

**Trojan Horse or Boomerang:
Two-Tiered Investment
in the Asian Auto Complex**

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THE EMERGENCE OF MULTI-TIERED ASIAN PRODUCTION NETWORKS

The last decade has witnessed a momentous transformation in the political economy of East and Southeast Asia. From the 1950s until the early 1980s transnational production played a limited role in the strategies of Northeast Asian governments and firms. Ubiquitous policies of protection and promotion aimed to increase *domestic* investment, production and exports. Governments discouraged outward investment through financial controls, particularly over foreign currencies; they limited inward foreign investment to narrowly confined niches, and then often subjected it to onerous restrictions to prevent foreigners from gaining a major foothold in the national economy. The few exceptions involved areas in which domestic production was inadequate: investments in Southeast Asian raw materials and energy; investments by Japanese and Western firms in Korea and Taiwan for some labor-intensive products to be sold in local or third-country markets (but rarely in Japan); and a handful of high-tech investments by Western firms such as IBM which enjoyed such strong patent positions that they could not be forced to license their technology.¹ Since the mid-1980s the combination of rapid currency appreciation, rising costs of labor, land and pollution control in Northeast Asia, and liberalizing economic reforms in Southeast Asia led to a huge surge of direct foreign investment, mainly for the production of labor-intensive manufactured goods. The focal point of Northeast Asian economies shifted from export-led growth based on protected domestic markets to management of regional production networks spread throughout Asia.

For some this surge of investment implied that Japan was forming a hard and exclusive “yen bloc” in Asia to counter the North American Free Trade Agreement and the European Union. American and European firms, it seemed to many, risk exclusion from the most dynamic and potentially largest market in the world.² The proposals of Malaysia's Prime Minister Mahathir to “look East” and create an East Asian Economic Caucus deliberately excluding all western countries, proposals that Japan was reluctant to repudiate, did little to inspire confidence in the future openness of Asia.³ At least through the early 1990s the evidence about the possible emergence of an exclusive and Japanese-dominated trading order in Asia remained ambiguous. Gravity models which corrected for changes in relative sizes of the economies of trading partners showed no increase in propensity to trade within Asia rather than with the outside world, and the yen showed few signs of displacing the dollar.⁴ More recent work finds evidence of a small

increase in the tendency of Asian nations to trade with each other even after correcting for the "natural" increases in concentration that stem from rapid growth.⁵ Some business analysts, notably a senior economist at Japan's prestigious Nomura Research Institute, predict and advocate increasing replacement of the dollar by the yen in Asia.⁶ Thus, though the prospects for a hard and exclusive 1930s style currency bloc are slight, the Asian economies are increasingly integrated. Instead, most observers agree that Japanese corporations have played a crucial role in organizing the division of labor in East and Southeast Asia, and are well ahead of American and European firms in the region.⁷ Outward foreign direct investment and management of the regional production networks it has spawned are now crucial elements of national and corporate strategies.⁸

Japan is not alone in this wave of investment. Hong Kong, Taiwan, Singapore and Korea have also become major investors. However, much less attention has been paid to the interactions among the different tiers within this emerging hierarchy of Asian production networks. Direct foreign investment (DFI) from Taiwan is relatively recent, and that of Korea even more so. Most accounts of DFI from the Newly Industrializing Countries (NICs) examine it in conjunction with the development of "greater China,"⁹ or treat it as a novel example of "multinationals from developing countries,"¹⁰ somewhat along the lines of Dr. Johnson's account of a dog walking on two legs.

One interpretation is statist: second-tier direct foreign investment in Asia represents the extension of closed corporate networks beyond Japan's borders.¹¹ In this view, investments from Japanese-related firms in Taiwan or Korea into Malaysia, Indonesia or Guangdong are merely a way of cutting costs of land and labor, while ultimate control over technology, design, procurement and marketing remains in Japanese hands. Taiwan has depended upon Japan for 60% of its technology licenses.¹² Though Korea has attempted to impose more stringent limits on Japanese investment and licensing, if anything it has been even more dependent on inputs of Japanese parts and technology for its export growth.¹³ The Japanese government and Japanese firms share a determination to maintain high value-added production in Japan. Japanese scholars and officials are fond of describing Asian growth as reminiscent of a flock of tightly aligned "flying geese" in which Japan is merely the lead goose. The unstated implication, however, is that Japan will remain in the lead indefinitely and across all sectors. Bernard and Ravenhill go further, arguing that Japan is in a fundamentally different position from the other Asian

economies, since it alone commands a fully developed and integrated industrial economy. Given Japanese control over design, production technology and high quality inputs the rest of Asia has but little choice to align with the Japanese.¹⁴

In principle, according to this line of analysis, strong industrial policies elsewhere could counteract much of Japan's advantage and carve out space for more independent strategies, but in practice few governments in the region have the necessary capacity. Moreover, Japanese DFI has already pre-empted many of the sectors into which these countries might expand, and has been accompanied by large amounts of overseas development assistance (ODA), and technical assistance from the Japanese government, Japanese firms and business associations. Japan is the world's largest aid donor, and the large majority of its aid and technical assistance flow to developing countries in Asia. The motivations and operation of this Japanese development aid have drawn a great deal of critical scrutiny from both Asians and other foreigners. Critics have charged that the terms of aid have been unusually stringent, with Japanese aid directly or indirectly "tied" to purchases from Japanese corporations. Defenders assert that the terms of Japanese aid have steadily improved, and claim that Japanese aid is as open as that of most Western donors.¹⁵ From the perspective of those who emphasize the role of Japan in organizing production networks, this debate risks missing the point. Whether or not the benefits of Japanese aid in the form of new harbors and electrical generating facilities are open to use by firms from third countries, there is little question that they are designed in large measure to facilitate the activities of Japanese firms operating in Southeast Asia and increasingly China, and that the Japanese firms are in a position to take disproportionate advantage of them. The Japanese government and business community use foreign aid, diplomatic pressure, technical assistance and the prospect of further investment to encourage local policies conducive to Japanese investments, especially support of small and medium-sized suppliers in the auto and electronics industries, Japan's two most internationally competitive sectors. Japanese aid and technical assistance does not encourage the formation of large firms that might compete directly with Japan, nor other sectors which are of less interest to Japanese investors. Thus, from the statist perspective, Asian development resembles not a flock of flying geese, but a giant Canadian goose leading a flock of timorous canaries.

The implication of this approach is that DFI by firms from the NICs either will not occur in the same sector or will be used as a proxy for Japanese investment. NIC firms which have

received Japanese investment will act as "global pawns," subordinate to and never challenging their Japanese parents, or as Trojan Horses, stealthily extending Japanese influence and control under the guise of independent investment. Naturally, these scenarios are disturbing to host governments. They are also of concern to Western firms and governments, since it raises the possibility that formerly exclusive Japanese production networks are becoming exclusive Asian production networks, still organized in Japan, and still excluding Western firms from the fastest growing markets in the world.

A second scenario completely reverses this argument, viewing the growth of first and second-tier foreign investment as evidence of a breakdown in the old Japanese production system. In this view, Japanese production networks cannot survive without political protection. Foreign investment is not a preferred strategy, but the result of high costs of land and labor and the strong yen; Japan has lost comparative advantage in many industries and has been forced to invest abroad. Japanese investment and technology transfer have created fierce competitors who are especially suited to operating in low-income and intermediate technology environments typical of developing countries in Asia, just as the Japanese once used Southeast Asia as a low-end export base to build up their prowess to compete with Western firms in advanced country markets. With continual improvements in communication and transportation, technology diffuses more rapidly, while shrinking product cycles compel multinationals to use up-to-date production technology to produce leading edge goods even in facilities located in developing countries. This process of creating competitors through foreign investment is known in Japan as the "boomerang effect": investments thrown into the NICs fly back and strike Japanese firms on the head.¹⁶ Given the ability of host firms to access advanced technology, attempts by Japanese firms to maintain closed and hierarchical production networks are unlikely to succeed; if they do, the cost of continued centralized control may well be rigidity, redundancy and impeded responsiveness.¹⁷ Traditional forms of direct foreign investment may be increasingly passe, replaced by strategic alliances, virtual companies and arms-length contracting relations.¹⁸ If this competitive dynamic proves common, it is comforting to the West--though not, perhaps, to Japan--for it implies that competition across national boundaries is severe, and the chance of exploitation of market power by any one firm, or by a group of firms from one country such as Japan, is greatly reduced. If the magic of the market is melting Japan, Inc., two patterns of investment seem possible. At least in the initial stages of overseas expansion, second tier

investors are likely to target different industries and product segments from their parents, with the Japanese concentrating on higher-technology, higher cost segments, while the newly emerging investors focus on simpler, lower-cost products or market niches.¹⁹ If this interpretation is correct, investors seeking to maximize returns from their unique assets will tend to avoid either competition with or dependence on Japanese firms and Japanese-dominated networks. Over time, this niche approach could give way to boomerang investments, as Japanese DFI strengthens the second-tier countries as direct competitors.

The third scenario posits that the degree of closure and control is not uniformly high, as the statist would have it, nor low, as the global competition model implies, but varies across sectors.²⁰ More independent forms of investment should occur in sectors where new entry is not obstructed by high levels of capital and technological intensity, entrenched and valuable brand names, and a tightly-coupled production process. The destination of final demand may also affect investment patterns: if local demand is sufficient to sustain efficient production, host firms and governments are in a better position than if the product must be marketed to a broad range of countries across the globe, or integrated into a product which requires intensive marketing. Thus, autos, aerospace and pharmaceuticals are likely to present high barriers, while most electronic goods should present fewer problems, and textiles and garments almost no obstacles. The implication of this view for host governments and Western firms is somewhat ambiguous, depending as it does on the height of the barriers among the various market segments, and whether NIC and overseas Chinese firms can come to challenge Japan even in higher tech areas. If so, competition is likely to be dynamic and unpredictable. If not, Japanese firms, supported by the Japanese government, may continue to forge patterns of economic and institutional development in Southeast Asia and China that are congenial to their own strategies, and preserve the most profitable and high value-added activities for Japanese firms.

THE ASIAN AUTO COMPLEX

A key test case for the evolution of production networks in Asia is the automotive sector. Autos constitute a huge and important industrial complex with numerous linkages to supplier and complementary industries such as steel, machine-building, synthetic rubber and auto electronics. If competitive, the auto sector can be a major center of investment; if uncompetitive and protected it can hamper the development of a whole range of associated industries. The auto industry is a major area of direct foreign investment. The size and prominence of the auto complex make host governments anxious to use their control over the local market to induce local production. In larger and more mature economies, global auto makers tend to favor local assembly to fine tune their models for the local market, and to reduce foreign exchange risks. At the same time, autos is a likely case for relatively closed corporate networks. Automotive production involves large economies of scale; demanding quality requirements; and a significant investment in research and development. Auto makers must develop recognizable brand names and a wide-spread service network.

The complex division of labor also leads to significant transaction costs which make integrated production networks especially important in autos. As Oliver Williamson has shown, in conditions of high uncertainty and complexity, recurrent transactions, and large investments in assets dedicated to specific relationships, firms will tend to reject reliance on arms-length market relationships in favor of some form of integration.²¹ In the last couple of decades it has become clear that in electronics and autos, the Japanese reliance on production networks such as manufacturers' *keiretsu* often provide significant efficiency advantages over the traditional patterns of in-firm vertical integration long characteristic of mass production industries in the West.²² Recent research has revealed that the relationship between giant design and assembly firms such as Matsushita or Toyota and the pyramid of sub-contractors from which they procure parts is by no means completely one-sided or exploitative: many Japanese sub-contractors come to develop skills unavailable in the "mother" firm, and often assume responsibility for the design and production of whole sub-assemblies.²³ Nonetheless, overall design, production of key parts, marketing and after-service are controlled by the final assemblers. Moreover, the gap in resources between "mother" firms and regional suppliers is typically much larger in developing countries whose firms generally bring far fewer special skills to the table, and often find

themselves relegated to the second and third tiers of the pyramid by first-rank suppliers brought along by the parent firm from Japan.

Japanese firms loom particularly large in the auto sector. Japan is the world's leading producer of autos, motorcycles and advanced motor parts. Japanese auto companies invented "lean production" and are the acknowledged masters of the rapid development of new models.²⁴ Japanese firms are especially dominant in Southeast Asia. Japanese brands account for 80-90% of passenger car sales in the countries of the Association of Southeast Asian Nations (ASEAN), and Japanese companies have assembled cars and motorcycles in the region for decades.²⁵ In recent years, local promotional policies, the growth of Asian markets and the rise of the yen have induced Japanese firms to invest more heavily in Southeast Asia. Under Japanese urging, ASEAN has developed since 1988 a "brand-to-brand complementation scheme" that allows Japanese firms to ship auto parts across ASEAN nations with very low tariffs. Mitsubishi Motors has been the most aggressive in developing a genuine production network in Southeast Asia. Honda and Suzuki have been active in both cars and motorcycles. In the last few years even Toyota, long the most committed of all Japanese auto makers to its local production base, has begun creating a genuinely transnational network. In Japanese auto circles, the hottest trend is developing low-end "Asia cars" especially for Asian markets, and incorporating high levels of parts interchanges.²⁶ In contrast, American and European makers have very few local production facilities in Asia, and engage in almost no intra-regional exchanges.

After Japan, the largest source of foreign investment in Asia is Taiwan.²⁷ A former colony of Japan, Taiwan is an upper-level NIC with a moderate-sized population (21 million) and a fairly high level of income (per capita GDP of \$12,000 in 1995)²⁸ Taiwan is a major host of Japanese foreign direct investment across a broad range of industries. Unlike the case in Korea, Taiwan's auto sector is also the site of a great deal of Japanese investment (the significance of this distinction is discussed below). Taiwan is ideally placed to serve as a bridge between Japan and the rest of Asia, particularly the Sinic parts. It is intermediate between Japan and the rest of Asia in income and technology. Culturally, Taiwan is akin to southern China and the overseas Chinese descended from that region, but Japanese language and culture are more widely known and respected in Taiwan than anywhere else in Asia. To what extent have firms in the Taiwan auto complex undertaken direct foreign investment in Asia? And how have these second-tier

investments furthered, challenged, or bypassed the strategies of the Japanese parent companies?
 Based on the previous discussion, we can identify four likely scenarios.

FIGURE ONE

Scenarios

	Japanese Producer	Taiwan Affiliate
Global Pawn	Uses direct foreign investment (Taiwan affiliate) to gain access to local market	Serves local market; No DFI (may export some parts)
Trojan Horse	Uses Taiwan affiliate to service local market and to invest in third market (alone or jointly)	Engages in DFI as proxy of Japanese mother company
Niche Player	Uses DFI to access local market	Engages in independent DFI, but avoids direct competition with mother company
Boomerang	Uses DFI to access local market	Engages in independent DFI in direct competition with mother firm

THE FIRST TIER: JAPANESE INVESTMENT AND THE DEVELOPMENT OF THE TAIWAN AUTO SECTOR

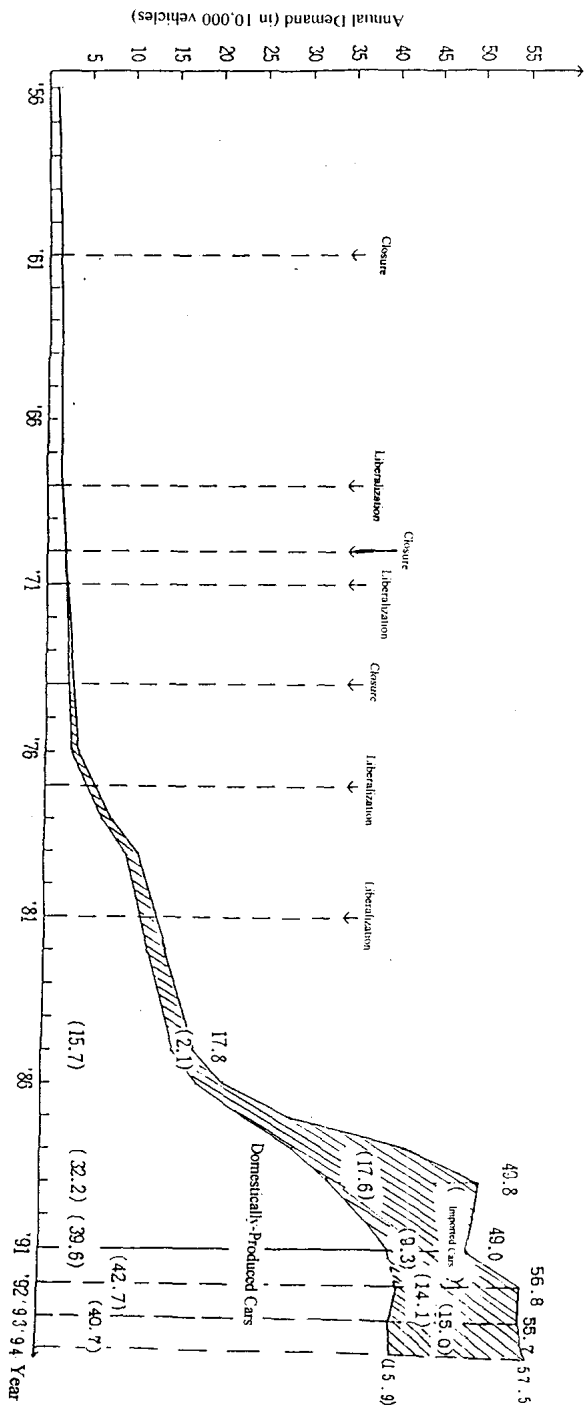
Historically, Japanese firms have a strong presence in each of the major segments of the automotive sector in Taiwan: auto assembly, motorcycles, and parts. Four of the five leading auto assemblers depend upon Japanese parents for their models; until recently, the last firm, though owned by Ford, assembled models from Japan's Mazda. All of the leading motorcycle firms are linked to Japanese producers. Japan has been the overwhelming source of parts and technology for both autos and motorcycles. Over the past decade, however, assembly, part and motorcycles have followed increasingly divergent paths.

AUTO ASSEMBLY: INCREASING DEPENDENCE ON JAPAN

Japanese dominance is most complete in auto assembly, despite decades of effort by the Taiwan government to foster an independent industry. Policy toward the auto industry followed a sequence typical of developing countries. In the initial stages of industrialization, the government imposed high tariffs and stiff local content regulations to encourage local production via direct foreign investment and licensing. In the mid-1980s, tariffs on imports of passenger cars were still as high as 65% and assemblers were required to achieve 70% local content.²⁹ Imports of Japanese cars were banned outright. These restrictions caused Japanese-affiliated assemblers to import knocked-down kits to accumulate assembly experience and a rudimentary supply network. The government also fostered the development of motorcycles, both to satisfy the requirements of the middle-income local market, and to increase the base of parts suppliers for the auto industry. Next, as local firms accumulated experience, the government attempted to increase local contents requirements. Finally, when these policies proved inadequate to make local firms competitive, the government attempted to rationalize production and increase economies of scale.³⁰

Despite the relatively high level of manufacturing capabilities in Taiwan, two factors impeded the implementation of these policies. First, policy in the auto sector was uncharacteristically weak and vacillating. At times the government tried to use import liberalization to impose market discipline, while at other times it applied more stringent local

content regulations and import controls. This vacillation attracted great criticism in Taiwan. Liberals cited autos as a classic example of the futility and high costs of protectionism.³¹ Statists pointed to Korea as an example of the ability of an aggressive and consistent government policy to promote the development of an export-oriented infant industry.³² The only point of agreement among the critics was the incoherence of the policies pursued in Taiwan.



Source: China Motors

FIGURE TWO

The most common explanation for the unusual inconsistency of policy in autos is interest group politics: local assemblers were able to convince the government to avoid either full-scale liberalization.³³ This explanation is not convincing: while existing producers certainly lobbied the government, there is little evidence that they were able to exert any more influence than many other industries facing liberalization. In the mid-1960s the government allowed a host of new producers to enter the market, despite the efforts of pioneers such as Yulong to exclude them. And in general, before the democratization of the late 1980s business was not able to exert a significant influence on government policy.³⁴ A more likely explanation is the conflicting motivations within the government leadership itself.³⁵ The Ministry of Economic Affairs, and particularly its Industrial Development Bureau, favored promotion of autos as a strategic industry and potential source of exports. The IDB tried to avoid reliance on Japanese technology, and was skeptical of the possibilities for developing parts without an independent assembly industry. The military, Ministry of Foreign Affairs and top party leadership were particularly concerned with the diplomatic and military implications of auto policy: they wanted to develop the domestic industrial base and strengthen alliances with foreign MNCs such as Ford, GM, Nissan and Toyota. They were less concerned about efficiency, consumer welfare, or even export potential. Finally, economists in the Council for Economic Planning and Development (CEPD) and quasi-governmental think tanks cast doubt on the viability of the auto industry. They advocated import liberalization, with at most promotion of those auto parts in which Taiwan had a potential comparative advantage. The difficulty of promoting autos in a small, developing country, and the shifting balance of influence among these groups resulted in inconsistent policies. Closely related to this vacillation was the government's unwillingness to encourage the development of large private business groups along either Korean or Japanese lines. The Kuomintang (KMT), Taiwan's quasi-Leninist ruling party preferred to keep a balance between state-owned enterprises, foreign investors, and small and medium-sized private firms, and to preserve another balance between promotional policies and market competition. These balances worked well in sectors such as textiles, electronics and petrochemicals, but prevented the attainment of economies of scales in autos.

The combination of limited market size, high tariffs and inconsistent policies led to predictable results: inefficiency, high prices, and a fragmented market with too many brands and models. The ban on Japanese imports had perverse consequences. The ban was designed to

avoid Japanese domination, limit Taiwan's chronic trade deficit with Japan, and encourage technology transfer. It was also seen as a way to reduce Taiwan's embarrassing trade surpluses with Western countries, and to give an advantage to American and European auto producers and indirectly to Western governments whose diplomatic support Taiwan eagerly sought. Ironically, by blocking access of Japanese firms to the local market, the ban succeeded in creating even greater reliance on Japan: all but one of Taiwan's auto leading producers were affiliated with Japanese firms, and the local content regulations were inadequate to prevent reliance on Japan for virtually all high value-added parts. Economies of scale in production were impossible to attain, so firms concentrated on covering as wide a spectrum of local demand as possible.

Frustrated with the failure of protected local assemblers to grow up, the Economics Ministry tried to broker a joint venture between state-owned China Steel and a major Japanese producer to produce 200-300,000 small cars per year. Taiwan imposed unrealistic demands to combine high export rates with high levels of local content, and eventually the chosen firm, Toyota, pulled out of the negotiations. The government then retreated to a compromise approach. Beginning in 1985 it gradually reduced tariff rates and local content requirements. By the mid-1990s tariffs had dropped to 30% and local content requirements to 50%.³⁶ The ironic result of this liberalization was an even-greater degree of Japanese dominance. European-affiliated firms declined. As Taiwan prepared to enter the World Trade Organization (WTO), it came under pressure to implement a more drastic program of liberalization. Fortunately for the local auto industry, conflict with mainland China over who would be first to enter the WTO delayed the elimination of local content regulations and opening to Japanese imports.³⁷ Anticipating liberalization, even more Japanese auto firms entered the local assembly market, and existing firms strengthened their hold over local affiliates.³⁸ In 1994 demand for autos reached totaled just under 600,000 units. Domestic production of 420,000 was spread across 11 firms and over 70 models.

AUTO PARTS: ORIGINAL EQUIPMENT VS. AFTER-MARKET

The parts sector contains two distinct segments. The more complex and sophisticated original equipment parts are sold almost entirely on the domestic market to Japanese-affiliated suppliers. Simple, non-moving parts, such as dashboards, bumpers and wheels, on the other hand, are often exported, mostly for after-market sales such as replacements and upgrades, where quality and marketing requirements are less onerous. These parts quickly earned a reputation for low prices and equally low quality. In the United States they became known derisively as "Taiwan tin."³⁹ Over time quality improved somewhat, and the range of products diversified. Exports to Southeast Asia increased as the Japanese yen revalued and local markets boomed. By the mid-1990s, export sales reached two billion dollars, about 40% of parts production.⁴⁰

DISTRIBUTION OF PARTS FIRMS IN THE TAIWAN AUTO INDUSTRY

ITEM	NUMBER OF FIRMS	AVERAGE CAPITAL (NT \$1,000)	AVERAGE NUMBER OF WORKERS
Engine Parts	85	15,915	152
Engine Accessories	40	10,704	94
Electric Parts	45	11,312	118
Transmission, Steering, Brakes	45	12,285	131
Body, Stamping	60	4,774	84
Interior Parts	96	6,671	105
Other	82	4,492	97
TOTAL	453	8,141	113

Source: China Motors

As in the case of auto assemblers, the vast majority of parts firms in Taiwan obtained their technology from Japan, even when that technology originated in the West. A survey found that 95% of technology licenses in the parts industry were signed with Japanese firms.⁴¹ Despite relying on Japanese firms for technology, local parts firms, particularly those producing for the

after-service market are somewhat less dependent on foreign capital than are auto assemblers. One survey of 90 large parts firms indicated that just under half of local firms had foreign capital shares of at least 25%. Over 90% of the foreign investments came from Japan:

Japanese Capital Participation	Percentage of Firms
None	44.6%
Limited (1-25%)	7.8%
Significant (25-50%)	31.1%
High (50-100%)	16.7%

SOURCE: Taiwan Transportation Vehicle Manufacturers' Association

Firms supplying the domestic market are organized very differently from the traditional Japanese pattern. In Japan, auto parts producers tend to be arranged in a supply pyramid, and enjoy long-term relationships with assemblers. Trade relations are usually cemented with small capital stakes, interchange of personnel from assemblers to parts firms, and membership in assembler-based parts associations. Affiliates of Nissan almost never sell to Toyota and vice versa. These vertical or manufacturer's *keiretsu* are the strongest in the auto industry. The relationships are by no means completely exclusive or dependent: except for the Nissan-Toyota taboo, multiple sales are the norm. Suppliers often develop specialized competencies, so that dependence is a two-way street. And suppliers tend to follow a life-cycle in which they gain more competence and sell to more assemblers over time, although they usually retain especially close relations with one firm.⁴² A smaller group of firms producing relatively standardized items such as batteries and wire harnesses remains independent and sells to all assemblers. These firms have been unusual active investors in Taiwan.⁴³

In contrast to the Japanese norm, Taiwan assemblers rarely develop special relations with one firm, and joint development of sub-assemblies is far less common than in Japan. In part, this reflects Taiwan's dependence on Japan for most sophisticated parts, and in part it stems from the degree of geographic concentration in Taiwan: virtually the entire auto industry is located in northern Taiwan within a 90-minute drive of Taipei. Most importantly, though, parts makers in Taiwan sell equally to all assemblers because no single assembler can provide significant economies of scale. Since technical improvements achieved by suppliers diffuse quickly to all

assemblers, the assemblers are reluctant to invest in long-term cooperative arrangements with suppliers. And unlike Japanese auto firms, they have no idea what their suppliers' real costs are. As a result, they generally eschew the long-term contracts used in Japan in favor of American-style contracts involving frequent, price-based negotiations among 3-4 suppliers.⁴⁴ Lack of economies of scale has also prevented a seemingly obvious marriage between autos and Taiwan's highly competitive electronics industry: the industry association tried approaching semiconductor firms about joint ventures to develop new parts for autos, but once the semiconductor makers realized just how limited the local auto market was they declined to participate.⁴⁵

In 1990 the Industrial Development Bureau devised a clever buy-back scheme to encourage Japanese firms to procure parts from Taiwan. Local assemblers that exported to Japan an increasing percentage of their output (or that of their suppliers) in the form of parts would be given the right to import from Japan a certain number of luxury cars with engines over 3000cc. In practice, the Japanese rarely incorporated the parts in domestic cars, but instead rerouted them to "Asia cars" assembled in Southeast Asia. A combination of careful targeting and lucky timing, as the rising yen cut into the cost competitiveness of Japanese parts, resulted in surprising success. Exports of auto parts nominally to Japan increased rapidly. In 1991 parts exported to Japan equalled only a little more than 5% of the value of parts imported from Japan. By 1994 the ratio reached 20%. Ironically, in some ways this policy only strengthened the hands of Japanese mother firms, since they held the key to exports to Southeast Asia, while Taiwan firms without ties to the major Japanese assemblers were left with even fewer options.⁴⁶ In 1986, 60% of Taiwan's auto parts exports of roughly \$770 million dollars moved to the United States, the vast majority of it for after-sale parts, while only 3% went to Japan; by 1994 the share of the \$1.9 billion dollars total bound for the U.S. slipped below 40%, while the proportion headed to Japan topped 10%.⁴⁷ Some of the largest auto parts exporters were subsidiaries of Japanese firms, including Yazaki, a maker of electric wiring harnesses, and the battery maker Yuasa.⁴⁸

The government provided some technical assistance in development of new parts. It also helped coordinate implementation of electronic data exchange and central factory-satellite factory systems between auto assemblers and their suppliers. For a time it implemented a scheme to encourage specialization. While modestly helpful, without the pull of economies of scale none of these programs was able to provide a fundamental breakthrough.

THE TAIWAN MOTORCYCLE INDUSTRY: INCREASING INDEPENDENCE

The motorcycle industry presents precisely the opposite trajectory from auto parts: starting from a position of dependence on Japanese technology, parts and designs, the leading Taiwan producers attained economies of scale and systematically moved to acquire their own parts and design capability. They developed their own brands, and ended technology licenses with Honda, Japan's leading motorcycle producer.

Motorcycles share many important similarities with autos, notably the division of labor between design/assembly firms and an extensive network of sub-contracting. Many parts suppliers sell to both, or begin with motorcycles and move on to autos. At one time or another many of the auto assemblers or auto parts firms produced motorcycles, including Honda, Suzuki and Yamaha in Japan, and Sanyang, Yulong and Yutian in Taiwan. Honda is both a major auto company and the world's largest manufacturer of motorcycles, producing both in Japan and in a number of overseas subsidiaries and joint ventures. Even today, motorcycles are a major business. In the recessionary years of the early 1990s Honda earned more profits from motorcycles than automobiles.⁴⁹ In Taiwan, leading motorcycle producer Guangyang has consistently been the most profitable producer in the auto complex.

As with autos, policies intended to protect and promote Taiwan's motorcycle industry initially led to a fragmented industry in which all producers depended for technology and advanced parts on foreign partners, the vast majority of them Japanese. Two major differences in the product and market, however, have led to very different types of production networks and competitive balances. First, motorcycles are much cheaper. Consumers in developing countries can afford motorcycles long before they start buying automobiles. Second, motorcycles are also simpler to build and service than autos, and the barriers to entry are smaller. Even Taiwan's medium-sized firms were able to become major motorcycle producers.

These differences in the nature of the market were reinforced by differences in policy. Since the trade-offs among policy goals were less restrictive, the government imposed stricter and more consistent restrictions on trade and investment in the motorcycle industry than in auto assembly. From the early 1960s the government essentially banned imports.⁵⁰ Almost by accident, the government also imposed a de facto restriction on the range of models: the Ministry

of Transportation refused to license motorcycles with engine displacements over 150cc. The ban was first imposed after the oil shock as a way to limit consumption of luxury goods and imported petroleum; later the size restriction came to be seen as a useful adjunct to traffic and parking policy. As a crucial side-effect the restriction helped build economies of scale by restricting production to small models. The Taiwan firms increasingly specialized in just two sizes, 50cc and 125cc. Almost all followed scooter designs.

Japanese (and to a much lesser extent Italian) motorcycle companies reacted to local restrictions by licensing or investing directly. The Taiwan government discouraged large capital shares, so the Japanese firms used multiple licenses to control their Taiwan affiliates. Licensing agreements all included various restrictions on exports. The Japanese firms were also much more aggressive in overseas investments in motorcycles than in autos. Honda, in particular, established joint ventures to produce motorcycles in a number of other Asian countries, including Thailand and Indonesia. Local firms originally showed little interest in upgrading or changing their profitable relationship with Japan. Motorcycle assembly was easy and profitable, and demand expanded rapidly. Sanyang developed a group of dedicated suppliers around its northern Taiwan base, while Guangyang's suppliers clustered around its assembly factory in Gaoxiong, the industrial center of southern Taiwan. Like Japanese auto makers, they pushed their suppliers to increase their capacities and undertake a larger share of design and development. For a few of the more complex parts the two companies procured from the same suppliers; in one early case they co-invested with Honda in a supplier. Investments in parts capacity in turn reduced costs and stimulated greater demand. Compared to autos, a smaller group of firms (five, of which three dominated), with limited capital from Japan, produced a much narrower range of products (two basic sizes) in larger quantities.

FIGURE 3

FIRST AND SECOND TIER INVESTMENTS
IN THE TAIWAN MOTORCYCLE SECTOR

FIRM	Guangyang	Sanyang	Yamaha Zhanye	Tailing	Others (6)	TOTAL
BRAND	Kymco	SYM	Yamaha/YMT	PGO	Suzuki	--
SALES (1995)						
Domestic	314,531	333,112	358,930	45,953	52,931	3,235
Exports	<u>282,856</u>	<u>177,792</u>	<u>26,218</u>	<u>26,080</u>	<u>17,289</u>	<u>28,488</u>
Total	597,387	495,495	385,148	72,033	70,220	31,723
FIRST TIER DFI (All Japanese)	Honda (22.5%)	Honda (13.5%)	Yamaha (51%)	Itochu (in flux)	Suzuki (50%)	--
SECOND TIER (OUTWARD) DFI	China	Vietnam				
	Jiangsu	Hanoi				
	Hunan	Ho Chi				
	Sichuan	Minh City				
	Indonesia	China				
	Jakarta	Fujian				

SOURCE: Compiled by author; sales data from Taiwan Transportation Vehicle Manufacturers' Association

Despite the favorable sectoral conditions and supportive policies, eventually the market reached saturation. From 1979 to 1986 motorcycle sales stagnated at about 700,000 units per year. Guangyang and Sanyang, the two Honda licensees, looked to exports to power continued growth. Unfortunately for them, Honda refused to allow them to export Honda-designed models to any country in which Honda had a subsidiary plant, in other words, virtually any viable target market.⁵¹ Both firms were in an awkward position, Sanyang because it was completely reliant upon Honda for car assembly, and Guangyang because a financial crisis in 1982 forced it to look to Honda for technical and managerial assistance, in the process giving Honda a 22.5% capital stake. In consort with the Industrial Development Bureau the firms developed three-stage strategies. First they decreased their reliance on Honda parts, investing in many of the more complex parts themselves. The last 10% of engine parts proved a challenge, but by the early 1990s the companies achieved virtually 100% self-sufficiency in parts. The next step was to develop an independent design capacity so as to avoid paying the higher royalty fees for exports (reportedly 4%, vs. 2% for domestic sales).⁵² Sanyang developed a design and development center of 300 people; Guangyang soon followed with 200 employees and plans for a drastic expansion. Most models were completely designed in Taiwan.

As their capacities increased, the firms bargained with Honda to remove export restrictions and lower royalty fees to reflect the decreased reliance on Honda's technology. The Industrial Development Bureau assisted by refusing to renew the licensing agreements until the export restrictions had been lifted. The agreements expired at the end of 1994. Since the locals were essentially independent in parts and designs, and were exporting under their own brands, Honda could do little.

The changing brand names utilized by the Taiwan companies provide vivid evidence of their evolution from dependence on Japan, to focus on the domestic economy, to emergence as significant exporters and international investors. Originally brand names followed the foreign parent. As the companies began to design their own models, they switched to Chinese names, written in either Chinese characters or roman letters, to appeal to Taiwan consumers. In the 1990s they all adopted English acronyms as brand names for the world market. Only Guangyang and Sanyang, however, removed initials identifying their Japanese parents:

FIRM	INITIAL FOR. BRAND	NATIONAL BRAND	NEW INTL. BRAND
Guangyang	Honda	Guangyang	KYMCO
Sanyang	Honda	Sanyang	SYM
Yamaha	Yamaha	Yamaha	YMT
Zhanye	Piaggio	Zhanye	PGO

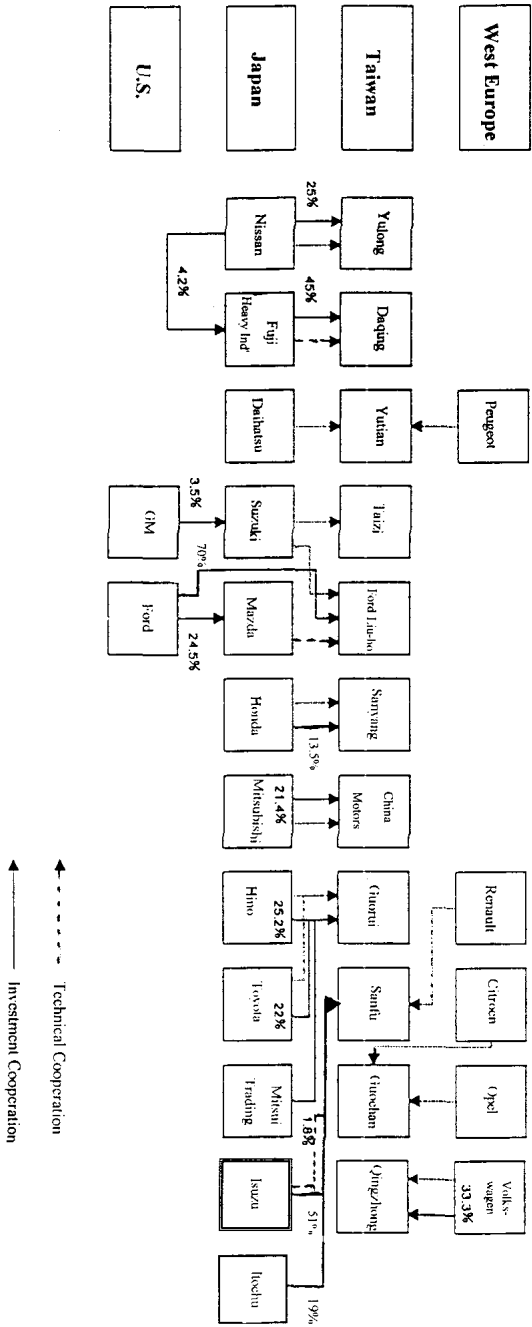
In addition to its help with license negotiations, the Taiwan government also promised to support any firms which made a serious commitment to independent design and exports. In practice this meant Sanyang and Guangyang. The government mobilized ITRI to help the firms comply with increasingly strict pollution control regulations. ITRI also helped establish a testing center and aided Guangyang in the development of a flexible manufacturing system for motorcycle engines.⁵³ Perhaps most important, the IDB helped the leading firms procure land in industrial zones and gain access to limited supplies of imported labor.⁵⁴

FIGURE 4
THE TAIWAN AUTO ASSEMBLY INDUSTRY

Firm Item	Mitsubishi (China Motors)	Ford (Liu-ho)	Toyota (Guorui)	Nissan (Yulong)	Honda (Sanyang)	Daihatsu/ Peugeot (Yutian)	Citroen (Guochan)	Suzuki (Taizi)	Isuzu/ Renault	Fuji Heavy Industries (Daqing)	Volkswagen (Qingzhong [Sanyang group])
Date of Initial Production	27,303	26,665	30,773	19,603	24,593	28,246	21,245	23,863	24,167	32,051	34,486
Registered Capital (million NT\$)	41	6	20	110	49	42	18	18	32	18	22
Personnel	2,700	3,100	1,400	3,400	3,900	1,700	2,400	1,600	1,700	500	150
Annual Production Capacity (units)	120,000	110,000	70,000	120,000	100,000	40,000	24,000	24,000	36,000	30,000	10,000
1994 Production	115,655	87,571	68,192	58,142	44,333	15,244	12,252	9,457	8,549	3,575	348
1994 Sales	110,421	87,508	66,695	58,877	44,333	17,139	12,262	8,800	8,923	5,055	348
Market Share	0	0	0	0	0	0	0	0	0	0	0

SOURCE: Taiwan Transportation Vehicle Manufacturer's Association

Technical and Investment Relationships among Automotive Firms



Source: Taiwan Transportation Vehicle Manufacturers' Association

TARIFF ENTREPRENEURS, GLOBAL PAWNS, AND QUASI-INDEPENDENTS

The interaction of market characteristics, industrial policy and Japanese strategies led to the emergence of three quite distinct types of firms in the Taiwan auto complex, and three approaches to direct foreign investment.

The first group, initially most numerous, consisted of tariff entrepreneurs--locally-controlled firms which gained the right to license foreign cars in Taiwan, but showed no intention of developing independent design or export capacities. These included Guochan, which assembled Citroens as well as some Opel models for GM; Prince (Taizi), assembler of Suzuki vehicles; and Hualong, a recent entrant aligned with Japan's Isuzu. As growth in the domestic market slowed and tariffs continued to decline in the mid-1990s observers expressed doubts about the viability of these companies as assembly platforms. However, since their major investments were in sales and service dealerships rather than production facilities, they were in a good position to switch to pure importing if the market were fully liberalized. Neither they nor their technology partners were committed to assembly for the local market, much less anywhere else.

Also oriented to the local market were global pawns, loyal subsidiaries of foreign mothers, most of whom controlled a large share of their capital. The most important of these global pawns were Ford Liu-ho [Liuhe] and Toyota's subsidiary Guorui. After Toyota's abrupt withdrawal from Taiwan in the early 1970s and the failure to reach agreement on a big new plant in the early 1980s, it was induced to return to build trucks, primarily for the military.⁵⁵ Production of passenger cars began in the late 1980s and quickly accelerated. Though the capital share of the Toyota group is only 49%, Guorui is completely subordinated to Toyota. Over two dozen managers are dispatched from Japan, and top-level company meetings are conducted in Japanese.⁵⁶ Many Toyota-affiliated suppliers from Japan have been brought in to supply the local plant in a miniature version of the famed "Toyota production system." Guorui has earned widespread praise for high quality and success in improving the operations of supplier firms, and many see it as potentially the strongest firm in Taiwan. The Industrial Development Bureau awarded Guorui an eagerly-sought plot in an industrial park in northern Taiwan in return for a pledge to export a minimum of 40,000 engines per year. In general, however, Toyota has no particular interest in improving the viability of Taiwan as an independent production and export base. IDB officials treat it as a guest--respectable and well-behaved but completely foreign.⁵⁷

The other major global pawn is Ford Liu-ho. Ford, once the largest producer in Taiwan and number three as of 1994, is the only major local assembler not dependent upon a Japanese parent. Although the models assembled by Ford Liu-ho have all derived from Japan's Mazda, in which Ford owns a 25% stake, management of the company is strictly Western. Local chief executives have been rotated in from Ford's other overseas operations, notably its Australian subsidiary. Observers claim that even decisions involving Mazda seem to circulate through Detroit. The company receives more praise for its financial controls than for its assembly operations. Recently Ford Liu-ho has also assembled the Festiva, a small passenger car, with heavy reliance on parts from Ford's Korean affiliate Kia. Sales have been respectable but not overwhelming; aside from the Festiva the role of Korean cars and parts in Taiwan has been insignificant. Ford Liu-ho has virtually no autonomy and aside from assembling the Festiva is not oriented to the broader Asia-Pacific region. Unlike the major Japanese-affiliated firms, it does not invest in its suppliers. It simply services the local market for Ford, and is strictly subordinated to Ford's global plans. Ford Liu-ho is scheduled to assemble the Mondeo "world car," designed not by Mazda but by Ford of Europe, and with the implementation of the Ford 2000" program, is set to become even more tightly integrated into Ford's global operations.⁵⁸

One smaller auto assembler is also essentially subordinate to a foreign MNC: Daqing, 45% of whose stock is owned by Fuji Heavy Industries of Japan. From the perspective of the government Ford, Fuji and Toyota are respected guests rather than a potential collaborators. In the motorcycle sector, both Yamaha and Suzuki assumed controlling interests in their Taiwan subsidiaries to try to recapture market share from Guangyang and Sanyang.

Only two considerations could fundamentally change the local market orientation of the global pawns. One would be a decision to use Taiwan as a springboard for entry into the China market. The other would be a decision to source more parts for Asia cars from Taiwan. So far, on both of these issues the global pawns are following rather than leading the Taiwan auto industry. When Ford announced it would establish its first joint venture to assemble autos on the mainland (a plan to assemble medium-sized trucks in Jiangxi), Ford Liu-ho's role was limited to sending a few technicians; when Ford decided to build a new assembly plant in Thailand for small commercial vehicles--Taiwan's strong point--it brought along Mazda but not Ford Liu-ho.⁵⁹

The third and most interesting group is composed of locally-controlled firms which at one time or another have displayed a serious interest in developing an independent production

and design capacity, and have made some attempts at exports or DFI. The first and most prominent of these firms is Taiwan's long-time de facto national champion firm, Yulong (also written Yue Loong and more recently Yulon). Yulong was established in the 1950s with government support by a textile entrepreneur from Shanghai. It began with assembly of Jeeps and soon added production of small passenger cars under license from Nissan. In 1981, concerned that Nissan might win the big car plant contract and drop Yulong, the company invested over \$50 million in an engineering center to produce designs independently of Nissan, and initiated preparations to export under its own brand.⁶⁰ Yulong's small "Feeling" sedan and other independently designed vehicles (all still reliant on Nissan engines) developed reputations for poor quality. Unlike early Japanese or Korea models, which also had initial quality problems, Yulong's models faced stiff competition from foreign brands in the domestic market. Yulong was forced to undertake a drastic shift of strategies. It requested Nissan to make a significant capital investment, and replaced the Yulong brand with Nissan badges on its cars. For Nissan, policies and strategies promoting localization were at most an annoyance and distraction from the real task of supplying the local market as profitably as possible. In 1985, when Yulong brought in capital from Nissan, the President of Nissan politely discounted Yulong's plans for exports (which at any rate would have to be marketed by Nissan), and made it clear that his main goal was "to have even more Nissan cars driving on the streets of Taiwan."⁶¹ Five years later, a Yulong Vice-President seconded from Nissan derided Yulong's attempt to create a design center: "I understand that Yulong is a company with strong nationalist sentiments, but sometimes national sentiments actually impede technology transfer." (He seemed unaware of the historical irony in this remark, which easily could have been directed at Japan 30 years earlier.)⁶² Despite a well-established position in the market and the assistance of more than a dozen Japanese managers, Yulong seems to be fading.⁶³ Once the leading producer in Taiwan, by 1994 it slipped to fourth. Its management is considered lumbering, and the family that owns a controlling share of its stock relies upon an elderly widowed mother and a son who, upon his return from study abroad, was installed as second in command at age 25.⁶⁴

A second would-be independent, Yutian, has faded even more badly. Like Hyundai of Korea it signed multiple technology licensing agreements rather than relying on one parent firm. It assembled both Peugeots and Daihatsu vehicles (an affiliate of Toyota), and talked of exporting. Like Hyundai, it made a serious effort at developing key parts, and tried to form a

general engineering conglomerate with subsidiaries in machinery and aerospace.⁶⁵ Unlike Hyundai, though, Yutian was plagued by weak management, weak partners and inconsistent government support; by late 1995 it had fallen into a financial crisis.⁶⁶ Sanfu, another family-owned and managed company, also tried an independent route, assembling first Subaru models then Renault cars and trucks, both without foreign capital investments. It emphasized independent design rather than parts production. Like Yutian, Sanfu proved unable to keep pace with the foreign-affiliated firms, and production fell below 5,000 units in 1995. It then looked to Japan's Isuzu for help.

Three other firms have had qualified success in attempting to develop a somewhat more independent posture. All have intermediate levels of foreign capital participation. Guanyang, the leading motorcycle producer, has been the most successful. Sanyang, the key member of the Qingfeng business group, assembles both Honda cars and Honda and Sanyang motorcycles. Unlike the case of Toyota or Nissan, however, Honda's capital share is quite small (13.5%), and it sends but two Japanese managers to Sanyang. Sanyang has taken a relatively positive stance toward localization of parts production. In 1994 the Qingfeng group established a new joint venture with Volkswagen called Qingzhong. The new company provided Qingfeng with a small commercial vehicle, which Honda was unable to provide, increased the group's bargaining leverage with Honda, and opened a possible connection to mainland China, where Volkswagen was the best-established foreign auto firm.⁶⁷

Finally, it is striking that China Motors, the most successful local auto assembler, is allied with both the most international of Japanese auto makers and the most domestic of Taiwan firms. China Motors was founded by the same family that controls the Nissan affiliate Yulong, but operations are entrusted almost entirely to professional managers. Mitsubishi Motors and Mitsubishi Corporation (the Japanese group's general trading company) have a combined capital stake of 21.4%. Mitsubishi Motors established the broadest production platform in Southeast Asia. China Motors uses the Mitsubishi badge and collaborates closely with Mitsubishi Motors, but unlike Ford Liu-ho or Toyota's Guorui, it is independent in management. The company employs only two to three Japanese executives, and conducts meetings in Chinese (though employees are encouraged to learn Japanese and English, and most top managers know some Japanese). Industry observers consider it one of the best-run auto companies in Taiwan. By

1994 China Motors surpassed Ford Liu-ho and “older brother” Yulong to become the largest producer of motor vehicles in Taiwan.

At the same time that it expanded production of Mitsubishi models, China Motors also embarked on independent development. Unlike Yulong, it chose to emphasize small commercial vehicles, a segment where Taiwan is much better positioned to compete with Japan. In Southeast Asia and China small companies rather than households tend to be the first purchasers of autos. While trucks with 1000 or 1200cc engines hold little appeal in the U.S., they enjoy strong demand in developing Asian countries with crowded cities, expensive gasoline, and greater sensitivity to price than fit and finish. In the late 1980s, in conjunction with Yulong's design center, China Motors developed an independent truck model called the Varica. It quickly became the company's leading model, selling around 30,000 units per year in the early 1990s. The Varica still depended upon Mitsubishi engines, and was acceptable to the Japanese mainly because the mother company did not produce any vehicles in exactly the same niche. China Motors made no moves to sell the vehicle in Southeast Asia, preferring instead to have Mitsubishi sell some of the parts it had developed. Tellingly, trading house Mitsubishi Corporation was more open to the possibility of replacing expensive parts from Japan with cheaper ones produced in Taiwan than Mitsubishi Motors, which was reluctant to inflict further damage on its recession-plagued Japanese suppliers.⁶⁸

THE SECOND TIER: PATTERNS OF TAIWAN DFI IN ASIAN AUTOS

Patterns of direct foreign investment by firms in Taiwan's auto industry vary dramatically depending upon region, industry segment, and level of initial Japanese investment.

FIGURE SIX

Type and frequency of Asian investments by firms in Taiwan's auto sector

REGION	BARRIERS TO ENTRY	
	LOW (motorcycles; light auto parts)	HIGH (auto assembly; complex auto parts)
Emerging: China, VN, India	Boomerang (1)	Trojan Horse (2)
Established: ASEAN four	Niche Player (3)	Global Pawn (4)

AUTO ASSEMBLY: TROJAN HORSE

Foreign investment in auto assembly and complex parts is limited in volume and overwhelming of the "Trojan Horse" variety. None of the global pawns has engaged in DFI. Ford Liu-ho and Toyota's subsidiary Guorui have no intention of doing so. None of the Taiwan auto assemblers has undertaken independent foreign investment. Nor have they moved into the ASEAN countries. The Japanese auto assemblers neither need nor want Taiwan affiliates to invest abroad. In the ASEAN countries the Japanese firms have decades of experience. The combination of increasing quality standards in Taiwan and the strong yen has begun to push Japanese firms to incorporate more Taiwan parts in their Asian operations.⁶⁹ Control over design and marketing, however, remains firmly in Japanese hands. As a result, very few Taiwan parts firms and no assemblers have made independent investments in Southeast Asia.

Instead, some of the quasi-independent firms have invested in China in cooperation with their Japanese parents. When it comes to mainland China, the balance of interests and capabilities shifts: the Japanese auto firms are less at ease, while Taiwan firms are more confident. The two governments have played a mostly passive role. Both have displayed sensitivity to the riskiness of the mainland investment climate, and the Taiwan government has shown concern that significant investments in the mainland by local firms could undermine the Taiwan industrial base and provide the PRC with extra leverage in its attempts to bring Taiwan back into the fold. All plans are complicated by the Chinese government's determination to develop a strong industrial policy for automobiles, including a radical plan to consolidate production in a few large assemblers.⁷⁰ Until recently the leading Japanese auto firms have been cautious about investing in the mainland, and ambivalent about the role they expect their Taiwan affiliates to play. Some Japanese executives would prefer to enter the mainland on their own so as to simplify management and avoid dissipating profits; in this scenario Taiwan affiliates would simply supply some parts as convenient. Others see the Taiwan firms as helpful in dealing with an unstable and alien policy and labor environment, and they are willing to consider joint ventures. At one time or another virtually all of the "would-be independents" have announced plans to invest in the mainland.

Within the Mitsubishi group, the most "Asian" of all the Japanese producers, the balance shifted toward accepting a role for Taiwan. In late 1995 China Motors announced a joint venture with Fuzhou Auto Industry Corporation of Fujian to build an assembly plant to produce two light

commercial vehicles, China Motors' own Varica and Mitsubishi's Delica. Six major Taiwan parts suppliers immediately applied to invest in Fujian to supply the plant, and others were expected to follow.⁷¹ The reorganization of Fuzhou's existing plant was completed in the summer of 1996. Mitsubishi Motors promised to support the second stage plan to build a new plant with a capacity of 150,000 units per year.⁷² This plant would effectively double China Motors' output and bring it into the range of serious economies of scale for small commercial vehicles. If successful, it would also provide Mitsubishi with an important base in the China market just as the Chinese authorities were trying to limit new entrants.⁷³

At about the same time Yulong announced a more cautious plan to invest 5% in Xiamen Auto Industrial Corporation, which would also build a 150,000 unit plant to produce small commercial vehicles.⁷⁴ Both of these plants would be located along the southeastern coast of Fujian Province, the ancestral home of most Taiwanese. Taiwan's government has refused to permit direct transportation links with mainland China for fear of becoming economically dependent. However, the ban is widely expected to fall within the next few years. Xiamen or Fuzhou would then be but a 50 minute flight from Taipei--as close as Taiwan's southern port of Gaoxiang.

The major impediment to these new investments was lack of an engine. Even in the few cases that Taiwan firms such as Yulong or China Motors were able to design independent models such as the Varica or Feeling, they still lacked engines to power them. Control over engines gave the Japanese mother firms effective veto power over any Taiwan export or investment plans. To overcome this limitation, the Taiwan government organized a consortium to build a "common engine" for local producers. The common engine project had two separate goals. The ostensible goal was practical: provide an engine to power Taiwan-developed models for export markets. In fact, the proposed engine really only fit one existing vehicle and one market. China Motors planned to fit the new engine to its Varica van for use in the mainland China market. The second and more important goal was to prove to the Japanese mother firms that their Taiwan affiliates had the capacity to develop and export whole vehicles on their own, and if necessary would do so without Japan.

No single local firm had attained sales volumes sufficient to justify investment in an independent engine. To overcome this collective stumbling block, the government subsidized a consortium organized by the quasi-governmental Industrial Research Technology Institute

(ITRI) to design a new engine. The ITRI team, headed by an American-trained Ph.D. with years of experience at NASA and Ford, conducted most of the design and development work itself, with assistance from several Western consulting firms, particularly the renowned British auto engineering firm Lotus. The group planned to build a 1.2 liter engine for small commercial vehicles, and then if successful move to a 1.6 liter engine for passenger cars. Originally four firms expressed interest in participating in the project: China Motors, Yulong, Sanyang, and Yutian. Toyota and Ford had no intention of investing in the consortium or using its engines, though Ford was generally cooperative. Eventually financial problems forced Yutian to withdraw, leaving three assembly firms and parts maker Xintong. The technical and financial feasibility of the project and the adequacy of the tiny development budget were all the object of considerable skepticism in local engineering circles. Nor were the Japanese parent firms supportive. According to the project's director, "The Japanese did everything they could to stop us."⁷⁵ Despite popular skepticism and Japanese opposition, project development proceeded smoothly, and in mid-1995 the four firms established a joint venture company to manufacture the engine. The three assemblers and the government's new product development fund each put up 20% of the stock, while the state-owned Bank of Transportation chipped in 15% and parts maker Xintong 5%, for a total investment of \$60 million, plus complementary investments made by individual firms. Plans called for mass production by October of 1997, reaching 75,000 units per year by the year 2000, just in time for China Motors's new plant in Fujian.⁷⁶

FIGURE 7

DIRECT FOREIGN INVESTMENT FROM TAIWAN IN AUTOS AND MOTORCYCLES

TAIWAN FIRM (Japanese Parent)	SUBSIDIARY/JOINT VENTURE Location/Partner	PRODUCT	FINAL CAPACITY
<i>AUTO ASSEMBLY</i>			
China Motors (Mitsubishi)	Southeast Automotive Fuzhou (Fujian Prov., China) Fujian Auto Ind. (50%)	Small commercial	150,000 units/year
Yulong (Nissan)	Xiamen Auto Ind. Xiamen (Fujian Prov., China) Fujian Auto, Xiamen Factory (95%)	Small commercial	150,000 units/year
<i>MOTORCYCLES</i>			
Qingfeng Group (Sanyang/SYM) (Honda, but DFI indep.)	VMEP Hanoi and Ho Chi Minh City (wholly-owned subsidiary)	Small motorcycles	500,000 units/year (2)
	Xiamen (Fujian Prov., China) Xiaring Motorcycle (Zhonghua brand) Xiamen Int'l Trust and Invest. Co./ Zhongxin Group (15%)	Small motorcycles	500,000 units/year
Guangyang (Kymco) (Honda, but DFI indep.)	Guangnan Motorcycle Changsha (Hunan Prov., China) Nanfeng Dongli (33%); Zhonghua Zixingche (10%)	Small motorcycles	500,000 units/year
	Jinshi Motorcycle Changzhou (Jiangsu Prov., China)	Small motorcycles	500,000 units/year
	Engine plant Chengdu, (Sichuan Prov., China) Zhufeng Group, Tibet	Engines for small motorcycles	500,000 units/year
	PT Kymco Indonesia Lippo Group (40%)	Small motorcycles	200,000 units/year
<i>AUTO PARTS (Illustrative Examples)</i>			
Lioho Machinery (Japanese tech. but no J. DFI)	Kunshan Liufeng Industries Kunshan (Jiangsu Prov. China) Toyota, Japan (10%)	Wheels	600,000/year (auto) 300,000 (motorcycle)
Cheng Shin Rubber (Japanese tech. but no J. DFI)	Kunshan subsidiary Toyo Tire, Japan (30%)	Replacement Tires	3.5 million/year
Right Way Industrial (Japanese tech. but no J. DFI)	Right Way Auto Parts (Fuzhou)	Pistons, etc.	(U.S. \$2 million)
	Taiwan Right Way Ind. (Malaysia)	Auto parts	(M. \$24 million)
Yuen Feng Industrial (diversified tech.; no J. DFI)	Indonesian JV with Overseas Chinese	Aluminum wheels	
Guoguang Rubber Ind. (50% subs. of Kinugawa Rubber)	Tianjin subsidiary HK trading co. (30%); Tianjin Mini Automobile (18%)	Rubber and resin seal parts	

SOURCES: Compiled by author from company reports and press accounts. Many of these investments were channeled through offshore shell companies. For example, Guangyang's investment in Hunan went through Cheng Jian, a company registered in Hong Kong, while Qingfeng's

In sum, in the area of auto assembly the leading Taiwan affiliates are firmly under the control of their Japanese mother firms, or Ford, which has channelled production relations through Mazda. The efforts of the Taiwan government and the would-be independents to carve out a measure of autonomy and develop some capabilities that Japan will have to recognize have not been entirely in vain.⁷⁷ Taiwan has slightly improved its position in the division of labor, and begun to export small amounts and engage in some direct foreign investment. Nonetheless, Japanese auto companies do not see Taiwan as a major complement to their Asian strategies, much less as a significant competitor. At most the Taiwan firms may help accelerate Japan's tardy entry into the China market. The only wild card is the possibility that investments in China will allow Taiwan assemblers to achieve economies of scale that allow them to begin reducing dependence on their Japanese parents. However, only two or three firms are in a position to implement major investments in the mainland, and none elsewhere. Even if they are successful, for many years they will be capable of investing only if they receive the approval and support of their Japanese mother firms. Without an active industrial policy the Taiwan firms would have no role to play, but even with it their reliance on Japan is so great that their investments constitute Trojan Horses.

MOTORCYCLES AND LIGHT AUTO PARTS: BOOMERANG AND NICHE PLAY

For local motorcycle companies, foreign investment emerged as a strategy to overcome barriers to exports. With the strengthening of the local producers and relaxation of the ban on trade with the mainland, exports exploded, exceeding 500,000 units by 1995, accounting for one-third of total production. Guangyang, now completely independent of Honda in management, exported more than 280,000 units in 1995, over 90% of them to China [CHART]. Its motorcycles reached the mainland any number of ways, including tourism and smuggling. Rising import barriers drove Guangyang to seek local partners in the mainland. It signed technology contracts with local firms in Chengdu and Guangzhou and exported semi-knocked down kits to them. With a large and stable local market and an increasing exports, the local firms began to expand capacity. Guangyang, the most profitable transportation equipment firm

in Taiwan, was especially aggressive. It broke ground on a giant factory in Tainan that would boost the company's total output to 1.2 million motorcycles a year and put it into a dead heat with Honda for title of world's largest producer. The old factory was to be converted into a greatly enlarged R&D center.⁷⁸

Even before the overseas ventures began assembly operations in mid-1995, the Chinese government announced increasingly tough localization policies. First, in June 1994 it declared that the mainland's 150 or so motorcycle factories would be consolidated to 5 or 10 by the year 2000. It raised tariffs to 120%, and mandated a minimum local content of 40%. Then in September of 1995 the government restricted foreign firms to two joint ventures or technology partnerships with the local motorcycle industry, and strictly enforced a ban on imports of semi-knocked down kits. These policies forced the Taiwan firms to undertake full-scale investments. Guangyang accelerated construction of mass production facilities at 50/50 joint ventures with local motorcycle and bicycle firms in Changsha, Hunan Province, and Changzhou in Jiangsu. Each was designed to reach production of 500,000 units per year. To satisfy the mandated levels of local content, Guangyang invested in a new joint venture to produce 500,000 engines per year in Chengdu, Sichuan.⁷⁹ It also brought along its parts suppliers. At least 26 parts firms from Taiwan settled near the Changzhou plant.⁸⁰ Guangyang's new plants headed on a collision course with Honda's joint ventures in the mainland. Wuyang-Honda in Guangzhou, for example, aimed to produce 300,000 small motorcycles, but the Japanese found it difficult to adapt to sudden policy changes in the mainland.⁸¹ Ominously for Honda, local demand in the mainland focused squarely on 125cc models--the strength of the Taiwan firms.

Sanyang followed cautiously in the mainland, establishing a joint venture in Xiamen to complement its auto plans in Fujian, and concentrated instead on another emerging ex-communist economy with a large population, Vietnam. Back when the American embargo on business with Vietnam still encumbered Honda, with its large American presence, the leader of the Qingfeng group made a full-scale charge into the country. He made investments totaling over \$300 million in petrochemicals, cement, banking, and motorcycles. Qingfeng established a solely-owned subsidiary called VMEP (Vietnam Manufacturing and Export Processing Company. Ltd.) to build Vietnam's first large motorcycle assembly plants, one near Hanoi and another in Ho Chi Minh City. The investments were approved in late 1993 and the plants began production in September, 1995. To meet the government's increasingly demanding local content

requirements Qingfeng had to convince Sanyang's Taiwan suppliers to invest in Vietnam to supply the plants. Though many were reluctant to pay the high land prices in Vietnam's cities and deal with the backward infrastructure, at least 17 went along, including multi-million dollar investments by Shilin Electric in starters and the President Group (Tongyi--a major foodstuffs company, and Taiwan's largest single investor in China) in batteries. Initial production was limited by government restrictions on foreign exchange, but VMEP soon grabbed 15-20% of the market from Honda, and aimed for 50% market share by the year 2000.⁸² Thanks to his early and persistent efforts in Vietnam, the brain surgeon-turned-entrepreneur was able to convince the government to increase tariffs on whole bike imports. More important, the government delayed approval of applications by other foreign motorcycle firms. Honda had long dominated the Vietnamese market with imports from its Thai plant. Yet despite its size and an alliance with the state-owned Agricultural Machines, its plan to build a giant assembly plant in northern Vietnam was stalled.⁸³

The quasi-independent motorcycle makers have exhibited more caution in investing in the ASEAN markets, where Honda and the other Japanese makers are well established. In 1996, Guangyang announced formation of a 60/40 joint venture in Indonesia with the giant Overseas Chinese business conglomerate Lippo Group to produce up to 200,000 small motorcycles per year.⁸⁴ This investment was both later and smaller than Guangyang's numerous investments in mainland China. As of 1996 Sanyang had no assembly operations in ASEAN.

The other significant motorcycle producers in Taiwan have been forced to rely on increasing support from Japan; so far none has embarked on DFI. Zhanye is related to Yutian, the troubled assembler of Daihatsu and Peugeot automobiles. Like Yutian it has made an effort to develop some of its own parts and designs. While it has been more successful than Yutian, its total production is but a tenth that of Sanyang or Guangyang. After Yutian's financial crisis forced a temporary suspension of operations it fell under the effective control of the Japanese trading company Itochu.⁸⁵ Similarly, Suzuki/Tailing fell far behind the more independent firms. In 1996 Suzuki raised its capital stake to 50% and reorganized the subsidiary.⁸⁶ The third major producer is Yamaha Motors of Taiwan, 51% owned by Yamaha of Japan, and headed by a Japanese president. Like Ford Liu-ho and Toyota's Guorui in the auto sector, it is a competent and loyal subsidiary--a global pawn of Yamaha. It focuses on the local market and has only a limited independent design capability. As a result, unlike the case with Sanyang and

Guangyang, the government declines to extend special help in the acquisition of land or development of technology. Yamaha of Taiwan is an efficient assembler and leads the industry in domestic sales, but it trails badly in both design capabilities and exports. Yamaha's recent R&D center is barely a tenth the size of those of Sanyang and Guangyang, and through 1994 the company had developed only one model on its own.⁸⁷ Yamaha of Taiwan exports less than 5% of its production, compared to 20% for Sanyang and 40% for Guangyang.⁸⁸ The Taiwan subsidiary is exporting some parts to the mother company's joint venture mainland assembly plant in Chongqing, Sichuan.⁸⁹ However, despite the increasing pressure from Sanyang and Guangyang, it has made no investments abroad, while Yamaha of Japan is strengthening its subsidiaries in Thailand and the rest of Southeast Asia.

So far, the boomerang effect has been confined to small motorcycles. Now that Guangyang and Sanyang have achieved economies of scale in smaller models, they would like to expand into larger engine sizes where the Japanese still have a major lead. After participating in the research phase of the common engine project for autos, Sanyang asked the Industrial Development Bureau to support a similar consortium to develop 250cc motorcycle engines. Predictably, Guangyang supported the application while global pawns Yamaha and Suzuki declined to participate. The IDB and the Industrial Technology Research Institute were eager to accede. At first they were blocked by the Ministry of Transportation's refusal to relax the ban on large motorcycles, but Taiwan's application to the WTO rendered that objection moot, and a new consortium to develop 250cc engines was formed.⁹⁰ If successful, this project sets the stage for a full-scale competition with the Japanese throughout Asia in all but the largest cycles.

Direct foreign investment by producers of simple auto parts is less common, but a small stream is beginning to flow. A few examples illustrate the orientation of the industry to market niches without direct competition from Japan. The largest local parts producer in Taiwan is Dong Yang (Tong Yang Industry), with roughly \$150 million dollars in annual sales. It produces a wide range of plastic parts, the most important of which are instrument panels and auto bumpers. The company supplies every auto and motorcycle firm in Taiwan as well as exporting, primarily to the United States. Dong Yang has no significant foreign capital. While its technology originally came from Japan, in recent years it has deliberately looked to Germany and the United States as well. Its first foreign investment was not in Asia but in Dallas, to be near the American

after-service market and the petrochemical industry, though it has also expressed interest in supporting China Motors' investment in Fuzhou.⁹¹

A few parts firms also enter alliances with Overseas Chinese. Right Way Industrial (Zhengdao) sells about \$22 million dollars of pistons and steering assembly parts annually, three-quarters of them for the domestic market. Virtually all of the company's technology originated in Japan, but its stock is entirely domestically owned. Right Way invested in a majority-owned Malaysian subsidiary in 1989. Despite losses in Malaysia and stagnant sales for the parent company, it has increased its investments in the subsidiary. Yuanheng (Yuan Feng Industrial) is another example. A wheel maker with annual sales of about \$35 million, one-third of them in the form of exports, Yuanheng teamed up with local Overseas Chinese in 1992 to establish a subsidiary to produce aluminum alloy wheels in Indonesia. That same year it also purchased an existing wheel plant in the United States with Overseas Chinese assistance.⁹²

However, these cases are much less common than investments in the mainland. In a few cases, Japanese auto parts makers have used their Taiwan subsidiaries to form joint ventures in the mainland to produce labor-intensive parts. Examples include Unisia Jecs in Shanghai, and Kinugawa Rubber in Tianjin.⁹³ The industry associations from Taiwan and Japan regularly hold meetings where possible cooperation in mainland joint ventures is a major topic.⁹⁴

In a few cases the relationship between Taiwan and Japanese investors remains ambiguous. Lioho Machinery produces about \$75 million dollars worth of stamped and forged parts per year, especially aluminum wheels and brake drums and rotors. Like Dong Yang it produces for virtually all local auto and motorcycle makers and exports. Though it is a relative of Ford Liu-ho, most of its technology comes from Japan, and most of its exports go to Japan or Japanese producers in Southeast Asia. It has invested in a series of joint ventures with Toyota in Kunshan, Jiangsu province. In some ventures Liu-ho holds a clear majority share, in others Toyota is majority owner. As of the end of 1994, Kunshan Liufeng Industries, produced a total of 25,000 wheels a month, initially all for export, 90% to Japan and 10% to Korea. In 1994 the companies invested \$30 million dollars in Toyota Industries (Kunshan) to produce stamped and forged parts.⁹⁵ Finally, Cheng Shin Rubber established a large factory, also in Kunshan, to produce replacement tires. Its long-time source of technology, Japan's Toyo Rubber, accepted a junior share of 30%. These cases straddle the border between "niche" and "boomerang" strategies. Both appear unusually equal at the moment, but the lack of Japanese capital

investment gives the Taiwan partners greater flexibility. In particular, Cheng Shin's investment holds the potential to transform into a major boomerang, since Toyo lacks the kind of control over design and marketing that Toyota exerts.

KOREA: BOOMERANG--BUT ONLY IN AUTO ASSEMBLY

Korea represents the mirror image of the Taiwan case. After some initial fumbling, Korean government policy succeeded in creating a highly competitive auto assembly industry that has forged Japanese capital and technology into a giant boomerang.⁹⁶ Korean auto companies export over a million units a year and invest throughout the globe. Less frequently noticed is the relative weakness of Korean parts producers, especially independent ones, and the virtual absence of a motorcycle industry. In one respect Korea does resemble Taiwan: DFI has been heavily concentrated in newly emerging economies where Japan does not enjoy a head start. With a couple of interesting exceptions, the Korean firms have invested relatively little in ASEAN.

As in Taiwan, the initial condition of the auto industry was not promising. Korea's market was small and fragmented (twice the population of Taiwan, but with a significantly lower per capita income), and its industry technically backward. The Korean government, however, helped local assemblers overcome the formidable barriers to entry. Unlike the government in Taiwan, it used preferential credit allocation to promote large business groups capable of carrying out the huge investments necessary in the auto industry. It all but banned imports, provided subsidies for initial exports, and implemented stricter and more consistent restrictions on both imports and direct foreign investment, especially from Japan. Leading groups such as Hyundai deliberately diversified the sources of technology and design. None of the Korean firms (with the brief and unsuccessful exception of Daewoo) served as a global pawn. Even so, Japanese technology, production assistance and parts were still crucial. Each of the leading firms in Korea has maintained a Japan connection: the Mitsubishi group invested in Hyundai; Daewoo was linked to Suzuki and Isuzu through investments in all three by General Motors, before it shifted to Honda in 1992; Kia received capital and design assistance from Mazda. Even Samsung, Korea's leading conglomerate, sought a Japanese alliance (with the Nissan group) when it entered the industry in the late 1990s.

At first even this more rigorous regime of protection and promotion proved inadequate. Even five years after Hyundai's first exports, Korean producers were still not in sight of economies of scale.⁹⁷ The government then implemented a drastic rationalization of the industry, limiting production of passenger cars to just two firms, and a narrow range of models and engine sizes. The results were dramatic. In 1980, the year preceding the rationalization campaign, motor vehicle production in Taiwan slightly surpassed that of Korea. By 1987, the first year after relaxation of entry barriers in Korea, motor vehicle in Taiwan had not quite doubled to 250,000 units, and was spread across nearly a dozen assemblers. In Korea three firms remained dominant, and output expanded explosively, increasing more than ten-fold, to just under a million units.⁹⁸

As a result, the Koreans have extended the Boomerang effect into the right-hand side of Table 2. Korean companies, led by Daewoo, have undertaken extensive investment in China, India, Vietnam, Poland, Romania and other emerging countries, especially ex-socialist countries.⁹⁹ According to a government survey, by 1995 Korea's overseas auto investments totaled more than six billion dollars.¹⁰⁰ In some cases the rush abroad has been so intense that the government has stepped in to coordinate foreign investments by Korean conglomerates.¹⁰¹ As with Taiwan, investments in ASEAN have been fewer, later, and smaller than ventures in the emerging economies. Several materialized in response to invitations by ASEAN countries such as Malaysia and Indonesia to invest in new assembly operations to create an alternative to Japan. The Korean companies have promised to provide more up-to-date designs and much more aggressive localization of parts.¹⁰²

Despite the extraordinary growth of the Korean assembly industry, and the lower barriers to entry in parts and motorcycles, Korean parts firms have exported less and engaged in less direct foreign investment than have Taiwan parts makers.¹⁰³ Many of the foreign investments that have been made have come not from independent parts firms but from the assemblers.¹⁰⁴ The motorcycle industry, so vibrant in Taiwan, is virtually non-existent in Korea. The government is now trying to use financial incentives to strengthen small parts firms, and to increase economies of scale through mergers and promotion of standardized parts, but the impact is yet unclear.¹⁰⁵ The stunted development of both parts and motorcycles reflects the concentration of the government and the *chaebol* conglomerates on auto assembly. Thus, Korea demonstrates powerful boomerang potential, but so far only in auto assembly. Even there, it is

not completely clear that the Koreans can sustain a challenge to the Japanese auto firms in managing multinational production networks.¹⁰⁶

CONCLUSION

The two most extreme patterns dominate two-tiered investment in the Asian auto complex. Overseas investments by Taiwan companies engaged in auto assembly and some complex parts serve as Trojan Horses extending the influence of their Japanese parents without creating independent inroads for Taiwan. More common is the Boomerang Effect: motorcycle and light auto parts makers from Taiwan have used direct foreign investment to compete directly with their Japanese parents in third countries. The Boomerang Effect is also manifested in the dramatic foreign investments of Korean auto assemblers who originally received assistance in technology, design and parts as well as some investment from the Japanese auto companies. The other two patterns are growing, but still much less common. Global pawns usually leave foreign investments to their parents; occasionally they participate as distinctly junior partners. It is especially striking that the approach that economists would highlight as most logical and natural, the niche strategy, is relatively rare in autos.

These outcomes reflect the influence of two factors. One is the interaction of entry barriers and the aggressiveness of industrial policies. Where barriers are low, investments follow a niche or boomerang logic. Wheels, tires and other labor-intensive parts for the aftermarket are major examples, as are motorcycles. Starting from a position of technology licensing and direct foreign investment from Japan, motorcycle producers Guanyang and Sanyang have emerged as independent, branded competitors with nearly 100% local content, rapidly expanding product development capabilities and autonomous foreign investments. When entry barriers are high, as in auto assembly and complex original equipment parts, the global pawn outcome of no DFI or minor participation is the norm. The exception to this pattern is auto assembly by Korean firms such as Hyundai and Daewoo. In the Korean case an aggressive and consistent industrial policy was able to overcome entry barriers and create a major boomerang in auto assembly (though, surprisingly, not in parts or motorcycles). The second factor is regional, and reflects the timing of Japanese entry into the area of second tier investment. In emerging, ex-socialist economies such as China, Vietnam, Eastern Europe and India, Japan and the NICs are entering at roughly

the same time. In a few cases, such as Vietnam, the NICs even entered earlier. In these countries, DFI from Taiwan and Korea is quite aggressive, and the boomerang effect is noticeable. In contrast, Taiwan and Korean firms in the motor vehicle sector have been much more cautious in the ASEAN region, where massive foreign investment and the creation of Japanese-affiliated production networks predated the full industrialization of Taiwan and Korea.

Several implications follow from these outcomes. First, for all the talk of globalization, the world economy is not seamlessly integrated, nor has industrial policy been obviated. Industrial policy still exerts a crucial influence on the development of the auto industry, particularly auto assembly, throughout Asia. Trade restrictions are not limited to subtle "non-tariff barriers" or voluntary export restrictions, important as those are. Quotas, bans, stiff tariffs and demanding local content requirements pervade the region. Imports of cars and motorcycles from Japan are still banned in Taiwan, while all foreign autos have been effectively excluded from the Korean market.¹⁰⁷ These policies have played an important part in the tier-two auto investments reviewed here. China has limited imports and direct foreign investment, encouraged localization, and attempted to consolidate production facilities. The rapid movement of Sanyang and Guangyang into mainland motorcycle assembly and engine investments was a direct reaction to increased trade barriers and local content requirements. After dissatisfaction with the failure of Japanese auto companies to increase localization even after decades of import substitution policies in autos, Indonesia and Malaysia switched to even more aggressive policies. The Malaysian government established a joint venture with Mitsubishi called Proton.¹⁰⁸ Then it brought in the Koreans and French to pressure Mitsubishi in autos, and established a joint venture in motorcycles with Kawasaki to produce a "national motorcycle."¹⁰⁹ Indonesia resorted to blatant favoritism to produce a new national car in alliance with Korea's Kia.¹¹⁰ The apparent exception is Thailand, which reacted to the problems of import substitution by shifting to more liberal policies in recent years. Thailand has become the favorite investment site of Japanese auto producers. However, as Richard Doner has shown, Thailand's approach has not been one of *laissez-faire*, but a concentration on industrial infrastructure and collective action dilemmas that has been influenced and to some extent directed by Japan.¹¹¹

The Japanese government has maintained a consistent if subtle policy on automotive development in Asia: keep the field clear for Japanese firms. On the surface this looks like a liberal international trade policy, and in part it is, as might be expected from a country with a

highly competitive export sector. While Japan has sought in recent years to legitimize the role of industrial policy in developing nations, in no small part to legitimize its own developmental history,¹¹² it uses aid policy and training programs to discourage industrial policies by other countries that interfere with the activities of its own firms.¹¹³ Nor are the Japanese recommendations for a "New Asian Industrial Development Plan" strictly neutral or laissez-faire.¹¹⁴ A notable example is the panel of "wise men" economists appointed by the Ministry of International Trade and Industry (MITI) to promote development in ASEAN countries. The group called for strong policies to support small and medium size industries which support investments by Japanese electronics and auto firms in the region--even though it admitted that such policies were hard to justify in terms of Western neo-classical economics--and actively sought to discourage development of large local firms.¹¹⁵ Given the increasing ability of Korean conglomerates to compete head to head with Japan in auto, semiconductors and elsewhere, this reluctance to aid in the development of potential new challengers is understandable. Nonetheless, it does not constitute a neutral policy. It is also striking that Japanese auto companies are not ceding the low end of the auto market to firms from Korea or Taiwan, as the niche approach might suggest, but are actively developing new low-cost "Asia cars" to consolidate their position in the region and ward off the NICs.

None of this, it should be emphasized, implies that government intervention in the auto industry is always or even often effective, much less efficient. Far from it. The difficult irony is that most countries try to use industrial policy to promote the automotive sector, and at least since Henry Ford virtually no country has succeeded without such a policy, but the vast majority of countries that try, fail miserably. For every Japan or Korea, there are many Indonesias and Vietnams. Auto industry policy in Taiwan before 1985 was a distinct failure, and the legacy of policy equivocation persists to this day. Even where policy is successful in creating a competitive auto industry, it may not spur national, much less global efficiency. In Korea, for example, consumers have effectively been denied the opportunity to buy foreign cars, or even motorcycles. The opportunity costs of putting so many resources into automobiles are also great. Similarly, Malaysia's Proton has managed to dominate local markets, and even export modest amounts, but only with the help of high levels of protection. For better or worse, few governments are willing to adopt open policies in the auto sector, and the policies they adopt have profound impact on first and second tier investors.

The Asian auto complex also highlights the continuing relevance of sectoral variation and traditional forms of DFI. The auto industry--one of the largest and most important in most industrial economies--provides an important check against facile arguments about "a post-Fordist integrated global economy." In the automobile industry, efforts to cut costs through economies of scale still exert a profound influence on competitiveness. The flexible "lean production" so lauded in studies like MIT's *The Machine that Changed the World* is only one aspect of competitiveness in the auto industry, as the subsequent spectacular growth of the Korean auto industry--praised by the MIT researchers--clearly demonstrates.¹¹⁶ In fact, lean production is really a more sophisticated form of mass production that Henry Ford would readily recognize. Lean production is to mass production as humans are to chimpanzees, not to centipedes.¹¹⁷ By the early 1990s Taiwan's auto sector finally achieved economies of scale in motorcycles and some after-service auto parts, but it was far from sufficient scale in auto assembly and original equipment parts. Without the kind of rigorous protection, promotion and rationalization provided in Korea, the Taiwan assemblers were unable to attain sufficient scale to export, much less engage in foreign investment.

Similarly, notwithstanding popular arguments about the irrelevance of traditional forms of direct foreign investment and the importance of strategic alliances, networking, and virtual companies, the proportion of direct capital investments provides an amazingly accurate guide to the relationship between the auto firms of Japan and Taiwan, and the propensity of the latter to export or invest abroad. When the foreign capital share approaches or exceeds 50%, the local affiliate becomes a global pawn, and does not undertake independent design or investment activities. Ford Liu-ho, Toyota's Guorui and Taiwan Yamaha all fit this pattern. At the other extreme, virtually all Taiwan firms that have tried to compete without any direct foreign investment from Japan have failed. Yulong, Taiwan's would-be national champion, was forced to seek an investment link with Nissan in 1985, while its younger brother China Motors did not take-off until it strengthened its relationship with Mitsubishi through a capital investment a year later. Even in motorcycles, Guangyang had to seek capital infusion and management guidance from Honda in the early 1980s before it recovered to become the local industry leader--and began plotting to achieve its independence from Honda. The firms most likely to blend stability with some measure of independence are those with intermediate levels of Japanese capital (10-25%). By the mid-1980s, this group had grown to include Sanyang, Guangyang, Yulong and

China Motors. So far these four are the only Taiwan assembly firms to engage in significant foreign activities.

Once NIC companies have developed significant independent capabilities, Japanese firms without capital ties are more willing to cooperate with them in entering foreign markets. Smaller auto firms such as Suzuki and trading companies like Itochu (now a major distributor of Kia cars in Europe and Australia) or even Mitsubishi Corporation have been more open to the possibility of competing in third markets on the basis cheap goods produced in conjunction with NIC firms. Traditional Japanese market leaders such as Toyota, Nissan and Mitsubishi Motors, on the other hand, already have used equity ties to construct powerful, high quality production networks. For them, the role to be played by companies from middle-income countries like Taiwan is strictly limited. These market leaders and the Japanese government constantly exert pressure to mold industrial policies in the rest of Asia to conform with the interests of Japanese multinational companies. Only when forced by price competition from NIC firms (or difficulties in operating in China) do they reluctantly enlarge the role to be played by their NIC subsidiaries.

Important though the auto complex undoubtedly is, it represents a fairly extreme case of high entry barriers and integrated supplier pyramids. We should be wary of overarching generalizations about the ability of Japanese firms to dominate Asia through control of integrated production networks. In some sectors crucial to the initial stages of industrialization, such as textiles, footwear, and food processing, entry barriers are low and Japanese companies have only a modest role to play. In many parts of the electronics complex, labor-intensive assembly of standardized parts is important and the labor process is more divisible. Here, while Japanese firms are major players, their control over investment is much lower. However, in a number of industries economies of scale and other entry barriers loom large and Japanese firms occupy dominant positions. DRAM semiconductor chips and TFT screens come to mind. Not surprisingly, in both, active promotion by the Korean government and aggressive investment by Korean chaebol, including recent foreign investments, has provided some of Japan's most intense competition. Perhaps the most exciting question for further research is how DFI strategy fits into attempts by leading electronics firms to shape the architecture of the industry.¹¹⁸

The Asian auto case suggests two policy implications for Western firms and governments. The preferred policy is likely to be a straightforward application of WTO principles: liberalize trade and investment regimes. Where that is difficult, as it often is in the

auto industry, the West is likely to adopt a second-best policy that implicitly accepts some industrial policies that limit the working space of Japanese producers. This dynamic can be seen in Taiwan's WTO negotiations with Japan and the United States. In areas with lower entry barriers, little more need be done. Second-tier investments are increasingly common and seem well on the way to opening up or undermining Japanese production networks through niche strategies and boomerang effects.

NOTES

¹ Russell Mardon, "The State and the Effective Control of Foreign Capital: The Case of South Korea," *World Politics* 43:1 (October 1990), pp. 111-138; Mark Mason, *America Multinationals and Japan: The Political Economy of Japanese Capital Controls* (Cambridge: Council on East Asian Studies, Harvard University, 1992); Mark Mason, "United States Direct Investment in Japan: Trends and Prospects," *California Management Review* 35:1 (Fall 1992), pp. 98-115; on Japan's outward investments before the 1980s, see Terutomo Ozawa, *Multinationalism, Japanese Style: The Political Economy of Outward Dependency* (Princeton: Princeton University Press, 1979). John Jay Tate, *Driving Production Innovation Home: Guardian State Capitalism and the Competitiveness of the Japanese Automobile Industry* (Berkeley: BRIE, 1995).

² Richard Child Hill and Yong Joo Lee, "Japanese Multinationals and East Asian Development: The Case of the Automobile Industry," in Leslie Sklair, ed., *Capitalism and Development* (London: Routledge, 1994), pp. 289-315; Mark Z. Taylor, "Dominance through Technology: Is Japan Creating a Yen Bloc in Southeast Asia?" *Foreign Affairs*, November-December 1995, pp. 14-20; *Business Week* cover story, April 10, 1995.

³ See Mahathir's mini memoir in *Nikkei Weekly*, February 6, 1996.

⁴ Jeffrey A. Frankel, "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" in Jeffrey A. Frankel and Miles Kahler, eds., *Regionalism and Rivalry: Japan and the United States in Pacific Asia* (Chicago: University of Chicago, 1993), pp. 53-87; see also Edward M. Graham and Nakaoka T. Anzi, "The Myth of a de facto Asian Economic Bloc," *Columbia Journal of World Business* 29:3 (Fall 1994).

⁵ Peter A. Petri, "The Interdependence of Trade and Investment in the Pacific," in Edward K.Y. Chen and Peter Drysdale, eds., *Corporate Links and Foreign Direct Investment in Asia and the Pacific* (Pymble, Australia: HarperEducational Publishers, 1995), pp. 29-55.

⁶ C.H. Kwan, "Why Asia Should Form a Yen Bloc," *Asian Business* 32:2 (February 1996); Walter Hatch and Kozo Yamamura, *Asia in Japan's Embrace: Building a Regional Production Alliance* (New York: Cambridge University Press, 1996).

⁷ Shimokawa Koichi, "The Internationalization of the Japanese Automobile Industry," in Glenn D. Hook and Michael A. Weiner, eds., *The Internationalization of Japan* (London: Routledge, 1992), p. 168; Lawrence G. Franko, "The Japanese Juggernaut Roles On," *Sloan Management Review* 37:2 (Winter 1996), pp. 103-109. Japanese investment is not limited to Asia, of course. Most is still located in Japan's major export markets in North America and Europe, where it enables Japanese companies to leap over trade barriers and localize products for major foreign markets. Nevertheless, Asian investments are growing faster and have been more profitable, and Japanese business leaders routinely refer to Asia as the key to the 21st century. Moreover, Japan is clearly far ahead of other industrialized countries in investments in Southeast Asia, and after some hesitation, seems poised to pull ahead in China as well. See the data in Dennis Encarnation, "Bringing East Asia into the U.S.-Japan Rivalry: The Regional Evolution of American and Japanese Multinationals," in Doherty, ed., *Japanese Investment in Asia*, pp. 67, 69.

⁸ John Zysman, Eileen Doherty, and Andrew Schwartz, "Tales from the 'Global' Economy: Cross National Production Networks and the Re-organization of the European Economy," BRIE Working Paper 83, June 1996.

⁹ Sumner J. La Croix, et al., eds., *Emerging Patterns of East Asian Investment in China: From Korea, Taiwan and Hong Kong* (Armonk, N.Y.: M.E. Sharpe, 1995); Yongwook Jun and Denis Fred Simon, "The Pattern of Korea's

Foreign Direct Investment," in Ross Garnaut and Liu Guoguang, *Economic Reform and Internationalisation: China and the Pacific Region* (Singapore: Allen & Unwin, 1992).

10 Krishna Kumar and Maxwell G. McLeod, eds, *Multinationals from Developing Countries* (Lexington: Lexington Books, 1981); Sanjaya Lall, *The New Multinationals: The Spread of Third World Enterprises* (New York: Wiley, 1983); Khush M. Khan, ed., *Multinationals of the South* (London: Francis Pinter, 1986)

11 Mitchell Bernard, "The Post-Plaza Political Economy of Taiwanese-Japanese Relations," *Pacific Review* 4:4 (1991), pp. 358-367.

12 Investment Commission, Ministry of Economic Affairs, *Statistics on Overseas Chinese & Foreign Investment, Technical Cooperation, Outward Investment, Outward Technical Cooperation, Indirect Mainland Investment*, December 31, 1994, p. 4.

13 Byung-Nak Song, *The Rise of the Korean Economy* (Hong Kong: Oxford University Press, 1990), pp. 121-122.

14 Mitchell Bernard and John Ravenhill, "Beyond Product Cycles and Flying Geese: Regionalization, Hierarchy, and the Industrialization of East Asia," *World Politics* 47:2 (January 1995), pp. 171-209.

15 For critical views of Japanese aid, see David Arase, *Buying Power: The Political Economy of Japan's Foreign Aid* (Boulder: Lynn Rienner, 1995) and Robert M. Orr, Jr., *The Emergence of Japan's Foreign Aid Power* (New York: Columbia University Press, 1990); for a spirited defense, see Shafiqul Islam, "Foreign Aid and Burdensharing: Is Japan Free Riding to a Coprosperity Sphere in Pacific Asia?" in Frankel and Kahler, eds., *Regionalism and Rivalry*, pp. 321-389.

16 Young-Kwan Yoon, "The Political Economy of Transition: Japanese Foreign Direct Investments in the 1980s," *World Politics* 43:1 (October 1990), pp. 1-27.

17 Michael Borrus, "Left for Dead: Asian Production Networks and the Revival of U.S. Electronics," in Doherty, ed., *Japanese Investment in Asia*, pp. 125-146.

18 The forerunner of this model would be Nike: its shoes are designed and marketed in America and manufactured in Asia by contractors in whom Nike has no investments. While comforting to Americans formerly concerned about the possible "boomerang" impact of foreign investment, it may carry different implications for the manufacturing countries, until and unless one of them can break into the design and marketing of the shoes they produce. On Nike's Asian production strategy, see *Far Eastern Economic Review* November 5, 1992.

19 Hadi Soesastro, "Introduction and Overview," in Chen and Drysdale, eds., *Corporate Links*, pp. 1-8.

20 Herbert Kitschelt, "Industrial Governance Structures, Innovation Strategies and the Case of Japan: Sectoral or Cross National Comparative Analysis?" *International Organization* 45:4 (Fall 1991).

21 Oliver Williamson, *The Economic Institutions of Capitalism* (New York: Free Press, 1985).

22 Michael L. Gerlach, *Alliance Capitalism: The Social Organization of Japanese Business* (Berkeley: U.C. Press, 1992).

23 Banri Asanuma, "Manufacturer-Supplier Relationships in Japan and the Concept of Relations-specific Skill," *Journal of the Japanese and International Economies* 3:1 (March 1989), pp. 1-30. For an excellent overview of the literature on Japanese subcontracting practices and new evidence on the relative financial performance of assemblers and their suppliers, see Christina Linn Ahmadjian, "Power and Mutualism in Japanese Supply Networks," Ph.D. Dissertation, U.C. Berkeley, 1995.

24 James P. Womack et al., *The Machine That Changed the World* (New York: Rawson Associates/MacMillan, 1990).

25 Richard F. Doner, *Driving A Bargain: Automobile Industrialization and Japanese Firms in Southeast Asia* (Berkeley: U.C. Press, 1991).

26 See *Nihon Keizai Shinbun*, October 10, 1995; *Nikkei Bijinesu*, July 31, 1995, October 10, 1995; *Ekonomisuto*, October 15, 1996.

27 Richard F. Doner, "Japanese Foreign Investment and the Creation of a Pacific Asian Region," in Frankel and Kahler, eds., *Regionalism and Rivalry*, p. 168.

28 Council for Economic Planning and Development, *Taiwan Statistical Data Book 1996*

29 Zhonghua Zhengxinsuo, *Taiwan Diqu Chanye Nianbao: Qijicheye 1994* [Taiwan Area Industrial Yearbook: The Auto and Motorcycle Industries 1994] (Taipei, 1994), p. 285.

30 Analysts differ on just how large minimum economies of scale for auto assembly and engine production really are, and the extent to which technical progress is reducing scale requirements. Interviews with auto executives suggest that significant economies begin at about 100,000-200,000 units per year. This figure should be viewed as a ballpark estimate. At any rate, it is clear that no auto firm in Taiwan--or anywhere in Asia outside Japan and Korea--enjoys significant economies of scale. By the end of the century Thailand may join Japan and Korea.

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- 31 Wu Rong-yi in Hugh Patrick, ed., *Pacific Basin Industries in Distress* (New York: Columbia University Press, 1991).
- 32 Yun-han Chu, "Industrial Change and Developmental State in Two East Asian NICs: A Case Study of the Automotive Industries in South Korea and Taiwan," *Proceedings of the National Science Council, Republic of China, Part C: Humanities and Social Sciences* 3:2 (July 1993), pp. 203-223.
- 33 Walter Arnold, "Bureaucratic Politics, State Capacity, and Taiwan's Automobile Industry Policy," *Modern China* 15:2 (April 1989), pp. 178-214.
- 34 Yun-han Chu, "The Realignment of Business-Government Relations and Regime Transition in Taiwan," in Andrew MacIntyre, ed., *Business and Government in Industrializing Asia* (Ithaca, N.Y.: Cornell University Press, 1994), pp. 113-141.
- 35 Gregory W. Noble, "Contending Forces in Taiwan's Economic Policymaking: The Case of Hua Tung Heavy Trucks," *Asian Survey* 27:6 (June 1987), pp. 683-704.
- 36 Zhonghua Zhengxinsuo, *Qijicheye* 1994, pp. 283, 295.
- 37 Government statements have been ambiguous, sometimes making the abolition of local content requirements contingent on WTO entry, and other times insisting that the requirements would cease at the end of 1996. See *Cheliang Gonghui Huixun*, November 20, 1995, p. 40 and December 20, 1995.
- 38 *Cheliang Gonghui Huixun*, December 20, 1995, pp. 31-32.
- 39 *Automotive News*, July 8, 1991, p. 261.
- 40 Taiwan Transportation Vehicle Manufacturers's Association.
- 41 China Motor Company.
- 42 For a good summary of the literature on keiretsu in the auto industry, see Ahmadjian, "Power and Mutualism".
- 43 On the different types of supplier networks in Japan, see Tate, *Driving Production Innovation Home*, particularly Appendix 6, pp. 255-258.
- 44 Author interview at China Motors.
- 45 Author interview at industry association (TTMVA).
- 46 See e.g. *Gongshang Shibao*, December 21, 1995.
- 47 1986 figures from Hu Yongan, "Tan Lingzujian Gongye: Woguo Qiche Gongye xilie tantao zhisan" [On the Parts Industry: No. 3 in a Series Exploring Our Nation's Auto Industry"], *Taiwan Jingji Yanjiu Yuekan*, February 1989, p. 78; 1994 data from China Motor Company.
- 48 According to the list of 500 leading export-import firms provided in Central News Agency, *1996 Shijie Nianjian*, pp. 230-284, in 1994 only tire maker Chengshin exported more auto parts from Taiwan than Yazaki did.
- 49 *Fortune*, September 9, 1996.
50. Major policy restrictions included stiff tariffs (25% in the early 1990s), demanding local content requirements (90%), and a ban on imports from anywhere other than the United States and Europe. See the account by the IDB's Ou Jiarui, "Ruguan hou Jiche Gongye de Yinying cuoshi" [Countermeasures by the Motorcycle Industry after it Enters GATT], in *Jingji Ribao*, eds. 84 Nian Cheliang ji Lingpeijian Tekan [Special Report on the Auto and Auto Parts Industry, 1995], p. 53. In practice imports were negligible. "Taiwanqu Jiche Gongye de Xiankuang yu Zhanwang," *Chanye Jingji* 167 (July 1995), p. 55.
- 51 Author interview with Huan Hui Chiang, Executive Vice President, Sanyang Industry Co., August 1995.
- 52 Author interview with T.L. Li, *Jingji Ribao*, August 1995.
- 53 *Cheliang Gonghui Huixun*, July 10, 1995, pp. 26, 27.
- 54 Author interview with Tseng Fern-hann, Section Chief, First Division, Industrial Development Bureau, Ministry of Economic Affairs, August, 1995.
- 55 Noble, "Contending Forces".
- 56 Number of dispatched managers is given in *Kaigai Shinshutsu Kigyo Soran*, 1994 (Tokyo: Toyo Keizai Shinposha), p. 80. Language of meetings from interviews.
- 57 IDB interviews.
- 58 *Automotive News* May 29, 1995.
- 59 *Jingji Ribao*, August 4, 5, 1995.
- 60 *Tianxia*, November 1985, pp. 38-56.
- 61 Kume Yutaka, quoted in *Tianxia*, October, 1985, p. 98.
- 62 Zhuang Suyu, "Yulong Yan kaitai: Shaozhu Yao Zhongxing" [Yulong's Yan Kaitai: The Young Owner Wants Rejuvenation], *Tianxia*, May 1990, p. 103.
- 63 Number of Japanese managers from Toyo Keizai, *Kaigai Shinshutsu* 1994, p. 80.
- 64 Zhuang, "Shaozhu," pp. 98-105.

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- 65 On Hyundai and autos, see Alice H. Amsden, *Asia's Next Giant: South Korea and Late Industrialization* (New York: Oxford University Press, 1989), Ch. 7.
- 66 *Jingji Ribao*, December 29, 1995.
- 67 Cf. *Gongshang Shibao* December 13, 1995.
- 68 Author interview, China Motors Corporation, August 1995.
- 69 For the example of Nissan, see *The Japan Times*, weekly international edition, December 18-24, 1995, p. 11; see also *Motor Business International*, 4th quarter, 1995.
- 70 See for example, *Nikkei Bijinesu*, February 13, 1995.
- 71 Officially the application was made through a subsidiary registered in the Virgin Islands. *Jingji Ribao* December 16, 1995; *Gongshang Shibao* January 5, 1995.
- 72 *Liang'an Jingji Tongxun*, December 10, 1995, pp. 21-22; *Nikkei Weekly*, July 17, 1996. Building the new plant faced opposition from both sides of the Straits. Taiwan's Ministry of Economic Affairs worried that excessive investment in the mainland might erode Taiwan's technological advantage, and increase the PRC's political leverage. On the mainland side, China Motors was able to elicit support from the Fujian provincial government and the machinery bureau, but faced skepticism from the State Planning Commission, which hoped to consolidate China's auto assembly sector. *Gongshang Shibao*, August 19, 1996.
- 73 On the late but accelerating entry of Japanese auto makers in China, see *Nikkei Bijinesu*, February 13, 1995; *Motor Business Asia-Pacific* (Economist Intelligence Unit), 4th Quarter 1995, pp. 14-31.
- 74 *Gongshang Shibao*, December 27, 1995.
- 75 Author interview with Jet P.H. Su, Deputy General-Director, Mechanical Industry Research Laboratory, ITRI.
- 76 Su interview; *Tianxia*, July 1995, pp. 200; *Jingji Ribao*, December 29, 1995.
- 77 Despite significant liberalization, the governments still wields tremendous influence over the price of non-traded commodities such as land and labor through its zoning and licensing powers. In its efforts to encourage individual and collective investments in key parts and independent designs, Taiwan's Industrial Development Bureau can provide land for about one-half of its market price, and can facilitate applications to import immigrant labor. Tseng (IDB) interview.
- 78 *Cheliang Gonghui Huixun*, September 20, 1995, p. 34; *Nikkei Weekly*, July 10, 1995; *Jidosha Nenkan* 1994, p. 218.
- 79 *Cheliang Gonghui Huixun*, October 20, 1995, 24; December 20, 1995, p. 32.
- 80 *Jingji Ribao*, August 4, 1995; *Gongshang Shibao* December 28, 1995.
- 81 *Nikkei Bijinesu*, May 15, 1995, p. 30. For a full list of mainland motorcycle firms and their tie-ups with foreign firms (overwhelmingly from Japan and Taiwan), see *Jingji Ribao*, eds. *84 Nian Cheliang ji Lingpeijian Tekan*, pp. 73-83.
- 82 Lin Yuanjun, "Qingfeng: Bozhong Handong, Shoufeng Nuanchun" [Qingfeng: Sow in the cold of winter, reap in the warmth of spring] *Yuanjian*, May 15, 1995, pp. 75-78; Yang Aili, "Shenmi Hanjiang Huang Shihui" [Mysterious brave general Huang Shihui], *Tianxia*, January 1995, pp. 26-44; *Shangye Zhoukan*, November 1, 1995 *Gongshang Shibao*, May 1, 1995.
- 83 Honda formally announced its investment plans in early summer, 1995, but as of the end of 1995 the plant had not yet been approved. *China News*, July 5, 1995.
- 84 *Gongshang Shibao*, September 2, 1996.
- 85 *Zhuoyue Zazhi*, December 1995, pp. 16-17; *Jingji Ribao* January 4, 1996.
- 86 *Nikkei Weekly*, July 22, 1996.
- 87 Zheng Ruwen, "Guangyang Jiche: 'Yao zuo jiu zuo zui hao de!'" [Guangyang Motorcycle: If you're going to make it, make it the best!] *Zhuoyue Zazhi*, December 1993, p. 133; You Changshan, "Jicheye Biaoxiang Xin Dianfeng" [The Motorcycle Industry Races toward a A New Peak], *Tianxia*, January 1995, pp. 124.
- 88 *Chanye Jingji*, "Jiche Gongye," p. 56.
- 89 *Chanye Jingji*, "Jiche Gongye," p. 63.
- 90 *Gongshang Shibao*, December 2, 1995; *China Post*, May 11, 1996.
- 91 Ou Xichang, "Lingjian Juntuan Gongshang Ziyuan" [The Parts Army Shares Resources], *Tianxia*, June 5, 1995, pp. 44-45; *Jingji Ribao* August 10, 1995; *Gongshang Shibao* January 5, 1995. Dongyang annual report.
- 92 1993-1994 annual report, Yuan Feng Industrial Company.
- 93 Hidehiko Mukoyama, "Active Investment by Japanese Parts and Materials-Processing Industries in Asia: Exploring the Backgrounds of their Moves in Thailand and China," *RIM: Pacific Business and Industries* 2:24 (June 1994), p. 44.

94 Lu Chunfu, "Disijie Zhongri Qiche Lingjianye Jiaoliu Kentanhui Jiyao" [Report on the Fourth Sino-Japanese Auto Parts Exchange Roundtable], *Cheliang Gonghui Huixun*, May 10, 1995, pp. 14-15.

95 Data from Lioho Machinery.

96 Michael McDermott, "The Development and Internationalization of the South Korean Motor Industry: the European Dimension," *Asia Pacific Business Review* 2:2 (Winter 1995), pp.23-47.

97 The tendency of some writers to exaggerate the independence and skill of Hyundai, and deprecate Daewoo and Kia, should thus be viewed with considerable skepticism. Amsden, *Asia's Next Giant*; Myung-oc Woo, "Export Promotion in the New Global Division of Labor: The Case of the South Korean Automobile Industry," *Sociological Perspectives* 36:4, 1993, pp. 335-357.

98 Council for Economic Planning and Development, *Taiwan Statistical Data Book 1994*, p. 90; McDermott "South Korean Motor Industry," p. 29.

99 Reuters, September 6, 1996; *Nikkan Kogyo Shinbun*, August 29, 1996.

100 *Korea Economic Weekly*, September 30, 1996.

101 See Reuters October 18, 1996 on the Daewoo/Hyundai clash in Poland; on MOTIE efforts at coordination, see *Korea Economic Weekly*, October 18, 1996.

102 For a good overview of Korean auto investments abroad, see *Far Eastern Economic Review*, June 13, 1996. On Korean auto investments in India and Malaysia see *Nikkei Weekly*, July 29 and October 7, 1996.

103 Korean parts exports were only about half as large as those from Taiwan, running at about one billion dollars per year in 1996. *Korea Economic Weekly*, October 24, 1996.

104 Reuters October 17, 1996; *Korea Economic Weekly*, October 18, 1996.

105 *Korea Economic Weekly*, August 9, 1996, September 16, 1996. This recapitulates the policy pattern seen in Japan of concentrating first on assembly, then parts. Kent E. Calder, *Japan's Strategic Capitalism: Private Business and Public Purpose in Japanese Industrial Finance* (Princeton: Princeton University Press, 1993), pp. 177-182. Of course, Japan's assemblers developed a parts pyramid from an early period.

106 In recent years, the Korean auto industry has been extraordinarily successful. However, the ability of the Korean firms to manage complex global production networks is not yet assured. Hyundai lost over one billion dollars on its Canadian plant. Most of the current DFI is by Daewoo, a highly leveraged company that could fail in a serious downturn. With overcapacity and genuine market liberalization looming, and the managerial and financial resources of the firms, especially Daewoo, stretched by a series of audacious moves in still emerging economies, the possibility of catastrophe cannot be ruled out. *Far Eastern Economic Review*, June 13, 1996. On the high gearing and low (or nonexistent) profitability of all Korean producers other than Hyundai, see McDermott, "South Korean Motor Industry," p. 33 and *Korea Economic Weekly*, August 20, 1996.

107 Taiwan has allowed imports from Japanese transplant factories in the United States as a way of reducing the persistent trade surplus with the U.S. As late as 1995, imports accounted for less than 1% of the Korean car market. *Korea Economic Weekly*, September 19, 1996.

108 S. Jayasankaran, "Made-in-Malaysia: The Proton Project," in Jomo K.S., ed., *Industrialising Malaysia: Policy, Performance, Prospects* (London: Routledge, 1993), pp. 272-285.

109 Reuters, October 2, 1996; *Nikkei Weekly*, October 7, 1996.

110 On the controversy over Kia's support for the Timor "national car" project, see *Far Eastern Economic Review* June 13, June 20, and October 17, 1996.

111 Richard F. Doner, "Limits of State Strength: Toward an Institutional View of Economic Development," *World Politics* 44:3 (April 1992), pp. 398-431.

112 Many analysts cite automobiles as an example of the weakness of industrial policy, since two separate efforts by MITI to consolidate the industry largely failed. See e.g. Takatoshi Itoh, *The Japanese Economy* (Cambridge: MIT Press, 1992), p. 202. The implication is not justified, since merger policies were only a small part of auto industrial policy (nor were they a complete failure: see Hiromichi Mutoh, "The Automobile Industry," in Ryutaro Komiya, et al., *Industrial Policy of Japan* (San Diego: Academic Press, 1988), pp. 316-317). Restrictions on imports remained almost complete until 1980, by which time the industry was highly competitive. Direct foreign investment was blocked until 1970 and limited thereafter. Financial aid was crucial not only in the 1950s, as most analysts concede, but well into the 1960s. As noted above, the government also played a major role in strengthening and consolidating the parts industry. Sumimaru Odano and Saiful Islam, "Industrial Development and the Guidance Policy Finance: the Case of the Japanese Automobile Industry," *Asian Economic Journal* 8:3 (1994), pp. 285-315. See also Tate, *Driving Production Innovation Home*.

113 On the conflict between Japan and the World Bank on industrial policy in Asia, see Robert Wade "Japan, the World Bank, and the Art of Paradigm Maintenance: The East Asian Miracle in Political Perspective, *New Left Review* 217 (May/June 1996), pp. 3-36.

114 Shunichi Yamada, "ASEAN-shokoku e no Nihon no Keizai Kyoryoku" [Japan's Economic Cooperation toward ASEAN Countries], in Yashichi Ohata, et al., eds., *ASEAN no Keizai, Nihon no Yakuwari* [The Role of Japan in ASEAN economies] (Tokyo: Yuhikaku, 1992).

115 Ippei Yamazawa, "Promotion of SMEs for Industrial Upgrading in ASEAN: A Japanese Proposal for Industrial Cooperation," *ASEAN Economic Bulletin* 11:1 (July 1994), pp. 16-24.

116 Womack, et al., *The Machine that Changed the World*, pp. 261-263.

117 For a careful analysis of the evolution of the influential concept of "lean production," see Tate, *Driving Production Innovation Home*, fn. 97, p. 53.

118 See upcoming BRIE volume.