THE product cycle explanation of East Asia’s industrialization was popularized by Bruce Cumings. In his often cited 1984 article, he made the convincing argument that economic development in East Asia cannot be understood outside the context of “the fundamental unity and integrity of the regional effort” that began with Japanese colonialism. Cumings applied the analogy of “flying geese” to the situation in East Asia: countries are said to follow one another in a developmental trajectory in which the latecomers replicate the developmental experience of the countries ahead of them in the formation. The economic rise of states is seen as a process that is tightly linked to the emergence, maturation, and decline of particular industrial sectors.

While we agree with Cumings that a regional perspective is essential for understanding the pattern of industrialization in contemporary East Asia, we find that the “flying geese” variant of the product cycle theory fails to capture the complexity of the regional political economy, which is increasingly dominated by the regionalization of industrial production.

The argument advanced here is that three forces are driving the process of economic integration in East Asia: the globalization of production networks; increased intergovernmental disputes over bilateral economic relationships; and the rapid pace of technological change. The tension between the territorially based interstate system and the
globalized networks of production and exchange has generated a dynamic interplay of "politics" and "economics" that is exercising a profound influence on the structure of the East Asian political economy as tensions rise over imbalances in interstate trade. In addition, the complex and rapid nature of industrial change has fragmented product markets, decentralized the locus of manufacturing activity, and shifted the organizational setting in which production takes place from the firm to the network.

Rather than replicating Japan's development experience in country after country throughout the region as the flying geese analogy suggests, the diffusion of manufacturing in East Asia has increasingly been characterized by shifting hierarchical networks of production linked both backward to Japanese innovation and forward to American markets for the export of finished goods. Such networks offer access for some firms and activities and diminish the opportunities for others. Spatially and organizationally the networks are neither static nor closed. Fears that such networks may be the building block for the creation of a new Co-Prosperity Sphere in East Asia are exaggerated. Regional state elites are increasingly concerned about the extent of technological dependence on Japanese corporations and are eager to diversify their sources of technology. Such concerns, coupled with continued dependence on American (and to a lesser extent Western European) markets for manufactured exports and growing friction over access to the Japanese market, militate against the formation of a yen bloc.

We begin with a brief outline of product cycle theory and a discussion of why we believe it does not adequately capture key features of the contemporary regional political economy in East Asia.

**Flying Geese and Product Cycles**

The analogy of flying geese was first proposed by the Japanese economist Akamatsu Kaname in the late 1930s. Curiously, although many writers have made use of the analogy, few appear to have looked at its original formulation. Akamatsu set out to explain not only the development trajectories of less developed countries, but also why the world economy is characterized by alternating periods of free trade and pro-

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tectionism. Based on his study of the textile industry in Japan, Akamatsu suggested that the diffusion of new products and technologies begins with their import into less industrialized countries. Over time, techniques and capital goods are imported, and "homogeneous industries" are established. The less industrialized countries acquire their own capital goods industries. In the fourth stage of the cycle, local capital goods industries develop export capabilities, and interstate trade conflicts become more common. The process, he argues, follows a "wild-geese-flying pattern of successive appearance of import, domestic production, and export." "Wild geese," he notes, "are said to come to Japan in autumn from Siberia and again back to north before Spring, flying in inverse V shapes, each of which overlaps to some extent." Akamatsu summarized his model in the graph shown in Figure 1.

Whereas Akamatsu was concerned with leading sectors, which he saw as determining the development of national economies, Raymond Vernon in his product cycle theory focused on the behavior of individual firms. He examined how the life cycle of individual products affects the competitiveness of firms and thus the locus of manufacturing production. Based on the manufacturing experience of U.S.-based transnational corporations, the theory suggests that product innovation occurs in high-income countries. Initially, demand from other countries is met through exports; it is a period when the innovating firm enjoys oligopolistic advantages. As the product and the technology employed in its manufacture mature, so costs of production, particularly labor costs, take on greater importance. Exports are increasingly displaced either by overseas production by the innovating firm or by local production. In the final stage of the cycle domestic demand is met by imports from countries that have lower labor costs. Ultimately, the firm that originated the product often abandons its production as its oligopolistic advantages disappear.

Liberal economists (primarily Japanese, but not exclusively so) have attempted to synthesize aspects of Akamatsu's and Vernon's arguments into a model of East Asian regional development. They have incorporated Akamatsu's discussion of industrial diffusion across nations with Vernon's model of direct foreign investment and foreign sourcing of products by innovating firms. The two have in turn been linked to neoclassical notions of comparative advantage to describe a "ratio-
pattern of industrial diffusion from Japan to the East Asian newly industrializing countries [NICS], to ASEAN, and most recently to China. As the product cycle is repeated for increasingly sophisticated products, so, it is argued, the development experience of Japan will be replicated in a succession of sectors and countries. Kojima Kiyoshi has dubbed this amalgam of Akamatsu’s and Vernon’s ideas, the “catching-up product cycle theory.” Common reference to the “flying geese” analogy in the contemporary literature, as for instance in the Cumings article, is to this amalgam rather than to Akamatsu’s original formulation. We will follow this practice in this article and use “flying geese” and “product cycle theory” interchangeably.

Product cycle explanations of East Asia’s success are found not only in the writings of Japanese economists but also in the work of Western economists and political scientists. The American economist Peter Petri has employed the flying geese analogy in suggesting that East Asian developmental trajectories have followed the Japanese path more closely than would have been expected from considering neoclassical (Heckscher-Ohlin) arguments about relative factor endowments. In

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7 Ippei Yamazawa, “Gearing the Japanese Economy to International Harmony,” *Developing Economics* 28 (March 1990), 9. There is often a move from description to prescription in the usage of the flying geese metaphor by Japanese economists: the core assumption is that “the development model adopted by the Japanese may be regarded as a suitable development strategy for newly industrializing economies today” (Yamazawa, 27). Kojima Kiyoshi, a student of Akamatsu’s, argues that the special features of what he terms “Japanese-style DFI” are what enables developing countries to imitate Japan’s development pattern. See, for instance, Kojima, “Japanese-Style Direct Foreign Investment,” *Japanese Economic Studies* 14 (Spring 1986).

part, he argues, this was because the NICs (Korea in particular) consciously set out to model their industrialization on the Japanese experience. But it has also been facilitated by the increasingly short life cycle of many industrial products, which has quickly brought considerations of labor costs to bear. The American political scientists Steve Chan and Cal Clark adopt a similar approach in asserting that “perhaps the most important explanation” for dependency reversal in East Asia “lies in what Raymond Vernon terms the ‘international product cycle.’”

We believe the uncritical application of the product cycle literature to the contemporary East Asian experience is misleading for several reasons. First, the theory makes assumptions about the maturation of products and technology as industries progress through the product cycle, but these do not hold in many sectors in which production has been regionalized in East Asia. Second, both Akamatsu and Vernon argued that production for export in the countries to which manufacturing migrated would build on an experience of import-substituting manufacturing of these products; again such assumptions have decreasing relevance to the East Asian experience. Finally, the theory predicts that in the last stage of the product cycle, firms in the originating country will exit from the market, leaving domestic demand to be met from the exports of the countries to which production has migrated. As we will argue, this stage of “reverse exporting” has largely failed to occur. That it has not done so is a primary cause of the increasing interstate trade tensions within the region.

Consider first the assumptions regarding technological maturation. Product cycle theory suggests that manufacturing will migrate to less industrialized countries once the products and the technology for producing them within the sector have matured. As Cumings asserted in his discussion of industrialization in Korea and Taiwan, firms in these countries “use ‘steady-state’ or obsolescent technologies—as Lin puts it, technology ‘is stable in the product-cycle sense.’” Students of technology transfer have long questioned the accuracy of this hypothe-

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sis. William Walker, for instance, in surveying several machinery industries, discovered little evidence that product and process standardization had occurred; rather, he found that technical change had been continuous and rapid. He concluded therefore that product stability is "very exceptional," as the survival of most firms depends upon product innovation.\textsuperscript{12} Merton Peck and Robert Wilson reached a similar conclusion in their study of technology in Japanese manufacturing. They observed, contrary to expectation, that when supposedly technologically mature product groups such as automobiles and TVs began to be produced in Japan in the 1960s, product and process innovation continued at a rapid rate.\textsuperscript{13}

Studies of technological change suggest that while technology and production processes may be stable for a particular generation of products, radical change may occur within a relatively brief period of time as one generation of products is succeeded by the next. The microelectronics revolution has greatly accelerated the rate of technological development. Microelectronic technology constitutes a "basic innovation" applicable in almost all aspects of product and process design.\textsuperscript{14} Its application offers the opportunity to employ flexible production techniques that, in turn, decrease the significance of economies of scale. As a consequence, short production runs of nonstandardized products for specialist markets have become possible, enabling smaller companies to gain a foothold in production chains.

While the microelectronics revolution has provided opportunities for some forms of entry into production for global markets, it has foreclosed or complicated others. Increased technological complexity has produced greater barriers to entry (in the form of both higher start-up costs and knowledge requirements), steeper learning curves, increased specialization, and a growing reluctance on the part of companies (and

\textsuperscript{12} William B. Walker, \textit{Industrial Innovation and International Trading Performance} (Greenwich, Conn.: JAI Press, 1979), 25.


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177 governments) to transfer technology. These trends make the establishment of backward linkages and indigenous industries far more difficult than was the case during the initial period of industrialization in Taiwan and Korea. More complicated production processes, the increasing rapidity with which products are being introduced, and more complex embodied technologies that result from research and development (requiring an increased ability to synthesize disparate fields of knowledge) have all reduced the efficacy of reverse engineering as a catch-up production strategy.16

Instead of a process of replication and homogenization of industrial structures, as the product cycle theory predicts, technological diffusion in East Asia has been partial, varies from country to country, and has remained linked throughout to a "supply architecture" built around ongoing Japanese innovation of components, machinery, and materials.17 As a result, the evolution of a wide range of industries in other parts of the region has been different from the experience in Japan, where substantial indigenous capacity for technological innovation had already been built in the interwar period.

That the burgeoning manufacturing activity in parts of Southeast Asia should now be seen in the context of product cycle theories as a replication of what transpired in Taiwan or Korea is, at best, a gross oversimplification. Rather, the partial technological diffusion has brought about an intraregional hierarchy of production. Unlike the

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15 Cf. World Bank, The East Asian Miracle: Economic Growth and Public Policy (New York: Oxford University Press, 1993), 319: "There is some evidence, and a growing subjective sense, that arm's-length licensing is decreasing as an option for closing technology gaps."

16 Reverse engineering refers to the process by which a finished product is disassembled to discover how it was produced. Studies of technological change have concluded that imitation, primarily through reverse engineering, has been the single most important channel of technological diffusion. Freeman, for instance, notes the importance of reverse engineering to Japan's industrial development: from well before the First World War, the Japanese government gave priority to importing and improving on the best available technology. Christopher Freeman, Technology Policy and Economic Performance: Lessons from Japan (London: Pinter Publishers, 1987). Howard Pack and Larry E. Westphal make a similar argument about the importance of imitation through reverse engineering in Korea's economic growth; see Pack and Westphal, "Industrial Strategy and Technological Change," Journal of Development Economics 22 (June 1986).


earlier experiences of Korea and Taiwan, the new manufacturing for export in Southeast Asia does not build on any substantial foundation of import-substituting industrialization. Nor, contrary to the product cycle theory, has there been any significant development of indigenous capital goods industries. Export manufacturing relies almost entirely on foreign technology and components and is carried out for the most part by subsidiaries of transnational corporations.

Ongoing product innovation by Japanese corporations, facilitated by the application of microelectronics technologies, has ensured not only that Japanese companies supply the core technologies for most of the region’s output in industries such as consumer electronics and automobiles, but also that in many sectors, contrary to product cycle predictions, Japanese companies have not exited from production of consumer goods.

This leads in turn, to another dimension on which the contemporary regionalization of production in East Asia differs from product cycle predictions. To date regionalization has not generated significant reverse exports to Japan, as the product cycle theory predicts; rather, it has led to trade triangles in which technology and components are sourced from Japan while the finished products are exported to third-country markets, principally to the United States and Western Europe.

Finally, the product cycle approach, like all unilinear theorizing, is impoverished by its failure to examine the changing contexts within which industrialization occurs. Economists are fond of employing ceteris paribus assumptions to exclude such environmental influences. But things seldom do remain the same—changes in context may exert a powerful shaping influence on the course of industrialization and need to be incorporated into a more comprehensive theory of regional economic evolution. We emphasize in particular, first, the need to incorporate both geopolitics and world historical time as intrinsic rather than exogenous features of the development process and, second, the centrality of the shift to production based on regional networks for understanding the contemporary political economy of East Asia.

In the next section we examine the acceleration of the regionalization of production in East Asia following the Plaza Agreement. We then examine how networks of production operate in the electronics industry in a manner contrary to the predictions of product cycle theory. Our case studies of Korea, Taiwan, and Southeast Asia demonstrate how the recent industrial development of these countries, contrary to the flying geese analogy, has differed significantly from that of Japan. Finally, we review how the regionalization of production has led
primarily not to reverse exports back to Japan but to the emergence of trade triangles in which the U.S. has borne the bulk of the costs of adjusting to East Asian industrialization.

PLAZA AND THE REGIONALIZATION OF PRODUCTION

Cumings provides a useful reminder that the regionalization of production in East Asia has its foundations in the Japanese colonial period. Japanese production in Taiwan, Korea, and Manchuria was an integral part of the pre-1945 Japanese empire. The postwar roots of interfirm alliances in East Asia date back to the direct investment in Taiwan by Japanese firms in such industries as electronics and machinery manufacturing in the late 1950s. These were aimed at establishing a presence in the local market. These investments were followed by a series of equity and nonequity alliances between Japanese and local enterprises in response to local ownership and content regulations promulgated by the Taiwanese government. The same pattern was replicated to a lesser extent in Korea in the aftermath of the signing of the Japan–Korea normalization treaty in 1965.

Both quantitative and qualitative changes occurred in the regionalization of production in East Asia in the 1980s, especially in the years after the Plaza Agreement. The agreement was significant not only for what it achieved directly—very large currency realignments—but also for what it symbolized, namely, the increased contentiousness of international economic relations in the Pacific region. The original tensions between Japan and the United States were extended to Korea and Taiwan, which quickly exploited the advantages they gained in the post–Plaza period as their exports became more competitive relative to those of Japan. A surge in imports from these countries in 1986–88 led the Reagan administration and Congress to increase pressure for currency appreciation and liberalization of access to their markets. Meanwhile, the increasing use of voluntary export restraints and other non-

tariff barriers by the U.S. restricted the access of their exports to the American market.22 Both Korea and Taiwan were “graduated” in 1989 by the U.S. from its generalized system of preferences (GSP).

Economic and political factors combined to encourage manufacturers in Japan, Korea, and Taiwan to undertake foreign investment. The magnitude of the currency realignments in the years following Plaza wrought dramatic changes in the competitiveness of domestic manufacturing. The yen was revalued by close to 40 percent in 1985–87; the NT dollar (Taiwan) by 28 percent in the same period; and the Korean won by 17 percent from 1986 to 1988. And, at a time when the currencies of Japan and the NICs (including Singapore) were appreciating against the U.S. dollar, China and the Southeast Asian countries were depreciating their currencies—which not only facilitated inward investment but also made them more attractive as export platforms.

Currency appreciations were compounded by changes in relative wages.23 The loss of competitiveness was such that manufacturers in Japan and the Northeast Asian NICs had little alternative but to move some stages of their production offshore. China and the ASEAN countries were obvious locations.24 Not only were they proximate but they were also comparatively well-known entities. For Taiwan there was the advantage of a “natural” link through overseas Chinese communities. And Malaysia offered the advantage of an English-speaking workforce. Furthermore, the Southeast Asian countries continued to benefit from the U.S. GSP scheme.

These countries responded to difficult economic situations by adopting measures in the second half of the 1980s to increase their at-

22 11 Sakong reports a study suggesting that nearly 30 percent of Korea’s exports to the United States in the years 1984–89 were subject to some form of U.S. protectionist action. Cited in Sakong, Korea in the World Economy (Washington, D.C.: Institute for International Economics, 1993), 131.

23 As an illustration, the average hourly labor costs in spinning and weaving in 1990 were estimated as follows (relative to the U.S. average hourly rate of $10.02): Japan 139%; Taiwan 46%; Korea 32%; Hong Kong 30%; Mexico 22%; Malaysia 9%; Philippines 7%; China 4%; Indonesia 2%. Such data must be interpreted with caution given the problems involved in conversion to a common currency. And they tell us nothing about the relative productivity of the various labor forces. Nevertheless, they do provide an indication of the magnitude of intercountry differentials. Data from Werner International in Textile Month (February 1991), quoted in David O’Connor, “Textiles and Clothing: Sunrise or Sunset Industry,” in Jomo K. S., ed., Industrialising Asia (London: Routledge, 1993), 241.

24 The primary focus of our discussion of this spatial extension of regional manufacturing is on ASEAN, especially Malaysia and Thailand. In the 1990s parts of coastal China have also come to figure prominently in the regionalized production networks. We do not deal with the Chinese case in this article, as the unique features of the Chinese political economy would require separate and protracted discussion. For example, China had developed a large industrial base as part of its pre-1978 development strategy. Unlike other countries in the region, China’s recent promotion of export-oriented production is not so much part of a process of “industrialization” as it is one of “re-industrialization.” We believe, however, that recent industrial change and the incorporation of parts of China into regionalized production networks actually buttress our central argument.
tractiveness to foreign investors. They had found themselves facing
burgeoning current account deficits and increasingly serious debt
problems in the mid-1980s following the decline in commodity prices
associated with slower world economic growth. Also declining in real
terms were official capital flows, especially overseas development assis-
tance. Governments in Southeast Asia responded by removing past
disincentives to investors (for instance, reducing uncertainty by signing
investment guarantee agreements) and by introducing packages of
assistance measures such as tax holidays and accelerated depreciation
allowances.

The quantitative changes in the regionalization of production are
reflected in part in the huge increases in the outflows of foreign direct
investment from Japan, Korea, and Taiwan in the second half of the
1980s. Japan's total foreign direct investment (FDI) increased rapidly
after 1986. In the four-year period 1986–89 FDI grew at an average an-
nual rate in excess of 50 percent. By the end of this period Japan was
the world's single largest source of FDI, with an annual outflow
amounting to $48 billion (up from $6.5 billion in 1985). Although the
share of Asian countries in total Japanese investment declined (because
of the large outflows to North America and Europe) and the share of
manufacturing in total Asian investments also declined, the absolute
amounts invested in manufacturing in Asia rose significantly. In fact,
Japan's investment in manufacturing in other Asian countries in the
years 1986–89 exceeded the cumulative total for the whole of the
1951–85 period. In 1990 the flow of investment accelerated, with $10
billion invested in manufacturing in ASEAN and $8 billion in the Asian
NICs.\textsuperscript{25}

Within Asia, both the location and sectoral composition of Japanese
investment changed dramatically. By 1985 Japanese investment flows
to manufacturing in ASEAN countries already exceeded those to the
NICs. But after 1986 the gap between manufacturing investments in
these regions widened considerably. The principal reason was that
most new Japanese investment for the production of consumer goods
for the global market was switched from the NICs to ASEAN. Japanese
manufacturing investment in Korea and Taiwan now focused predom-
inantly on production for their domestic markets, and an increasing

\textsuperscript{25} Tran Van Tho, \textit{Technology Transfer in the Asian Pacific Region: Implications of Trends since the Mid-
1; and Shujiro Urata, "Changing Patterns of Direct Investment and the Implications for Trade and
Development," in C. Fred Bergsten and Marcus Noland, eds., \textit{Pacific Dynamism and the International
proportion of new Japanese investment there was directed toward service industries. By 1989 barely more than a third of Japanese investment in the Asian NICs was in manufacturing. In ASEAN the focus of Japanese investment moved quickly from textiles and metals to the production of electrical machinery.

The growth in Taiwanese and Korean investment in ASEAN was even more spectacular. At the end of 1987 the total stock of Taiwanese investment in manufacturing in ASEAN stood at $78 million. In the following three years over $850 million was invested. As was true for Japanese investment, electronics was the single largest sector, with 39 percent of the total. A similar surge, although at lower levels, occurred in outflows from Korea: in 1985 the cumulative investment from Korea in ASEAN amounted to only $42 million; in 1989 alone new investment from Korea amounted to $132 million. By the end of the decade Taiwan had replaced the United States as the second most important investor in ASEAN and had overtaken Japan as the single largest investor in Malaysia. The share of the four East Asian NICs combined in foreign investment in all ASEAN countries except Thailand was comparable to or exceeded that of Japan.

These data give some indication of the quantitative changes in the regionalization of production that occurred in the years immediately following the Plaza Agreement. As we will argue later, a focus on foreign investment data alone provides an incomplete picture of the increasingly regionalized production networks, since these often operate through technology licensing agreements or through other forms of production cooperation that do not involve the transborder flow of funds. Moreover, data on the share of these flows in domestic capital formation may disguise their importance for the host economies.
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The data do, however, point to one important change in regional production networks in the post-Plaza years: the spatial expansion of such networks. Malaysia, Thailand, and coastal China have all become linked to production in Northeast Asia, so that we may now speak of regionalized manufacturing activity in a number of industries. A second prominent change is the shift from the company to the "network" as the locus of productive and innovative activity. It is the interaction between firms linked by chains of production, exchange, and distribution that now constitutes the basic organizational "unit." Firms, or even decentralized divisions within firms, maintain a degree of autonomy in the production chain, but all significant activity is in some way coordinated with other organizations in the network. In the following sections we discuss how these regionalized networks of production are operating in Northeast and Southeast Asia, and why product cycle theories provide at best only a partial explanation of the evolving regional division of labor.

REGIONALIZED NETWORKS OF PRODUCTION

The integration of Malaysia, Thailand, and parts of coastal China with Northeast Asian production has been one of the most marked changes in the spatial organization of the East Asian political economy since the Plaza Agreement. While superficially this trend may appear to lend credence to the flying geese scenario, emerging organizational and spatial changes in production actually undermine many of its key assumptions. In this section we examine the rise of regional production networks and consider their implications for our understanding of the region's political economy. We use a case study from the electronics industry to highlight the problem with product cycle–based understandings.

We have argued above that the flying geese view of East Asia fails to grasp the complexities of technological change and of how technology is actually transferred. Similar problems arise with its understanding of production, the spread of which is regarded as an undifferentiated shift from country to country. The "national economy" is held to be the appropriate unit of analysis and the nature of production is ascertained by examining the flow of goods and capital between countries. That is


what is contemplated by the recommendations of the Japanese Ministry of Finance’s Committee on Asia Pacific Economic Research: “It is necessary that what Japan used to do should be done by the Asian NIES, what the Asian NIES used to do should be done by ASEAN countries.” This statecentric view sees political economy as a tightly coupled process between the rise and fall of products and the rise of national economies.

The regionalization of production in East Asia has, however, come to be organized in ways that belie the neatness of the avian analogy. First, production does not migrate across countries in an undifferentiated manner. Production structures differ across time and space depending on local configurations of power, historical trajectories, and the dominant technologies of particular eras. In other words, goods are made in different ways and in different contexts at different historical times. These differences apply not only comparatively to how production differs between specific places, but also relationally to the way production links places together. For example, whereas export-oriented production of consumer electronics in Japan in the 1950s was organized internally within the Japanese political economy, Malaysian production in the early 1990s is part of a transnationalized process that can only in the narrowest sense be viewed as “local.”

Second, the product cycle-based theory sees individual products as “disembodied” from larger industrial structures, whereby the life cycle of any given product can be treated in isolation from the myriad of other products and the organizational foundations that initially spawned it. But rather than an “ahistoric” flow of a single commodity, contemporary production needs to be seen in terms of interrelated complexes of industrial activity involving networks of firms, and continuous innovation of a range of key inputs in a multitude of related industries. The transnationalization of production has been marked by a spatial separation of ongoing innovation and the location of final assembly. This separation has undermined the notion that the transfer of assembly from one country to another will inevitably re-create the myriad backward linkages into the domestic economy envisaged by Akamatsu in his writings about the Japanese textile industry prior to the Second World War.

Finally, while transnational networks organize production in ways


32 Production structure refers to the way production is organized, the social relations and subjective understandings among participants, and how particular firms are embedded in both the domestic and the global/regional political economies.

33 See Bernard (fn. 19).
that do not correspond to the boundaries of formal political communities, they still exist concurrently with the interstate system. The two structures to a certain extent correspond to what Giovanni Arrighi has referred to as "two logics of power." Rather than collapsing economic life into a "system of states," increasingly it is more useful to look at how the two structures intersect, with all the inherent possibilities for new forms of both cooperation and conflict.

There is no better example than the electronics industry to illustrate how production linkages in East Asia are more complex than the trade and investment data conventionally used to describe them. One of the most striking changes in regional production since the Plaza Agreement has been the rapid shift of much of Northeast Asia's low-end consumer electronics production to Malaysia and, to a lesser extent, to Thailand. Most prominent has been the investment by the Japanese electronics industry, which made ninety-five separate investments in Malaysia between 1986 and 1990. The pattern with Thailand is similar, if less pronounced. Available data show a similar pattern with regard to Taiwanese and, to a lesser extent, Korean electronics investment in Malaysia and Thailand.

This great infusion of investment in the electronics industry represents the transfer in a mere five years of much of the low-end, export-oriented consumer electronics assembly industry that had been built up in Northeast Asia since the 1950s. For example, Japan's domestic consumer electronics production for export fell from a high of 3.8 trillion yen in 1985 to 2.2 trillion yen in 1992. Exports of color televisions fell in the same period from 13.4 million sets to 4.5 million; by 1991 overseas production by Japanese companies of color TVs had risen to 22.7 million units. Surveys conducted by Japan's Ministry of International Trade and Industry indicate that in 1988 and 1989, 61 and 68 percent, respectively, of production by Japanese subsidiaries in electrical machinery-related sectors in ASEAN was for export. By

36 According to the Taiwan Electrical Manufacturers Association (TEAMA), between 1987 and 1991 there were over one hundred separate investments in Malaysia by member companies, and just over fifty in Thailand. Similarly, a World Bank study indicated that in the four years following the Plaza Agreement, more than one-quarter of Korean investments in Thailand was related to the production of electrical appliances. World Bank (fn. 28), 36.
1992 Japanese electronics firms had 514 subsidiaries in Asia. The largest single number was in Malaysia (121) followed by Taiwan (95), Singapore (71), and Thailand (63).

Northeast Asian investment in ASEAN has brought a number of changes to the structure of production and exchange in the electronics industry. One example that illustrates the increasingly limited utility of an “international” approach to issues of investment, production, and exchange is the investment by the Taiwanese firm Jinbao Electronics in Thailand. Jinbao Electronics, a company based in Taipei, manufactures calculators, facsimile machines, and other office automation equipment. According to Tian Xia magazine’s 1991 industrial survey, it was ranked 117th by total sales and 45th by export sales of all Taiwanese electronics firms in 1990.\(^{39}\) It exported 88 percent of its total sales in 1990, with almost half of its exports going to the United States and Canada.\(^{40}\) Jinbao is one of the larger Taiwanese electronics firms, but its export profile and the nature of its foreign investment is quite typical.

In April 1990 Jinbao opened a factory in Thailand to manufacture low-end calculators that could no longer be made in Taiwan and exported at a profit. Of its calculators, 60 percent by volume and 40 percent by value are now made in Thailand. Jinbao has been assembling, on an original equipment manufacturing (OEM) basis, a majority of its calculators for Japanese companies such as Casio and Canon. Since the appreciation of the yen it has been working closely with Sharp Corporation of Osaka; and after extensive consultation with Sharp, Jinbao undertook its Thai investment. A large share of Thai production was to be made on an OEM basis for Sharp, which decided that it would rely on a supply from Jinbao rather than open a factory in Thailand itself.

The innovation behind the product, the brand name, and the marketing are Japanese. All key components for the calculators, such as liquid crystal displays (LCDs) and production equipment in the Thai factory such as insertion equipment, are imported from Japan. All procurement and administration are controlled from Taipei, and the management of the plant is Taiwanese. The labor is Thai. Output from the

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\(^{39}\) Tian Xia, Wai Xiao Qian 100 Ming Zhong (Taipei: Tian Xia Wen Hua Chuban Kengsi, June 1991).

\(^{40}\) Much of this information is based on interviews conducted by Mitchell Bernard with company representatives, Taipei, June 1991.

\(^{41}\) Original equipment manufacturing is an arrangement whereby a corporation will contract for another firm to manufacture one or more of its products to its specifications and to be marketed under its brand name.
plant is exclusively for export. In international trade data Jinbao’s production is recorded as Thai exports of electronic goods. To purchasers at the other end the products appear to be Japanese. The direct foreign investment statistics indicate a Taiwanese investment.

The emergence of these production networks in the electronics industry undermines the statecentric notions of the product cycle approach, which links the production of specific products with “national” stages of development. To see the investment in Thailand in the above example as being Taiwanese or the exported finished product as Thai is to miss the point. The “architecture” of supply of components and machinery that pervades the industry is linked to the specific skills from these different places; together they constitute a complex whole that synergistically transcends the sum of the individual transactions recorded in the investment or trade statistics.

The product cycle approach to the region’s political economy would interpret this spatial shift in production as marking Japan’s transition out of the consumer electronics industry. However, the continuing hierarchical nature of regional production, with its dependence on supply of Japanese components and machinery, even with the location of final assembly in Southeast Asia, marks neither the demise of the domestic consumer electronics industry in Japan nor a replication of Japan’s industrial trajectory in the next tier of geese, Taiwan and Korea, as they move into higher value-added sectors vacated by Japanese producers. Japanese investment in regionalized production of consumer electronics was accompanied by continued innovation at home, building on the strength of interconnected industries. There appears to be no imminent likelihood that domestic production of consumer electronics will disappear as it did in the United States by the early 1980s. In the first seven years after Plaza, production dropped by less than 20 percent—from a 1986 high of 4.4 trillion yen to 3.6 trillion yen in 1992.42

In contrast to the Japanese experience, Taiwanese investments in Southeast Asian electronics assembly have been accompanied by a move away from consumer electronics production at home. In 1987, for example, Taiwan was the world’s largest exporter of television monitors, with exports reaching a peak of 4.4 million sets. By 1990 exports had declined to 2.1 million sets.43 By 1992 those producers such

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42 In the prerecession year of 1991 domestic production of consumer electronics was in fact higher than in 1986. Nihon Denshi Kikai Kogyokai (Electronics Industries Association of Japan), Chosa-shitsu Shirabe (Research report) (Tokyo: Nihon Denshi Kikai Kogyokai, various years).
as Kelin and Zhong Xin that had not abandoned domestic consumer electronics production by shifting into export-oriented manufacture of computer peripherals had virtually ceased exporting from their Taiwanese operations. Consumer electronics production has focused increasingly on domestic demand. The accompanying liberalization of trade has resulted in increased imports of new generations of Japanese consumer electronics and deepening linkages between remaining producers and Japanese suppliers.

The Japanese consumer electronics industry has transformed itself on the basis of product innovation and through its efforts to acquire production companies in the United States to create a tighter linkage between hardware and software. The Taiwanese industry, by contrast, is based increasingly on production at lower volumes for Taiwan's small domestic market, with producers still dependent on Japanese suppliers for key components, and increasingly acting as importers for Japanese products. This trend is not the result of the workings of the product cycle. Rather, the Taiwanese industry has only partially replicated the structure of the Japanese industry, having been unsuccessful at reproducing the innovation capacity or the components and machinery production capabilities of the Japanese industry. This important difference highlights how misleading it is to argue that overseas production by Taiwan and Korea replicates the first wave of Japanese offshore production in the 1960s and 1970s. We confront here the question at the heart of the flying geese argument: are the neighboring countries replicating the Japanese development trajectory more generally, as the analogy would suggest?

Industrial restructuring has become a key issue in the political economies of both Taiwan and South Korea. Altering established patterns of production has proved difficult amid the multitude of changes that have

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taken place since the Plaza Agreement. The window of opportunity created by the appreciated yen was, by 1987, greeted with American pressure on both the Taiwanese and Korean governments to appreciate their currencies, increase market access, and enforce intellectual property rights. Domestic exporters fearing retaliation against their U.S.-bound products and influential American-trained liberal economists promoting doctrinaire free-trade policies provided domestic support for American objectives. As a result, both governments have implemented domestic tariff reductions, especially for finished products, and dismantled many of the export-promotion mechanisms that were so prominent until the mid-1980s.

These changes may appear on the surface to be part of an inexorable process of adjustment similar to that undergone by Japan at the “equivalent stage” in its development. Such arguments are misleading, however, and are made on the basis of ahistorical conceptions of political economy that have little regard for the “process,” as opposed to the quantitative “outcomes,” of economic activity. Nor do they adequately take into account the changing structural features of the global and regional political economies that provide the context for economic change. This restructuring calls into question one of the core assumptions of the flying geese argument—that Taiwan and South Korea are replicating the Japanese experience.

Central to the argument originally developed by Akamatsu is the notion that industrialization is a process of “homogenization”: as industries move from country to country, their structure and degree of backward linkage will over time replicate that of the more advanced countries whence they came. The argument equates industrial structure in Taiwan and Korea with that in Japan at a similar “stage” in its development. However, the argument that a “Japanese model” has been generalized throughout East Asia is partial at best and difficult to sustain.

One critical difference between Japanese industrialization and that of Korea and Taiwan has been in the area of technological and organizational innovation. Alice Amsden has pointed out that industrialization in both Taiwan and South Korea differed from the industrializations of the late nineteenth and early twentieth centuries in that they occurred primarily on the basis of “learning” rather than innovation.

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47 Alice Amsden, Asia’s Next Giant: South Korea and Late Industrialization (New York: Oxford University Press, 1989), 19.
She further notes that “beginning with Korea and Taiwan, late-industrializing countries were the first to attempt to penetrate world export markets with little more competitive advantage than low wages.” By contrast, industrialization in Japan had a strong indigenous innovative base prior to the dramatic increase in both the depth and the breadth of Japan’s global economic presence in the 1950s. The cotton textiles industry, upon which Akamatsu based his flying geese analogy, provides a good example. Prior to the First World War, Platt Brothers, the world’s leading textile machinery firm, regularly dispatched technicians to Japan to advise Japanese customers on how to operate its machinery. The flow of know-how from the English company was halted by the war in Europe, and by war’s end Platt Brothers technicians discovered that their former Japanese customers now utilized locally made machinery, such as the Toyoda power loom, that was technologically in advance of the machinery produced by the English manufacturers. In addition, the prewar Japanese conglomerates (zaibatsu) had created innovative general trading companies (sogo shosha) with worldwide procurement and information-gathering capabilities. With these advances, as well as with cheaper wages, Japanese producers displaced Lancashire producers in many overseas markets.

The story in the electronics industry was similar. Japanese innovation commenced in the 1920s and 1930s, several decades prior to Sony’s acquisition of transistor technology. There were also at that time significant breakthroughs in areas such as the reception of television signals and antennae technology, as well as the development of materials such as ferrite. In addition, weapons research conducted by companies such as Hitachi and Toshiba during the Second World War created the institutional framework and knowledge that was to prove so important in indigenizing foreign technology in the postwar period.

The industrialization of Korea and Taiwan has been marked by a far greater and longer-lasting dependence on imported technology, primarily from Japan and to a lesser extent from the United States. Those industries that have been successful in making backward linkages from the production of end-use to intermediate goods, such as the textile machinery industry, have essentially acquired the capability of manufacturing standard products developed elsewhere, through reverse en-

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48 Ibid., 143.
gineering, licensing of know-how, and learning by doing. To equate this capability, important though it has been, with complete backward integration or a replication of the structure of the same industries in Japan would require both a narrow and a static view of what constitutes an industry. As we have noted, the pace of technological change has become more rapid, and the complexity of products in the era of microelectronics makes them far less susceptible to reverse engineering. As a consequence, manufacturing in most sectors in Korea and Taiwan depends on the continuing import of key components and machinery. A recent study of the Korean electronics industry provides an example: Bloom found that in 1987 the industry imported 36 percent of its components from Japan. This figure may considerably understate the import dependence of the industry: a 1993 Bank of Korea study found that only 38 percent of the value of semiconductors was added locally.

By contrast, Japanese companies not only possessed the ability to absorb and improve upon foreign technology through indigenous R and D and the presence of innovative component manufacturers, but they also built strong marketing networks that facilitated worldwide brand recognition. Korean and Taiwanese companies in similar export industries have lacked comparable innovative capacity and have relied disproportionately on OEM manufacturing. In consumer electronics, apparel, and steel, for example, a Korean Trade Association report indicates that OEM exports exceed 80 percent of total exports. Where manufacturing occurs on an OEM basis, producers inevitably depend on networks for product marketing. Furthermore, OEM contracts have often stipulated export restrictions on sales under the manufacturer’s own brand labels and inhibited the development of marketing and after-sales-service capabilities. We can see, therefore, how the historical timing, the pattern of industrialization, and the specific strategies for linking up with global production networks have created in Korea and Taiwan sectoral structures as well as individual production units with characteristics that differ from those prevailing in Japan.

Analogies that equate recent increases in overseas production by Taiwanese and Korean producers with the direct foreign investments

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51 Interviews conducted by Mitchell Bernard with representatives of various medium-size and large textile companies in Korea and Taiwan in 1991 and 1992. These companies are major users and often manufacturers of textile machinery.


made by Japanese companies in the early 1970s are equally misleading. Not only are many of these investments made by companies that have industrialized under circumstances that differed from those of their Japanese counterparts, but their “location” within networks of region- alized or globalized production also differs from that of Japanese companies. Production networks, while offering some flexibility, continue to be arranged hierarchically. Location within the hierarchy relates to the architecture of supply and the production practices of different firms that have pursued diverse strategies in their respective contexts. Location influences the nature of overseas investment. The content of direct foreign investment needs to be considered rather than simply relying on a measurement of the numbers of transactions and the capital flows involved. Jinbao’s investment in Thailand, for example, may or may not facilitate technology transfer or increase the skill level of Thai workers. However, at the level of regional political economy Jinbao is located differently in the regional structure of production than are large integrated producers like Sharp (even though they may all be making the same products). Sharp has achieved worldwide domination in key technologies such as LCDs, has established a series of interconnected research and development centers throughout the region, and often supplies key inputs to smaller companies that actually compete with it in end-use product lines.

Korea’s large electronics producers, while differing in some fundamental respects from small Taiwanese companies, also share characteristics of this pattern of industrialization within regional networks. Bloom thus concludes that underlying forces such as the way Korean production was linked to that of Japan, the early addiction to OEM, the vulnerability from excessive reliance on exports to the United States, and a regime of cheap labor combined to shape, and continue to be present in, the globalization undertaken by Korea’s large conglomerates (chaebol). Just as was the case with Jinbao’s investment in Thailand, Korean companies—lacking design or marketing capabilities, structurally locked into production hierarchies from which they derive key components and other inputs, and dependent on low-cost production to maintain export competitiveness—will transnationalize their firms differently from the way it is done by companies coming out of other industrial contexts.

There have been significant increases in research and development

spending in both Korea and Taiwan since the Plaza Agreement. Between 1986 and 1990, for example, Korean R and D increased from U.S. $1.7 billion to $4.5 billion. This increase also needs to be understood in relation to the broader structural changes outlined above rather than automatically seen as evidence that the second-tier geese are now entering the next stage of development. A major reason for this increase in R and D relates back to our discussion of technological change. As we argued above, mature industries should not be viewed in static terms. Even those older industries in which Koreans or Taiwanese were reasonably proficient producers were opened up by the incorporation of new technologies. Thus, new technologies were needed not only to move into more sophisticated product lines but also to maintain established positions in core industries. Furthermore, significant expenditures on R and D are required to ensure that production units possess the requisite skills to continue to link their activities to the technological changes that are proceeding at prodigious speed in the centers of innovation of the global political economy. Ironically, the result of increased expenditure on R and D and the upgrading of production capabilities has been an increase in dependent patterns of procurement of components and capital goods that are part of the regional architecture of supply as evidenced by the steady expansion of both Taiwanese and Korean bilateral deficits with Japan. In other words, the increases in expenditures for R and D have not produced more independent “national” industries.

This continued dependence on imported technologies can be seen in export-oriented industries such as computers, where growing competition and/or inelastic demand for low-technology products required manufacturers to change their products for export and upgrade their technology. Small-scale Taiwanese factories that previously manufactured monochrome and color television monitors for export have become world leaders in the production of monochrome and color monitors for computers: in 1991 Taiwan accounted for 39 percent of global production of computer monitors. As is the case in many other sectors, however, the key component, the cathode ray tube, is procured exclusively from Japanese suppliers, and these tubes represent between 30 and 35 percent of the cost of a monitor. This example further un-

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55 OECD, Main Science and Technology Indicators (Paris: OECD, 1992).
56 For several examples relating to Taiwan, see Bernard (fn. 45).
57 Taiwan Institute for Information Industry, Taipei, 1992 (mimeographed statistics).
derscores how the accumulation of production skills and know-how has allowed Taiwanese producers to enter more sophisticated sectors, but in ways that do not diminish their structural dependence on Japanese technology.

Finally, there is an argument advanced by product cycle proponents that protectionism, particularly in the United States, has systematically capped export surges from Japan, thereby providing special incentives to Korean or Taiwanese producers to move into these industries. This ostensibly aids in the replication of the Japanese development pattern. This argument too rests on a static conception of economic activity. The automobile industry illustrates how production does not simply pass in an undifferentiated form from one country to another.

Voluntary export restraints (VERS) were imposed by the U.S. government on automobile exports from Japan in 1982. At the time the VER was implemented, there were significant breakthroughs in the organization of production of automobiles in Japan. These enabled Japanese car makers to produce compact-sized automobiles more cheaply than their Korean counterparts, who were relying on the import and assembly of components using cheap labor. The Korean Ministry of Commerce estimated at the time that the production cost of a Hyundai Pony, despite being built in Korea where wage rates were one-seventh of those in Japan, was U.S. $3,972, compared with an estimated cost of $2,300 for a Toyota Corolla built in Japan. As the VER quotas were quantitative, Japanese manufacturers initially shifted their automobile exports away from the low end of the car market in their quest for increased profits. Hyundai, Korea's premiere auto maker, seized the opportunity to enter the U.S. market. But Japanese companies, rather than relinquishing the low end of the market, embarked on investments in the U.S. and Canada. Facing increased competition from these Japanese transplants, Korean auto exports to the U.S. peaked in 1988 and then began to drop back dramatically.

The reasons for the short-lived success of the Korean auto exports to the U.S. underscore the limitations of the assumption at the core of the flying geese analogy that technological trajectories are linear. Thus, Japanese companies did not simply abandon the small car market. Rather, direct investment in North America gave them the capacity to recapture by the late 1980s what had been lost through VERS. In addi-

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59 Petri (fn. 9, 1993), 32.
tion, changes in production techniques enabled Japanese car makers to continue to compete with the Korean manufacturers despite higher labor costs. Furthermore, the labor unrest that beset the Korean auto industry in late 1987 precipitated six consecutive years of wage rises, thus undermining one of the bases of Korean competitiveness. Finally, rapid technological change in the industry, such as the computerization of engine control and the use of new materials, has meant that "the Koreans, unlike the Japanese of twenty years ago, are chasing a target that is moving away from them at an ever increasing rate." It has also resulted in imported materials and components constituting nearly a quarter of the value of automobiles produced in Korea.

The process of industrial transformation in Taiwan and Korea has taken place in a specific historical context—with its own forms of technology and structures of production—that in certain respects differ strikingly from the context that marked the initial periods of Japanese industrialization. Similarly, the context within which restructuring must take place in Taiwan and Korea features the rapid and ongoing technological change that is associated with the initial stages of the microelectronic revolution and a changed geopolitical structure in the post-cold war era. The changed context along with the institutional differences, the legacy of territorial division, and the small size of both countries' domestic markets, make analogies between structural change in Korea and Taiwan in the 1990s and that of Japan in the 1970s tenuous. The fact that the specific nature of industrialization in Korea and Taiwan condition how restructuring will proceed within a changing global context also raises a series of questions about the rapid economic change currently taking place in much of Southeast Asia and whether we are witnessing the ascent of new geese there.

Southeast Asia: The Latest Geese?

In the second half of the 1980s Malaysia, Thailand, and Indonesia enjoyed economic growth at rates comparable to those achieved by Korea and Taiwan during the 1970s and 1980s. The expansion of their manufactures exports, albeit from a small base, was even more impressive.

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62 Ibid., 427.
63 Bank of Korea (fn. 52).
64 In Malaysia, for instance, the value of exports of machinery and transport equipment more than trebled in the years 1986–90. By the end of this period they alone accounted for more than a quarter of total exports. Total manufactures contributed more than half of the country's export earnings—up from 36 percent at the start of this period. World Bank, World Development Report (New York: Oxford University Press, 1988 and 1992).
This remarkable economic performance has earned these three countries the labels of "new NICs" and "next-tier NICs." Some observers consider the growth of manufactured exports from ASEAN countries a vindication of the flying geese analogy: Malaysia and Thailand and, to a lesser extent, Indonesia and the Philippines are the latest geese in line for takeoff. But this is another instance of analogy triumphing over analysis. The experience of the Southeast Asian economies has been very different from that predicted by product cycle theory.

Unlike those predictions, and unlike the experience of Korea and Taiwan, the recent move to manufacturing for export in Southeast Asia did not build on an experience of successful import-substituting industrialization. Rather, the new exporting industries have been grafted onto economies whose small manufacturing sectors are notable for their histories of rent seeking and inefficiency.

A second feature follows from this lack of a domestic manufacturing tradition. The technological dependence that we noted as characteristic of Korean and Taiwanese high-technology production is present in a much more extreme form in Southeast Asia. Yoshihara's comment that the latter region has experienced "technologyless" industrialization is still largely applicable. In contrast to the Northeast Asian experience, there is a very heavy dependence on subsidiaries of transnational corporations for these manufactured exports: for instance, in Malaysia at the end of the 1980s, foreign-controlled companies contributed 99 percent of the exports of electronics, over 90 percent of the exports of machinery and electrical appliances, over 80 percent of the exports of rubber products, and 75 percent of textile and apparel exports.

Much of the early foreign direct investment in export-oriented manufacturing in Southeast Asia occurred in export-processing zones (EPZs). This trend has become less pronounced, as governments in the

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region have recently allowed firms established outside the zones the same access to duty-free imports as prevails in the EPZs, provided these imports are utilized in manufacturing for export. But an oft-noted characteristic of the EPZs still applies in most instances to these foreign subsidiaries in Southeast Asia: the lack of backward linkages with the local economies. The various surveys of EPZs in Southeast Asia conducted in the mid-1980s all found that there was little linkage between firms in the zones and the local economy. Rather than backward linkages to the local economy, firms tended to establish links with other companies operating within the same zone or in other free-trade zones. For instance, a study by Lim and Fong suggests that foreign subsidiaries in Malaysia's EPZs were more integrated with Singapore's free-trade industrial sector than with the "local" industry.

To what extent has the new wave of investment in export-oriented manufacturing in Southeast Asia corresponded to this earlier pattern? Although the relatively recent date at which the new investment was undertaken makes any conclusions tentative, some preliminary evidence is nonetheless available from surveys of Japanese subsidiaries operating in Malaysia. These show that although there was a significant increase in the value of components procured locally in the late 1980s, the share of local procurement in overall output of these subsidiaries rose only marginally—in the electronics sector from 29.8 percent in 1987 to 32.5 percent in 1989. Of particular note is that less than one half of "local" procurement in the electronics sector was derived from Malaysian companies. Twenty-four percent was purchased from other Japanese subsidiaries operating in Malaysia and an additional 22 percent from the Malaysian-based subsidiaries of European and American companies. Although the value supplied by Malaysian companies had more than doubled over the years 1987-89, the share of these companies in "local" procurement remained constant.

These data illustrate how misleading figures on "local" content can...
be in an era of regionalized manufacturing networks. The participation of local in the sense of domestically owned firms in these networks is far less widespread in Southeast Asia than in Korea or Taiwan. This raises the question of whether national ownership really matters in a networked regional economy. The answer is probably yes for countries like those in Southeast Asia that are at early stages of industrialization, because it is more likely that technology will be transferred to the domestic economy if domestic firms are more intensively involved in the networks. Leslie O’Brien concludes in her detailed survey of manufacturing companies in Malaysia that locally owned or controlled companies were more likely than their foreign counterparts to forge links with the national economy and to modify or manufacture their own production equipment to suit local conditions.

Nonetheless, the dominance of Japanese subsidiaries in production networks in Southeast Asia provided ASEAN economies with an advantage over those of Korea and Taiwan, at least in the short term. Some of the fall in the imports of consumer electronic products from Korea and Taiwan that occurred in the Japanese market in the late 1980s was the result of their displacement by imports from Japanese subsidiaries in Southeast Asia. Imports of color TVs from Korea and Taiwan, for example, fell from 1.6 to 1.3 million units in the years 1989–91. In the same period imports from Malaysia rose from 2,000 to 385,000 units. By the latter date Malaysia had replaced Taiwan as Japan’s second most important source of imports of this product and was also the single largest supplier of radio cassette recorders to the Japanese market. Since Japanese companies maintained control over the use of technology in their Southeast Asian subsidiaries, the companies in these production networks were more likely to be given access to the latest production technologies than were their locally owned competitors in Korea and Taiwan.

Surveys suggest that Japanese companies wish to increase their local content purchases—both from other Japanese subsidiaries and from domestic firms. This preference has become more pronounced with the rise in the value of the yen, and it is encouraged by the adoption of production techniques such as “just-in-time” manufacturing that favor sourcing from nearby suppliers. The principal barrier preventing an increase in inputs from domestic firms is the inability of local companies

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73 Tanaka (fn. 45), 31, table 17.
74 Aoki (fn. 29).
to produce goods of the desired quality with the reliability required by the Japanese. Again this reinforces our argument about the difficulties facing local firms seeking to enter production networks in the microelectronics era, with its exacting engineering standards. Domestic firms are handicapped by other factors that distinguish the local economies from those of Korea and Taiwan, especially the low educational levels of the workforce and the small percentage of GDP that is spent on research and development. To date there have been few instances of technical or managerial assistance being provided by transnational subsidiaries to domestic companies to help improve their quality control.

The predominance of foreign firms in many sectors of manufacturing in Southeast Asia and the continued dependence of such firms on technology and component inputs from overseas casts doubt on the relevance of the flying geese analogy for Southeast Asia. Certainly, even if the different regional, global, and technological environments in which industrialization is occurring are ignored, the pattern of manufacturing development in these countries—the overwhelming dependence on foreign firms, export-oriented manufacturing that does not build on an import-substituting base, and the lack of linkages with local components suppliers—is very different from that experienced by Japan or by Korea and Taiwan.

Part of our argument, of course, is that the different regional, global, and technological environments in which the new wave of industrialization is taking place cannot be ignored. The relationship between state and society in the various Southeast Asian countries not only is far removed from that in Japan, Korea, or Taiwan, but also varies significantly across Indonesia, Malaysia, the Philippines, and Thailand. As the ideology of economic liberalization has become hegemonic, the move to export-oriented industrialization in Southeast Asia, contrary to the Northeast Asian experience, has been accompanied by a reduction in state intervention in local economies. And the global economic environment is significantly different for these "late late" developers than that faced by Korea and Taiwan in the 1960s. In the post-cold

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75 This is estimated at 0.5 percent to 0.6 percent of GDP for Malaysia, but the bulk of local expenditure for R and D is devoted to the primary products sector. Ibid., 77. In 1990 Korea spent approximately 2 percent of its GDP on R and D; the equivalent figure for Taiwan was 1.65 percent.

76 For one dimension of state-society relations, the relationship between business and the state, see, for instance, Gary Hawes and Hong Liu, "Explaining the Dynamics of the Southeast Asian Political Economy: State, Society, and the Search for Economic Growth," *World Politics* 45 (July 1993); and Andrew MacIntyre, ed., *Business and Government in Industrializing East Asia* (Ithaca, N.Y.: Cornell University Press, 1994).
war era the United States is no longer willing to tolerate sustained bil-
lateral trade imbalances. The changed global economic environment is
one reason why the failure of the last stage of the product cycle—the
“reverse export” of goods to the country where innovation originally
occurred—to materialize has become so politically contentious, as we
discuss in the following section.

PRODUCT CYCLES AND TRADE TRIANGLES

The final stage of the product cycle occurs when firms in the originat-
ing country cease manufacturing the now standardized product and
the domestic market is serviced instead by imports from foreign pro-
ducers. In East Asia this final stage of the cycle has not materialized.
The unwillingness of Japanese producers to abandon products or to
import foreign production back into Japan on a significant scale has
caus ed trade triangles to become the dominant pattern—triangles
where inputs are purchased from Japan (and increasingly from Taiwan
and Korea), processed in the NICS and to an increasing extent in ASEAN
and China, and exported to third country markets rather than to
Japan. Had the product cycle gone full circle, then a more self-con-
tained yen bloc would have emerged as exports of final manufactured
products flowed back to Japan from other countries in East Asia. As
Frankel and Petri have demonstrated, the intensity of intraregional
trade in East Asia (measured as a percentage of total trade), despite
having increased in the second half of the 1980s, is substantially less
than in previous periods and is much lower than that of the European
Community. The failure of the product cycle to go full circle provides
much of the explanation for why a yen bloc has not emerged.

There is of course no good reason in economic theory why any bilat-
eral trade relationship should be in balance. Countries have different
factor endowments; trade imbalances may be offset by capital flows.
But this is an instance where sound economics does not necessarily
make for sound politics. Bilateral trade imbalances, particularly in
manufactured goods, are inevitably of great political salience (espe-
cially in a period when low rates of overall world economic growth
make the politics of domestic economic adjustment more difficult).

The regionalization of production in East Asia has had two promi-
nent consequences for trade patterns. First, all the states in the region

77 Jeffrey Frankel, “Is a Yen Bloc Forming in Pacific Asia?” in R. O’Brien, ed., Finance and the Inter-
BEYOND PRODUCT CYCLES

(with the exception of China, where, as deemed necessary, the state has strictly controlled imports) experienced growing trade deficits with Japan as their imports not only of Japanese consumer goods but also of capital goods and components used in domestic manufacturing rose in the second half of the 1980s (see Table 1).

Studies of foreign subsidiaries of Japanese corporations have shown that they tend to import a larger percentage of inputs from their home country than do branches of TNCs domiciled elsewhere.78 The average reliance on imports from Japan by Japanese affiliates in all manufacturing sectors in Asia (including food and fuel products where there is a high percentage of local procurement) is over 40 percent. Japanese affiliates in machinery manufacturing in the Asian NICS and ASEAN source close to half of their inputs from Japan (see Table 2). The dependence on Japan for capital equipment is even higher—more than 75 percent for affiliates in ASEAN in the late 1980s.79 The growth in imports of capital and intermediate goods in the second half of the 1980s was not offset by compensating increases in exports of manufactured goods to Japan. Although such exports did increase, their volumes lagged well behind the growth of imports from Japan. The consequent trade imbalances heightened tensions between Japan, on the one hand, and Korea, Taiwan, and the ASEAN states, on the other.

The growth of Korean and Taiwanese investment in Southeast Asia has also been accompanied by growing trade imbalances. Although equivalent data on sourcing from home countries are not available for NIC subsidiaries in ASEAN, data collected for a World Bank survey show that the subsidiaries of NIC-based companies in Asia rely heavily on imported capital equipment and components. The study found that 90 percent of the NIC subsidiaries surveyed imported more than 50 percent of their inputs; 37 percent imported all of their raw materials, components, and capital goods.80 The rapid growth in the deficit in trade in manufactures between Malaysia and Thailand, on the one hand, and Korea and Taiwan, on the other (see Table 1), can be attrib-

78 Mordechai E. Kreinin, "How Closed Is Japan’s Market? Additional Evidence," *World Economy* 11 (December 1988). Sakong reports data from a Korean Ministry of Finance study that show that in 1986, 74 percent of the imports of the subsidiaries of Japanese corporations operating in Korea came from Japan, 8 percent from the United States, and 18 percent from other countries. For U.S. subsidiaries 50 percent of imports came from the United States, 20 percent from Japan, and 30 percent from other countries. Sakong (fn. 22), 124, table 5.10.


80 World Bank (fn. 28), 24, table 8.
The second major repercussion that regionalization of production in East Asia has had on trading patterns is seen in the dramatic changes in balances in manufactures trade between the region and the United States, and to a lesser extent the European Community (see Table 1). Whereas in 1985 both Malaysia and Thailand ran trade deficits in

<table>
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<tr>
<th>Sector</th>
<th>NICS</th>
<th>ASEAN</th>
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<tbody>
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<td>Precision Machinery</td>
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**Table 2**

**Procurement Practices of Japanese Subsidiaries in Area**

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<td>Precision Machinery</td>
<td>31.0</td>
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</tbody>
</table>

**Table 1**

**Balance of Trade in Manufactures**

<table>
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<th>EC</th>
<th>Korea</th>
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<td>Singapore</td>
<td>(-3,695)</td>
<td>(+456)</td>
<td>(-786)</td>
<td>(-238)</td>
<td>(-444)</td>
</tr>
<tr>
<td></td>
<td>-11,820</td>
<td>+3,051</td>
<td>+467</td>
<td>-1,198</td>
<td>-698*</td>
</tr>
</tbody>
</table>

**SOURCE:** UN Trade Tapes accessed through the International Economics Data Bank, Australian National University.

*Data in parentheses are for 1985; other data are for 1992 (except where marked with an ' where data are for 1991). Trade balances are for countries in the left column with trading partners in the other columns.*
manufactured goods with the United States, in the early 1990s both were earning surpluses substantially in excess of $2 billion annually. Over the same period, China, Malaysia, Thailand, and Singapore all turned their trade deficits in manufactures with the European Community into surpluses.

Korea and Taiwan similarly increased their trade surpluses in manufactures with the European Community. Their manufacturing trade surpluses with the United States grew much more slowly in the post-Plaza period, however, as increasing pressure was applied by the Reagan and Bush administrations for restraints on their exports and simultaneously for the opening of their markets to American goods. By 1990 the value of manufactured exports from Korea and Taiwan to the U.S. had fallen back from the peaks reached in 1987–88. The fall in the nominal value of these exports by the end of the 1980s is all the more striking given the appreciation of the Korean and Taiwanese currencies against the dollar. The decline in its trade surplus with the United States has been particularly problematic for Korea, which has no significant alternative market to offset its growing trade deficit with Japan. Taiwan, by contrast, has not only been more successful in maintaining its trade surplus with the United States but has also made significant sales of inputs to the burgeoning industry of mainland China.

These aggregate data illustrate two facets of the regional political economy in the second half of the 1980s. First, political pressure on the Northeast Asian states to reduce their trade surpluses with the U.S. has had a direct impact on the regional pattern of trade, and in particular has encouraged the movement of production to Southeast Asia and China. Second, the data show that the dominant pattern in regional trade has been the emergence of trade triangles—the import of components and capital goods from Japan and the Northeast Asian NICs and the export of finished products to the United States and the European Community—because the incomplete nature of the product cycle has not led to compensatory increases in Japanese imports of these finished products.

Debate continues to rage about Japan’s pattern of trade. Alternative econometric models lead to different conclusions as to whether the volume of Japan’s imports is unusual for an industrialized country once account is taken of Japan’s resource structure and its geographical location. We share Paul Krugman’s view that “it seems fair to argue that, in the general debate, the view that Japan does import less than one might have expected wins on points. . . . On the whole, then, the conventional wisdom survives crude empirical testing more or less in-
Only a small percentage of the production of Japanese affiliates in the NICs and especially in ASEAN is exported back to Japan. In fiscal year 1989, for instance, only 10.4 percent of the sales of Japanese subsidiaries located in ASEAN were to the Japanese market. In contrast, exports to other markets accounted for over 25 percent of sales. And of the more than 50 percent of sales that were made to the “local” market, many of these products were undoubtedly subject to further processing within regional production networks and then exported.

The consequence is that the United States, in particular, has had to bear the majority of the costs of adjustment to industrialization in East Asia (as demonstrated by the data in Table 3). The U.S. share in East Asian exports of manufactures has fallen for most countries since 1985, with the decline of the U.S. dollar relative to the yen. But for all the countries listed in Table 3, the United States continues to absorb a much larger percentage of manufactured exports than Japan does. Not all of this can be attributed to the relative size of the two economies (Japan’s GDP in 1989 was estimated to be 55 percent of that of the United States). Only for South Korea and Thailand does Japan absorb half the level of exports that the United States does; for most of the other countries the ratio is closer to a quarter. The Japanese market’s share of manufactured exports from China, Korea, and Singapore in 1992 was actually below what it was in 1980.

A desire to circumvent trade barriers and reduce trade tensions with the United States was a primary motivation for the post-Plaza wave of foreign investment from Northeast Asia. The danger for the host countries is that they will become embroiled in similar tensions as they become significant factors in the U.S. trade deficit, as has happened with the People’s Republic of China. Japan’s share in the manufac-

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82 Takaoka and Satake (fn. 79), 17.

83 The share of local, Japanese, and other markets varied considerably across sectors. Local sales were particularly high in transport machinery (over 90 percent) and iron and steel (over 85 percent). It is particularly noteworthy that sales to other export markets were highest (over 35 percent) for the most rapidly growing sector of Japanese manufacturing investment—electrical machinery. See Takaoka and Satake (fn. 79), 17; and additional data from Ura (fn. 79). Japanese subsidiaries operating in Korea do send a larger percentage of their exports to Japan. In 1985, however, one-third of the exports of Japanese subsidiaries in Korea went to the U.S. market. Sakong (fn. 22), 122, table 5.8.

84 In 1992 the United States had a trade deficit of $12.5 billion with the member states of ASEAN (excluding Brunei). The deficit with the People’s Republic of China in the same year was $18.3 billion. Malaysia contributed 4.7 percent of the total U.S. trade deficit; Thailand 4.2 percent; Indonesia 2.1 percent; Singapore, 2.0 percent; and the Philippines 1.9 percent. Data from United States Information Service, Wireless File, May 17, 1993.
Table 3

U.S. AND JAPANESE SHARES IN EAST ASIAN EXPORTS OF MANUFACTURED GOODS

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>Japan</th>
<th>U.S.</th>
<th>Japan</th>
<th>U.S.</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>34.1</td>
<td>2.8</td>
<td>46.0</td>
<td>3.3</td>
<td>28.6</td>
<td>4.3</td>
</tr>
<tr>
<td>South Korea</td>
<td>29.0</td>
<td>13.3</td>
<td>38.6</td>
<td>10.1</td>
<td>25.1</td>
<td>12.8</td>
</tr>
<tr>
<td>Singapore</td>
<td>21.0</td>
<td>8.1</td>
<td>32.5</td>
<td>3.6</td>
<td>26.0</td>
<td>5.7</td>
</tr>
<tr>
<td>Taiwan</td>
<td>38.3</td>
<td>7.3</td>
<td>53.7</td>
<td>6.3</td>
<td>35.2</td>
<td>8.3</td>
</tr>
<tr>
<td>China</td>
<td>9.0</td>
<td>11.0</td>
<td>18.9</td>
<td>10.8</td>
<td>23.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Malaysia</td>
<td>31.7</td>
<td>5.7</td>
<td>41.3</td>
<td>5.9</td>
<td>29.1</td>
<td>7.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>17.5</td>
<td>7.1</td>
<td>29.4</td>
<td>6.8</td>
<td>31.7</td>
<td>16.3</td>
</tr>
</tbody>
</table>

SOURCE: Calculations from UN trade tapes accessed through the International Economic Data Bank, Australian National University.

* Manufactures defined as STC 5-8 less 67 and 68.

tured exports of most countries in the East Asian region has grown in the period since Plaza, but not at a sufficiently rapid rate to satisfy either Washington or the governments of the East Asian countries and certainly not nearly fast enough to offset its sales of capital goods and components. Despite the realignment of currencies following Plaza, despite the increase in Japan's intraindustry trade with the NICs, and despite the success of other East Asian countries in increasing their manufactured exports to the Japanese market, the failure of the product cycle to reach its final stage has ensured that the United States continues to bear the bulk of the burden of adjustment to the industrialization of the countries of East Asia—with the inevitable concomitant trade tensions.

CONCLUSION

We have argued that the emerging political economy of East Asia should be understood in terms of the relationship between changes in the global political economy, changes in the political economy of individual states, and changes in the organization of production. A growing body of literature emphasizes how patterns of state-society relations vary across countries that have been labeled NICs.85 We are

attempting to build on this literature by linking comparative and international political economy perspectives through a microlevel focus on the organization of production and technological innovation.

Despite the growing literature on the diversity of the East Asian experience, the analogy of flying geese still remains commonplace. Our intention has been to demonstrate why the analogy, as well as other approaches that suggest a unilinear path of industrial transformation, should finally be laid to rest.\textsuperscript{86} Not only has the pattern of industrialization in Korea and Taiwan been dramatically different from that pursued by the original goose, Japan, but it in turn differs significantly from the current rapid growth in manufacturing exports in Southeast Asia. The flying geese analogy fails to note that the changing global political economy and developments in technology and production techniques preclude a homogenization of industrial structures. Although Korea and Taiwan, and more recently Malaysia and Thailand, may be exporting products in the same industries in which Japan enjoyed export success a few years ago, the context in which they are doing so is substantially different, in terms of both industrial organization and geopolitics.

Contrary to the predictions of the flying geese argument, the industrial exports of these countries remain heavily dependent on capital goods and technologies imported primarily from Japan. In Korea and Taiwan original equipment manufacturing is still dominant in high-technology industries. In Southeast Asia export-oriented manufacturing is conducted overwhelmingly by the subsidiaries of transnational corporations. This dependence on Japanese technology, coupled with the dependence of Japanese corporations on other locations in the region for lower-cost labor for assembly operations, has produced a new regional division of labor that is based not on national economies but on regionalized networks of production.

The emergence of these regionalized production networks has profound implications for the way in which we study political economy. The manner in which production structures are linked together across countries is influenced by and in turn also influences national politics. As we have suggested in this article, a focus on the production network alerts us to the limitations of readily available national data such as

\textsuperscript{86} The neoclassical theory of growth suggests that economies will converge as they exploit their comparative advantage to pass through successive stages of growth. We find more persuasive the recent endogenous growth theories that emphasize the role of technology in generating increasing returns to scale: rather than convergence, a widening gap may develop between richer and poorer economies. On endogenous growth models, see, for instance, Paul Romer, "The Origins of Endogenous Growth," \textit{Journal of Economic Perspectives} 8 (Winter 1994).
those on trade, investment, and local content. The example of the calculators produced by the Taiwanese company Jinbao is typical of how regionalized production networks are complicating the interpretation of trade and direct foreign investment data. Similarly, the discussion of Malaysia suggests how regional networks of production may render data on “local” content of dubious value. To gain an understanding of how production is now organized within the East Asian region requires moving beyond national data to a study of the linkages effected within networks.

Rather than following product cycle models in focusing on the flow of a specific product in isolation from all others, or perceiving technologies as having linear patterns of diffusion, specific sectors need to be seen as a part of “complexes” of industrial activity. For example, the establishment of a network of production by Japanese electronics producers in East Asia indicates not so much the diffusion of individual products as the way production is linked across countries, involving clusters of companies, many with long-term non-arm’s length affiliations, producing large numbers of interrelated products. The interrelatedness of products is one reason Japanese companies have been unwilling, contrary to the predictions of product cycle theory, to vacate sectors in which products appear to have achieved “mature” status. Changes in production techniques, increased product differentiation, or the advent of whole new technologies can have the effect of “dematuring” specific products. Thus, as research and development becomes increasingly more nonlinear, abandoning production of certain mature products carries the risk of losing know-how in manufacturing techniques or component manufacturing that might have been critical to seemingly nonrelated future production.

Are we dismissing the flying geese analogy prematurely? Might not other East Asian countries ultimately follow the Japanese path as their technological capabilities mature? We think not. To answer in the affirmative would be to ignore the important changes that have occurred in the global political economy and in production techniques in the last twenty years. Steeper learning curves, increased costs of research and development, and the necessity of locating within an established distribution network all exacerbate the problems faced by economies seeking to reduce their technological dependence. As we have shown, even the most advanced NICs continue to depend very heavily on imported technologies for their production of sophisticated manufactures. Industrialization in East Asian countries has occurred in different historical periods and under different circumstances. This has
brought about a partial diffusion of industrial organization and technological capabilities, and it has produced new hierarchies in the regional division of labor.

To acknowledge the existence of hierarchies and dependencies is not to deny that they may be mutually beneficial to participating actors. The regionalization of production has opened new opportunities for entry into networks producing sophisticated manufactures. Many Korean and Taiwanese companies have made significant progress in industrial deepening, in applying advanced technologies, and in upgrading the skills of their labor force. Contrary to the skepticism of some dependency theorists, the subsidiaries of transnational corporations in the electronics industry in Southeast Asia have generally not behaved in a footloose manner. Even if low-cost labor was the initial attraction for such investors, they now seem to be equally concerned about retaining access to the skilled labor pool that has been established.\(^\text{87}\) The recent experience of Southeast Asia as well as of Korea and Taiwan points to the important role that production networks may have in helping to resolve collective action and other developmental problems. A focus on production networks is an essential complement to research on the state and on domestic private actors.\(^\text{88}\) And inevitably it leads to a focus on bargaining between the various local and transnational parties.\(^\text{89}\)

Dependency within regional production hierarchies may facilitate increased productivity and enhance skill formation. But it can also inhibit indigenous innovation or, as is often the case in East Asia where foreign suppliers of key inputs are also competitors, delay supply of new technologies and thereby affect the speed with which new products are developed and marketed. Dependency can also give rise to political problems. Bureaucrats and politicians, in particular, can be acutely sensitive to dependency and can perceive it as diminishing their policy options or state power. Dependency and how it is perceived are also salient in the formation of the identity of a political community. A historical legacy of oppression, such as that suffered by Koreans at the hands of Japanese imperialism, can be a crucial ingredient in the identity formation of a political community. Subsequent technological dependence on Japan in a different historical context, as

\(^{87}\) See Lim and Fong (fn. 69).

\(^{88}\) For an argument stressing the need to broaden research horizons on collective action problems beyond the focus on state strength, see Richard F. Doner, "Limits of State Strength: Toward an Institutionalist View of Economic Development," *World Politics* 44 (April 1992).

manifested in the large bilateral trade deficits that characterize Korean-Japanese trade, may continue to be politically unacceptable because it is perceived as a threat to the shared identity of large numbers of Korean people, and to their understanding of their history. This is not necessarily a threat to economic “development” or the material well-being of the community (although it may be), but it is just as important in precipitating political action. In other words, the noneconomic aspects of dependency matter. It is in this context that the failure of the product cycle in East Asia to come full circle—with the resulting large imbalances in trade both within the region and between the region and the United States—takes on increasing political importance.