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GROUNDING ASIA'S FLYING GEESE: THE COSTS OF DEPENDING HEAVILY ON JAPANESE CAPITAL AND TECHNOLOGY

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This essay addresses a generally overlooked source of East Asia's financial crisis—Japanese production networks. The author argues that developing countries in Asia relied heavily on Japanese capital and technology in the 1970s and 1980s, and therefore had little incentive to invest in technological innovations that would have allowed them to compete globally in more advanced sectors. In the latter half of the 1990s, Japanese corporations have responded to difficulties at home by reducing the pace of technology transfer and supplying their plants and joint ventures in Asia with Japanese (as opposed to local) inputs. The evidence suggests that U.S. pressure on Japan to absorb the exports of afflicted Asian economies is misguided. The rapid growth of these economies never depended on exports to Japan, and Tokyo has attempted, unsuccessfully, to prime the pump for six years. Japan's, and now Asia's, problems are supply-side in nature, arising from an inability to generate new technologies and the accompanying benefits.

Introduction

Neoclassical economists concede that they have been caught flat-footed by the economic crisis that has rolled across Asia in the past year.[1] And yet, when it comes to diagnoses and prescriptions, most have not revised their model much at all.[2] The Asian economic crisis, they say, is a temporary phenomenon caused by (1) immature financial

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[1] Unless otherwise noted, "Asia" means South Korea, Taiwan, Singapore, and Hong Kong (the four Asian "NIEs," or newly industrializing economies), Thailand, Malaysia, Indonesia, and the Philippines (the four core members of ASEAN, or the Association of Southeast Asian Nations), plus China.

[2] One exception is Joseph Stiglitz, chief economist for the World Bank, which in 1993 published *The East Asian Miracle*. Stiglitz has launched a follow-up study entitled, "Rethinking The East Asian Miracle," in which he hopes to take a closer look at the way institutions work (or do not work) to enhance economic efficiency in the region.

markets suddenly exposed to globalization and (2) improper macroeconomic policies that took too long to liberalize exchange rates.

The neoclassical view is correct in many ways. Unfortunately, though, it overlooks the fact that shortcomings in Asian financial markets are tied directly to structural weaknesses in the "real" political economies of affected nation-states, and that each national economy in Asia is part of an increasingly integrated regional economy knit together in large part by Japanese capital and technology. Exchange rate policies, dictated by this regional logic, worked marvelously—until recently. So what changed?

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In this paper, I argue that the economic crisis in Asia has been caused by a breakdown in the "flying geese" pattern of regional development that had benefited economies following the lead goose (Japan). Furthermore, I maintain that the crisis is not likely to abate as long as the region's political economies rely so heavily on Japanese capital and technology.

From Soaring to Hobbled Birds

Asia's current economic malaise is rooted in its past success. In the early-1980s, the region's Newly Industrializing Economies (NIEs)—South Korea, Taiwan, Hong Kong, and Singapore—used high rates of saving and capital formation to build rapidly growing economies. In the late-1980s, three of the core members of the Association of Southeast Asian Nations (ASEAN)—Thailand, Malaysia, and Indonesia—began using the same recipe of heavy savings and investment to fuel their take-off. During that decade, gross domestic investment averaged 30 to 32 percent of GNP in South Korea, Thailand, Malaysia, and Indonesia (see Appendix table 1). This, by itself, is not so unusual. A poor economy must, by definition, rely heavily on investment in the early stages of development. But once it has industrialized or "matured," that economy will inevitably experience diminishing returns. That is, output can be increased by giving a machine to a worker to use. Output may even increase by giving that worker two machines. At some point, however, an additional machine just begins to get in the way. In the real world of fixed resources, the marginal product of adding new capital will eventually decline. (The same, of course, is true for labor: adding additional workers only pays off to a limited point.)[3]

[3] Applied to a macroeconomy, the "law" of diminishing marginal returns is best captured, technically, in the labor-augmenting growth model developed by Nobel Prize-winning economist Robert Solow. Paul Krugman used this model in his controversial article, "The Myth of East Asia's Miracle," *Foreign Affairs*, November/December 1994. The analysis presented here begins with the same logic, but goes further to incorporate the political economy of technology and capital flows in Asia, a regional dimension that Krugman did not consider in his work.

Yet the "law of diminishing returns" did not appear to hold—until quite recently. In fact, as the industrializing economies of East Asia began to "mature," their gross rates of investment actually climbed higher—to as much as 45 percent of GNP in Malaysia, 44 percent in Thailand, 38 percent in Indonesia, and 37 percent in South Korea (see Appendix table 1). This was possible for two related reasons: (1) industrializing Asia was able to find export markets, primarily the United States, where it could sell the investment-fueled output that vastly exceeded the absorption capacity of domestic consumers and (2) exporting firms in each industrializing country managed, by and large, to remain globally competitive, primarily by importing foreign capital and technology.

In the end, the law of diminishing returns did indeed catch up with much of developing Asia. The first hint came at the end of 1995, when some nations in the region began to run up extraordinarily large deficits in their current account (CA) balances.[4] Thailand's CA deficit reached 8 percent of GDP, and remained at that high level in 1996 (see Appendix table 2). Malaysia's reached an even higher level of 10 percent in 1995, but dropped to almost 5 percent in 1996 as domestic demand, and thus import growth, slowed. (Its deficit apparently rose sharply again in 1997.) Beginning in 1993, Indonesia's and South Korea's deficits increased steadily, reaching 3.4 percent and 4.7 percent of GDP in 1996, respectively.

Behind these figures was a dramatic slowdown in the growth of exports from each Asian country (see Appendix table 3). What happened? As they expanded, these economies failed to make the investments in human capital and technological know-how that would allow them to increase productivity and maintain their global competitiveness. In a nutshell, they came to depend too heavily on foreign capital and technology, particularly Japanese capital and technology.

Between 1992 and 1995, Japanese multinational corporations (MNCs), chased by a rising yen at home, pumped more than $35 billion in foreign direct investment (FDI) into Asia.[5] This was far more money than came from any other country, and yet it grossly underestimates Japan's contribution because it does not include reinvestments. Among manufacturers, who enjoyed higher profits in Asia than they could earn at home, reinvestments far outpaced new investments during this period.[6] Japanese banks also played a leading role as a supplier of capital to the region. Loans to Thailand and South Korea doubled between 1993 and 1996. Japanese banks now hold 37 percent of Asia's private external liabilities.[7] Finally, the Japanese government is easily the number one supplier of concessionary loans to the region through its foreign aid program. In 1995

[4] Current account (CA) = merchandise trade + services trade (including investment income or repatriated profits) + international transfers.

[5] JETRO, *1997 Jetro hakusho, Toushi hen* (1997 Jetro White Paper on Foreign Direct Investment), p. 25.

[6] In fact, reinvestments were as much as 65 percent of total investments. *Ibid.*, p. 32.

[7] Toyoo Gyohten, "Currency crises not so mysterious," *Daily Yomiuri*, January 30, 1998.

alone, it provided about $9 billion in yen loans to Asia.[8]

Japan's technology exports to Asia, which climbed from 166 billion yen ($1.3 billion) in 1992 to 280 billion yen (nearly $3 billion) in 1995, were just as critical to Asia's success.[9] With the exception of the Philippines and China, countries in the region have tended to obtain more of their technology licenses from Japan than from any other source (see Appendix table 4). In addition, all of them rely heavily on the technology embodied in machinery and equipment imported from Japan to run their manufacturing industries.

Of course, Japan has been the dominant, but hardly the exclusive, source of capital and technology to Asia. U.S. and European electronics producers have licensed sophisticated technology to Taiwanese and South Korean manufacturers, while MNCs from North America, Europe, and the NIEs have built hundreds of their own factories in the region. In addition, Western portfolio investors have pumped huge amounts into the region's stock and bond markets, which Japanese investors have generally avoided. But these capital and technology exports represent a second generation that sought to tap into an economic dynamism that already had been triggered in large part by Japan's early and ongoing commitment to the region.

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Combined, these massive infusions of capital and technology dramatically altered the structure of incentives in Asia, making it possible for local capitalists to profit without making their own investments in human capital and technological innovation. Flush with cash, Asian capitalists began to invest more aggressively in speculative ventures, such as hotels, skyscrapers, and other forms of property development. They ignored the humdrum chore of building wealth incrementally. In other words, they did not use productive assets to create productive assets. Why bother? Why worry? Capital and technology continued to pour in. In the meantime, a speculative bubble (not unlike the one that engulfed the Japanese economy a decade earlier) began to grow. The Asian Development Bank got it right in 1996 when it wrote that

> …in the early stages of industrialization, it may be perfectly sensible to rely on imported technology rather than innovation. However, as economies catch up, then an indigenous capacity to innovate becomes more important. The critical issue facing a number of Asian economies is whether they can create the capacity for technical innovation as it

[8] Ministry of Foreign Affairs (MOFA), *Japan's Official Development Assistance: Annual Report 1996*, Tokyo: Association for the Promotion of International Cooperation, February 1997. "Asia" here includes India, Pakistan, and other countries of South and Southwest Asia.

[9] Management and Coordination Agency, *Heisei kyuunen, Kagaku gijutsu kenkyuu chousa houkoku* (Report on the Survey of Research and Development), 1997.

becomes necessary. This is an issue brought into focus by the performance of exports in 1996 and the longer-term picture of changing comparative advantage.

The Case of Thailand

It is not surprising that the contagion spreading through much of Asia got its start in Thailand, the Asian economy most dependent on Japanese capital and technology. After several years of double-digit growth, the bottom suddenly fell out of Thai exports in 1996.[10] Labor-intensive industries, such as shoes and garments, saw the biggest drop: they suddenly found themselves competing head to head against Chinese industries, which enjoyed not only a lower cost structure (due to cheap labor) but also benefited from a devaluation of the yuan in 1994. But some higher-value-added industries also suffered. For example, exports of video and audio equipment, produced largely by Japanese MNCs in Thailand, dropped 24.3 percent between 1995 and 1996. Experts anticipated far worse in 1997.

Thailand's National Electronics and Computer Technology Centre (Nectec) estimated that electronics exports, which had grown by more than 20 percent a year during the 1990s, would increase by less than 10 percent in 1997 and, by 2000, would begin to decline.[11] Nectec blamed this not on slumping demand for semiconductors and other computer-related products, but on eroding productivity (and thus competitiveness) in the domestic industry. In a survey, Thai electronics firms—90 percent of which are foreign-owned—reported sharply increased costs for labor, raw materials, parts, and financing. The massive devaluation of the baht is not expected to help because the industry continues to import so many of its core components.

Not so long ago, Thai business and government elites had high hopes for the country's electronics industry. SubMicron Technology, a domestically owned chipmaker, symbolized those hopes. It proposed to build the first silicon wafer fabrication plant in Thailand, ushering in a new era of higher-value-added production in the electronics industry. But last year, the company went bankrupt under the weight of creditor lawsuits and a criminal investigation of alleged fraud by top executives.[12] It seems that quick and easy returns, not the painfully slow process of innovation, were the company's top priority.

Those who have worked to promote Thailand's technological development are increasingly frustrated. At a 1997 seminar, Cheovet Yimsirikul, vice president of the Technology Promotion Association (Thailand-Japan), declared that his country faced a long-term crisis because technology is something that "we have not yet got into our

[10] There is good evidence, however, that export growth actually began to decline a year earlier. The Bangkok Post reported in early 1996 that the government had fudged its 1995 export figures by as much as $4 billion.

[11] Pichaya Changsorn, "Dire warning given to electronics sector," in *The Nation* (Bangkok), September 6, 1997, p. B1.

[12] *The Nation* (Bangkok), September 12, 1997.

blood."[13] The government, he said, has not focused enough attention on upgrading Thailand's capacity to adopt and eventually master technology from other countries, particularly Japan.

This is evident from a look at Table 5, which shows that most Southeast Asian nations, but particularly Thailand, have exceptionally low enrollment in junior and senior high schools—a fact that flies in the face of conventional wisdom in the West that Asian economies in general have expanded on the strength of highly educated, academically driven populations. Only 37 percent of 12 to 18 year olds in Thailand attend secondary schools. On some measures of technological development, the country has actually lost ground. For example, R&D expenditures increased from 0.1 percent to 0.2 percent of GDP in the 1980s, but dropped again to 0.1 percent in the early-1990s.[14] Additionally, the shortage of skilled technicians (college graduates with technical degrees), which was already serious in 1997 (when Thailand had a supply-demand gap of 3,360 workers), is expected to increase 3.5 times by 2001.[15]

Because of the heavy, steady inflow of foreign capital and technology, the Thai government has felt no pressing need to support domestic entrepreneurship and innovation. In particular, Thailand has depended deeply on Japan. In the 1990s, 57 percent of its inward foreign direct investment in manufacturing and 53 percent of its technology licenses came from Japan.[16] The Japanese government provided 64 percent of Thailand's overseas development assistance, while Japanese banks accounted for 53 percent of its total external private debt.[17] In 1995, Japanese firms in Thailand accounted for 22 percent of Thailand's total exports, while employing 7 percent of its production workers.[18]

The Case of South Korea

At first glance, the political economy of South Korea is quite unlike that of Thailand, making it an unlikely candidate to fall prey to the same contagion. South Korea has done far better, after all, at educating its youth and channeling resources into research and development. On the other hand, as the recent outbreak of corruption scandals indicates, it has not been immune from rent-seeking, the socially unproductive

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[13] Watcharapong Thongrung, "Technology a 'new crisis' for Thailand," *The Nation* (Bangkok), September 12, 1997.

[14] Kitamura Kayoko, "Gaikoku gijutsu izon kara jishu gijutsu kiban no seibi e" (From dependence on foreign technology to the construction of an independent technological foundation), *Ajiken Waarudo Torendo*, no. 23 (May 1997), p. 19.

[15] Ministry of Science, Technology, and Environment (Thailand), *Science and Technology Development Plan by Field*, July 1996.

[16] Board of Investment (Thailand), September 1997.

[17] MOFA, *Japan's Official Development Assistance*, *op. cit*., and Bank of International Settlements.

[18] Japanese Chamber of Commerce and Industry (Bangkok), *Dai-san-kai, Nikkei kigyou no koukendo: Chousa Houkokusho* (The Contribution of Japanese Firms in Thailand: Report on the Third Survey), April 1997.

quest for excess profits due to government protection. Additionally, the competitiveness of Korean firms, like their Thai counterparts, has fallen sharply as productivity failed to keep up with rapidly rising wages. In the all-important manufacturing industry, the average monthly wage nearly doubled between 1990 and 1995. "During the boom, Korean companies failed to strengthen their international competitiveness," according to Chang Seung Woo, deputy minister of finance. "Now our big companies are realizing that they can't survive without re-engineering."[19]

Because Korean exports, particularly of machinery, compete head-to-head with many Japanese exports, the ups and downs of the Korean economy are dictated in large part by the value of the yen. In April 1995, when the won was cheapest relative to the yen, Korean products enjoyed a 20.4 percent price advantage over equivalent products from Japan. Machinery exports, therefore, jumped 39.5 percent between 1994 and 1995. Fifteen months later, however, this price advantage had all but disappeared under the influence of "enyasu" (yen depreciation), and the growth in machinery exports between 1995 and 1996 likewise disappeared, falling dramatically to only 3 percent.[20]

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In addition, while South Korea relies far less than Thailand on Japanese capital, it relies just as much on Japanese technology. Of total South Korean technology imports in the machinery sector between 1962 and 1995, 58.6 percent came from Japan.[21] And this figure does not include imports of Japanese capital goods and intermediate products, which have powered Korea's export-oriented economy and caused its trade deficit with Japan to double from $7.86 billion to $15.51 billion in 1995.[22] That bilateral deficit remained at nearly the same level in 1996, even as the South Korean economy weakened. The trade deficit with Japan accounts for fully three-fourths of South Korea's total trade deficit (and thus a significant share of its overall current account deficit).

Table 6 shows just how much Japan dominates South Korea's import structure. In some industrial classifications, such as motor vehicle parts and machine tool parts, Korean manufacturers rely on Japanese suppliers for more than 60 percent of their imported components—despite continued pressure from the government to diversify sourcing. In Korea's machine tool industry, the value added by imports is higher than the

[19] Quoted by Adi Ignatius, "Future Shock," *Far Eastern Economic Review*, October 31, 1996, p. 56.

[20] Data on price competitiveness come from a survey conducted by the Federation of Korean Industries and reported in Kayoko Kitamura and Tsuneo Tanaka, eds., *Examining Asia's Tigers: Nine Economies Challenging Common Structural Problems*, Tokyo: Institute of Developing Economies, July 1997, p.1. Data on machinery exports come from Asian Development Bank, *Key Indicators of Developing Asian and Pacific Countries*, vol. 28, Manila: Oxford University Press, 1997.

[21] Korea Industrial Technology Association (KITA), "Major Indicators of Industrial Technology," 1996, pp. 180-181.

[22] International Monetary Fund, *Direction of Trade Statistics Yearbook 1997*, p. 279.

value added in production (53 versus 47 percent).[23] By relying so heavily on imported Japanese parts, the Korean *chaebol* have slowed the development of strong, indigenous supporting industries.

Flying Geese

Until recently, the industrializing nations of Asia have been able to mask deficiencies in their political economies by relying on foreign resources. In fact, from 1986 to 1992, several developing economies in the region actually reported modest to robust gains in total factor productivity (TFP, an aggregate index of labor and capital productivity), which for most of them had been insignificant or negative in previous periods.[24] TFP growth in Thailand, for example, averaged 4 percent a year during this period—up from 0.3 percent between 1980 and 1986 period. In Malaysia, annual TFP growth was 2.8 percent—up from -1.9 percent.

These productivity gains coincided with a massive influx of foreign capital and technology. Japan, as noted earlier, served as the primary supplier of capital and technology, first, to the NIEs and later—along with the NIEs themselves—to the members of ASEAN. More recently, it has joined the NIEs, particularly Hong Kong, and the overseas Chinese capitalists in ASEAN as an important supplier of capital and technology to China. Japan was able to play this role because its high-tech manufacturing firms, particularly those in machinery industries, had managed in earlier years to adopt successively more sophisticated technology, allowing them to upgrade industrial production at home and to shed "old" technology via foreign direct investment in developing Asia. In other words, Japan functioned as the "lead goose" in a V-shaped "flying geese" pattern of regional development.

The flying geese model attempts to introduce dynamism into traditional, otherwise static, trade theory. It suggests that trade and investment flows can integrate economies and create a virtuous cycle of development based on evolving comparative advantage. For example, an economy in a region marked by such integration will import raw materials from less developed neighbors and capital goods from more developed neighbors, causing its stock of capital to expand more rapidly than its supply of labor: in other words, shifting its relative factor endowments. This economy is thus induced to move gradually out of labor-intensive manufacturing and into more capital-intensive production. As this process continues, and capital goods continue to be imported, the economy will move further up the value-added chain. Drawn on a chart, the process takes a "V" shape, like flying geese.

The flying geese model is not well-known in the West, even though it is based loosely on Raymond Vernon's product cycle theory that examines the process of

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[23] Kayoko Kitamura and Tsuneo Tanaka, eds., *Examining Asia's Tigers, op. cit.,* p. 3.

[24] Barry Bosworth, Susan M. Collins, and Yu-chin Chen, "Accounting for Differences in Economic Growth," Brookings Institution, discussion papers in international economics, #115, December 11, 1995.

technological maturation through which a single product evolves.[25] The model is based much more tightly on Akamatsu Kaname's analysis of the inexorable development, via imports and then exports, of a single industry—textiles.[26] In Japan, however, the model is cited routinely not only by economists, but also by business and government elites. In 1970, Yoshihisa Ojima, then a top official in the Ministry of International Trade and Industry, invoked its logic when he told a conference that the development process in Asia was one of "progressively giving away industries to other countries, much as a big brother gives his out-grown clothes to his younger brother. In this way, a country's own industries become more sophisticated." By the 1990s, what had been a simple but powerful tool of analysis had become a rather blunt tool of Japanese foreign economic policy. Thus, former Prime Minister Toshiki Kaifu told a Southeast Asian audience that:

> Japan will...continue to seek to expand imports from the countries of the region and promote greater investment in and technology transfer to these countries, in line with the maturity of their trade structure and their stages of development. And as the necessary complement to this effort, I hope that the host countries will make an even greater effort to create a climate receptive to Japanese investment and technology transfer.[27]

In the hands of Japanese elites, then, the flying geese model became an ideology justifying Japan's ongoing role as the economic hegemon of Asia—even though economists using this dynamic model clearly forecast that the "following geese" would catch up with and someday overtake the leader, only to be overtaken themselves by other followers.[28] Despite its misuse, the model has been a valuable analytic.

A Break in the Cycle

The virtuous cycle of development contemplated in the flying geese model began to break down in the mid-1990s. Two events signaled the end. First, in 1994 China devalued its currency, making its labor-intensive exports highly competitive relative to those from the ASEAN-4. In response, many Japanese manufacturers shifted export-oriented FDI from Southeast Asia to coastal China. Second, the yen lost 18 percent of its value against the dollar between 1995 and 1996; a sharp depreciation that, for Japanese manufacturers, removed much of the competitive advantage of exporting from Asia. They responded by cutting the flow of Japanese capital and technology to export-oriented

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[25] Raymond Vernon, "International Investment and International Trade in the Product Cycle," *Quarterly Journal of Economics*, vol. 80 (May 1966).

[26] Kaname Akamatsu, "A Historical Pattern of Economic Growth in Developing Countries," *Developing Economies*, vol. 1 (1962).

[27] Toshiki Kaifu, "Japan and ASEAN: Seeking a Mature Partnership for the New Age," in *ASEAN Economic Bulletin*, vol. 8 (1991).

[28] Kojima, for example, anticipated such a succession process. See Kiyoshi Kojima, *Direct Foreign Investment: A Japanese Model of Multinational Business Operations*, London: Croom Helm, 1978, p. 168.

sectors in the region. For example, new Japanese FDI in Asia's electrical/electronics industry dropped 16 percent in 1996.[29]

Japan has become unable to play the role of benevolent "lead goose" because it has run into limits on its own ability to innovate and achieve productivity gains.

One must note, however, that the yen's depreciation is really an intervening variable that reflects a more fundamental problem: Asia's "lead goose" is desperately ill. Indeed, it was the Japanese government's phenomenally low-interest rate policy, designed to stimulate a domestic economy that has stagnated since its own speculative bubble popped in the early-1990s, that depressed the value of the yen in the mid-1990s. Japan has become unable to play the role of benevolent "lead goose" because it has run into limits on its own ability to innovate and achieve productivity gains.

In retrospect, we should have seen this coming. Japan's growth rate slowed dramatically in the 1970s, along with that of other industrial countries. It was able to keep chugging along only with the aid of massive capital infusions. But these investments, unlike those made during the rapid growth era of the 1950s and 1960s, were increasingly inefficient. One study shows that Japan, after earning a real aggregate rate of return of 28 percent on gross non-residential fixed capital stock in 1960, was earning 18 percent in 1970, 8 percent in 1980, and 4 percent in 1990 (the U.S. rate, by contrast, went from 14 percent—half of Japan's—in 1960, to 12 percent in 1970, 9 percent in 1980, and 6 percent in 1990).[30] Put simply, innovation failed to keep up with capital formation.

Heavy but increasingly unproductive investment did, however, cover up this structural flaw in the Japanese economy. It also led to the bubble of the late-1980s. But when the bubble burst in 1990, evidence of Japan's technological weakness began to leak out. An Oxford study shows that Japanese TFP in manufacturing was growing, on an annual basis, much faster than U.S. TFP in the 1960s; by the 1980s, however, it was growing much more slowly.[31] In the early-1990s, Japanese TFP actually declined by nearly 4 percent, according to MITI.[32] Even the much-vaunted machinery sector experienced an annual 2 percent drop in TFP.

Regional Production Networks and Technology Transfer

[29] Ministry of Finance, *Heisei hachi-nen-do ni okeru taigai oyobi tainai chokusetsu toushi joukyou* (The state of outward and inward direct investment in 1996), June 1997.

[30] Richard Katz, *The System that Soured: The Rise and Fall of the Japanese Model*, New York: Diamond Publishing, forthcoming.

[31] Gavin Cameron, "Catch-up and Leapfrog between the USA and Japan," a paper written for the Foundation for Advanced Information and Research, Tokyo, May 1997, p. 17.

[32] MITI, *Tsuushou hakusho, Heisei kyuu-nen* (1997 white paper on international trade), Tokyo: Tsuushou sangyou chousakai, 1997, p. 254.

It was this crisis at home, emerging first as high domestic production costs in the late-1980s, that drove Japanese business and government elites to try to organize Asian production networks in the first place. They sought to regionalize the cooperative networking practices that had worked so well in Japan when it was still a developing economy, but that seemed to create more costs than benefits once Japan became a fully developed economy. Professor Kozo Yamamura and I have argued that Asia would benefit handsomely in the short run from Japanese capital and technology exports, but might very well suffer in the long run as "embraced development" gave way to "captive development."[33] This would occur when Japanese innovation slowed so much at home that its multinationals began to squeeze their junior partners in Asia by capturing for themselves a larger share of the economies of networking. In concrete terms, we anticipated a reduced pace of technology transfer, at least to non-Japanese partners in Asian production networks, and less generous terms for joint venture partners and non-Japanese suppliers.

Both statistical and anecdotal data suggest that the benevolent "lead goose" has become a stingier bird, and that "embraced development" may indeed have begun to yield to "captive development." Table 7, for example, shows that Japanese technology licenses to Asia have been captured increasingly by affiliates of the Japanese parent rather than by independent local firms. In other words, intra-firm technology transfer began to account for more than half of the total technology exports from Japan to Asia. This trend was particularly pronounced in the case of China, where intra-firm deals accounted for only 21.4 percent of the total in 1992 but 71.9 percent in 1995.

Preliminary survey data that I have compiled also indicate that Japanese MNCs in Asia are increasingly subcontracting to Japanese transplants in the region for "local" parts and relying more heavily on Japanese management, often dispatched from the home office in Japan, to run their operations. For the host country, then, these two avenues of technology transfer—subcontracting and management—appear to be more restricted.

Interviews with local businesspeople in Asia indicate that friendly relations with Japanese multinationals have, in some cases, become irreparably strained. They note that Japanese joint venture partners are trying to consolidate their control over local operations, either by buying out local partners or by bringing in more of their own personnel from Japan.[34] They say Japanese assemblers are less willing to forge agreements with purely local suppliers, choosing instead to buy from Japanese suppliers that have built plants to produce parts in the host country. Consider these cases:

- A Japanese-Thai joint venture produces engine and steering parts. The Thai partner says that, after five years of smooth sailing, new Japanese management came on the

[33] Walter Hatch and Kozo Yamamura, *Asia in Japan's Embrace: Building a Regional Production Alliance*, Cambridge, U.K: Cambridge University Press, 1996.

[34] Local partners are often delighted to be bought out, especially in these hard economic times. For example, the local partner of Mitsubishi Sittipol Corp. in Thailand was not at all unhappy when Mitsubishi Motors agreed to increase its equity share from 48 percent to 98 percent in 1997.

scene and demanded changes to the basic business agreement—higher shipping fees, higher technology fees, higher financing fees. "Basically, they wanted to be able to transfer more profit back home."[35]

- A Japanese-Thai joint venture has produced computer disk drive parts for nine years. Over the past three years, according to the Thai partner, the Japanese partner has become increasingly unreasonable, dispatching a larger and larger number of young Japanese managers and technicians. "Anytime anything went wrong, they blamed our Thai staff—even if it was a project they had assumed complete control of."[36]
- An Indonesian car parts supplier had sold flywheels to a Japanese automaker in Indonesia for several years—until early 1996, when the automaker's Japanese supplier set up shop in Indonesia. "Once the Japanese firm moved in, they dropped us right away," complained an executive for the Indonesian firm. "They cooked up some story about quality and delivery problems. But when I examined the records, I found only one problem that had been reported early on, corrected immediately, and never again repeated."[37]
- An Indonesian metalworking firm has found it increasingly difficult to win contracts from Japanese MNCs. "In general, the ones that have been here longer are the ones that are more likely to use our services. But even some of those well-established companies have gotten new management from Japan and they are beginning to tell us, point blank, that they will deal only with the Japanese from now on."[38]

Many Asian firms, then, are learning the hard way just how costly their reliance on Japanese technology can be. After failing to develop their own indigenous technological skills in the first half of the 1990s, they are struggling to survive in the second half of the decade, when their number one supplier—Japan—suddenly has less technology to provide, and will provide what it *does* have only on more restrictive terms.

There are, of course, other technology suppliers in the world, and they are being approached by aggressive local firms. To the extent that host regimes can create opportunities for non-Japanese firms to do business in the region's highly oligopolistic markets, rival technology suppliers may help Asian economies break out of this syndrome of "captive development." Indeed, the Thai, Indonesian, and Malaysian governments have all tried to cultivate ties with non-Japanese automakers to reduce their dependence on Japanese MNCs, which produce as much as 90 percent of the vehicles in those three countries.

Indeed, the Thai, Indonesian, and Malaysian governments have all tried to cultivate ties with non-Japanese automakers to reduce their dependence on Japanese MNCs, which produce as much as 90 percent of the vehicles in those three countries.

[35] Interview, Bangkok, Thailand, September 5, 1997.
[36] Interview, Chonburi, Thailand, September 9, 1997.
[37] Interview, Jakarta, Indonesia, September 20, 1997.
[38] Interview, Jakarta, Indonesia, September 22, 1997.

It should also be acknowledged that not all Asian manufacturers are unhappy with the status quo. In fact, during interviews, several saluted their Japanese joint venture partners and parts contractors. Unlike their disgruntled colleagues, these local manufacturers generally seemed to have lower expectations about what they might gain, particularly in terms of technology, by doing business with a Japanese partner or customer.

One Thai autoparts producer, who has forged a highly successful joint venture with a Japanese MNC and thereby gained access to Japanese-dominated supply clubs in Thailand, told me that he and his local counterparts lack technological know-how, and should learn to accept this reality with humility. "Our mentality should be, 'Let them take the lead.' I take the lead on finance and personnel, but when it comes to technology, I let them take the lead. If they want to buy a machine, that's fine. I just ask them to make sure it gets used once in a while."[39]

Conclusion

This analysis does not pretend to be the whole story of Asia's ongoing economic crisis—just a fundamentally important part that has been almost completely overlooked by others, particularly Western observers. To be sure, some have begun to talk about a Japanese role in the crisis. The Clinton Administration, for example, has harshly criticized Japan for not doing more to stimulate its own economy and thereby serve as Asia's locomotive, pulling the region out of the doldrums by absorbing more and more of its exports.

This complaint, however, misses the mark in two respects. First, it ignores the fact that, even during its boomtime, Asia relied very little on exports to Japan. Between 1980 and 1994, when the region achieved its "miracle," exports to Japan—as a share of its total exports—actually fell from 19.8 percent to 12.6 percent.[40] Second, it ignores the fact that Tokyo has been priming the pump for the past six years and, with the exception of skyrocketing public sector liabilities, has little to show for its Keynesian effort. This is because Japan is suffering not from a temporary downturn in the business cycle but from a structural constraint on its ability to pioneer new technologies and develop new industries.

Japan has indeed played an important role in the current Asian crisis, just as it did in the previous Asian "miracle." But the impact of its actions (and now also its inactions) has been felt primarily on the supply side, not the demand side.

Consider the link between Japan's bubble economy in the mid- and late-1980s and Asia's bubble economy in the early- and mid-1990s. The former, a result of excessively easy access to domestic capital (via the Ministry of Finance's low interest

[39] Interview, Ayutthaya, Thailand, September 9, 1997.

[40] International Monetary Fund, *Direction of Trade Statistics*.

rate policy in the mid-1980s), helped produce the latter, which resulted from excessively easy access to foreign capital and technology. In this way, the current Asian crisis is vaguely reminiscent of the early-1980s Latin American debt crisis. Neither Asia nor Latin America were blameless, of course; both invested capital unwisely. But the moral hazard was created in the first place by overzealous capital (and, in the current case, technology) exporters. In the early-1980s, these were international banks who saw Latin America as a convenient place to park excess "petrodollars." In the mid-1990s, these were—first—Japanese MNCs who saw Asia as a low-cost alternative to their high-cost home base, and then Western portfolio investors who saw Asia, stoked with Japanese machinery, as an unbeatably strong profit haven.

Asia, of course, benefited enormously from Japan's neighborly (even big brotherly) attention in the 1970s and 1980s. As the flying geese model of economic development suggests, "following" economies can upgrade their industrial structures and thus develop quickly by adopting used technology passed on by a "leading" economy. A virtuous cycle of development then occurs. The problem arises when the leading economy stumbles and is unable to rapidly generate new innovations and new industries. Several Japanese economists, quite familiar with the implications of the flying geese model, have figured out what this means (even if most of their Western colleagues have not yet): Japan has bumped into a technological wall, and the virtuous cycle of development has broken down.[41] Unfortunately, much of developing Asia has yet to develop a sufficient stockpile of indigenous technical skills to pick up the slack on its own. Time will tell whether this crisis serves as a necessary wake-up call.

[41] See Musha Ryouji, "Maboroshi datta gankou keitai gata: Ajia hatten" (Asian development: The flying geese pattern that has proved to be illusory), *Ronsou* (Toyo Keizai Shinposha), November 11, 1997; and Kurosawa Seiichi, "Higashi ajia tsuuka, kinyuu kiki hassei no gen'in to eikyou: Gankou keitai gata hatten to kokusai shikin furou ni ihen" (The cause and effect of the East Asian currency and financial crisis: The curious connection between the flying geese pattern of development and international capital flows), *Seikai Keizai Hyouron*, December 1997.

APPENDIX

Table 1. Gross Domestic Investment in Asia
(percent of GNP)

	1981-90	1991	1992	1993	1994	1995	1996
Hong Kong	27.2	27.2	28.5	27.6	31.9	34.5	32.0
South Korea	31.4	39.2	36.8	35.3	36.3	37.4	36.5
Singapore	41.8	34.2	35.3	38.0	32.3	33.0	34.8
Taiwan	22.5	22.8	24.5	24.9	23.6	23.4	21.2
Indonesia	30.4	33.5	33.9	34.5	33.7	34.8	37.7
Thailand	31.1	43.4	40.8	41.3	42.0	44.2	43.8
Malaysia	32.4	39.3	37.1	39.8	42.5	45.4	45.1
Philippines	22.4	19.9	20.8	23.6	23.5	21.6	23.9
China	33.3	34.7	36.2	43.4	40.0	41.2	39.6

Source: Asian Development Bank, *Asian Development Outlook 1997 and 1998.*
Note: 1981-90 figures are the annual average during that period.

Table 2. Current Account Balances as Ratio of GDP

	1980	1991	1992	1993	1994	1995	1996
Hong Kong	8.9	7.1	5.7	7.4	1.6	-3.1	-0.6
South Korea	-0.9	-3.0	-1.5	0.1	-1.2	-2.0	-4.7
Singapore	8.3	11.2	11.3	7.5	17.1	16.9	15.0
Taiwan	6.8	6.9	4.0	3.2	2.7	2.1	4.0
Indonesia	-3.1	-3.8	-2.4	-1.5	-1.7	-3.3	-3.4
Thailand	-8.7	-7.7	-5.6	-5.1	-5.6	-8.0	-8.0
Malaysia	-2.2	-8.8	-3.8	-4.8	-7.8	-10.0	-4.9
Philippines	-6.1	-2.3	-1.9	-5.5	-4.6	-4.4	-4.7
China	3.1	3.1	1.1	-2.1	1.2	0.0	0.6

Source: Institute of Developing Economies (Ajia Keizai Kenkyuujou), *1998 Economic Outlook for East Asia.*
Note: Figures for Hong Kong represent balance of payments on goods and services only.

Table 3. Growth Rate of Merchandise Exports
(percent per year)

	1991	1992	1993	1994	1995	1996
Hong Kong	20.0	21.2	13.2	11.9	14.8	4.0
South Korea	10.2	8.0	7.7	15.7	31.5	4.1
Singapore	12.1	8.5	17.0	25.8	21.5	6.7
Taiwan	13.0	6.9	4.5	9.4	20.0	8.2
Indonesia	10.5	14.0	8.3	9.9	13.1	8.8
Thailand	23.8	13.7	13.4	22.2	24.7	0.1
Malaysia	17.0	18.1	16.1	23.1	25.9	4.0
Philippines	8.0	11.1	15.8	18.5	29.4	17.5
China	14.4	18.1	8.8	35.6	24.9	1.5

Source: Asian Development Bank, *Asian Development Outlook 1997 and 1998*.

Table 4. Sources of Imported Technology
(percentage of total license fees paid by Korea and Thailand)

Supplier	Korea	Thailand
Japan	47.9	53.0
USA	28.2	19.8
United Kingdom	3.8	5.0
Germany	5.7	2.7

Source: Korea Industrial Technology Association, Thai Board of Investment.
Note: Data for Korea are 1962-1995; data for Thailand are 1983-1994.

Table 5. Gross Enrollment Ratios

(percentage of school-age population in secondary schools)

	Percentage	Year of Data
Hong Kong	*	*
South Korea	92	1994
Singapore	68	1991
Taiwan	96	1994
Indonesia	43	1992
Thailand	37	1992
Malaysia	59	1993
Philippines	79	1993
China	55	1993

Source: UN, *Economic and Social Survey of Asia and the Pacific* (1997).
Note: Hong Kong data not available in original source.

Table 6. Korea's Dependence on Japanese Machinery and Parts

(Imports from Japan in 1994)

SITC	Product Name	Volume (million US$)	Japan's Share
724	Textile, leather machines	$749	60.0
728	Other machinery and parts for special industries	$1,630	50.1
735	Machine tool parts	$103	60.4
749	Non-electrical machinery parts	$118	55.6
751	Office machines	$133	66.8
778	Electrical machine accessories	$666	52.6
784	Motor vehicle parts	$693	62.0

Source: UN, *Commodity Trade Statistics*, 1995.
Note: SITC = Standard Industrial Trade Classification.
Note: "Japan's share" = share of total ROK imports in that SITC coming from Japan.