum of Export 1986–89

Competi-tiveness	ISIC	Description	World Market 1985–89		Grand Total (%)
			Fast (%)	Slow (%)	
Winners	331	Wood and wood products	31.2		31.2
	322	Wearing apparel	9.2		9.2
	371	Iron and steel	2.8		2.8
	381	Fabricated metal products	1.3		1.3
	352	Other chemicals	1.2		1.2
	341	Paper and paper products	1.2		1.2
	390	Other manufacturing	1.1		1.1
	356	Plastic products	0.9		0.9
	323	Leather and leather products	0.7		0.7
	362	Glass and glass products	0.6		0.6
	369	Nonmetallic mineral products	0.4		0.4
	314	Tobacco	0.4		0.4
	332	Furniture	0.3		0.3
	385	Professional and scientific equipment	0.2		0.2
	361	Pottery and china	0.1		0.1
	342	Printing and publishing	0.1		0.1
	382	Machinery	0.1		0.1
	353	Petroleum refineries		15.4	15.4
	321	Textiles		8.1	8.1
	311	Food 1		8.1	8.1
	351	Industrial chemicals		2.8	2.8
	355	Rubber products		1.3	1.3
	312	Food 2		0.4	0.4
	384	Transport equipment		0.4	0.4
	324	Footwear		0.0	0.0
	313	Beverages		0.0	0.0
		Winners total	51.7	36.6	88.3
Losers	372	Nonferrous metal	10.5		10.5
	383	Electrical machinery	1.2		1.2
		Losers total	11.7		11.7
Grand total			63.4	36.6	100.0

B.   Sum of Export 1989–96

Competi-tiveness	ISIC	Description	World Market 1989–96		Grand Total (%)
			Fast (%)	Slow (%)	
Winners	322	Wearing apparel	11.8		11.8
	381	Fabricated metal products	2.6		2.6
	383	Electrical machinery	6.8		6.8

TABLE VI (Continued)

| Competi-tiveness | ISIC | Description | World Market 1989–96 | | Grand Total (%) |
			Fast (%)	Slow (%)	
Winners	356	Plastic products	4.5		4.5
	312	Food 2	0.4		0.4
	314	Tobacco	0.4		0.4
	332	Furniture	1.3		1.3
	385	Professional and scientific equipment	0.8		0.8
	382	Machinery	1.8		1.8
	331	Wood and wood products		21.3	21.3
	353	Petroleum refineries		6.3	6.3
	321	Textiles		11.5	11.5
	311	Food 1		6.6	6.6
	351	Industrial chemicals		2.9	2.9
	355	Rubber products		6.3	6.3
	341	Paper and paper products		2.2	2.2
	390	Other manufacturing		2.6	2.6
	362	Glass and glass products		0.6	0.6
	384	Transport equipment		1.5	1.5
	361	Pottery and china		0.3	0.3
	342	Printing and publishing		0.4	0.4
	324	Footwear		0.3	0.3
		Winners total	30.2	62.8	93.0
Losers	352	Other chemicals	0.9		0.9
	372	Nonferrous metal		3.7	3.7
	371	Iron and steel		1.6	1.6
	323	Leather and leather products		0.4	0.4
	369	Nonmetallic mineral products		0.3	0.3
	313	Beverages		0.0	0.0
		Losers total	0.9	6.0	7.0
Grand total			31.2	68.8	100.0

Source: Calculated from the United Nations, *International Trade Statistics*.

The notion that Indonesia was able to maintain competitiveness is evident from the fact that the export share of winner industries, the industries whose export growth is higher than world import growth, increased from 88.3 per cent during 1985–89 to 93.0 per cent during 1989–96.

D. *Constant Market Share Analysis*

The above RCA and trade map analysis has shown that the decline of Indonesia's export growth was in part due to a decline in the RCAs of some major exporting industries and selling to markets with declining demand. However, the trade map

analysis only considers one aspect of the demand factor—namely, the commodity composition effect—and leaves out another aspect of demand, country effect factors. It is possible that Indonesia's exports commodity classified as winners in the trade map analysis was not the result of the ability to penetrate world markets, but simply a reflection of Indonesia's ability to choose the "right" markets.

Constant market share (CMS) analysis addresses this issue. CMS analysis measures export performance of country j for product i by its growth differential from a benchmark or standard growth rate, such as the world consumption of that commodity. It also explicitly decomposes the differential into three proximate sources: (1) the choice of commodities (i.e., specialization in commodities for which world consumption is increasing); and (2) the choice of markets (i.e., targeting countries whose consumption is growing faster than the average). By extracting these two demand factors from the export growth differential, CMS analysis can be called the residual or the competitiveness effect.

The commodity effect shows how much of an export differential is due to the fast growth in the world import of particular commodities compared to the import of other commodities. A positive value implies that the country's export of the particular commodity increased because the demand for that commodity is increasing.

The country effect shows how much of an export differential is due to demand factors of the targeted country. Positive country effects show that the export growth of a particular country is partly due to choosing the right market. Conversely, a negative value suggests that the country's exports were destined to countries whose demand is not growing as fast as world growth.

The competitiveness effect is the difference between the actual growth rate of country j for product i to country k and the growth rate of k's total import of that particular commodity. Country j's export of a certain commodity is said to be gaining competitiveness in country k if it is growing faster than country k's import of the particular commodity from all sources. If the export by country j of product i to country k grows faster than the exports of other countries to the particular country, j's market share in country k is increasing. If this happens in most countries to which j exports, then the particular industry of country j is gaining in competitiveness.

Table VII provides a tabulation of the CMS results by commodity for 1986–89 and compares it with figures for 1989–96. Total manufacturing export differentials are positive for both periods, implying that in general Indonesia's manufacturing exports grew faster than the standard. The total manufacturing commodity effect is negative for both periods (−18 per cent for 1986–89 and −17 per cent for 1989–96), suggesting that Indonesia has been specializing in manufacturing commodities whose world demand is declining. However, the aggregate country effect is positive for both periods, suggesting that Indonesia's export destination mix is favorable, in the sense that Indonesia exports its products to countries where import demand is grow-

TABLE VII

CONSTANT MARKET SHARE ANALYSIS BY COMMODITY, 1986–89 AND 1989–96

A. 1986–89

ISIC	Description	Export Differential	Commodity Effect	Country Effect	Competitiveness Effect
311	Food 1	−106	−62	27	−71
312	Food 2	9	−3	2	10
313	Beverages	5	0	1	3
314	Tobacco	29	2	4	23
321	Textiles	388	−29	27	390
322	Wearing apparel	351	55	−57	354
323	Leather and leather products	42	−3	7	39
324	Footwear	7	0	0	7
331	Wood and wood products	882	138	487	257
332	Furniture	47	1	3	43
341	Paper and paper products	53	4	17	32
342	Printing and publishing	9	0	2	8
351	Industrial chemicals	102	−5	25	82
352	Other chemicals	10	3	−1	8
353	Petroleum refineries	−546	−633	354	−267
355	Rubber products	197	−2	6	194
356	Plastic products	141	0	5	136
361	Pottery and china	22	0	1	20
362	Glass and glass products	49	−1	10	40
369	Nonmetallic mineral products	54	1	3	50
371	Iron and steel	250	25	56	169
372	Nonferrous metal	−82	96	162	−340
381	Fabricated metal products	197	4	14	179
382	Machinery	5	0	1	3
383	Electrical machinery	−43	10	27	−79
384	Transport equipment	35	−1	10	27
385	Professional and scientist equipment	13	0	1	10
390	Other manufacturing	103	5	10	89
	Total manufacturing	2,223	−396	1,202	1,415
	%	100	−18	54	64

B. 1989–96

ISIC	Description	Export Differential	Commodity Effect	Country Effect	Competitiveness Effect
311	Food 1	466	−210	85	591
312	Food 2	17	3	9	5
313	Beverages	−4	−1	4	−8
314	Tobacco	34	17	60	−44
321	Textiles	638	−474	171	941
322	Wearing apparel	733	−88	46	776
323	Leather and leather products	−56	−9	2	−49
324	Footwear	42	−22	4	60
331	Wood and wood products	−340	−398	774	−717

TABLE VII (Continued)

ISIC	Description	Export Differential	Commodity Effect	Country Effect	Competitiveness Effect
332	Furniture	222	14	73	135
341	Paper and paper products	478	−106	71	513
342	Printing and publishing	106	−6	3	109
351	Industrial chemicals	447	−48	49	446
352	Other chemicals	51	32	18	1
353	Petroleum refineries	−134	−178	−174	218
355	Rubber products	1,191	−37	31	1,197
356	Plastic products	845	38	27	779
361	Pottery and china	51	−13	3	60
362	Glass and glass products	4	−2	44	−38
369	Nonmetallic mineral products	−11	−6	35	−40
371	Iron and steel	−125	−67	4	−62
372	Nonferrous metal	−495	−237	−35	−224
381	Fabricated metal products	358	12	126	220
382	Machinery	846	48	60	738
383	Electrical machinery	2,104	379	19	1,706
384	Transport equipment	300	−29	39	290
385	Professional and scientific equipment	157	7	41	109
390	Other manufacturing	496	−71	84	483
	Total manufacturing	8,420	−1,451	1,673	8,198
	%	100	−17	20	97

Source: Same as Table VI.

ing. However, the importance of the country effect has diminished. During 1986–89 the effect account for 54 per cent of the export differential, and 20 per cent during 1989–96. The competitiveness effects are positive and increasing during the two periods. This suggests that Indonesia was able to improve its export share in destination markets for almost all industries.

The aggregate results mask sectoral variations in the sources of export growth differential. Table VIII provides cross-tabulations of the demand and supply factors. The demand factor is represented by commodity effect, while the supply factor is manifest in the competitiveness effect. Based on these two factors, the industries can be clustered into four quadrants.

1. Those in fast-growing markets (positive commodity effect), while at the same time improving their competitiveness (positive competitiveness effect)
2. Those with positive commodity but negative competitiveness effects
3. Those with negative commodity but positive competitiveness effects
4. Those with negative commodity and competitiveness effects

The industry clusters based on those four quadrant are also presented in Table VIII.

One explanation of the decline in Indonesia's export performance can be found

TABLE VIII

COMPETITIVENESS OF EXPORTS, 1986–89 AND 1989–96

A. Sum of Export Share 1986–89

(%)

World Market	ISIC	Description	Competitiveness		Grand Total
			Competitive	Noncompetitive	
Fast	331	Wood and wood products	31.2		31.2
	322	Wearing apparel	9.2		9.2
	371	Iron and steel	2.8		2.8
	381	Fabricated metal products	1.3		1.3
	352	Other chemicals	1.2		1.2
	341	Paper and paper products	1.2		1.2
	390	Other manufacturing	1.1		1.1
	356	Plastic products	0.9		0.9
	369	Nonmetallic mineral products	0.4		0.4
	314	Tobacco	0.4		0.4
	332	Furniture	0.3		0.3
	385	Professional and scientific equipment	0.2		0.2
	342	Printing and publishing	0.1		0.1
	382	Machinery	0.1		0.1
	372	Nonferrous metal		10.5	10.5
	383	Electrical machinery		1.2	1.2
		Fast total	50.2	11.7	61.9
Slow	321	Textiles	8.1		8.1
	351	Industrial chemicals	2.8		2.8
	355	Rubber products	1.3		1.3
	323	Leather and leather products	0.7		0.7
	362	Glass and glass products	0.6		0.6
	312	Food 2	0.4		0.4
	384	Transport equipment	0.4		0.4
	361	Pottery and china	0.1		0.1
	324	Footwear	0.0		0.0
	313	Beverages	0.0		0.0
	353	Petroleum refineries		15.4	15.4
	311	Food 1		8.1	8.1
		Slow total	14.5	23.5	38.1
Grand total			64.8	35.2	100.0

B. Sum of Export Share 1989–96

(%)

World Market	ISIC	Description	Competitiveness		Grand Total
			Competitive	Noncompetitive	
Fast	383	Electrical machinery	6.8		6.8
	356	Plastic products	4.5		4.5
	381	Fabricated metal products	2.6		2.6

TABLE VIII (Continued)

World Market	ISIC	Description	Competitiveness		Grand Total
			Competitive	Noncompetitive	
Fast	382	Machinery	1.8		1.8
	332	Furniture	1.3		1.3
	352	Other chemicals	0.9		0.9
	385	Professional and scientific equipment	0.8		0.8
	312	Food 2	0.4		0.4
	314	Tobacco		0.4	0.4
		Fast total	18.9	0.4	19.3
Slow	322	Wearing apparel	11.8		11.8
	321	Textiles	11.5		11.5
	311	Food 1	6.6		6.6
	353	Petroleum refineries	6.3		6.3
	355	Rubber products	6.3		6.3
	351	Industrial chemicals	2.9		2.9
	390	Other manufacturing	2.6		2.6
	341	Paper and paper products	2.2		2.2
	384	Transport equipment	1.5		1.5
	342	Printing and publishing	0.4		0.4
	361	Pottery and china	0.3		0.3
	324	Footwear	0.3		0.3
	331	Wood and wood products		21.3	21.3
	372	Nonferrous metal		3.7	3.7
	371	Iron and steel		1.6	1.6
	362	Glass and glass products		0.6	0.6
	323	Leather and leather products		0.4	0.4
	369	Nonmetallic mineral products		0.3	0.3
	313	Beverages		0.0	0.0
		Slow total	52.7	27.9	80.7
Grand total			71.7	28.3	100.0

Source: Same as Table VI.

in this table. During 1986–89, there were sixteen industries in fast-growing markets. These industries accounted for 61.9 per cent of total exports during the period. In contrast, there were only nine industries in fast-growing markets, accounting for 19.3 per cent of total exports during 1989–96. The most notable shifts were sectors to quadrant-4 (negative commodity and competitiveness effects). These include wood and wood products, nonferrous metal, iron and steel, glass and glass products, leather and leather products, nonmetallic mineral products, and beverages. These industries therefore suffered from slow world demand and became less competitive. On the other hand, several minor export items (in terms of share) moved to quadrant-1 from one period to the next. These include electrical machinery, other chemicals,

and food 2. It is interesting to note that electrical machinery responded quite effectively to trends in world demand, which has been growing rapidly since 1986, but during 1986–89 Indonesia was constrained from exploiting that potential. The situation changed dramatically in 1989–96, when electrical machinery became the largest competitive Indonesian industry in a fast-growing world market, as investments boomed from the early 1990s on.

E.   *Competitiveness in the Domestic Market*

The analytical framework to gauge export competitiveness, especially CMS analysis, may be modified to analyze the competitiveness of domestic producers against imports in the domestic market. In this framework, import growth is compared with domestic consumption growth. If imports grow faster than domestic consumption, then it may be said that domestic producers are losing some of their market shares to imports. Conversely, if domestic output grows faster than imports, then it may be inferred that local producers are gaining some of import's share.

Similar to CMS analysis for exports, the first import differential to be calculated can be defined as the difference between actual change in imports and the change in imports keeping pace with growth in apparent consumption. Like the CMS analysis for exports, the import differential can be decomposed into several components. However, unlike CMS analysis for exports, country composition effects are missing. Another slight difference with CMS-export analysis is that the import differential of the imported commodities is what is measured. Therefore, negative values for competitiveness effects are interpreted as gains in the competitiveness of local manufactures over imports.

Table IX shows the results of our CMS analysis for import competitiveness. Due to data limitations, the analysis is limited to 1986–89. The table shows a negative import differential, implying that the market share of imports in the domestic market declined over that period. In other words, domestic products gained market share in the domestic market. Further decomposition reveals that most of the gain was due to competitiveness effects and was not confined to only a few industries, but happened across the board.

The most notable trend is the gain of domestic goods over imports in several capital/technology-intensive industries, such as industrial chemicals, nonmetallic mineral products, and iron and steel.

The CMS results for exports and for imports were cross-tabulated to infer the relationship between performance in domestic and export markets. Such domestic-export performance is divided into four quadrants.
1.   Competitive in both export and domestic markets
2.   Competitive in export market but noncompetitive in domestic market
3.   Noncompetitive in export market but competitive in domestic market
4.   Noncompetitive in both export and domestic markets

TABLE IX

CONSTANT MARKET SHARE RESULTS OF IMPORT COMPETITIVENESS, 1986–89

ISIC	Description	Import Differential	Commodity Effect	Country Effect	Competi- tiveness Effect
311	Food 1	587,427	215,100	0	372,327
312	Food 2	−69,096	−48,587	0	−20,509
313	Beverages	14,701	3,793	0	10,908
314	Tobacco	27,870	−7,370	0	35,241
321	Textiles	−381,915	−29,039	0	−352,876
322	Wearing apparel	−12,004	21,465	0	−33,469
323	Leather and leather products	−4,569	−36,386	0	31,817
324	Footwear	−1,819	18,411	0	−20,230
331	Wood and wood products	5,139	−26,118	0	31,257
332	Furniture	78,395	75,241	0	3,154
341	Paper and paper products	−332,480	87,468	0	−419,948
342	Printing and publishing	−85,271	24,713	0	−109,984
351	Industrial chemicals	−2,237,323	−698,183	0	−1,539,140
352	Other chemicals	−300,822	−123,142	0	−177,680
353	Petroleum refineries	247,444	307,245	0	−59,801
355	Rubber products	−51,258	−24,658	0	−26,600
356	Plastic products	−85,486	154,433	0	−239,920
361	Pottery and china	4,488	17,142	0	−12,654
362	Glass and glass products	−14,599	34,114	0	−48,713
369	Nonmetallic mineral products	−21,496	1,985,857	0	−2,007,353
371	Iron and steel	−571,108	2,418,574	0	−2,989,682
372	Nonferrous metal	−85,190	557,986	0	−643,176
381	Fabricated metal products	−215,605	−47,856	0	−167,749
382	Machinery	−1,893,588	−1,242,817	0	−650,771
383	Electrical machinery	48,984	1,473,332	0	−1,424,348
384	Transport equipment	−912,060	429,872	0	−1,341,933
385	Professional and scientific equipment	−274,414	−59,315	0	−215,098
390	Other manufacturing	−85,231	12,342	0	−97,573
	Total manufacturing	−6,620,886	5,493,617	0	−12,114,503
	%	100	−83	0	183

Source: Same as Table VI.

Table X reveals several important trends regarding competitiveness in exports and domestic markets according to industry cluster. Most industries that are competitive in the domestic market are also competitive in the export market. These industries accounted for 63.8 per cent of total exports during 1989–96. The most competitive industries in both markets included wearing apparel, textiles, electrical machinery, petroleum refineries, rubber products, plastic products, and industrial chemicals.

However, these general trends need to be balanced by considering several constraining factors. One possible explanation for deviation from the general trend is

TABLE X

COMPETITIVENESS IN EXPORT AND DOMESTIC MARKETS ACCORDING TO INDUSTRY CLUSTER, 1989–96

Sum of Export Share 1989–96

Competitive-ness in Export Market	ISIC	Description	Competitiveness in Domestic Market		Grand Total (%)
			Competi-tive (%)	Noncom-petitive (%)	
Competitive	322	Wearing apparel	11.8		11.8
	321	Textiles	11.5		11.5
	383	Electrical machinery	6.8		6.8
	353	Petroleum refineries	6.3		6.3
	355	Rubber products	6.3		6.3
	356	Plastic products	4.5		4.5
	351	Industrial chemicals	2.9		2.9
	381	Fabricated metal products	2.6		2.6
	390	Other manufacturing	2.6		2.6
	341	Paper and paper products	2.2		2.2
	382	Machinery	1.8		1.8
	384	Transport equipment	1.5		1.5
	352	Other chemicals	0.9		0.9
	385	Professional and scientific equipment	0.8		0.8
	342	Printing and publishing	0.4		0.4
	312	Food 2	0.4		0.4
	361	Pottery and china	0.3		0.3
	324	Footwear	0.3		0.3
	311	Food 1		6.6	6.6
	332	Furniture		1.3	1.3
		Competitive total	63.8	7.8	71.6
Noncompetitive	372	Nonferrous metal	3.7		3.7
	371	Iron and steel	1.6		1.6
	362	Glass and glass products	0.6		0.6
	369	Nonmetallic mineral products	0.3		0.3
	331	Wood and wood products		21.3	21.3
	314	Tobacco		0.4	0.4
	323	Leather and leather products		0.4	0.4
	313	Beverages		0.0	0.0
		Noncompetitive total	6.2	22.1	28.3
Grand total			70.1	29.9	100.0

Source: Same as Table VI.

the high level of protection enjoyed by some industries. Under high protection a domestic producer may enjoy price advantages over imported goods, which may explain its domination over the domestic market. However, protection may also induce inefficiency, which is manifest in the inability to compete in the world market, as in the case of nonferrous metal, iron and steel, glass and glass products, and nonmetallic mineral products.

IV.   THE WAY FORWARD: IMPLICATIONS FOR REGAINING AND SUSTAINING COMPETITIVENESS

Indonesia's rapid export growth and its subsequent decline prior to the economic crisis of the late 1990s appear, as in other East Asian economies, due more to cyclical rather than structural factors or declining competitiveness. This is evident from the observation that a fall in prices was an important factor in declining growth of the value of exports. Trade mapping analysis indicates that the slowdown in exports was also related to exports being destined to markets facing declining demand, rather than due to declining competitiveness. Constant market share (export) analysis indicates that while Indonesia did specialize in products whose world demand was declining, the aggregate country effect was still positive, indicating that the mix of export destinations still led to markets where import demand was growing, although the importance of exports going to growing markets declined from 54 per cent of the export differential during 1986–89 to only 20 per cent during 1989–96. More importantly, competitiveness effects—that is, being able to improve market share in destination markets—were positive and contributed more to explaining export growth above standard growth. However, there are important trends to note from CMS-export analysis. There were significant shifts of exports classified as destined to fast-growing markets and experiencing improved competitiveness. A number of industries such as wood, nonferrous metal, iron and steel, and glass and glass products shifted out of the "winner" category, while electrical machinery was an important shift into the "winner" category.

    CMS-import analysis also indicates that domestic production was gaining market share compared to imports, and the cross-tabulation of CMS-export and CMS-import calculations indicates importantly that most industries which are competitive in the export market are also competitive in the domestic market. Such industries accounted for 64 per cent of total non-oil exports which include such products as garments, textiles, electrical machinery, petroleum refineries, rubber products, plastic products, and chemicals. Changes in competitiveness are reflected in changes occurring in revealed comparative advantage (RCA). A number of Indonesian industries increased their RCAs during 1989–96: namely, electrical machinery, paper and paper products, industrial chemicals, and fabricated metal products. In line with the above CMS analysis, those experiencing declining RCAs, although still

above one, were wood, garments, petroleum refineries, nonferrous metal, and to-bacco.

Therefore, the pre-crisis decline in export growth had more to do with the cyclical factors we have already discussed. It would appear that just prior to the crisis, Indonesia was in a transition stage of moving away from comparative advantage based on its abundant resource endowment, mainly natural resource–intensive exports, such as wood, and unskilled labor–intensive exports, such as garments and textiles, and moving to more technology- and capital-intensive exports, especially electronics (mainly consumer electronics). This was driven by foreign direct investment and to some extent lower labor costs. However, as shown by various case studies, Indonesia was no doubt at the beginning of entering into this phase, since it had weak human resource and physical infrastructure, weak supporting industries, such as components and basic materials, and an electronics industry which had up to the early 1990s been mostly oriented toward the domestic market (Thee and Pangestu 1998; Soesastro and Pangestu 1998). The reliance on imported inputs was still high, and as the experience of the crisis indicates, such reliance made it less possible for Indonesia to export its way out of the crisis.

The effect of the crisis on exports again indicates the cyclical factors behind the decline in growth, with price declines and contraction of overall demand explaining a large part of it. Other factors that are notable due to the unfolding of the crisis are that "survivors" and winners were those that were less dependent on imported inputs, such as the paper and paper products, resource- and agriculture-based export industries, and those that were part of an international network, either by being a subsidiary of a multinational corporation or part of an established network of buyers-suppliers, enabling them to shift sales from domestic to export markets quickly as well as overcome trade financing constraints.

A decline in real wages combined with net effective depreciation is expected to provide a competitive boost to unskilled labor–intensive exports and feature low cost of labor as a source of comparative advantage. However, too rapid an increase in wages, which is a distinct political possibility, will erode this competitiveness quickly (Feridhanusetyawan 2000). First, there has been an increasing trend in the minimum wage, which could continue because it has great political appeal. A minimum wage increase was delayed during the worst period of the crisis in 1998 and was only increased by 15 per cent, compared with inflation of 77 per cent. However, since then it has been increased twice by 16 per cent in April 1999 and then by 25 per cent in April 2000.

Secondly, there is a potential for greater demand for wage increases by labor unions. The crisis weakened the bargaining power of labor due to increased unemployment and surplus labor. However, the bargaining power of labor is expected to increase in the coming years. Political reform and democratization for the past two years have given more freedom to workers to organize. As a result, demand for

higher wages, especially the minimum wage, will increase. However, due to the slow process of economic recovery, increases in productivity and employment may not call for wage increases. Therefore, it would not be surprising if the incidence of labor disputes, strikes, and other labor problems will increase in the coming years.

Other than the labor issue, in the short run the major problems will continue to be cyclical, and the recovery in East Asia should facilitate a recovery in its exports and there are signs that this is beginning to take place in first quarter 2000. However, exports are not in general expected to be the main conduit for recovery, given the strong reliance on imported inputs, the possibility of rising wages, continued uncertainties affecting investment, and slowness in the recovery of the banking sector. In the very short term, what needs to be done is to ensure that existing sources of competitiveness can be maintained until more pressing medium-term issues can be dealt with. This includes (1) maintaining macro economic stability; (2) maintaining a check on wage increases so that they do not surpass productivity; (3) exploring any potential for breakthroughs in obtaining trade financing, which can work in the short term without having to wait for the banking sector to recover; and (4) utilizing foreign direct investment and networks for market access and to obtain lowest cost inputs and overcome financing constraints.

However, structural factors such as increasing competition, productivity, and value added, which were already being flagged prior to the crisis, will be important if export growth is to be sustained in the medium term. There is a whole range of issues that needs to be addressed. First, one should not forget the lessons already learned by Indonesia, such as maintaining competition in the domestic market. Furthermore, a recent study on Korea and Japan has found that imports have a stronger effect on productivity than do exports. Imports provide competitive pressure on local products, can influence productivity by embodying technological gains in country of origin and contributing to the product, and can be effective in assimilating new technologies (Yusuf 2000). Other factors conducive to exports such as foreign direct investment and international networks, appropriate macroeconomic policy, and building up competitive support industries so that the reliance on imported inputs will be reduced, are all also important.

The familiar problem of reliance on imported inputs has to do with the early phase of manufactured export development that Indonesia now finds itself in, but is also based on policy flaws and mistakes as mentioned in past studies. A domestic content policy, which is no longer allowed under the Trade Related Investment Measures (TRIMs) agreement in the WTO, has not worked effectively and is not a viable option for Indonesia. Allowing duty free imported inputs for export production was important in the early phase of trade deregulation when tariff levels could not be immediately reduced. However, the fact that domestic components, which are indirect exports, do not receive duty free allowance implies that there is a preference for imported inputs. Duty free inputs should be extended to both domestic

components and inputs that are used in export production. An even more ideal strategy would be to reduce tariff levels affecting core inputs and components, and provide the right incentives for the development of an efficient and viable domestic support industry. The "natural" protection provided by the net effective 50 per cent depreciation of the rupiah should provide the perfect opportunity to do so.

The situation in pre-crisis Indonesia indicates that its comparative advantages in natural resources and low labor costs have contributed substantially to the increased competitiveness of exports, especially during the post-1986 deregulation period. However, from the experience of the sectors which survived or even gained during the crisis, the importance of having a "deeper" industrial structure underlying the export industry and the transient nature of the traditional sources of comparative advantage were becoming more and more evident. Thus, the crucial medium-term issue facing Indonesia is how to continue to maintain its traditional comparative advantage while building up new sources of comparative advantage. This would entail developing competitive support industries, ensuring that Indonesian companies are part of an international trade, finance, and technology network, and enhancing its technological capabilities. Lall, Albaladejo, and Aldaz (1999) rank Indonesia's technological capability as the lowest compared with the other East Asian economies, given that "late starter" status in export-oriented industrialization means that the development of a technological base is much more recent and had not taken root yet.

There are several areas for building up local capabilities: trade policy, financial sector policies, infrastructure development, industrials structure, skills formation, technology promotion, and the role of FDI (Lall, Albaladejo, and Aldaz 1999, p. 22). The first three areas have already been mentioned, and under the IMF reform program, Indonesia has already embarked on steps to respond to the issues in each area. The promotion of technology and the role of FDI are crucial to ensuring competitiveness, but have only to date received lip service in Indonesia. The experience of the crisis should remind us how important it is to pay attention to these two areas, which facilitated an export-led recovery in Korea and to a lesser, but still important, extent in Taiwan.

Skill formation and export competitiveness are generally accepted as necessary, but the need has become even more urgent given the rapid pace of technological change, information technology development, and the so-called future of the knowledge-based economy, which will determine competitive edge based on knowledge and information, and ability to adapt and be flexible. On a scale of one to ten, Indonesia scores the lowest out of the East Asian economies (World Bank 2000, fig. 3.10) in terms of the percentage of the population enrolled in secondary and tertiary education. More importantly, as Lall, Albaladejo, and Aldaz (1999) point out the pattern of skills needed for competing in modern manufacturing have changed. There has to be a shift of focusing from quality and quantity of education (i.e.,

general enrollment levels) and corporate training to higher-level, specialized training with close collaboration and links between educational institutions and industry needs. Indonesia compares very poorly with other East Asian economies in tertiary level enrollments in technical subjects (data for 1995 cited in Lall, Albaladejo, and Aldaz 1999). It also has one of the lowest levels of technology imports and scientists and engineers per million people in the East Asian economies (World Bank 2000, fig. 3.10).

Technological activity and promotion are often measured by R&D as a rough indicator of technological effort. R&D expenditures in productive enterprises as a percentage of GNP in developing countries roughly correspond to the technological level of their exports. Based on this indicator, the percentage productive enterprises spend on R&D in the more developed NIEs is about ten times higher than in the new NIEs and Latin America. Asia as a whole accounts for 86 per cent of R&D scientists and engineers in the developing world. Out of the East Asian developing economies, Korea and Taiwan are the leaders, while the Southeast Asian economies, including Indonesia, are somewhat lower (World Bank 2000).

Multinationals and FDI also play an important role in the technological capability of a country. If Indonesia is to participate in the manufacture and sale of the most dynamic products in the global market, products which require more complex technology and levels of product differentiation, there is no way to do so without participation of MNCs. A regression analysis shows that the significant determinants of RCA in high-tech exports are FDI and R&D expenditures, while for medium-tech exports skills (technical enrollment), R&D, and risk (measured by index of economic stability), for low-tech exports wages, skills, and risk, and resource-based exports R&D (Lall, Albaladejo, and Aldaz 1999).

The implications of sustaining competitiveness in the medium term are clear. Indonesia will sooner or later have to make a move into activities that lead to greater technological learning, rapid technical progress, and greater spillover effects.

Indonesia will need to build a broad and deep base of human capital, like the more mature NIEs in East Asia. Other than continuing to develop the quantity, and more importantly quality, of secondary and tertiary education, emphasis on special skills, especially in the technical areas, needs to be accelerated. In order to develop greater technological capability, incentives that promote competition and innovation, supported by the appropriate institutions, are needed.

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