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Did East-Asian Developing Economies Lose Export Competitiveness in the Pre-Crisis 1990s?: Assessing East-Asian Export Performance from 1980 to 1996

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Did East-Asian Developing Economies Lose Export Competitiveness in the Pre-Crisis 1990s?

Assessing East-Asian Export Performance from 1980 to 1996

March 2002

This ADB Institute study uses standard export indicators to determine (i) how export performance evolved during the emergence of the dynamic East-Asian trade-FDI nexus and (ii) whether successful trading economies were already starting to lose their competitiveness before the Asian crisis struck.

Contrary to the belief that Asia's emerging export machine was no longer a dominant force, we find that very few of these economies lost their export competitiveness prior to 1996.

This also supports the view that the causes of the crisis could not be blamed on macroeconomic factors associated with a conventional current account crisis, since such factors would have been expected to have led to a loss in international competitiveness.



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PREFACE

The ADB Institute aims to explore the most appropriate development paradigms for Asia composed of well-balanced combinations of the roles of markets, institutions, and governments in the post-crisis period.

Under this broad research project on development paradigms, the ADB Institute Research Paper Series will contribute to disseminating works-in-progress as a building block of the project and will invite comments and questions.

I trust that this series will provoke constructive discussions among policymakers as well as researchers about where Asian economies should go from the last crisis and recovery.

Masaru Yoshitomi
Dean
ADB Institute

ABSTRACT

The capacity to sustain high export growth over decades has been a hallmark of the path-breaking East Asian export-led development model. But the sudden region-wide collapse in export growth beginning in mid-1995 and extending through 1996 raised concerns whether ‘emerging Asia’s export machine was going to remain the dominant force it had been in the past (Goldstein, 1998).’

This study focuses on two questions: (1) how did export performance evolve during the emergence of the highly dynamic East-Asian trade-FDI (T-I) nexus from the early 1980s to 1996, a period when rapid regional export growth was supported for the first time by large inflows of FDI; and, (2) did East-Asian developing economies lose export competitiveness in the pre-crisis 1990s, especially by 1996 when export growth slumped? These questions are evaluated by tracking two standard export performance indicators – revealed comparative advantage indices and constant market share estimates – applied to a systematic data set for all goods and non-factor services exports over the period from 1980 to 1996 for the East-Asian (EA) EA-9 economies (NIE-4, ASEAN-4 and the PRC) and five additional economies for comparison (Japan, US, European Union-12, Mexico and India). Structural changes in comparative advantage and export competitiveness by industry are assessed by using a technology-intensity index that ranks 22 manufacturing industries by their relative levels of research and development spending (based on OECD data).

The study’s findings show that EA-9 export growth exceeded world rates during the emergence of the T-I nexus from 1985 to 1995 by steadily upgrading the technology intensity of their comparative advantage structure over time, by increasing competitive shares in global export markets and by specializing in rapidly growing export markets, both in terms of products and market destinations. Intra-regional export restructuring from the high-cost NIE-4 to the low-cost ASEAN-4 and PRC was particularly strong in five product-cycle-led sectors – lower-technology textiles, apparel and footwear; wood products and furniture; other manufacturing; rubber and plastics products; and medium-high-technology electrical equipment. The upgrading process of the EA-9, particularly for six of them, viz. Taipei, China, Korea, and Singapore among the NIE-4 and Malaysia, Thailand and the Philippines among the ASEAN-4, was strongly influenced by strong gains in high-technology, personal-computer-related exports. The EA-9 as a region gained a large share of global export markets in high-technology electronics over this period.

For the EA-9 from 1990 to 1996, FDI inflows were found to be highly correlated with gains in competitive export market share, while changes in exchange rates were not correlated with changes in competitiveness.

Comparative advantage development for the above six economies from the early 1980s to 1995 developed in a somewhat unique pattern characterized by strong comparative advantage in low-technology and high-technology export sectors, with relatively weak advantage in the medium-technology, “heavy” industries. This development path differs from the historic path established by Japan, the traditional “lead goose” in the region, and from the contemporaneous path for Mexico, a comparable emerging economy.

Interestingly, little evidence was found that the EA-9 lost export competitiveness during the 1996 export growth slump leading up to the crisis. Only Thailand appeared to lose export competitiveness in 1996, and even in this case, the loss seems quite mild. This also supports the view that the causes of the crisis could not be blamed on macroeconomic factors associated with a conventional current account crisis, since such factors would have been expected to have led to a loss in international competitiveness.

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Executive Summary

Purpose of Study

1. For decades until the crisis hit in mid-1997, East Asian economies led the developing world in achieving high rates of economic growth, accomplishing what had come to be known as the East Asian Miracle. This paper focuses on nine East-Asian developing economies (the EA-9), which include, according to common groupings related to different stages of development: the NIE-4 (Hong Kong, China; Korea; Singapore; and Taipei,China); the ASEAN-4 (Indonesia, Malaysia, Philippines, and Thailand); and, the People's Republic of China (PRC). A hallmark of their success has been the capacity to sustain high export growth over long periods of time. Sustaining high export growth involves an on-going process of expanding shares in world markets by increasing the price and quality competitiveness of export products and by specializing in more productive exportable activities that are growing rapidly on world markets.
2. From around 1985, high export growth became increasingly linked to surging inflows of foreign direct investment (FDI) and deeper regional economic integration (here the trade-FDI nexus). From 1985 to 1995, EA-9 merchandise exports rebounded from a post-OPEC-II slump to grow by 15 percent per year compared to a rate of 10 percent for world exports, while inward-FDI to the EA-9 economies expanded by 29 percent annually compared to 19 percent worldwide. EA-9 economies outperformed global trends most profoundly from 1990 to 1995, maintaining robust export and FDI growth while world growth rates moderated.
3. Export growth collapsed throughout the region beginning in mid-1995 and extending through 1996. After averaging 21 percent growth per year in 1994 and 1995, EA-9 merchandise export growth dropped to just 3.3 percent in 1996, converging down to world export growth levels for the first time in decades. Export growth fell substantially for all economies in the region, except for Indonesia, whose exports declined moderately, and the Philippines, which bucked the regional trend by increasing exports in 1996. For the first time since the mid-1980s, this deep, unexpected and region-wide collapse in export growth increased uncertainty and raised new concerns that the region's capacity to sustain high export growth rates may be faltering through a loss of competitiveness.
4. Although several studies have attempted to determine the causes of this regional export growth slump, they present conflicting results using methodologies that are difficult to compare. The objective of this paper is to develop a comprehensive empirical framework that tracks export performance dynamics among EA-9 and five supplementary economies on a comparable basis over time, among economies, and across sectors. The study focuses on the pre-crisis period from 1980 to 1996 in order to evaluate whether changes in these indicators in the mid-1990s provide evidence that export competitiveness of the EA-9 may have deteriorated significantly during the 1995/96 export slump.

Export Performance Indicators Chosen

5. Two standard, complementary export performance indicators are calculated: constant market share (CMS) trends and revealed comparative advantage (RCA) indices. Both of these indicators reveal, but do not measure directly, underlying domestic export capabilities in terms of gains in export market share (CMS analysis) and the upgrading of export structures (RCA indices). CMS analysis decomposes aggregate export growth into three sources: (1) growth attributed to a general increase in world demand for exports (World Demand Factor); (2) growth attributed to specializing in specific products or market destinations where demand for exports is growing more rapidly than world averages (Product/Market Demand); and (3) a residual representing gains in export value from increasing share in global markets (the Competitive Factor). An economy outperforms world export growth if the sum of the product/market demand and the competitive factor is positive. Gains in the competitive share factor reflect a gain in competitive advantage, arising when exporters from a particular economy increase market share by gaining a price and/or non-price (e.g. product quality, delivery time and after-sales service) advantage relative to its competitors on world markets.

Revealed Comparative Advantage Results

6. The RCA index is a measure of export structure. It is calculated as the ratio of two ratios—the ratio of exports for each sector in an economy to that economy’s total exports, relative to the ratio of world exports for each corresponding sector to total world exports. It reveals the relative pattern of export specialization for an economy relative to worldwide patterns. The greater a sector’s RCA, the more an economy specializes in that sector’s exports relative to world specialization patterns, revealing a stronger comparative advantage in that sector. Tracking the structure of RCAs over time reveals an economy’s comparative advantage development and importantly its export upgrading process, which contributes to sustained and future growth.
7. Underpinning the rapid regional export growth the export structures of the EA-9 economies shifted strongly toward higher-technology manufacturing and non-factor services. Although each economy evolved along its own path, the EA-9 economies also became increasingly interlinked through the expansion of intra-regional trade and FDI facilitated by the proliferation of MNC-led regional production networks. In 1980 the export structures of the EA-9 economies varied widely and were dominated by lower-technology manufacturing products for the NIE-4 and resource-intensive goods for the ASEAN-4 and PRC. While manufacturing exports accounted for around three-quarters of all goods and non-factor services exports for the NIE-4 economies, the bulk of these were lower-technology products, consisting predominantly of textiles, apparel and footwear, and plastics and rubber products.
8. The export structures of the ASEAN-4 and PRC, were immature and strongly reliant on natural-resource-based exports (both non-manufactured goods and resource-based manufactures), reflecting the relative anti-export bias of their development

strategies in 1980. Manufacturing export levels relative to GDP for these economies were relatively low, especially for Indonesia, which had by far the strongest reliance on non-manufactured goods exports in the region, and the PRC, whose export level and structure reflected the distortions inherent in decades of autarky and central planning.

9. All EA-9 economies achieved high levels of export growth from 1985 to 1995 except Hong Kong, China from 1990-1995. By 1995, the export structure of each of the EA-9 economies had transformed substantially. For the ASEAN-4 and PRC, manufacturing exports boomed as non-manufacturing goods exports fell to less than 10 percent of all goods and services exports for each economy except Indonesia, which nevertheless also greatly reduced its reliance on primary commodities. Within the manufacturing sector, non-natural-resource-intensive exports exploded, with each economy except Indonesia increasing exports rapidly from higher-technology industries, particularly consumer electronics, over this period.
10. Over the period 1980-95 five upgrading processes appear to have been at work among EA-9 economies, operating more or less in tandem and strongly influenced by intra-regional trade and FDI. First, product-cycle-led restructuring of cost-sensitive industries spurred a shift of export capacity from high-cost (the NIE-4 and Japan) to low-cost (the ASEAN-4 and PRC) economies. This happened most profoundly in five industries that span three different technology-intensity groups: low technology—textiles, apparel and footwear, and wood products and furniture; medium—low technology—other manufacturing and rubber and plastics products; and medium—high technology—electrical machinery (predominantly consumer electronics).
11. Second, although NIE-4 economies shifted segments of their lower-technology, cost-sensitive export capacity offshore, they appeared at the same time to maintain niches of comparative advantage in these lower-technology sectors as represented by declining but still quite strong RCAs in the product-cycle-led industries. Similarly, the ASEAN-4 economies generally maintained, although at steadily declining levels, comparative advantage in natural-resource-intensive sectors. This dynamic suggests that EA-9 economies have been able to upgrade advantage within traditional lower-technology industries over time even as domestic costs escalated. For textiles, apparel and footwear, it may also reflect the substantial incentives to maintain such exports due to export rents associated with MFA (Multifiber Agreement) import quotas in the United States and EU-12.
12. Third, unlike Japan, EA-9 economies did not develop strong comparative advantages in traditional “heavy,” medium-technology industries, especially medium-high technology industries such as motor vehicles, chemicals and non-electrical machinery. Fourth, some six regional economies at relatively different stages of development—Taipei, China, Korea, Singapore, Malaysia, Thailand and the Philippines—gained strong comparative advantage positions in high-technology (predominantly personal-computer-related) electronics sectors. And, fifth, unlike

any of the other EA-9 economies, Hong Kong, China, and to a lesser extent the Philippines, shifted competitive strength toward non-factor services exports.

Constant Market Share Analysis

13. The CMS analysis shows that NIE-4 economies gained export market share solidly from 1985 to 1990, and then, for the first time over the sample period, lost share mildly from 1990 to 1996. This loss, however, was more than compensated for by the surge in product/market demand from 1990 to 1996, which served to boost NIE-4 export growth well above world growth rates over that period. Specialization in rapidly growing electrical machinery and high-technology electronics accounted for most of the gain in product demand, while specialization in booming intra-EA-9 exports contributed the bulk of gains related to market demand.
14. The experiences among these four economies, however, differed profoundly. Hong Kong, China lost market share among all industrial sectors throughout the sample period, particularly in the 1990s as manufacturing capacity shifted offshore, largely to the PRC. Korea and Singapore, in contrast, continued to gain merchandise export share solidly over the 1985 to 1996 period, successfully offsetting losses of share in lower-technology industries with gains in higher-technology sectors. Korea, unlike any of the other EA-9 economies, did this by expanding market share in a number of medium-high-technology industries over the 1990s, especially motor vehicles, chemicals and non-electric machinery. On the other hand, within the HT electronics sector, while gaining modest shares in communication equipment and semiconductors, Korea also stands out among the EA-9 (except Hong Kong, China) by not gaining a share in office and computer equipment. Almost all of Singapore's impressive gains in market share from 1990-96 resulted from roughly equivalent advances in office and computer equipment, and communications equipment and semiconductors. Whereas Korea broadened its base of export competitiveness among a relatively broad range of industries, Singapore's competitiveness was increasingly concentrated in high-technology electronics.
15. Unlike the NIE-4, the ASEAN-4 and PRC exceeded world export growth rates from 1985 to 1996 primarily by gaining competitive shares in global export markets, with specialization in rapidly growing markets becoming somewhat more important during the 1990s for the ASEAN-4 but less so for PRC. Also unlike the NIE-4, these five economies increased market shares broadly among most manufacturing industries over the entire period, with gains increasing rapidly over the 1990s. From 1990 to 1996, PRC stands out among all EA-9 economies as gaining market share across most manufacturing industries, with particularly strong gains in lower technology industries such as textiles, apparel and footwear.
16. Malaysia, Thailand and the Philippines—and to a lesser extent PRC—advanced market share strongly in higher-technology industries from 1990 to 1996, dominated by a boom in competitive share gains associated with electronics, both electrical machinery and particularly personal-computer-related products. While Malaysia and Thailand most strongly gained market share in office and computing equipment, the

Philippines advanced most strongly in communications equipment and semiconductors. PRC most strongly gained shares in electrical machinery. Only Indonesia among the ASEAN-4 did not increase its share significantly in electronics markets.

Regression Analysis

17. To throw further light on the CMS results, regression analysis is used to examine whether changes in export market share are correlated significantly with changes in exchange rates and FDI flows. Annual proportional changes in export market share gains for East Asian economies, derived from the CMS analysis are regressed on a set of exchange rates, FDI flows and control variables, defined as follows: (a) real effective exchange rates and the yen/dollar exchange rate, each lagged one year; (b) inward-FDI as a percentage of GDP and outward-FDI as a percentage of GDP; and (c) a set of control variables.
18. Two results are evident. First, the regressions for the EA-9 economies show no discernible correlation between changes in exchange rates and export market shares from 1990 to 1996. This suggests, at least within this limited sample of data, that exchange rates for the EA-9 economies were not generally overvalued in the pre-crisis 1990s and were not sensitive to swings in the yen/dollar rate. The second result is that increasing foreign direct investment was correlated with EA-9 gains in export market share over the 1990s. This highly significant correlation holds when export competitiveness is measured for merchandise exports or all goods and services exports.
19. CMS estimates of export competitiveness for EA-9 economies over the full 1990-1996 period show little indication of declining export competitiveness. However starting in mid 1995 and continuing into 1996 there was major downturn in regional export demand. About 89 percent of the decline in export growth in 1996 for EA-9 economies can be attributed to weakening export demand either through world demand or product and market demand, with only 11% due to a loss in competitiveness.

Thailand Results

20. Thailand appears to be the only EA-9 economy (and only crisis-affected economy) to experience a deterioration in export competitiveness in the lead up to the crisis, a deterioration that may be even milder than estimated here given evidence of export data irregularities that appear to moderate the deterioration somewhat. More emphatically than for any other EA-9 economy, growth of Thai exports in volume terms plummeted from around a positive 40 percent in 1995 to around a negative 10 percent in 1996, while prices for Thai exports actually increased mildly. Thai RCAs declined more abruptly in 1996 than for any other EA-9 economy, especially for other transport equipment, rubber and plastic products, and, to a lesser extent, textiles, apparel and footwear.

Summary Findings

21. Our analysis suggests strongly that the 1996 region-wide collapse in export growth resulted predominantly from a large drop in overall export demand, including both world and product/market demand, not by a serious erosion in regional export competitiveness in terms of a loss in market share. World export demand in nominal terms cycled downwards unusually strongly in 1996, while typically robust product/market demand for the EA-9 began to trend downward in 1995 and became a negative influence on EA-9 export growth. Weakening product/market demand reflected slumps in intra-EA-9 trade and in a number of industries that EA-9 economies tend to specialize in, including textiles, apparel and footwear, and communication equipment and semiconductors.
22. Gains in export market shares did weaken substantially in 1996 compared to 1995 for the PRC, Korea and Thailand. Thailand, however, appears to be the only EA-9 economy (and crisis economy) to experience a broad-based, although relatively mild, deterioration of export competitiveness in the lead up to the crisis.
23. This also supports the view that the causes of the crisis could not be blamed on macroeconomic factors associated with a conventional current account crisis, since such factors would have been expected to have led to a loss in international competitiveness.

Did East-Asian Developing Economies Lose Export Competitiveness in the Pre-Crisis 1990s?[†]

1. Introduction

For decades until the crisis hit in mid-1997, East Asian economies led the developing world in achieving high rates of economic growth, accomplishing what had come to be known as the East Asian Miracle (see World Bank, 1993). This paper focuses on nine East-Asian developing economies (the EA-9), which include, according to common groupings related to different stages of development: the NIE-4 (Hong Kong, China; Korea; Singapore; and Taipei, China); the ASEAN-4 (Indonesia, Malaysia, Philippines, and Thailand); and, the People's Republic of China (PRC). A hallmark of their success has been the capacity to sustain high export growth over long periods of time. Sustaining high export growth involves an on-going process of expanding shares in world markets by increasing the price and quality competitiveness of export products and by specializing in more productive exportable activities that are growing rapidly on world markets. It is this continuous enhancement of domestic productivity and related industrial upgrading as domestic incomes and costs rise that links high export growth to strong and enduring economic development.¹

Urata (1998) and Hill and Athukorala (1998) identify the emergence of a new, regional trade-investment (T-I) nexus from around 1985, when high export growth became increasingly linked to surging inflows of foreign direct investment (FDI) and deeper regional economic integration. From 1985 to 1995, EA-9 merchandise exports rebounded from a post-OPEC-II slump to grow by 15 percent per year compared to a rate of 10 percent for world exports, while inward-FDI to the EA-9 economies expanded by 29 percent annually compared to 19 percent worldwide (see Table 1). EA-9 economies outperformed global trends most profoundly from 1990 to 1995, maintaining robust export and FDI growth while world growth rates moderated.

[†] Further information on the detailed data on which the paper is based can be requested from the Asian Development Bank Institute at info@adbi.org

¹ See Lloyd and MacLaren (2000) for an overview of the relationships underpinning export-led growth and Haque (1995) for analysis of the link between export competitiveness, technology and productivity gains.

Table 1. Export and FDI growth, 1980-95

Export annual growth %	1980-85	1985-90	1990-95	1995-96	1995 US\$ bill
World	-1.3	12.6	7.6	3.4	4,626
EA 9	5.3	15.8	14.8	3.3	720
NIE 4	7.4	16.6	12.3	2.6	379
ASEAN 4	-0.3	13.1	17.2	6.0	193
PRC	9.7	17.1	19.5	1.8	148
FDI flows annual growth %					
World	7.0	33.0	7.0	2.0	331
EA 9	11.0	32.0	27.0	17.0	60
NIE 4	3.0	39.0	8.0	25.0	15
ASEAN 4	0	40.0	14.0	25.0	12
PRC	na	16.0	59.0	12.0	40

Sources: for exports ANU-IEDB; for FDI flows IMF Balance of Payments Statistics.

Underpinning these aggregate trends was an increase in regional economic integration involving the intra-regional restructuring and complementary upgrading of export capacity among EA-9 economies. Over 90 percent of FDI into the EA-9 over this period flowed into six economies (the FDI-led-6 economies)—PRC (with 60 percent of the total by itself), Singapore, Indonesia, Malaysia, Philippines and Thailand (see Table 2). Although growing briskly from a small base, inward-FDI flows to Korea, Taipei, China and Hong Kong, China (and Japan) remained minor relative to domestic capital formation. About 60 percent of the FDI inflows into the FDI-led-6 economies originated from Japan and the NIE-4, reflecting the intra-regional restructuring of export capacity in manufacturing industries from higher to lower cost economies. Intra-EA-9 exports also expanded rapidly over this period, growing by 21 percent per year compared to 15 percent for EA-9 exports to all market destinations. Growth in intra-EA-9 trade, however, differed significantly among EA-9 economies. From 1980 to 1995, Korea, Taipei, China and Hong Kong, China most profoundly shifted exports from developed economies to EA-9 destinations, in line with correspondingly large FDI outflows to EA-9 economies. Such growth was less important for the FDI-led-6 economies, which maintained a much stronger reliance on exports to the United States. Facilitating regional economic integration was the aggressive expansion of MNC-led, cross-border production networks that used FDI and non-FDI relationships to exploit more efficient regional divisions of labor and scale economies.

Export growth collapsed throughout the region beginning in mid-1995 and extending through 1996. After averaging 21 percent growth per year in 1994 and 1995, EA-9 merchandise export growth dropped to just 3.3 percent in 1996, converging down to world export growth levels for the first time in decades. Export growth fell substantially for all economies in the region, except for Indonesia, whose exports declined moderately, and the Philippines, which bucked the regional trend by increasing exports in 1996. Even as export growth plummeted, nevertheless, FDI-inflows continued to expand solidly in 1996.

For the first time since the emergence of the T-I nexus in the mid-1980s, this deep, unexpected and region-wide collapse in export growth increased uncertainty and raised new concerns that the region's capacity to sustain high export growth rates may be faltering.

Although several studies have attempted to determine the causes of this regional export growth slump, they present conflicting results using methodologies that are difficult to compare.² Even now, with the heightened awareness of the need to monitor economic conditions among the export-led EA-9 economies, no systematic and accessible analysis of export performance in the region is available to assist governments, the private sector and international organizations.

The objective of this paper, therefore, is to develop a comprehensive empirical framework that tracks export performance dynamics among EA-9 and five supplementary economies on a comparable basis over time, among economies, and across sectors. The study focuses on the pre-crisis period from 1980 to 1996 in order to benchmark the East Asian export performance indicators underpinning the emergence of the T-I nexus and then to evaluate whether changes in these indicators in the mid-1990s provide evidence that export competitiveness may have deteriorated significantly during the 1995/96 export slump.

Two standard, complementary export performance indicators are calculated: constant market share (CMS) trends and revealed comparative advantage (RCA) indices.³ Both of these indicators reveal, but do not measure directly, underlying

² Although Parker and Hutabarat (1996) noted the declining regional export growth trends, we know of only one paper—Dasgupta and Imai (1996), an internal World Bank memo that to our knowledge was not released to the public until well after the crisis—that analyzed the causes of this slowdown before the crisis hit in 1997. From a post-crisis perspective, OECD (1998) and Yeats (1999) question whether the East Asian export-led growth model in the mid-1990s may be faltering, with the OECD Report noting that inappropriate policies and structural weaknesses in these economies may be inhibiting their capability to sustain high export and real GDP growth over time. Ito (2000) and Kwan (1998) suggest that the appreciation of East Asian real effective exchange rates due primarily to the yen depreciation from April 1995 depressed regional export growth in 1996 and 1997. Dasgupta and Imai (1998) and World Bank (2000) reject that EA-9 export competitiveness weakened significantly in 1996, either due to deteriorating domestic productivity or overvalued exchange rates, and attribute the slowdown in East Asian export growth predominantly to unfavorable global and product demand cycles.

³ Although numerous studies have used CMS and RCA indicators to assess EA-9 export performance, none has developed a common analytical and empirical framework that facilitates systematic comparison across time, economies and sectors. See Yeats (1999) and Lall et al. (1999), both unpublished conference background papers, for the most comprehensive examination of regional export performance trends available. A sample of other recent papers present a collage of CMS and RCA estimates covering different economies, time periods and product groupings—for CMS: Lloyd (1994), Lloyd and Toguchi (1996), Voon (1998), Wilson and Mei (1999), Peh and Wong (1999), and James and Movshuk (2000); and for RCAs: Hiley (1999), Soong (1996), Das (1998), Carolan, Singh, Talati (1998).

domestic export capabilities in terms of gains in export market share (CMS analysis) and the upgrading of export structures (RCA indices). It is important to note, as well, that both indicators are affected by government policy that may influence the link between domestic capabilities and export performance.

Following Leamer and Stern (1970), the following export-based constant-market-share (CMS) formula can be derived as follows, let:

V_{ij} = an economy's export value of product i to country j in period 1;

V'_{ij} = an economy's export value of product i to country j in period 2:

$V_{..} = \sum_i \sum_j V_{ij}$ = an economy's total exports in period 1;

$V'_{..} = \sum_i \sum_j V'_{ij}$ = an economy's total exports in period 2;

r = the percentage increase in total world exports from period 1 to 2;

r_{ij} = the percentage increase in world exports of product i to country j from period 1 to 2.

Then,

$$\begin{aligned} V'_{..} - V_{..} &= \sum_i \sum_j r_{ij} V_{ij} + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij}) \\ &= r V_{..} + \sum_i \sum_j (r_{ij} - r) V_{ij} + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij}) \end{aligned}$$

(1) (2) (3)

CMS analysis decomposes aggregate export growth into three sources: (1) growth attributed to a general increase in world demand for exports (World Demand Factor); (2) growth attributed to specializing in specific products or market destinations where demand for exports is growing more rapidly than world averages (Product/Market Demand)⁴; and (3) a residual representing gains in export value from increasing share in global markets (the Competitive Factor).⁵ An economy outperforms

⁴ Product/Market Demand captures the fact that an economy can exceed world growth rates without actually gaining competitive market share for any particular product (or market destination) by specializing in products (or market destinations) that are growing faster than world averages. In this case, maintaining market share in rapidly growing markets generates export growth in excess of world rates. Although it is common in studies using CMS analysis to report the separate effects of product and market composition, since it is arbitrary whether one computes the product composition or the market distribution first, such a differentiation is not meaningful, as noted by Leamer and Stern (1970). As a result, this study reports the product/market effect jointly.

⁵ We define global markets in terms of global exports (the export-share approach). Lloyd and Toguchi (1996) and James and Movshuk (2000) point out that this approach excludes competition between imports and domestic producers in export destination economies. For example, an East-Asian economy not only competes with rival exporters to sell their products in the U.S. market, they also must compete with U.S. producers selling in their home market. If imports from the East-Asian exports gain in

world export growth if the sum of the product/market demand and the competitive factor is positive. Gains in the competitive share factor reflect a gain in competitive advantage, arising when exporters from a particular economy increase market share by gaining a price and/or non-price (e.g. product quality, delivery time and after-sales service) advantage relative to its competitors on world markets.

From 1990 to 1996, (dynamic) constant market shares are calculated for each year, which more accurately incorporates the impact of changes in the structure of exports over time than do the calculations from 1980-85 and 1985-90, which exclude the effects of structural change during the intermediate years (see Wilson and Mei, 1999).

In contrast, the RCA index is a measure of export structure. It is calculated as the ratio of two ratios – the ratio of exports for each sector in an economy to that economy's total exports, relative to the ratio of world exports for each corresponding sector to total world exports.⁶ We estimate Balassa's (1989) export-based RCA using the following formula:

$$RCA_i^k = \frac{E_i^k}{E_i^t} \bigg/ \frac{E_w^k}{E_w^t},$$

where: E_i^k = country i's exports of commodities in industry k,

E_i^t = country i's total exports,

E_w^k = world exports of commodities in industry k,

and E_w^t = world total exports.

It reveals the relative pattern of export specialization for an economy relative to worldwide patterns. The greater a sector's RCA, the more an economy specializes in that sector's exports relative to world specialization patterns, revealing a stronger comparative advantage in that sector. Tracking the structure of RCAs over time reveals an economy's comparative advantage development and export upgrading process.⁷

Upgrading the structure of an economy's exports toward more productive activities is a critical feature of export-led development and sustained high export

competitiveness relative to domestic producers – e.g. an increase in the import penetration of apparent consumption – the export-share estimate will understate the overall gain in competitiveness by the East Asian exporter into the U.S. market. To provide a perspective on the magnitude of this understatement, Lloyd and Toguchi reports that EA-9 economies increased their import penetration into apparent consumption of industrial economies from 1.2 percent in 1980 to 3.7 percent in 1993 (a tripling of share), while world import penetration into those economies increased from 16.3 percent to 25.5 percent from 1980 to 1993 (a 50 percent increase in share).

⁶ See Richardson and Zhang (1999) for a recent perspective on RCA indices.

⁷ Comparing RCAs over time provides an indication of dynamic comparative advantage development by tracking how the structure of export specialization within an economy is changing relative to its international competitors. Since this is a relative measure, however, it is not directly related to changes in sectoral export growth or market share. For economies where overall export growth matches or exceeds world export growth, which has been the case in most instances for each of the EA-9 economies from 1980 to 1996, an increase in the RCA index reflects that an economy has increased exports in that sector at a faster rate than for world exports in that sector. In this case, a higher RCA would reflect a gain in market share.

growth (see further Porter, 2000). Recent studies have emphasized that technology capability is a key constraint to sustaining export growth for East-Asian developing economies, since these economies are typically not constrained by stocks of low-skilled labor nor by the availability of capital to finance investment in plant and equipment (given high domestic savings supplemented by FDI and other foreign capital inflows). To capture such a dynamic, an index based on research and development spending is used to rank the technology intensity of manufacturing industries.⁸ Such a metric, at least conceptually, aims to capture the combined influences of the many factors underpinning the strength of domestic technology and learning capabilities, associating specialization in exporting products in more technology-intensive industries with a more advanced mix of physical capital, skills, technology, infrastructure and institutions that represent stronger learning capabilities.

A major contribution of this study is the development of a systematic database covering all goods and non-factor services exports from 14 economies over a sixteen-year period, providing a consistent and globally comprehensive empirical framework for tracking the two export performance indicators over time, among economies, and between sectors. Exports of all goods and non-factor services for 1980, 1985 and 1990 through 1996 are covered for the EA-9 and five supplementary economies included for comparison: the developed economies of Japan, the United States, and the EU-12, and two emerging economies—Mexico and India.⁹ Unless otherwise noted, exports are measured in terms of nominal U.S. dollar values to the world.¹⁰ The CMS product/market demand estimates for merchandise exports are calculated using 2-digit SITC, Revision 1 product categories (58 categories for all merchandise exports). Both CMS and RCA indicators for manufacturing exports are calculated for the 22 sectors that conform to the industrial classifications where technology intensity data are available. Table 2 summarizes the technological structure of manufactured exports from the EA-9, NIE-4, ASEAN-4 and the PRC and shows the dramatic shift to high technology (HT) goods in most of the region since 1980.

⁸ The properties of this index are described in a fuller version of this paper available from the Asian Development Bank Institute by request to info@adbi.org

⁹ Full details of this data are available on request.

¹⁰ Unlike most of the referenced studies that estimate export performance indicators, this study evaluates performance relative to world export markets. This is particularly important for East-Asian economies, where intra-regional economic restructuring has shifted export patterns profoundly as the T-I nexus has evolved. For example, if export competitiveness is determined only by evaluating the share of exports to the U.S. market (the market most commonly used in other studies), export performance indicators would show that NIE-4 economies have lost market share in many consumer goods such as footwear and televisions, while ASEAN-4 and the PRC gained share in the U.S. market. In fact, given the efficiency gains associated with new cross-border production networks, each of the EA-9 economies may have gained competitiveness, as NIE-4 firms which had previously exported such consumer goods have upgraded into new export activities, including exports of machinery, intermediate inputs and services to the ASEAN-4 and the PRC in support of their exports of consumer goods to the United States. The competitive dynamics of such “triangular” trade would be obscured if market share is defined only by exports to the United States.

Table 2. Composition of Manufactured Exports by Technological Intensity 1980, 1995 and 1996 (%)

Countries	HT	MHT	MLT	LT
EA 9				
1980	9.5	16.5	31.1	42.9
1995	29.5	23.7	19.8	27.0
1996	31.5	23.5	19.4	25.6
NIE 4				
1980	10.3	19.9	32.5	37.4
1995	36.2	26.0	19.3	18.5
1996	36.5	26.1	19.8	17.6
ASEAN 4				
1980	11.8	6.2	29.8	52.2
1995	31.3	19.2	16.3	33.2
1996	36.9	18.4	14.4	30.3
PRC				
1980	1.8	13.6	25.8	58.8
1995	9.5	22.5	25.0	43.0
1996	11.2	22.7	24.3	41.8

Source: ANU-IEDB.

Notes: HT is high technology, MHT is medium-high technology, MLT is medium low technology and LT is low technology; this classification is based on the R and D intensity of different export activities following OECD (1997); see also Hatsichronoglou (1997).

The next two sections assess the results of tracking estimates of revealed comparative advantage and constant market shares during the emergence of the T-I nexus. We also evaluate whether export competitiveness among the EA-9 deteriorated significantly during the pre-crisis 1990s, especially during the 1996 export growth slump.

2. Shifting Composition of EA-9 Exports in 1980-1995

Underpinning the rapid regional export growth associated with the emergence of the T-I nexus, the export structures of the EA-9 economies shifted strongly toward higher-technology manufacturing and non-factor services. Although each economy evolved along its own path, the EA-9 economies also became increasingly interlinked through the expansion of intra-regional trade and FDI facilitated by the proliferation of MNC-led regional production networks.¹¹

In 1980, just twenty years ago, the export structures of the EA-9 economies varied widely and were dominated by lower-technology manufacturing products for the NIE-4 and resource-intensive goods for the ASEAN-4 and PRC (see Table 2). While manufacturing exports accounted for around three-quarters of all goods and non-factor

¹¹ See generally Song (2001) for a discussion of Japanese multinationals in East Asia and sequential foreign investment and regional technology platforms (www.adbi.org/PDF/wp/wp22.pdf).

services exports for the NIE-4 economies, the bulk of these were lower-technology (LT+MLT) products, consisting predominantly of textiles, apparel and footwear, and plastics and rubber products. Korea had begun to export iron and steel products in significant amounts, as did Taipei, China for other manufactured goods. Over one-third of Singapore's exports in 1980 consisted of refined petroleum products. The composition of Hong Kong, China's exports resembled those of Taipei, China, with a relatively broad base of manufacturing exports. The first solid signs of export growth in higher-technology sectors among the NIE-4 economies were occurring in electrical machinery, and communications equipment and semiconductors in the early 1980s, gaining force steadily.

The export structures of the ASEAN-4 and PRC, on the other hand, were immature and strongly reliant on natural-resource-based exports (both non-manufactured goods and resource-based manufactures), reflecting the relative anti-export bias of their development strategies in 1980. Manufacturing export levels relative to GDP for these economies were relatively low, especially for Indonesia, which had by far the strongest reliance on non-manufactured goods exports in the region, and the PRC, whose export level and structure reflected the distortions inherent in decades of self-enforced autarky and central planning. The share of manufacturing exports to all goods and services exports among these five economies ranged from only 14 percent for Indonesia to between 40 and 60 percent for the other economies. Even within manufacturing, the ASEAN-4 tended to export natural-resource-related products, such as: food, beverages, and tobacco; wood products and furniture; and, non-ferrous metals. ASEAN-4 economies, for example, had not yet begun to expand labor-intensive exports such as textiles, apparel and footwear. Of these five economies, only the PRC was exporting substantial values of textiles, apparel and footwear by 1980.

As the T-I nexus emerged, all EA-9 economies achieved high levels of export growth from 1985 to 1995 except Hong Kong, China from 1990-1995.¹² By 1995, the export structure of each of the EA-9 economies had transformed substantially. For the ASEAN-4 and PRC, manufacturing exports boomed as non-manufacturing goods exports fell to less than 10 percent of all goods and services exports for each economy except Indonesia, which nevertheless also greatly reduced its reliance on primary commodities. Within the manufacturing sector, non-natural-resource-intensive exports exploded, with each economy except Indonesia increasing exports from higher-technology industries rapidly over this period. The policy reforms associated with the emergence of the T-I nexus ended the traditional over-reliance on resource-intensive exports by these labor-abundant economies. Among the NIE-4, Korea, Taipei, China and Singapore strongly increased higher-technology (MHT+HT) exports, while maintaining solid export growth in traditional lower-technology (LT+MLT) manufacturing industries, especially exports of textiles, apparel and footwear. Hong Kong, China was the only EA-9 economy to restructure substantially out of manufacturing into services exports.

¹² This section focuses on structural changes in comparative advantage and export upgrading during a period of quite rapid export growth. Such a focus, however, should not ignore the strong growth in exports among many industries, which contributed importantly to foreign exchange earnings, but did not grow fast enough to gain compositional share significantly.

A regional boom in electronics exports had a major impact on EA-9 economies over this period. EA-9 exports of electrical machinery, communications equipment and semiconductors, and office and computer equipment increased from \$14 billion to \$242 billion from 1980 to 1995. High-technology electronics dominated this surge, growing from \$8 billion to \$191 billion. The impact of high-technology electronics was spread relatively broadly among EA-9 economies, with exports of such products increasing from \$6 billion to \$132 billion for the NIE-4 economies, from \$2 billion to \$48 billion for the ASEAN-4 economies, and from \$2 billion to \$12 billion for the PRC. Approximately 65 percent of high-technology electronics exports from the EA-9 were related to the personal computer industry, consisting of personal-computer components (including PC-related semi-conductors), peripherals and assembled units.

Not to be overlooked, exports of non-factor services grew rapidly throughout the region, increasing as a share of overall exports most strongly for Hong Kong, China, but also for Indonesia, Malaysia and the Philippines. By 1995, non-factor services accounted for over half of all goods and services exports for Hong Kong, China, about one-third for the Philippines, one-fifth for Singapore and Thailand, and from 10 to 15 percent for Korea, Taipei, China, Indonesia, Malaysia and the PRC.

3. Comparative Advantage Development in 1980-1995

The RCA patterns of the EA-9 economies evolved extensively from 1980 to 1995. Details of the country estimates for the four technology-based export manufacturing categories as well as non-manufacturing exports are given in Appendix Table A.1

By 1980, the “early” export-led NIE-4 had developed comparative advantage predominantly in lower-technology manufacturing industries and in two higher-technology electronics sectors (electrical machinery, and communications equipment and semi-conductors). Taipei, China, Korea and Hong Kong, China had relatively broad bases of comparative advantage, with high RCAs for lower-technology (LT+MLT): textiles, apparel and footwear; wood products and furniture (except Hong Kong, China); non-metal mineral products; metal products; other manufacturing; and rubber and plastics products; and, higher-technology (MHT+HT): electrical machinery; and communications equipment and semiconductors. In addition, Korea had a strong RCA for iron and steel, and shipbuilding, Taipei, China in other transport, and Hong Kong, China in scientific instruments and office and computer equipment (Hong Kong, China was the only EA-9 economy with an advantage in office and computer equipment in 1980). Singapore’s RCA profile among manufacturing industries in 1980 was somewhat more narrow, with strong RCAs in petroleum refinery products, shipbuilding, rubber and plastics products, electrical machinery, and communications equipment and semiconductors. Singapore and Hong Kong, China also had gained comparative advantage in non-factor services, while all four of these economies were strongly disadvantaged in the non-manufactured goods sector.

From 1980 to 1995, Taipei, China, Korea and Singapore restructured their comparative advantage from lower-technology to higher-technology manufacturing industries, while Hong Kong, China shifted toward non-factor services. Comparative advantage among NIE-4 economies generally weakened in five “product-cycle-led” industries—textiles, apparel and footwear; wood products and furniture; other

manufacturing; rubber and plastics products; and electrical machinery. Although trending downward, however, in most cases the NIE-4 still retained comparative advantage in these sectors by 1995 (except wood products and furniture). As each NIE-4 restructured exports out of these lower-technology, wage-sensitive industries, often shifting export capacity through FDI activities to less costly overseas export platforms (typically the ASEAN-4 and PRC), each upgraded the technological intensity of their comparative advantage among manufacturing industries along somewhat different paths. Although Korea strengthened their RCAs among a relatively wide range of higher-technology (MHT+HT) industries—especially MHT motor vehicles, chemicals and non-electrical machinery, and HT electronics—these RCAs remained less than one, except for communications equipment and semiconductors. Korea built a comparative advantage in office and computer equipment over the 1980s and into the 1990s, only to lose it in the mid-1990s. Taipei, China, on the other hand, maintained relatively strong RCAs in higher-technology industries such as other transport, electrical machinery and communications equipment and semiconductors, while gaining advantage particularly strongly in office and computer equipment. Taipei, China also strengthened RCAs substantially in chemicals, non-electrical machinery and iron and steel, but not for motor vehicles and shipbuilding, as did Korea.

Among EA-9 economies, Singapore's comparative advantage structure had shifted most forcefully toward high-technology electronics by 1995, registering almost a ten-fold increase in its RCA for office and computer equipment while maintaining a strong advantage in communications equipment and semiconductors. Outside of these two industries, Singapore retained comparative advantage in only two other industries—still strongly in petroleum refinery products and just barely in electrical machinery—while just losing advantage in non-factor services over this period. Hong Kong, China, on the other hand, had lost comparative advantage throughout its manufacturing sector by 1995, while moving forward in non-factor services. Unlike other EA-9 economies, Hong Kong, China essentially “hollowed out” its manufacturing base by shifting capacity offshore, primarily to the PRC. Hong Kong, China retained comparative advantage in only four manufacturing industries—most strongly in textiles, apparel and footwear, more moderately in other manufacturing and scientific instruments, and just barely in communications equipment and semiconductors. Hong Kong, China was the only EA-9 economy that did not technologically upgrade the structure of its manufacturing exports as the T-I nexus emerged, actually losing advantage strongly in office and computer equipment.

Comparative advantage development among the ASEAN-4 and PRC economies from 1980 to 1995 was dynamic and varied. These economies shifted their comparative advantage from non-manufactured to manufactured exports, with Malaysia, Thailand and the Philippines substantially upgrading their comparative advantage within manufacturing as they were drawn up the technology ladder by rapidly increasing exports of higher-technology (MHT+HT) electronics products over the 1990s. RCA structural profiles for these three economies, especially by 1995, more closely resembled such profiles for Korea, Taipei, China and Singapore than for the much more highly populated economies of Indonesia and the PRC, whose comparative advantage remained concentrated in lower-technology exports.

In 1980, reflecting their less developed stage of development, the comparative advantage structures of these five economies were considerably less mature than for the NIE-4 economies at that time. Comparative advantage among the ASEAN-4 and somewhat less so for the PRC centered on resource-based sectors, including both non-manufacturing goods, and resource-based manufactured products such as food, beverages and tobacco, wood products and furniture, and non-ferrous metals. Malaysia, the Philippines and Thailand also had developed advantages in several other lower technology and electronics industries. Specifically, the Philippines and Thailand had a moderate advantage in apparel, textiles and footwear, and other manufacturing, Malaysia and the Philippines had a strong advantage in HT communications equipment and semiconductors, and Thailand had a moderate advantage in MHT electrical machinery. While the PRC also had moderate comparative advantage among a number of resource-based manufacturing industries in 1980, it stood out among these five economies by its quite strong RCA in textiles, apparel and footwear. Thailand and the Philippines were the only economies among this group to have advantage in non-factor services.

From 1980 to 1995, the ASEAN-4 and PRC significantly upgraded their comparative advantage structures, following different paths that appear to reflect their relative technological capabilities and comparative cost structures. Much as did the NIE-4 for product-cycle-led industries, these economies reduced, but typically did not lose, advantage in traditionally strong (non-manufacturing and manufacturing) resource-based export sectors. The economic reforms over the 1980s actually strongly stimulated Indonesia's comparative advantage in resource-based sectors.

Over this period, the ASEAN-4 and PRC improved advantage in a number of the five product-cycle-led industries where RCAs had fallen among the NIE-4 (and Japan). Among these industries, Indonesia, which started from the weakest industrial base in 1980, strongly increased RCAs in wood products and furniture, rubber and plastics products, textiles, apparel, and footwear, and other manufacturing, but made relatively little headway in electrical machinery. Thailand gained advantage strongly in other manufacturing, and rubber and plastics products, while maintaining advantage in textiles, apparel and footwear, and electrical machinery. The PRC also gained advantage strongly in other manufacturing, rubber and plastics products and electrical machinery, while maintaining strong advantage in textiles, apparel and footwear. Malaysia and the Philippines were less broadly involved with intra-regional restructuring in these product-cycle-led sectors. Malaysia gained advantage strongly only in electrical equipment, while remaining disadvantaged in the other four industries. The Philippines increased their RCA for electrical equipment, but remained disadvantaged in that industry, while maintaining but not increasing a mild advantage in textiles, apparel and footwear, other manufacturing, and rubber and plastics products.

In addition to the major restructuring of manufacturing export capacity among East Asian economies just described, the emergence of the personal-computer (PC) spurred major shifts toward comparative advantage in HT electronics throughout the region. This rapidly growing industry affected prominently not just the relatively advanced Singapore, Taipei, China, and Korea, but also less developed Malaysia, the Philippines and Thailand. Only Indonesia and the PRC (which was nevertheless gaining quickly over the 1990s) had not gained comparative advantage in HT electronics by

1995. While Malaysia and the Philippines maintained strong comparative advantage in communications equipment and semiconductors over the period, Thailand shifted from strongly disadvantaged to mildly advantaged in that sector. Most profoundly, each of these three shifted from strongly disadvantaged to solidly advantaged in office and computer equipment (in line with similar trends in Singapore and Taipei, China).

While these five economies substantially restructured RCAs among the goods sector, RCAs for non-factor services changed relatively little over this period. Thailand and the Philippines maintained RCAs close to one. Indonesia and Malaysia, on the other hand, strengthened their RCAs for services exports while nevertheless remaining strongly disadvantaged.

Summarizing these results, five upgrading processes appeared to be at work among EA-9 economies as the regional T-I nexus emerged, operating more or less in tandem and strongly influenced by intra-regional trade and FDI. First, product-cycle-led restructuring of cost-sensitive industries spurred a shift of export capacity from high-cost (the NIE-4 and Japan) to low-cost (the ASEAN-4 and PRC) economies. This happened most profoundly in five industries that span three different technology-intensity groups: LT—textiles, apparel and footwear, and wood products and furniture; MLT—other manufacturing and rubber and plastics products; and, MHT—electrical machinery (predominantly consumer electronics). Second, although NIE-4 economies shifted segments of their lower-technology, cost-sensitive export capacity offshore, they appeared at the same time to maintain niches of comparative advantage in these lower-technology sectors (as represented by declining but still quite strong RCAs in the product-cycle-led industries just noted). Similarly, the ASEAN-4 economies generally maintained, although at steadily declining levels, comparative advantage in natural-resource-intensive sectors. This dynamic suggests that EA-9 economies have been able to upgrade advantage within traditional lower-technology industries over time as domestic costs escalated. For textiles, apparel and footwear, it may also reflect the substantial incentives to maintain such exports due to export rents associated with MFA import quotas in the United States and EU-12.

Third, unlike Japan, and emerging Mexico as well, EA-9 economies did not develop strong comparative advantage in traditional “heavy,” medium-technology industries, especially MHT industries such as motor vehicles, chemicals and non-electrical machinery. Fourth, six regional economies at relatively different stages of development—Taipei, China, Korea, Singapore, Malaysia, Thailand and the Philippines—gained strong comparative advantage positions in high-technology (predominantly personal-computer-related) electronics sectors. And, fifth, unlike any of the other EA-9 economies, Hong Kong, China, and to a lesser extent the Philippines, shifted competitive strength toward non-factor services exports.

Comparing RCA profiles for the EA-9, Japan, Mexico and India, comparative advantage patterns appear to match well relative endowments of technology capabilities for Japan, on one extreme, and for Indonesia, the PRC and India at the other extreme. The RCA profile for Japan, an economy highly endowed with technology capability, increases monotonically from extreme comparative disadvantage in LT sectors to strong comparative advantage in MHT and HT sectors. The RCA profile for Indonesia, the PRC and India, three economies with relatively low technological capabilities, do just

the opposite—declining steadily from strong comparative advantage in LT sectors to extreme disadvantage in HT sectors.

For the other economies, evolving RCA profiles present a less clear pattern of comparative advantage development in terms of relative technology capabilities. Korea, Taipei, China, Singapore, Malaysia, Thailand and the Philippines each have a U-shaped profile with relatively strong comparative advantage in LT sectors (MLT for Singapore) and HT sectors (dominated by PC-related exports), and a relative disadvantage over medium-technology (MHT+MLT) sectors. The relative disadvantage is concentrated in MHT industries for Korea, Taipei, China and Singapore, and both MLT and MHT for Malaysia, Thailand and the Philippines. This pattern creates a “missing middle” of weak comparative advantage in many of the middle-technology, “heavy” industries that served as the foundation for comparative advantage development in Japan (the region’s traditional lead goose).¹³ Japan’s development process centered on strong comparative advantage in key middle-technology industries such as iron and steel, shipbuilding, non-electrical machinery, motor vehicles and other transport equipment, and scientific instruments, many of which these six East Asian economies have not gained advantage. Although Korea stands out as the EA-9 economy most strongly following Japan’s comparative advantage path (especially regarding iron and steel, shipbuilding, electrical machinery, and communication equipment and semiconductors), its advantage in MHT industries such as non-electrical machinery, motor vehicles, other transport, and scientific instruments in 1995 still lag well behind Japan’s advantage in those industries in 1980 (or 1995).

These trends identify, at least over the period from 1980 to 1996, that the more advanced EA-9 economies appear to be developing comparative advantage along a somewhat different industrial path than did Japan and than is Mexico, an economy with endowments similar to these EA-9 economies.¹⁴ More than any other factor, the EA-9’s increasing specialization in HT electronics (predominantly PC-related) has dominated their advance toward high-technology industries, in a manner substantially different than Japan and Mexico.

Although it is not possible in this study to link directly a move up the technology ladder with advances in fundamental resource endowment structures, this result does suggest that a new export development pattern is emerging in the region that requires further study and that questions many of the traditional patterns predicted by flying geese analysis.

¹³ These upgrading paths also differ considerably from Mexico, a comparable emerging economy that has made strong advances in global market shares over the 1990s. See Yamazawa (1990) for analysis of the flying geese pattern of development, and Bernard and Ravenhill (1995) and Blomquist (1996) for additional perspectives.

¹⁴ As noted above, however, Mexican RCAs appear to be converging somewhat toward the patterns of these EA-9 economies. One of the largest differences between Mexico and the EA-9 economies is Mexico’s strong RCA for motor vehicles in contrast to low RCAs among most EA-9 economies (except Korea). Such a divergence can most likely be explained by differences in trade and industrial policies, with most EA-9 economies employing aggressive inward-looking policies to protect their domestic motor vehicle industry, while Mexico has opened its industry fully through NAFTA to North American markets and competition.

4. Decomposing Sources of Export Growth Using Market Share Analysis for 1980-96

Constant market share analysis decomposes the sources of export growth for an economy into changes in competitive market shares and changes in international demand for exports, including both world and product/market demand. Table 3 summarises the results for different time periods and groups of countries, whilst Appendix Table A.2 gives individual country data.

Table 3. Sources of Export Growth 1985-96

Group/Source	1985-96 \$ bill (%)	1990-96
EA 9		
World demand	366 (64)	226 (58)
Product/Market demand	93 (16)	90 (24)
Competitiveness	112 (20)	68 (18)
NIE 4		
World demand	202 (70)	122 (69)
Product/Market demand	72 (25)	60 (34)
Competitiveness	16 (5)	-6 (-3)
ASEAN 4		
World demand	98 (62)	60 (50)
Product/Market demand	14 (9)	24 (21)
Competitiveness	46 (29)	34 (29)
PRC		
World demand	66 (53)	44 (49)
Product/Market demand	7 (6)	7 (8)
Competitiveness	50 (41)	39 (43)

Note: figures in brackets are proportions of export demand due to the different factors.

Merchandise export growth boomed among all EA-9 economies from 1985 to 1996, growing around 15 percent growth per year with competitive market share accounting for roughly 20%.

Comparing what might be considered the first (1985-90) and second (1990-96) stages of the emergence of the T-I nexus shows that while EA-9 economies continued to gain merchandise export market share robustly throughout both stages, three significant

new export dynamics developed in the 1990s.¹⁵ First, gains in product/market demand from specialization in rapidly growing export markets exploded from 1990 to 1996, contributing \$90 billion to EA-9 export growth in 1990-96 compared to just \$3 billion from 1985-90 (not shown in Table 3). Much of this surge occurred from 1991 to 1994, resulting from the expansion of intra-EA-9 trade and specialization in high-technology electronics exports. Gains from such specialization moderated in 1995 and actually turned negative in 1996, contributing to that year's export growth slump.

Second, although not included in this decomposition, EA-9 economies made large strides in advancing export competitiveness in non-factor services exports from 1990 to 1996, gaining \$55.8 billion in market share compared to just \$9.5 billion from 1985 to 1990. All EA-9 economies shared in advancing competitiveness in services exports regardless of their level of development. Although due to data constraints our competitiveness estimates for services are less reliable than for goods, these trends suggest strongly that all EA-9 economies entered into a new era in the 1990s of increasingly competitive services exports.

Third, from 1985-1996, the sectoral engine for EA-9 gains in export market share shifted strongly toward higher-technology industries, especially high-technology, personal-computer-related products. Over this period, 94 percent of the net EA-9 increase in export competitiveness was accounted for by MHT and HT sectors as was a similar percent from 1990-1996. High-technology electronics by itself accounted for around 62 percent of the total gain in EA-9 export market share. EA-9 market share in lower-technology industries essentially remained the same from 1990 to 1996, reflecting a major restructuring of gains among EA-9 economies, with NIE-4 economies losing share and the PRC, in particular, as well as the ASEAN-4, gaining share.

The CMS analysis shows that NIE-4 economies gained export market share solidly from 1985 to 1990, and then, for the first time over the sample period, lost share mildly from 1990 to 1996. This loss, however, was more than compensated for by a surge in product/market demand from 1990 to 1996, which served to boost NIE-4 export growth well above world growth rates over that period. Specialization in rapidly growing electrical machinery and high-technology electronics accounted for most of the gain in product demand, while specialization in booming intra-EA-9 exports contributed the bulk of gains related to market demand.

The experiences among these four economies, however, differed profoundly. Hong Kong, China lost market share among all industrial sectors throughout the sample period, particularly in the 1990s as manufacturing capacity shifted offshore, largely to the PRC. Although Hong Kong, China gained share moderately in services exports over this period, it nevertheless lost, on net, a huge amount of market share for overall goods and services exports. After gaining export share solidly from 1985 to 1990, Taipei, China began to lose export competitiveness over the 1990s, registering a \$5 billion loss

¹⁵ The importance of the first two effects have not been reported effectively in the literature. Lloyd and Toguchi (1996), for example, note that "all constant market share studies of East Asian countries have shown that the major explanation for the increase in the exports of manufactures from East Asian countries has been a steady increase in the contribution of ... the competitiveness effect. This is much more important than either the country or the commodity effects." More recently, Lloyd and MacLaren (2000) reinforces this point. We are not aware of any examination of the sources of services exports. Yeats (1999) reports estimates of demand effects in tables, but focuses only on changes in competitive market shares in its analysis.

in merchandise export share from 1990 to 1996. Market share losses over this period were concentrated in 1992 through 1994 and were accounted for almost fully by losses in the five product-cycle-led industries. These substantial and concentrated losses were not offset by gains in merchandise export share in 1991, 1995 and 1996 or by gains in a range of MHT and HT industries, even though Taipei, China did gain share strongly in office and computer equipment.

Korea and Singapore, in contrast, continued to gain merchandise export share solidly over the 1985 to 1996 period, successfully offsetting losses of share in lower-technology industries with gains in higher-technology sectors. Korea, unlike any of the other EA-9 economies, did this by expanding market share in a number of MHT industries over the 1990s, especially motor vehicles, chemicals and non-electric machinery. On the other hand, among HT electronics, while gaining modest shares in communication equipment and semiconductors, Korea also stands out among the EA-9 (except Hong Kong, China) by not gaining share in office and computer equipment. Almost all of Singapore's impressive gains in market share from 1990-96, on the other hand, resulted from roughly equivalent advances in office and computer equipment, and communications equipment and semi-conductors.¹⁶ Whereas Korea broadened its base of export competitiveness among a relatively broad range of industries, Singapore's competitiveness was increasingly concentrated in high-technology electronics.

While the technology upgrading path in terms of market share gains differed among these four economies, each tended to lose market share in five product-cycle-led industries where, as shown below, ASEAN-4 and PRC economies tended to gain.

Unlike the NIE-4, the ASEAN-4 and PRC exceeded world export growth rates from 1985 to 1996 primarily by gaining competitive shares in global export markets, with specialization in rapidly growing markets (product/market demand) becoming somewhat more important during the 1990s for the ASEAN-4 but less so for the PRC. Also unlike the NIE-4, these five economies increased market shares broadly among most manufacturing industries over the entire period, with gains increasing rapidly over the 1990s.

From 1990 to 1996, the PRC stands out among all EA-9 economies as gaining market share across most manufacturing industries, with particularly strong gains in lower technology industries such as textiles, apparel and footwear. The PRC dominated regional gains in these lower technology industries, gaining \$27.5 billion from 1990-1996 in LT and MLT industries compared to a gain of \$7.3 billion by the ASEAN-4. About 55 percent of PRC share gains in the manufacturing sector were accounted for by gains in the five product-cycle-led industries. Among the ASEAN-4, Indonesia and Malaysia moderately gained share in lower-technology sectors, both gaining in textiles, apparel and footwear, while Indonesia gained share in rubber and plastics products.¹⁷

¹⁶ Note that export share gains for Singapore are overstated due to the inclusion of re-exports in its export values.

¹⁷ Indonesia, with its large non-manufacturing goods sector, especially related to oil and gas exports, is somewhat of a special case. Although Indonesia gained only \$0.6 billion in market share for merchandise trade from 1990-1995, it gained a healthy \$5.8 billion in share for manufacturing exports. This reflects a declining market share in non-manufactured goods, most likely related to oil exports. Relative to its 1990 manufacturing export base, in fact, Indonesia registered one of the strongest advances in the region in manufacturing exports. Thailand also is a special case, with abnormally large losses in market share for lower-technology industries in 1996.

For the ASEAN-4, gains in product-cycle-led industries accounted for about one-third of overall gains in manufacturing export share.

Malaysia, Thailand and the Philippines and somewhat less so for the PRC advanced market share strongly in higher-technology (HT+MHT) industries from 1990 to 1996, dominated by a boom in competitive share gains associated with electronics, both MHT electrical machinery and particularly HT personal-computer-related products.¹⁸ While Thailand most strongly gained market share in office and computing equipment, the Philippines advanced most strongly in communications equipment and semiconductors. The PRC and Malaysia most strongly gained shares in electrical machinery. These three sectors accounted for about 80 percent of the total gain in higher-technology exports for these four economies, with high-technology electronics accounting for 64 percent of their total market share gains. Only Indonesia among the ASEAN-4 did not increase share significantly in electronics markets.

To throw further light on the CMS results, regression analysis is used to examine whether changes in export market share are correlated significantly with changes in exchange rates and FDI flows. Appendix Table A.3 presents the results of a set of generalized least square regressions run on panel data of 54 observations for the EA-9 economies from 1990 to 1996, and 60 observations for the EA-10 (EA-9 plus Japan).

Annual proportional changes in export market share gains for East Asian economies, derived from the CMS analysis are regressed on a set of exchange rates, FDI flows and control variables, as follows: (a) real effective exchange rates and the yen/dollar exchange rate, each lagged one year; (b) inward-FDI as a percentage of GDP and outward-FDI as a percentage of GDP; and (c) a set of control variables.¹⁹

Two results are evident. First, the regressions for the EA-9 economies show no discernible correlation between changes in exchange rates and export market shares from 1990 to 1996.²⁰ This suggests, at least within this limited sample of data, that

¹⁸ From 1990 to 1996, reflecting some broadening in their industrial base, each of the ASEAN-4 and the PRC also began to make small gains in chemicals, with Malaysia and Thailand gaining shares in non-electrical machinery.

¹⁹ Definitions for each variable are provided at the bottom of Appendix Table A.3. Note that CMS estimates of export market share extract the impact of changes in demand for exports and that changes in export competitiveness are regressed on changes in exchange rates and FDI flows. The results reported in Table A.3 hold whether each exchange rate is run separately or together, and whether inward and outward FDI are combined into a net FDI variable. The results also hold whether the exchange rate and FDI variables are lagged one year or run contemporaneously. To check the sensitivity of the regression correlations, each regression is run with and without the set of control variables. In each case, the coefficients for the exchange rates and FDI variables were not sensitive to the inclusion of the control variables.

²⁰ The results reported in our study do not support the presumption made by Kwan (1998) and Ito (2000) that EA-9 export growth is seriously affected by changes in Japanese export competitiveness associated with swings in the yen-dollar rate. Kwan does not account for the downturn in demand for exports. Although the posited transmission effect may be ineffective, Kwan's findings of a strong correlation between the yen-dollar rate and EA-9 export growth appears robust—EA-9 export growth declined rapidly following the depreciation of the yen in spring 1995 and then rose strongly following the strong appreciation of the yen in the fall of 1998. An alternative explanation for this strong correlation could be the high correlation between changes in the US dollar effective exchange rate (which is sensitive to the yen/dollar rate) and export prices for EA-9 economies, as noted in World Bank (2000). This effect in nominal export terms would be transferred more through demand factors (changes in world export prices) rather than through changes in competitive market shares between EA-9 economies and Japan.

exchange rates for the EA-9 economies were not generally overvalued in the pre-crisis 1990s and were not sensitive to swings in the yen/dollar rate. Since this regression covers six years and 9 economies, it is not possible to check specifically for the impact of exchange rate changes for a particular year (such as for 1996) nor for a particular economy.

In similar regressions with Japan added to the EA-9 (to become the EA-10), the real effective exchange rate coefficient becomes negative and significant at the 5 percent level. From 1990 to 1996, Japan's real effective exchange rate swung much more strongly than any other EA-9 currency, appreciating by about 35 percent from 1990 to 1995, and then depreciating by about 16 percent in 1996.²¹ Over this period, Japan lost huge amounts of market share. This result reflects the much stronger impact of exchange rate variation on export market shares for Japan relative to EA-9 economies, and illustrates the importance of analyzing EA-9 economies separately from Japan.

The second result shows how robustly increasing foreign direct investment was correlated with EA-9 gains in export market share over the 1990s.²² This highly significant correlation holds when export competitiveness is measured for merchandise exports or all goods and services exports, and holds as well for both the EA-9 and EA-10. This result squarely supports the linkages between FDI inflows and export growth that underpin the regional T-I nexus.

Outward-FDI, on the other hand, was negatively correlated with gains in export market shares among EA-9 economies (and the EA-10) for merchandise exports, but not for all goods and services exports. Interpreting this result is less straightforward, since although it is clear why outward FDI associated with restructuring out of a particular sector would cause a decline in export market share for that sector, there is no *a priori* reason why outward-FDI would cause export competitiveness for all merchandise exports to decline. This result provides an indication of the difficulty that East Asian economies with limited FDI inflows, and in particular large net capital outflows, had in successfully coping with competitive restructuring pressures from 1990 to 1996.

²¹ Ignoring short-term spikes in rates, the nominal yen/dollar rate appreciated steadily from roughly 145 in early 1990 to 100 in mid-1995 (the yen briefly spiked to below 80 in mid-April, 1995), and then depreciated steadily to about 120 by April/May 1997. Japan's real effective exchange rate over this period appreciated by about 30 percent from early 1990 to mid-1995 (excluding the spike up during the 2nd quarter of 1995) and then depreciated back to early 1990 levels by early 1997 (data based on monthly averages from IMF-IFS).

²² Borensztein, De Gregorio and Lee (1998) note that "FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies is available in the host economy." How to achieve the most appropriate balance between expanding "indigenous" capabilities and encouraging inward-FDI and other linkages to foreign firms that compensate for but do not necessarily remedy domestic weaknesses remains one of the most challenging policy issues for East Asian economies. Although in our study we can link strong export performance with economies receiving significant levels of inward-FDI, we cannot address the more subtle synergies, spillovers and trade-offs between FDI and indigenous capabilities. Suggesting how difficult it is to pick such effects up empirically, Aitken and Harrison (1999) "find no evidence supporting the existence of technology spillovers from foreign firms [operating in the domestic economy through some form of FDI relationship] to domestically owned firms" for a sample of firms in Venezuela.

5. Did East-Asian Developing Economies Lose Export Competitiveness Before 1996?

While the previous sections examine the changes in export performance indicators during the emergence of the T-I nexus from 1985 to 1995/96, here we focus specifically on the region wide downturn in export growth that started in mid-1995 and continued through 1996. The results presented must be qualified by the inherent difficulty of separating out cyclical from more persistent, fundamental trends, which is made even more difficult when a potential new trend may be developing in the last year of a sample.

EA-9 merchandise export growth collapsed from 20.2 percent and 21.8 percent in 1994 and 1995, respectively, to 3.3 percent in 1996. Several economies experienced even greater declines: Korea from 28.5 percent in 1995 to 1.4 percent in 1996, Thailand from 22.9 percent to -4.1 percent, and the PRC from 22.9 percent to 1.8 percent. Did export competitiveness throughout the region move off trend during the 1996 export growth slump?²³

CMS estimates of export competitiveness for EA-9 economies over the full 1990-1996 period show little indication of declining export competitiveness.²⁴ EA-9 economies, in fact, strongly gained export competitiveness by \$67.6 billion from 1990 to 1996, including a moderate gain of \$6.6 billion in 1996. A decomposition of export growth for the five countries most affected by the crisis—Indonesia, Malaysia, Thailand, Korea and the Philippines (the Crisis-5 economies) generates a similar result. Each of these results would be even stronger if robust share gains in non-factor services exports were included. To determine whether export competitiveness deteriorated specifically in 1996, decompositions can be made that isolate the sources of the decline in export growth for that year relative to 1995 (see Table 4). Table A.2 in the Appendix gives the individual country data in detail.

²³ Possible causes for this downturn include overvalued real exchange rates, declining productivity and innovation at the firm level, trade and industrial policies that caused regional export capacity to expand in similar industries, a crowding out of export capacity due to rapid investment in non-tradable sectors in booming economies, increasing competition from other emerging market competitors, and weak global demand in general and cyclical downturns in certain sectors such as semiconductors more specifically.

²⁴ The conclusions reported in this section conform generally with the largely qualitative assessment of Dasgupta and Imai (1998). They note that most of the 1996 decline in export growth was due to the confluence of cyclical downturns in several international demand factors (the large fall in world trade growth in nominal dollar terms; the weakening in Japanese import demand due to slow growth and the yen depreciation in mid-1995, and significant declines in export prices for major EA-9 export products) and not due to declines in international competitiveness nor due to increasing competition from the PRC. They also note that intra-EA-9 trade in 1995-96 did not offset weak global export demand as had been the case during the early 1990s and the tendency for EA-9 economies to encourage investment in electronics and other sectors that could have contributed to price wars that pushed export prices down. Finally, they note that Thailand stands out as the EA-9 economy with signs of newly deteriorating export competitiveness (largely in labor-intensive sectors) in the mid-1990s.

Table 4. Sources of Export Growth 1996

Group/Source	1996 \$ bill (%)
EA 9	
World demand	-76.7 (73)
Product/Market demand	-16.6 (16)
Competitiveness	-11.6 (11)
Crisis 5	
World demand	-32.7 (68)
Product/Market demand	-8.6 (18)
Competitiveness	-7.1 (14)

Note: figures in brackets are proportions of decline of export demand due to the different factors.

About 89 percent of the decline in export growth in 1996 for EA-9 economies, and 86 percent for Crisis-5 economies, therefore, can be attributed to weakening export demand. While competitive market share gains weakened in 1996 compared to 1995, the contribution nevertheless remained positive at \$6.6 billion for the EA-9 and \$6.4 billion for the Crisis-5. This result suggests that export competitiveness did not deteriorate significantly on a regional basis in the pre-crisis 1990s, contributing only a mildly depressing influence on EA-9 export growth in 1996. For example, if market demand had grown at the same rate in 1996 as in 1995 (at 18.7 percent), the moderation in competitive market share gain would have caused EA-9 export growth to fall from 21.8 percent in 1995 to around 20 percent in 1996.

The impact of declining demand for exports can be broken into two parts: world and product/market demand factors. The sharp downturn in world demand contributed about three-quarters of the overall decline in merchandise exports and about two-thirds for the Crisis-5. Large swings in world export demand are common—after growing by 7.5 percent in 1992, world export growth declined by 1.8 percent in 1993 only to rebound to a 14.6 percent growth rate in 1994. The extent of the drop in 1996, however, exceeded any other year in our sample. Before 1996, however, the EA-9 economies were able to sustain relatively high export growth rates even when world export growth turned down, by expanding competitive export shares and by specializing in rapidly growing export markets (e.g. from positive product/market demand). In 1996, however, product/market demand made negative contributions to EA-9 and Crisis-5 export growth, offsetting moderate gains in market share and causing EA-9 and Crisis-5 export growth to converge down (“re-link”) to world growth rates for the first time over the sample period.

The contribution of product/market demand to EA-9 export growth began to decline in 1995, after four years of strong growth from 1991 to 1994, falling from \$26.2 billion in 1994 to \$9.9 billion in 1995 to -\$6.7 billion in 1996. This drop occurred because two of the prime demand engines of export growth for the region turned lower. First, the advantage of specializing in intra-EA-9 exports began to fall in 1995 and dropped strongly in 1996, implying that the EA-9, who had increasingly specialized in trading with themselves, were not able to diversify to other markets when the region-

wide export slump hit. Second, many of the product sectors that EA-9 economies specialized in slumped on world markets, especially textiles, apparel and footwear in 1995 and 1996, and then, quite strongly for communications equipment and semiconductors in 1996. These declines in product demand, however, were offset somewhat by specialization in office and computer equipment exports, which continued to grow solidly in 1996 despite the overall export slump.

Although most of the region wide drop in nominal export growth in 1996 can be attributed to a decline in demand for exports, it is not possible using CMS analysis to determine whether this decline in demand was manifest through lower export prices or lower export volumes.²⁵ Growth in nominal world exports valued in U.S. dollars fell dramatically in 1996 and continued weakening through 1998. Growth in export volumes, on the other hand, proved to be more resilient, declining from around 10 percent growth in 1995 to 5 percent growth in 1996, and then rebounding somewhat to around 8 percent growth in 1997. In 1996, therefore, about two-thirds of the decline in nominal world export growth valued in U.S. dollars was due to declining export prices in U.S. dollar terms.

The pattern of export price and volume changes associated with the 1996 export slump is surprisingly varied among EA-9 economies. For Korea and Indonesia, most of the decline in nominal export growth in 1996 was due to lower export prices.²⁶ Korea is the most extreme case in this regard—where as growth in Korean export value fell from 31 percent in 1995 to just 4 percent in 1996, growth in export volumes remained remarkably strong, falling only from around 24 percent in 1995 to around 20 percent growth in 1996. For Thailand, Singapore and Hong Kong, China, conversely, declines in export volumes accounted for most of the decline in export values. This was especially true for Thailand, on the other extreme, where growth in export volumes plummeted from 37 percent in 1995 to a -9 percent in 1996, while growth in export values fell from 24 percent in 1995 to -2 percent in 1996, implying a mild increase in export prices. Among the EA-9, six economies—Philippines, Malaysia, Indonesia, Singapore, Taipei, China and Hong Kong, China—improved merchandise export market share gains in 1996 compared to 1995 (see Table 4). The Philippines, Malaysia and Indonesia, each crisis economies, registered strong gains in share.²⁷ On the other hand, gains in competitive market shares weakened for the PRC, Korea and Thailand, with Thailand and Korea actually losing market share. For each of these three economies, weaker share gains accounted for around 40 percent of their overall drop in export growth in 1996 (compared to the 11 percent average noted above for all EA-9 economies). This would imply that if export demand had remained the same in 1996 as

²⁵ Unlike competitive market share, which should be affected relatively less by changes in international prices, product/market demand is more sensitive to changing global prices. A country that specializes in an export product whose price falls substantially in global markets will experience a decline in the product demand factor even if export volume levels do not change.

²⁶ Any use of volume data should be highly qualified, since changes in export volumes are affected by changes in the composition of exports by weight. Rosner (2000) takes this type of analysis an important step further by calculating indices of export price and volume trends based on detailed unit value data. Although focusing on the post-crisis environment, his calculations show that Indonesian export prices fell moderately over 1996 while export volumes grew.

²⁷ While Hong Kong, China continued a decade long trend by losing market share in merchandise exports, its loss was slightly less worse in 1996 than 1995. Malaysia in particular, but also Indonesia, benefited from market share gains in non-manufactured goods in 1996.

1995, and if only the weakening in market share had occurred, these three economies would have registered a drop in export growth from (a quite high) 22-29 percent in 1995 to (a somewhat lower but still respectable) 13-17 percent in 1996.

Do these declines in share gains represent a serious erosion in export competitiveness for these three economies in the lead up to the crisis? For Korea, the answer appears to be no. Much of Korea's overall weakening in export competitiveness in 1996 was concentrated in communications equipment and semiconductors (which, with a heavy specialization in DRAMS, accounted for about 25 percent of total Korean manufacturing exports in 1995). Korea was particularly vulnerable to a sharp global downturn in demand which led to a collapse in DRAM prices. Excluding this industry, Korea gained export market share by a solid \$5.1 billion in 1996. Korea, as well, had the most cyclical pattern of market share gains among the EA-9 economies over the 1990s, with small losses in share in 1992-1994, much like occurred in 1996, offset by large gains in 1991 and 1995. Korea's relatively sound overall competitive position is reinforced by data that show merchandise export volumes expanding by around 20 percent in 1996, implying that most of its fall in nominal exports in 1996 was due to a large drop in export prices. Declining export prices also contributed to weak Korean nominal export growth in 1997 as nominal exports rose by just 5 percent even though export volumes expanded at a 25 percent pace.

For Thailand (where the crisis started) and the PRC (which escaped the brunt of the crisis), after a record of strong gains in export competitiveness throughout the sample period, both moved off trend in 1996 with a substantial weakening in export market shares spread broadly among most manufacturing industries. Whereas this weakening represented lower but still generally positive share gains among industries for the PRC, Thailand tended to lose market shares in absolute terms in most sectors. In Thailand, major reductions in market share in 1996 compared to 1995 occurred in two industries—for rubber and plastics products, and textiles, apparel and footwear—both industries sensitive to relative cost factors. Such market share declines for the PRC, on the other hand, were greatest in iron and steel, chemicals and motor vehicles. The overall weakening in Thailand's market share would have been substantially worse if strong share gains had not been made in high-technology electronics in 1996, especially office and computer equipment (likely related to the expansion of hard disk drive exports).

Four additional factors are considered. First, Warr (1999) suggests that export data irregularities in 1994 and 1995 caused the fall in Thailand's exports to be mildly overstated. Based on rough estimates of the effect of these irregularities, Thailand's loss of export market share would have been \$1.95 billion rather than the \$3.5 billion calculated from official export data.²⁸ Second, more emphatically than any other EA-9

²⁸ Export data for Thailand may be over-estimated for certain years due to over-invoicing related to the abuse of value added tax rebate schemes for exports that were liberalized in the early 1990s (Warr 1999). Rough estimates based on informal discussions with Thai experts suggest that export values may have been over reported by a factor of \$1.0 billion in 1994 and \$1.5 billion in 1995. Correcting for this potential bias, merchandise export growth rates would have been 20 percent in 1994, 23.3 percent in 1995 and -1.5 percent in 1996, compared to growth rates from officially reported exports of 22.7 percent, 24.5 percent and -4.1 percent for 1994 through 1996, respectively. Even with this correction, therefore, Thai export growth collapsed in 1996, but by less than the reported values. The lack of sectoral or export-destination composition related to this over-invoicing precludes a straight-forward re-estimate of constant
(cont.)

economy, growth of Thai exports in volume terms plummeted from around a positive 40 percent in 1995 to around a negative 10 percent in 1996, while prices for Thai exports actually increased mildly. Such a large decline in export volume growth would suggest a major loss of market share. Third, Thai RCAs declined more abruptly in 1996 than for any other EA-9 economy, especially for other transport equipment, rubber and plastic products, and, to a lesser extent, textiles, apparel and footwear. Fourth, while PRC merchandise export growth rebounded strongly to 21 percent in 1997, Thai export growth grew by only 3 percent in 1997. Although data is not available to calculate constant market shares for 1997, the return to vigorous export growth by the PRC, especially as export growth among other EA-9 economies lingered in 1997, suggests that the PRC gained competitive market share in that year.²⁹ Similarly, Thailand's weak export performance in 1997 reinforces the presumption of eroding competitiveness.

Based on these factors, Thailand appears to be the only EA-9 economy (and only crisis economy) to experience a deterioration in export competitiveness in the lead up to the crisis, a deterioration that may be even milder than estimated here given evidence of export data irregularities that appear to moderate the deterioration somewhat.

6. Conclusions

The capacity to sustain high export growth over decades has been a hallmark of the path-breaking East Asian export-led development model. Nine major East Asian developing economies (the EA-9: i.e. NIE-4, ASEAN-4 and PRC) entered into a new phase of economic development from the mid-1980s to the mid-1990s. Over this period, a regional trade-FDI (T-I) nexus emerged where these economies sustained high export growth rates supported strongly, for the first time, by a surge in export-oriented FDI. Intra-EA-9 trade and FDI expanded particularly robustly over this period, spurred by the proliferation of MNC-led production networks that carved up or "fragmented" regional production processes across national borders in order to take advantage of more efficient divisions of labor and scale economies within the region. The nexus developed primarily in response to a shift in development strategy by the less developed ASEAN-4 and PRC toward FDI-enhanced, pro-export policies in the mid-1980s, supported by exchange rate appreciations in Japan and the NIE-4 and by technology changes such as the rapid global commercialization of the personal computer and innovations that reduced communications and transportation costs. The sudden region-wide collapse in

market shares. If we assume, however, that product/market demand was not affected by this over-invoicing, the loss in competitive market share would be \$1.95 billion instead of the loss of \$3.5 billion using officially reported data, which still implies a substantial loss in export market share for Thailand in 1996. Further adding to the confusion, this milder loss may have to be further revised to account for Bank of Thailand (2000) data that report a somewhat lower decline in 1996 exports than does the ANU database.

²⁹ Among EA-9 economies, nominal exports grew strongly only for the PRC and Philippines in 1997, with all EA-9 economies except the Philippines posting weak export growth in 1998 as the crisis firmly took hold. Nominal merchandise export growth for 1997 and 1998 for each of the EA-9 economies are: Korea: 5.0 and -2.9 percent; Taipei,China: 4.8 and -9.0 percent; Hong Kong, China: 4.1 and -7.5 percent; Singapore: 0.0 and -12.2 percent; Indonesia: 7.2 and -8.6 percent; Malaysia: 0.3 and -6.9 percent; Philippines: 22.9 and 17 percent; Thailand: 3.4 and -5.7 percent; and the PRC 21.1 and 0.5 percent (EAEP, 2000).

export growth beginning in mid-1995 and extending through 1996 raised concerns whether “emerging Asia’s export machine was going to remain the dominant force it had been in the past (Goldstein, 1998).”

Table 5. Summary of Competitiveness Indicators for Manufacturing Exports in the Pre-crisis 1990s

Dynamic Comparative Advantage 85~96	Export Competitiveness 90~96	Strong Increase	Moderate Increase	Moderate Decrease	Large Decrease
	Strong Upgrading	Malaysia Thailand Philippines	Korea Singapore	Taipei,China	
Moderate Upgrading	PRC Indonesia Mexico	India			
Stagnant or Downgrading			United States EU-12	Hong Kong, China Japan	

RCA indices and CMS estimates provide two complementary perspectives on how EA-9 economies were able to sustain high export growth rates as the T-I nexus emerged from 1985 to 1995, a period when domestic labor and other costs increased among the EA-9 in line with rapidly advancing standards of living. Table 5 summarizes the combined results of tracking these two export performance indicators. The PRC, Singapore and ASEAN-4, (which attracted over 90 percent of the inward-FDI into the region over this period) and Korea achieved a combination of substantial comparative advantage upgrading and gains in competitive market share. Taipei,China kept pace by upgrading its comparative advantage, but, unlike Korea, it was not able to advance export market shares in higher-technology industries by enough to offset declining competitiveness in lower-technology sectors. Hong Kong, China stands out as the only EA-9 economy that experienced a major hollowing out of its manufacturing export sector, which was only partially compensated for by increases in competitiveness in services sectors. Among a group of five comparison economies, Mexico matched the East Asian FDI-led economies and Korea by strongly upgrading comparative advantage and even surpassed the PRC’s impressive record of market share gains from 1990 to 1996. India, on the other hand, more moderately upgraded comparative advantage and

only mildly gained export market share. Although Japan, the US and the EU-12 each exhibited weakening export competitiveness both in terms of comparative advantage development and market shares, Japan experienced by far the most intensive loss of manufacturing export competitiveness, partly due to the sustained Post-Plaza Accord appreciation of the yen.

Our analysis suggests strongly that the 1996 region-wide collapse in export growth resulted predominantly from a large drop in overall export demand, including both world and product/market demand, not by a serious erosion in regional export competitiveness in terms of a loss in market share. World export demand in nominal terms cycled downwards unusually strongly in 1996, while typically robust product/market demand for the EA-9 began to trend downward in 1995 and became a negative influence on EA-9 export growth. Weakening product/market demand reflected slumps in intra-EA-9 trade and in a number of industries that EA-9 economies tend to specialize in, including textiles, apparel and footwear, and communication equipment and semiconductors. Gains in export market shares did weaken substantially in 1996 compared to 1995 for the PRC, Korea and Thailand. Thailand, however, appears to be the only EA-9 economy (and crisis economy) to experience a broad-based, although relatively mild, deterioration of export competitiveness in the lead up to the crisis.

These findings have implications both for longer-term development policy and for understanding the nature of the Asian crisis. In the former case, lessons can be learned for developing economies from how powerfully export performance responded to the shift toward FDI-enhanced, pro-export policies by the ASEAN-4 and PRC. Lessons from the NIE-4 for developing economies aiming to upgrade the technological structure of their exports vary, since each of these economies used different policy strategies and achieved different degrees of success over this period. A final lesson for developing economies in general is that the regional embrace of the new and rapidly expanding personal-computer industry demonstrates that economies at different levels of development can participate actively in high-technology export sectors, spurred, in the East Asian case, by domestic policy reforms, FDI inflows and MNC-led production networks.

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Appendices

Appendix Table A.1
Revealed Comparative Advantage Indices for All Goods and Services Exports

Country	Yr	Non-mfg. Exports	Manufacturing Exports				Services Exports
			HT	MHT	MLT	LT	
JAPAN	80	0.03	1.95	1.90	1.51	0.41	0.79
	85	0.03	2.18	1.78	1.23	0.33	0.59
	90	0.03	2.17	1.61	1.13	0.25	0.62
	91	0.03	2.01	1.63	1.17	0.26	0.59
	92	0.03	1.99	1.63	1.20	0.25	0.58
	93	0.03	1.94	1.60	1.24	0.23	0.58
	94	0.03	1.92	1.55	1.27	0.21	0.60
	95	0.03	1.87	1.51	1.26	0.20	0.62
	96	0.04	1.76	1.53	1.25	0.21	0.67
HONG KONG, CHINA	80	0.05	1.07	0.64	0.84	2.42	1.74
	85	0.05	1.00	0.53	0.81	2.22	1.72
	90	0.08	1.00	0.49	0.56	1.86	1.87
	91	0.09	0.91	0.47	0.52	1.81	1.93
	92	0.11	0.91	0.41	0.48	1.69	2.04
	93	0.10	0.82	0.37	0.45	1.55	2.20
	94	0.08	0.75	0.36	0.40	1.45	2.42
	95	0.08	0.73	0.36	0.37	1.36	2.54
	96	0.06	0.60	0.34	0.34	1.34	2.68
KOREA	80	0.21	1.38	0.55	1.77	2.34	0.75
	85	0.21	1.24	0.49	2.45	1.66	0.60
	90	0.25	1.85	0.61	1.82	1.52	0.62
	91	0.25	1.82	0.63	1.89	1.44	0.57
	92	0.23	1.81	0.69	1.92	1.37	0.56
	93	0.21	1.77	0.74	1.81	1.29	0.60
	94	0.19	1.86	0.76	1.62	1.19	0.69
	95	0.18	1.99	0.81	1.45	1.00	0.74
	96	0.16	1.79	0.86	1.58	1.02	0.73
SINGAPORE	80	0.44	2.07	0.58	2.00	0.82	1.24
	85	0.37	2.28	0.59	1.95	0.78	0.96
	90	0.27	2.94	0.60	1.56	0.62	0.95
	91	0.26	2.78	0.64	1.54	0.64	0.90
	92	0.25	3.05	0.63	1.32	0.61	0.93
	93	0.22	3.15	0.61	1.28	0.54	0.90
	94	0.21	3.42	0.57	1.15	0.47	0.90
	95	0.21	3.47	0.54	0.98	0.41	0.97
	96	0.17	3.51	0.53	1.05	0.39	0.91
TAIPEI,CHINA	80	0.13	1.47	0.80	1.44	2.59	0.59
	85	0.17	1.19	0.81	1.60	2.23	0.46
	90	0.16	1.83	0.83	1.55	1.66	0.46
	91	0.16	1.70	0.88	1.47	1.66	0.46
	92	0.15	1.76	0.89	1.50	1.52	0.51
	93	0.14	1.75	0.92	1.40	1.38	0.60
	94	0.16	1.81	0.92	1.36	1.33	0.57
	95	0.16	2.02	0.92	1.24	1.20	0.56
	96	0.13	2.10	0.91	1.27	1.20	0.57

(cont.)

Appendix Table A.1 - cont.
 Revealed Comparative Advantage Indices for All Goods and Services Exports

Country	Yr	Non-mfg. Exports	Manufacturing Exports				Services Exports
			HT	MHT	MLT	LT	
INDONESIA	80	3.67	0.10	0.02	0.52	0.33	0.00
	85	4.42	0.09	0.04	0.51	0.86	0.23
	90	4.18	0.05	0.10	0.90	1.77	0.43
	91	4.09	0.07	0.14	0.93	1.94	0.41
	92	3.73	0.15	0.16	1.02	2.15	0.41
	93	3.59	0.22	0.18	1.02	2.30	0.43
	94	3.62	0.32	0.19	1.11	2.07	0.50
	95	3.83	0.32	0.23	1.13	1.95	0.51
	96	3.46	0.41	0.23	1.19	1.94	0.54
MALAYSIA	80	2.07	1.71	0.13	0.66	1.46	0.47
	85	2.53	1.59	0.20	0.58	1.40	0.59
	90	2.10	2.22	0.42	0.73	1.34	0.56
	91	2.00	2.29	0.52	0.68	1.27	0.53
	92	1.76	2.48	0.54	0.69	1.32	0.50
	93	1.43	2.66	0.59	0.59	1.34	0.53
	94	1.08	2.81	0.60	0.55	1.23	0.64
	95	1.05	2.80	0.61	0.55	1.14	0.65
	96	0.98	2.75	0.58	0.56	1.12	0.73
PHILIPPINES	80	1.09	1.52	0.12	0.58	2.58	1.03
	85	1.03	1.89	0.15	0.66	1.83	1.46
	90	1.26	1.62	0.21	0.79	1.78	1.23
	91	1.31	1.56	0.25	0.77	1.67	1.23
	92	1.17	1.71	0.25	0.73	1.56	1.32
	93	1.17	1.90	0.29	0.77	1.49	1.19
	94	0.97	1.96	0.30	0.72	1.25	1.42
	95	0.89	2.13	0.25	0.65	1.10	1.56
	96	0.59	2.62	0.23	0.51	0.91	1.62
THAILAND	80	1.26	0.23	0.19	0.94	2.12	1.13
	85	1.43	0.21	0.26	0.62	2.47	1.20
	90	1.18	1.18	0.30	0.81	2.18	1.06
	91	1.20	1.16	0.37	0.80	2.16	0.96
	92	1.17	1.19	0.41	0.81	1.98	1.02
	93	1.10	1.16	0.46	1.00	1.78	1.03
	94	1.13	1.34	0.50	0.91	1.74	0.95
	95	1.13	1.32	0.50	0.99	1.62	0.99
	96	1.04	1.77	0.48	0.71	1.41	1.11
PRC	80	1.37	0.24	0.39	1.08	2.80	0.00
	85	1.93	0.17	0.27	0.85	2.50	0.53
	90	1.33	0.28	0.73	1.10	2.41	0.42
	91	1.22	0.29	0.76	1.17	2.42	0.42
	92	1.09	0.47	0.56	1.36	2.59	0.45
	93	1.08	0.49	0.58	1.25	2.63	0.48
	94	0.87	0.55	0.57	1.37	2.52	0.56
	95	0.77	0.64	0.64	1.52	2.27	0.54
	96	0.69	0.73	0.65	1.52	2.30	0.55

(cont.)

Appendix Table A.1 - cont.
Revealed Comparative Advantage Indices for All Goods and Services Exports

Country	Yr	Non-mfg. Exports	Manufacturing Exports				Services Exports
			HT	MHT	MLT	LT	
USA	80	0.72	2.65	1.21	0.71	0.74	1.08
	85	0.65	2.21	1.02	0.60	0.57	1.45
	90	0.64	1.92	0.88	0.72	0.63	1.40
	91	0.66	1.79	0.88	0.73	0.62	1.38
	92	0.62	1.76	0.89	0.74	0.64	1.37
	93	0.60	1.62	0.91	0.75	0.64	1.37
	94	0.57	1.54	0.91	0.76	0.65	1.40
	95	0.68	1.43	0.91	0.78	0.67	1.39
	96	0.62	1.45	0.91	0.80	0.66	1.38
EU-12	80	0.29	1.18	1.23	1.33	1.07	1.23
	85	0.46	1.02	1.09	1.21	1.07	1.11
	90	0.46	0.91	1.08	1.23	1.05	1.03
	91	0.51	0.92	1.08	1.22	1.05	1.01
	92	0.51	0.91	1.06	1.20	1.05	1.03
	93	0.49	0.92	1.05	1.19	1.05	1.04
	94	0.52	0.90	1.07	1.20	1.04	1.01
	95	0.54	0.90	1.08	1.17	1.04	1.00
	96	0.50	0.90	1.10	1.19	1.04	1.00
MEXICO	80	2.12	1.05	0.38	0.50	0.51	1.18
	85	3.13	0.46	0.45	0.68	0.39	0.88
	90	2.86	0.27	0.75	0.92	0.41	1.13
	91	2.70	0.31	0.90	0.78	0.45	1.15
	92	1.81	0.76	1.30	0.81	0.58	0.76
	93	1.66	0.77	1.40	0.87	0.59	0.69
	94	1.53	0.89	1.42	0.83	0.60	0.67
	95	1.59	0.85	1.46	0.89	0.68	0.52
	96	1.52	0.88	1.48	0.84	0.75	0.47
INDIA	80	1.04	0.25	0.33	0.50	2.11	1.64
	85	1.56	0.19	0.22	0.76	1.93	1.44
	90	1.78	0.30	0.34	1.03	2.08	0.99
	91	1.69	0.28	0.36	1.02	2.11	1.03
	92	1.66	0.22	0.34	1.29	2.27	0.85
	93	1.91	0.23	0.33	1.35	2.13	0.86
	94	1.80	0.24	0.37	1.30	2.18	0.88
	95	1.80	0.27	0.36	1.22	2.27	0.90
	96	1.80	0.26	0.33	1.24	2.31	0.92
Composition of World Exports	80	23.4%	5.2%	23.7%	16.2%	14.2%	17.2%
	85	16.6%	7.8%	26.6%	15.9%	14.4%	18.8%
	90	11.5%	9.6%	28.8%	14.2%	15.2%	20.8%
	91	10.8%	10.4%	28.3%	13.8%	15.3%	21.5%
	92	10.2%	10.5%	28.3%	13.3%	15.5%	22.1%
	93	9.5%	11.1%	28.2%	13.3%	15.3%	22.6%
	94	9.3%	11.6%	28.8%	13.2%	15.5%	21.7%
	95	8.7%	12.3%	28.9%	13.5%	15.5%	21.2%
	96	9.4%	12.5%	28.5%	13.0%	14.8%	21.7%

Data Sources: ANU-IEDB.

Appendix Table A.2
Decomposing Export Growth into Demand and Competitiveness Factors
for Non-Factor Services Exports

(US\$ billions, percentages)

Country	Yr	Services Exports			Demand Factors			Competitive Factor				
		Value	Change\$	Change%	Total	World	Product	Total	IT/misc.	Finance	Transpt	Tourism
Japan ^{a)}	80-85	21.6	1.4	1.4	0.9	0.9		0.5				
	85-90	41.4	19.7	13.8	22.9	22.9		-3.1				
	90-95	65.3	23.9	9.5	20.9	20.9		3.2				
	91	44.8	3.5	8.3	2.4	2.4		1.0				
	92	49.1	4.2	9.4	3.8	5.2	-1.5	0.4	0.8	0.2	-0.2	-0.3
	93	53.2	4.2	8.5	0.9	0.5	0.3	3.3	2.7	0.3	0.3	-0.1
	94	58.3	5.1	9.5	5.4	4.5	0.8	-0.3	0.5	0.3	-0.6	-0.4
	95	65.3	7.0	12.0	8.2	8.1	0.1	-1.2	-0.1	0.0	-0.4	-0.7
	96	67.7	2.4	3.8	3.8	4.2	-0.4	-1.4	-3.2	2.7	-1.4	0.6
Hong Kong, China ^{a)}	80-85	7.8	2.0	6.2	0.3	0.3		1.8				
	85-90	18.3	10.4	18.5	8.3	8.3		2.2				
	90-95	34.3	16.1	13.4	10.5	10.5		5.6				
	91	20.7	2.5	13.4	1.1	1.1		1.4				
	92	24.5	3.7	18.0	2.4	2.4		1.3				
	93	27.9	3.4	13.9	0.3	0.3		3.1				
	94	31.1	3.3	11.8	2.4	2.4		0.9				
	95	34.3	3.2	10.3	4.3	4.3		-1.2				
	96	37.3	3.0	8.6	2.2	2.2		0.7				
Korea	80-85	3.8	1.3	8.3	-0.1	0.1	-0.2	1.3	0.5	-0.1	0.5	0.3
	85-90	9.6	5.8	20.3	3.7	4.0	-0.4	2.1	1.0	0.1	-0.2	1.4
	90-95	22.8	13.2	18.8	5.3	5.3	0.0	7.9	3.0	0.1	4.0	0.8
	91	10.0	0.4	3.9	0.6	0.6	0.0	-0.2	-0.3	0.0	0.5	-0.3
	92	10.7	0.7	7.1	1.0	1.2	-0.2	-0.3	0.0	0.1	0.3	-0.6
	93	12.9	2.2	20.8	0.1	0.1	0.0	2.1	0.8	0.0	1.0	0.3
	94	16.8	3.9	29.8	1.3	1.1	0.2	2.6	1.1	0.1	1.3	0.1
	95	22.8	6.0	35.8	2.3	2.3	0.0	3.7	1.5	-0.1	1.0	1.4
	96	23.4	0.6	2.6	1.2	1.5	-0.2	-0.7	0.6	0.1	-0.7	-0.6
Singapore	80-85	4.7	-0.2	-0.7	0.3	0.2	0.0	-0.4	-0.2	0.0	-0.2	0.0
	85-90	12.8	8.1	22.3	5.0	5.0	0.0	3.1	2.0	0.0	0.5	0.7
	90-95	29.8	17.0	18.4	7.6	7.3	0.2	9.5	6.7	0.2	1.7	0.8
	91	13.8	1.0	7.9	0.8	0.8	0.0	0.2	0.1	0.0	0.1	-0.1
	92	16.2	2.4	17.2	1.5	1.6	-0.1	0.9	0.4	0.0	0.1	0.4
	93	18.6	2.4	14.7	0.3	0.2	0.1	2.1	1.0	0.1	0.4	0.6
	94	23.0	4.4	23.9	1.8	1.6	0.2	2.7	2.2	0.1	0.5	-0.2
	95	29.8	6.8	29.4	3.3	3.2	0.0	3.5	2.9	0.0	0.6	0.1
	96	29.9	0.1	0.4	2.0	1.9	0.1	-1.9	-1.0	0.0	-0.1	-0.8
Taipei, China ^{a)}	81-85	2.9	0.7	6.7	0.1	0.1		0.6				
	85-90	7.0	4.1	19.4	3.1	3.1		1.1				
	90-95	15.0	8.0	16.5	4.5	4.5		3.5				
	91	8.5	1.5	20.8	0.4	0.4		1.0				
	92	10.2	1.7	20.6	1.0	1.0		0.8				
	93	13.3	3.1	30.3	0.1	0.1		3.0				
	94	13.2	-0.1	-0.8	1.1	1.1		-1.2				
	95	15.0	1.8	13.7	1.8	1.8		0.0				
	96	16.3	1.2	8.3	1.0	1.0		0.3				

a) Due to missing data, the product demand factor is not included for Japan, Hong Kong, China, and Taipei, China for those years left blank in the table. Since export destination data are not available for services, the market demand factor cannot be estimated. These data deficiencies may bias the estimates of the competitiveness factor. (cont.)

Appendix Table A.2 - cont.
Decomposing Export Growth into Demand and Competitiveness Factors
for Services Exports

(US\$ billions, percentages)

Country	Yr	Services Exports			Demand Factors			Competitive Factor					
		Value	Change\$	Change%	Total	World	Product	Total	IT/misc.	Finance	Transpt	Tourism	
Indonesia ^{b)}	80-85	0.8											
	85-90	2.5	1.6	24.1	1.0	0.9	0.1	0.7	-0.2	0.0	0.0	0.0	0.9
	90-95	5.5	3.0	17.1	1.5	1.5	0.0	1.5	-0.1	0.0	-0.1	0.0	1.7
	91	2.8	0.3	13.4	0.1	0.1	-0.1	0.3	-0.1	0.0	0.0	0.0	0.3
	92	3.4	0.6	20.2	0.4	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.2
	93	4.0	0.6	16.8	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.6
	94	4.8	0.8	21.2	0.4	0.3	0.0	0.5	-0.1	0.0	0.0	0.0	0.6
	95	5.5	0.7	14.0	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	96	6.6	1.1	20.7	0.4	0.4	0.0	0.7	0.2	0.0	0.0	0.0	0.6
Malaysia	80-85	1.9	0.8	11.2	0.0	0.1	0.0	0.8	0.3	0.0	0.3	0.2	
	85-90	3.9	1.9	14.8	2.0	2.0	-0.1	-0.1	-0.2	0.0	-0.1	0.3	
	90-95	11.6	7.7	24.6	2.7	2.6	0.0	5.1	3.1	0.0	0.7	1.3	
	91	4.4	0.5	13.4	0.2	0.2	0.0	0.3	0.1	0.0	0.1	0.1	
	92	5.0	0.6	14.0	0.5	0.5	0.0	0.2	0.1	0.0	0.1	0.0	
	93	6.4	1.4	28.5	0.1	0.1	0.0	1.4	1.2	0.0	0.0	0.1	
	94	9.3	2.9	45.4	0.6	0.5	0.1	2.3	1.2	0.0	0.1	1.0	
	95	11.6	2.3	24.5	1.3	1.3	0.0	1.0	0.5	0.0	0.4	0.1	
	96	14.5	2.9	25.1	0.7	0.8	0.0	2.2	1.7	0.0	0.3	0.2	
Philippines	80-85	2.2	0.8	9.1	0.1	0.1	0.0	0.7	0.5	0.0	0.0	0.1	
	85-90	3.2	1.0	7.7	2.3	2.4	-0.1	-1.3	-0.5	0.0	-0.1	-0.7	
	90-95	9.3	6.1	23.6	2.2	2.0	0.2	3.9	3.6	0.0	-0.1	0.3	
	91	3.7	0.4	12.6	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.1	
	92	4.7	1.1	29.8	0.4	0.4	-0.1	0.7	0.4	0.0	0.0	0.3	
	93	4.7	-0.1	-1.5	0.1	0.1	0.0	-0.2	-0.3	0.0	-0.1	0.2	
	94	6.8	2.1	44.8	0.5	0.4	0.1	1.6	2.0	0.0	0.0	-0.3	
	95	9.3	2.6	38.1	1.0	0.9	0.0	1.6	1.5	0.1	0.0	0.0	
	96	12.9	3.6	38.5	0.7	0.6	0.1	2.9	2.5	0.0	0.1	0.3	
Thailand	80-85	2.0	0.6	6.5	0.1	0.1	0.1	0.4	0.1	0.0	0.2	0.1	
	85-90	6.4	4.4	25.8	2.3	2.2	0.1	2.1	0.0	0.0	0.5	1.6	
	90-95	14.8	8.4	18.3	3.9	3.9	0.0	4.6	2.4	0.1	0.5	1.6	
	91	7.3	0.9	13.3	0.2	0.4	-0.2	0.6	0.4	0.0	0.1	0.2	
	92	9.3	2.0	27.7	0.9	0.8	0.0	1.1	1.3	0.0	-0.1	-0.1	
	93	11.1	1.8	19.1	0.1	0.1	0.0	1.7	0.7	0.0	0.4	0.5	
	94	11.6	0.6	5.3	1.0	0.9	0.1	-0.5	-0.1	0.0	-0.3	-0.1	
	95	14.8	3.2	27.5	1.6	1.6	0.0	1.6	0.0	0.0	0.4	1.2	
	96	17.0	2.2	14.6	1.0	1.0	0.0	1.2	0.6	0.0	0.1	0.5	
PRC ^{b)}	80-85	3.1											
	85-90	5.9	2.8	13.9	3.3	3.2	0.0	-0.5	0.1	-0.3	0.3	-0.5	
	90-95	19.1	13.3	26.7	4.6	4.5	0.0	8.7	2.5	1.3	-0.3	5.2	
	91	7.0	1.1	19.2	0.3	0.3	0.0	0.8	1.0	0.1	-0.9	0.6	
	92	9.2	2.3	32.5	0.8	0.8	0.0	1.5	0.7	0.0	-0.1	0.8	
	93	11.2	1.9	21.0	0.1	0.1	0.0	1.8	0.9	0.0	-0.2	1.1	
	94	16.6	5.4	48.5	1.0	1.0	0.0	4.4	0.0	1.3	0.9	2.2	
	95	19.1	2.5	15.1	2.3	2.3	0.0	0.2	0.0	-0.1	-0.1	0.4	
	96	20.6	1.5	7.7	1.3	1.2	0.1	0.1	1.6	-1.9	-0.4	0.8	

b) Service export data in 1980 was not available for Indonesia and PRC.

(cont.)

Appendix Table A.2 - cont.
Decomposing Export Growth into Demand and Competitiveness Factors
for Services Exports

(US\$ billions, percentages)

Country	Yr	Services Exports			Demand Factors			Competitive Factor				
		Value	Change\$	Change%	Total	World	Product	Total	IT/misc.	Finance	Transpt	Tourism
USA	80-85	73.1	25.5	9.0	2.3	2.1	0.2	23.2	7.2	0.7	6.8	8.5
	85-90	146.4	73.3	14.9	77.1	77.2	-0.1	-3.8	-3.8	-3.6	2.4	1.3
	90-95	217.8	71.4	8.3	74.2	73.0	1.2	-2.9	3.6	1.4	-7.3	-0.5
	91	162.5	16.1	11.0	8.8	8.6	0.2	7.3	2.5	0.8	-1.7	5.6
	92	175.0	12.5	7.7	18.4	19.0	-0.5	-5.9	0.8	-2.8	-2.9	-1.1
	93	184.3	9.3	5.3	2.3	1.9	0.5	7.0	2.1	1.5	0.0	3.3
	94	199.2	14.9	8.1	16.7	15.7	1.0	-1.8	2.6	2.1	-1.8	-4.7
	95	217.8	18.5	9.3	27.9	27.8	0.1	-9.4	-4.5	-0.3	-1.0	-3.7
	96	236.7	18.9	8.7	14.4	14.1	0.3	4.5	1.6	1.1	0.4	1.4
EU-12	80-85	166.0	-15.2	-1.7	8.2	8.0	0.1	-23.4	-10.8	-1.2	-4.4	-7.0
	85-90	361.4	195.4	16.8	172.4	175.3	-3.0	23.1	3.4	13.3	6.5	-0.2
	90-95	467.2	105.8	5.3	160.4	161.0	-0.6	-54.6	-39.3	-7.3	-7.0	-1.1
	91	371.4	10.0	2.8	22.3	21.3	1.0	-12.3	-11.3	0.2	-3.7	2.4
	92	421.3	50.0	13.5	45.0	43.4	1.6	4.9	-2.6	3.5	1.1	3.0
	93	398.7	-22.6	-5.4	3.8	4.6	-0.7	-26.4	-12.1	-1.9	-3.5	-8.9
	94	414.3	15.5	3.9	31.2	33.9	-2.7	-15.7	-8.0	-3.4	-2.5	-1.7
	95	467.2	52.9	12.8	58.0	57.8	0.2	-5.2	-5.2	-5.8	1.7	4.2
	96	486.3	19.2	4.1	30.2	30.2	0.0	-11.1	-2.3	-1.9	0.2	-7.1
Mexico	80-85	4.8	0.2	0.9	0.8	0.2	0.6	-0.6	0.2	-0.2	0.2	-0.8
	85-90	8.1	3.3	11.0	6.0	5.1	0.9	-2.7	-0.1	-1.1	-0.2	-1.3
	90-95	9.8	1.7	3.9	3.8	3.9	-0.1	-2.1	-0.4	0.1	-0.1	-1.7
	91	8.9	0.8	9.6	0.3	0.5	-0.2	0.5	0.0	0.2	-0.1	0.4
	92	9.3	0.4	4.6	1.3	1.0	0.2	-0.8	0.0	-0.2	0.0	-0.7
	93	9.5	0.2	2.6	0.1	0.1	0.0	0.2	0.1	0.1	0.0	0.0
	94	10.3	0.8	8.5	0.8	0.8	0.0	0.0	0.2	0.2	0.0	-0.4
	95	9.8	-0.5	-5.2	1.4	1.4	0.0	-2.0	-0.8	-0.1	0.0	-1.0
	96	10.9	1.1	11.5	0.7	0.6	0.1	0.4	-0.2	0.1	0.2	0.3
India	80-85	3.3	0.4	2.3	0.3	0.1	0.2	0.1	0.9	0.0	0.1	-0.9
	85-90	4.6	1.2	6.6	3.4	3.5	-0.1	-2.2	-1.7	0.0	0.0	-0.5
	90-95	7.4	2.8	10.1	2.2	2.2	0.0	0.6	-0.5	0.0	0.6	0.5
	91	5.0	0.5	10.3	0.3	0.3	0.0	0.2	-0.1	0.0	0.0	0.3
	92	4.7	-0.3	-6.1	0.6	0.6	0.0	-0.9	-0.8	0.0	-0.1	0.0
	93	5.3	0.5	11.6	0.1	0.1	0.0	0.5	0.2	0.0	0.3	0.0
	94	6.1	0.9	16.5	0.5	0.4	0.0	0.4	0.2	0.0	0.3	-0.1
	95	7.4	1.2	19.9	0.8	0.9	0.0	0.4	0.1	0.0	0.1	0.2
	96	7.6	0.2	3.3	0.5	0.5	0.0	-0.2	-0.2	0.0	0.0	0.0
World	80-85	409.5	17.4	0.9								
	85-90	842.1	432.6	15.5								
	90-95	1,244.9	402.7	8.1								
	91	891.7	49.6	5.9								
	92	995.9	104.2	11.7								
	93	1,006.7	10.8	1.1								
	94	1,092.3	85.7	8.5								
	95	1,244.9	152.5	14.0								
	96	1,325.4	80.5	6.5								

Data Sources: The World Bank WDI CD-ROM and CEIC Database.

Appendix Table A.3
Regression Analysis Explaining Changes in Export Competitiveness from 1990 through 1996

Independent Variable	Dependent Variable: Merchandise Exports Competitiveness				Dependent Variable: All Goods & Services Exports Competitiveness			
	(1) EA-9	(2) EA-9	(3) EA-10	(4) EA-10	(1) EA-9	(2) EA-9	(3) EA-10	(4) EA-10
Constant	-8.40 (19.43)	1.14 (19.15)	24.13 ** (7.60)	22.24 ** (8.14)	2.11 (18.10)	1.59 (20.14)	31.81 ** (7.79)	24.50 ** (8.76)
REER(-1)	0.12 (0.23)	-0.02 (0.23)	-0.19 * (0.09)	-0.21 * (0.08)	0.10 (0.23)	-0.01 (0.24)	-0.20 * (0.09)	-0.22 * (0.09)
Y/\$(-1)	0.01 (0.08)	0.03 (0.05)			0.00 (0.08)	0.03 (0.05)		
InFDI	1.45 ** (0.36)	0.86 ** (0.22)	1.27 ** (0.28)	0.92 ** (0.18)	1.39 ** (0.37)	0.66 ** (0.22)	1.20 ** (0.29)	0.74 ** (0.18)
OutFDI	-1.14 * (0.50)	-1.26 * (0.49)	-0.78 ** (0.24)	-0.92 ** (0.20)	-0.55 (0.52)	-0.76 (0.53)	-0.18 (0.26)	-0.37 (0.22)
DomINV	0.20 (0.15)		0.13 (0.18)		0.13 (0.15)		0.04 (0.18)	
Open	-0.07 * (0.03)		-0.03 (0.02)		-0.07 * (0.03)		-0.03 (0.02)	
Mfg	-0.04 (0.05)		-0.02 (0.05)		-0.02 (0.05)		0.00 (0.05)	
LP	-0.01 (0.07)		-0.04 (0.07)		-0.07 (0.07)		-0.09 (0.07)	
Number of observation	54	54	60	60	54	54	60	60
R-squared	0.54	0.50	0.53	0.51	0.36	0.28	0.38	0.34
F-stat	6.74 **	12.18 **	8.34 **	19.35 **	3.16 **	4.86 **	4.50 **	9.42 **

Export Competitiveness = Gains in Export Competition_(t) / Export_(t-1)

REER (-1) = Real Effective Exchange Rate with one-year lag (1990 = base year)

InFDI = Inward Foreign Direct Investment flows / GDP

DomInv = Domestic Fixed Investment / GDP

Mfg = Manufacturing value-added change relative to the World level (1990 = base year)

LP = Manufacturing labor productivity change relative to the US level (1990 = base year)

* Statistically significant at the 0.05 probability level.

** Statistically significant at the 0.01 probability level.

Standard Errors were computed according to White's Heteroskedasticity-Consistent Standard Errors & Covariance method. However, these values were only slightly different from those computed by the ordinary least squares method.

Data sources: ANU-IEDB, EAEP, IMF-IFS, WB-WDI, CEIC and Ohno (1999).

Y/\$ (-1) = Yen / US\$ exchange rate with one-year lag
OutFDI = Outward Foreign Direct Investment flows / GDP
Open = (Export + Import) / GDP (Merchandise trade)

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