TEXAS PAPERS ON LATIN AMERICA

**Pre-publication working papers of the
Institute of Latin American Studies
University of Texas at Austin**

ISSN 0892-3507

The Global Assembly Industry

Patricia A. Wilson

**Associate Professor of Architecture
University of Texas at Austin**

Paper No. 89-05

THE GLOBAL ASSEMBLY INDUSTRY: Maquiladoras in International Perspective

Patricia A. Wilson¹

University of Texas

I. INTRODUCTION

Most economists explain the development of the global assembly industry in terms of a natural process of diffusing the production of older, more mature and stable products to cheaper labor locations in the third world: "as products mature, technology diffuses, high-tech products eventually become traditional products, and production moves to more competitive locations abroad" (Grunwald and Flamm, 1985, p. 3). Known as product cycle theory (Vernon, 1971), this concept has been used to explain the spread of labor intensive assembly activity in electronics and textiles to Asia, Mexico, the Caribbean, and a few other cheap labor locations.

Economists have extended the same reasoning to explain the recent success stories of the newly industrializing countries of Asia—Korea, Taiwan, Hong Kong, and Singapore. Having begun in the 1960s to attract the labor intensive assembly activities of foreign corporations, the four Asian "tigers" can now design and produce some of their own sophisticated and high value-added products. Their wage levels have risen to the point where local entrepreneurs are going offshore themselves (e.g. to Thailand, Malaysia, China, and even the Caribbean) to seek more affordable labor. This trend can be seen as a natural continuation of the product cycle involving "normal structural shifts . . . into industries with more physical and human-capital-intensive lines" (Spinanger, 1984, pp. 80-81).²

The implications of this interpretation for Mexico are quite promising: Seen in this light, Mexico, too, should eventually evolve out of the traditional routine assembly into more sophisticated methods and products. Some of the new

evidence presented in Wilson (1989) could fuel the product cycle argument: Mexico's assembly industry now includes higher value-added activity and even more sophisticated technology. It takes only a small additional step beyond the product cycle analysis to conclude that a reasonable industrial development strategy could be based on assembly activity as the motor to a broad-based advanced industrialization, especially for countries with small or shrinking internal markets. Since 1982 Mexico has attempted such a strategy.

Nevertheless, the argument here is that there is no natural, inexorable path to advanced industrialization based on the assembly industry. Rather, the reason why some countries have been able to develop on the basis of assembly industry and some have not has to do with public policy, social relations, and the historical context. The following discussion of the rise of the global assembly industry addresses the conditions and factors that helped to create the success of some of the Asian countries, relegate the Caribbean to traditional assembly, and put Mexico in a role somewhere between the two extremes. While some of the propitious conditions and factors could be replicated in Mexico to take greater advantage of the assembly industry, there is no inexorable path toward such an outcome that Mexico is naturally following.

II. THE RISE OF THE GLOBAL ASSEMBLY INDUSTRY

Offshore assembly in developing countries started in the 1950s in Hong Kong and Puerto Rico,³ followed in the 1960s by Taiwan, Singapore, the Philippines, Mexico, and the Dominican Republic (see fig. 1). Following the example of Shannon airport in Ireland,⁴ many of these governments set up special industrial parks, called export processing zones, in order to attract foreign investment. Within the boundaries of these zones, firms would be allowed to process goods for export without paying duties on imported components. Hong Kong, following its tradition as a commercial entrepôt or free trade zone, designated the entire island as an export processing zone. By the end of the sixties, eleven developing countries had an export processing zone. By the end of the seventies there were

fifty-seven zones in twenty-nine countries. By the mid-eighties there were seventy-nine zones in thirty-five countries, with substantial assembly activity occurring outside designated zones as well (Currie, 1984). Asia accounts for over half (55 percent) of the world's zone employment; Mexico, the Caribbean, and Central America about 30 percent (with Mexico representing over half of that amount); South America (Brazil, Colombia, and Chile) about 8 percent; and Africa, the Mediterranean, and the Middle East account for the small remainder (see fig. 2). The main products are electronics—both consumer goods and components—textiles, apparel, and footwear (see fig. 3).

Figure 1

THE SPREAD OF EXPORT PROCESSING IN THE THIRD WORLD, 1960-84

(by country and date of establishment of
first export processing facilities)

	<u>1960-64</u>	<u>1965-69</u>	<u>1970-74</u>	<u>1975-79</u>	<u>1980-84</u>
<u>Asia</u>	Hong Kong	South Korea Taiwan Singapore Philippines India	Malaysia	Indonesia Sri Lanka	China Thailand Bangladesh Pakistan
<u>Latin America and Caribbean</u>	Puerto Rico	Mexico Dominican Republic Panama Brazil	Haiti El Salvador Guatemala Colombia	Jamaica Honduras Nicaragua Chile	Costa Rica
<u>Africa and Middle East</u>		Mauritius	Tunisia Jordan	Egypt Syria Liberia Senegal	Cyprus

Source: Currie (1984), p. 5, supplemented by country-specific information.

Figure 2

PRINCIPAL HOST COUNTRIES, 1978 to 1983

(by continent and amount of employment in export processing)

<u>Place</u>	<u>Export Processing Employment</u>			
	<u>1978</u>		<u>1983</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
ASIA	360,700	56%	478,500	55%
Singapore	105,000		105,000	
Taiwan	77,400		83,400	
Hong Kong	59,600		70,000	
Malaysia	56,000		101,000	
South Korea	33,000		33,000	
Philippines	19,700		24,700	
LATIN AMERICA AND CARIBBEAN	246,100	38%	335,200	39%
Mexico ¹	90,700	14%	150,900	17%
Caribbean and Central America ²	108,800	17%	120,000	14%
Haiti	87,900		87,900	
Dominican Republic ³	11,500		21,400	
South America	47,200	6%	64,300	7%
Brazil	43,800		60,000	
AFRICA AND MIDDLE EAST	39,200	6%	52,700	6%
Mauritius	17,400		28,900	
Tunis	<u>10,000</u>	—	<u>10,000</u>	—
TOTAL	646,000	100%	866,000	100%

Source: Currie (1984), except as noted.¹Mexican data from Secretaría de Programación y Presupuesto (SPP).²Does not include several small East Caribbean islands.³Dominican Republic date from the National Council of Industrial Free Zones, reported in Thoumi (1988).

Figure 3

SECTORAL COMPOSITION OF EXPORT PROCESSING INDUSTRY

(by percentage of firms in each sector)

	<u>Clothing and Textiles</u>		<u>Electronics</u>		<u>Other</u>	
	<u>1978</u>	<u>1983</u>	<u>1978</u>	<u>1983</u>	<u>1978</u>	<u>1983</u>
Asia (except Hong Kong)	16%	15%	45%	33%	39%	53%
Hong Kong	32%	31%	4%	5%	64%	64%
Caribbean and Central America	61%	38%	13%	21%	27%	42%
Mexico	33%	27%	47%	39%	20%	33%
South America	50%	35%	0%	0%	50%	65%
Africa and Middle East	41%	41%	2%	1%	57%	58%
AVERAGE ¹	26%	21%	38%	31%	36%	49%

Source: Based on data from Currie (1984), Table 4, p. 24, which are aggregated from individual zone level data for twenty-three countries.

¹Based on all reporting firms.

A. Corporate Strategy

The rise of international assembly in the late sixties was not an isolated curiosity. Rather, it was a bell weather event evidencing a deep-seated change in the global political economy which many authors refer to as the "new international division of labor" (e.g., Bluestone and Harrison, 1982; Frobels, Heinrich, and Kreye, 1980; Moulaert and Salinas, 1983). The rise of global assembly reflected the decline of U.S. corporate hegemony in the world economy, the rise of foreign

competition, and the search for new competitive strategies. In the face of the rising foreign competition, U.S.-based multinational corporations had two broad strategy choices: to improve productivity or to reduce costs.⁵ On a national level, workers' wage increases were beginning to outpace diminishing productivity gains. Many corporations chose a cost-reduction strategy focusing on labor costs. Third World countries that offered cheap, plentiful (and female⁶) labor became very attractive locations—not as an access point to the local market, but as a site for carrying out labor intensive processing of goods destined for the international market. Thus, as textile, garment, shoe, and toy production went offshore along with the assembly of electronic components and electronic consumer goods, the new international division of labor was born.⁷ It seemed to reflect the pinnacle of mass production rationality carried to an international scale (see Wilson, 1989).⁸

Among developed countries, U.S.-based multinationals were the primary ones to pursue the global assembly strategy. A lack of protectionist sentiment at home made offshore sourcing politically feasible. Existing U.S. tariff codes (Items 806 and 807) provided a tax incentive by allowing the U.S. components in the assembled products to be reimported duty free.

European multinationals did not face the same pressures as U.S. corporations to reduce costs because of tariff barriers helping to protect the European community from foreign competition. Moreover, European producers had access to large pools of cheap migrant labor without going offshore. There were also lower labor cost countries within Europe—Ireland, Portugal, Spain—that served as assembly sites for some industries. Nevertheless, the Europeans did have a presence in the global assembly industry—primarily in North Africa and the Mediterranean.

Japanese corporations carved out their comparative advantage largely on the basis of productivity increases stemming from the introduction of flexible manufacturing—not just new technology, but new management methods and shop floor organization, along with an emphasis on quality (see Wilson, 1989). Thus, they did not grow to depend on cheap labor locations as much as U.S. industry

did. Yet, like the Europeans, the Japanese did have a presence in the global assembly industry—especially in Taiwan, South Korea, and Malaysia. In fact, by the end of the 1970s their investment in electronics manufacturing in east Asia was growing rapidly, even though most of it was aimed at regional or third-party markets and consisted of older technologies (Grunwald and Flamm, 1985).

B. Sectoral Patterns

Improvements in international communication and transportation made a global production strategy feasible for certain products and industries: those with high value-to-weight ratios such as textiles (including garments) and electronic components. Electronic component assembly was the first U.S. industry to go offshore en masse in response to Japanese competition. The feasibility of offshore locations for electronics came about with the development of integrated circuits etched on silicon chips in the late sixties.⁹ While the manufacture of the chips was capital intensive, their assembly and encapsulation were not. Given the high value-to-weight ratios and improvements in air transport and telecommunications, the labor intensive portion could be geographically separated¹⁰

U.S. producers of electronic consumer goods—radios, tape recorders, televisions—also began to locate their labor intensive assembly operations abroad in the face of Japanese competition. Television components and subassemblies became the second largest 806/807 import to the U.S. from developing countries after semiconductors (Grunwald and Flamm, 1985, p. 18). By the early 1980s the remaining U.S. television manufacturers supplied virtually all of their subassemblies from their overseas operations—mainly Mexico, but also Taiwan and later Singapore.¹¹

U.S. producers of textiles, apparel, and shoes faced increasing competition in the sixties from cheap, but high-quality, imports (especially from Hong Kong and elsewhere in southeast Asia). With a declining supply of low-wage female workers in the U.S., many textile, apparel, and shoe manufacturers opted to take their most labor intensive operations abroad to cheaper labor locations in order to compete

with these imports. The stable and relatively unsophisticated production technology (even though the product designs were volatile and sophisticated), the high value-to-weight ratios of the products, and the separability of the labor intensive stitching from the design and cutting stages made this strategy feasible. Mexico and the Caribbean became the principal recipients of U.S. textile, apparel, and shoe assembly operations. They used almost exclusively U.S.-made materials to maintain quality standards and to qualify for 806/807 tax exemptions on the imported final products.¹²

The rise of the international assembly industry was the result of many individual corporate strategic decisions about how to deal with intensifying international competition. Yet they fit together into a pattern—by no means a natural or inexorable one—of opting for cost competition based on reducing direct labor costs. Many corporations found a strategy to deal with growing foreign competition not by substituting capital for labor, not by reorganizing the shop floor to increase worker productivity, not by bringing in cheap labor through migrant flows from the Third World (although this indeed has been increasing; see Sassen, 1988), but rather by going offshore to Third World locations. Compared to the primary Japanese strategy of increasing long-term productivity by adopting flexible manufacturing methods, the predominant U.S. strategy of labor cost cutting was a short-term one. This pattern reflected, and in fact exacerbated, declining U.S. economic hegemony (see Wilson, April 1989).

C. Geographic Patterns

If the global assembly industry is following a natural pattern of spreading to ever cheaper labor countries, as the product cycle theorists presume, why is it that so many developing countries have been passed over? The bulk of foreign assembly activity (about 87 percent) is concentrated in east and southeast Asia, Mexico, and the Caribbean. Figure 2 shows that the regional percentages have scarcely changed over time (although individual country shares within regions have).

Of particular interest for the Mexican comparison is why the rest of Latin America has been relatively untouched by assembly industry. There are many Latin American countries that offer plentiful, cheap, and dexterous female (and male) workers. And the distance argument—that South American countries are too distant from the U.S. compared to Mexico and the Caribbean—pales in the light of Asia's attractiveness.

There is one overriding reason why most of Latin America was overlooked by multinational corporations seeking assembly sites for reexport in the 1960s. It was the deep, prolonged commitment to import substitution as the primary industrial development strategy adopted by most Latin American governments. More precisely, it was the social relations (or what some would call the "business climate") forged by and forging the import substitution approach.

Ironically, the strategy of import substitution in Latin America was mostly complementary to, and supportive of, U.S. multinational interests during the post—World War II boom when lack of markets had been the fundamental impediment to their growth. The protectionist barriers of import substitution nurtured domestic markets, however fledgling. The import substitution strategy spawned an urban industrial labor force and a mushrooming middle class. The middle class included the expanding ranks of white-collar government employees needed to plan the industrial infrastructure, educate the workers, and manage the public enterprises underpinning urban industrial expansion.¹³ Instead of exporting final products to these countries, the multinational enterprises invested directly in factories and final assembly plants to supply the domestic markets from within the trade barriers. They also sold intermediate inputs and technology to the growing market of locally owned industries.

What, then, explained the sudden aversion to import substitution by corporations looking for assembly sites for reexport? Some corporations began to perceive foreign competition in the increasingly global market as a more threatening bottleneck to growth than the lack of markets. These companies began to look for a cheap and disciplined labor force in order to reduce labor costs. But

in Latin America the import substitution strategy had created populist demands to share the fruits of industrialization with the rapidly unionizing industrial workers, the growing urban middle class, and the flux of rural migrants expanding the ranks of the urban poor. A frequent result in Latin American countries was a populist government willing to (or forced to) share the gains with these mobilized social sectors—through public spending, overvalued currencies, or direct wage and salary increases. Thus, the Latin American countries that had whole-heartedly pursued import substitution—with the encouragement of U.S. foreign aid through the Alliance for Progress—were not attractive to multinationals as labor intensive assembly sites for reexport. These corporations needed a labor force that did not expect—or was in no position to demand—an increasing share of the pie.

Hong Kong, Taiwan, Singapore, and South Korea fulfilled that need well for multinational corporations for whom the distance was not an insurmountable problem. While three of these four countries did pursue import substitution, the fundamental difference is that the governments were able to prevent import substitution from becoming a vehicle for populist demands. They maintained an authoritarian control over the labor force and middle classes throughout their import substitution experience that carried over rather easily to their export manufacturing efforts. Moreover all but the government of Hong Kong maintained a strong active involvement in the economy—a striking contrast to the Chicago School or Thatcher neo-liberal approach characterized by *laissez-faire* and so often associated with export-led strategies. Even Hong Kong, with its nationalized land and subsidized housing stock, was far from *laissez-faire*.

Singapore. The island economy of Singapore had only a brief flirtation with import substitution, from independence in 1959 to 1965, following its British colonial role as a free port for trade between the Indian Ocean and the Pacific. During this interlude with import substitution, the government of Singapore swiftly routed Communist influence in the labor movement and established a single officially recognized (and controlled) union. The government rejected the import

substitution strategy in 1965 when expulsion from the Malaysian Federation and the British decision to close its military bases left them without hopes for a sizable internal market.

The city-state then adopted a full-fledged national strategy of export-oriented industrialization based on foreign assembly industry. It improved the roads, public utilities, telecommunications networks, and airports; it built an industrial estate with nearby public housing; it enacted tax incentives and investment guarantees for foreign investors (Griffith, 1987). But the central girder to their efforts was to control the labor force: "the government believed that the success of the (export) industrialization programmes rested on low wages and a disciplined work-force" (Chen, 1983, p. 12). In 1968 the government passed laws to increase the work week, to reduce vacation, sick leave, and eligibility for overtime pay, and to remove a broad range of labor issues from collective bargaining.

In that same year Singapore attracted its first electronics corporation, the semiconductor industry leader Fairchild⁴ (see fig.4). The ensuing wave of foreign investment created such growth in Singapore that in 1971 the government rescinded the tax holidays for foreign corporations (Chang, 1971, p. 41). While a late starter in the global assembly industry, by 1971 Singapore had the largest share of semiconductor assembly in Asia.

Taiwan. By the end of fifty years of Japanese colonial rule in 1945, Taiwan had developed a light industrial base along with some heavy industries such as aluminum, chemicals, and shipbuilding—largely through investments by leading Japanese family groups (Ho, cited in Cumings, 1984, p. 13). The colonial bureaucracy had developed into a strong state, with tight police and military control that helped to isolate it from middle- and working- class demands. In the absence of a local entrepreneurial class, the state played a large role in directing the economy. The Japanese family investment groups and the strong state repressed the Taiwanese labor force, "leading in the 1940s to a forced military-style discipline in the factories" (Cumings, p. 15).

The post war emergence of single party rule by the Kuomintang¹⁵ kept the centralized and powerful bureaucracy the Japanese had left behind largely intact. The KMT added their own sizable military force to ensure state autonomy and avoid democratic participation (and to entertain the hopes of someday retaking the mainland). The government continued to repress labor harshly, outlawing unions and imposing martial law that lasted from 1947 to 1986.

The U.S. supported the KMT with generous foreign aid—both economic and military. To bolster Japanese economic (but not military) influence in the region as a buffer to Communist influence, the U.S. wanted to groom Taiwan as a permanent economic periphery, providing labor, markets, and raw materials for Japan (Cumings, 1984, pp. 15-22). U.S. aid missions assisted Taiwan's national planning efforts for agricultural and industrial development.

The KMT—with at least tacit approval if not always active support by the U.S. aid missions—adopted an import substitution strategy. The government used protective tariffs and overvalued exchange rates to nurture selected industries such as textiles, cement, and glass. Forging a strong link between the state and the private sector, the KMT granted monopolies to favored entrepreneurs, usually mainlanders, who took over industries formerly held by Japanese family groups. After the peak of easy import substitution in 1958/1959, the government opted for an export-led strategy to utilize Taiwan's comparative advantage of cheap, yet educated, labor. While this strategic change from import substitution to export orientation has occurred at great social expense and political upheaval in Latin America, it happened quickly and easily in Taiwan.

To implement the export-led strategy, the Taiwan government in 1960 devalued the currency to cheapen exports (and the labor used to make the exports), reduced tariff barriers, created tax incentives for exporters, and provided state guarantees to protect foreign investments. In 1965 Taiwan opened an export processing zone at Kaohsiung to further attract multinational assembly plants. These steps were taken in the context of long-range planning by the state.

Figure 4

U.S. CORPORATIONS WITH SEMICONDUCTOR ASSEMBLY
PLANTS IN THE THIRD WORLD

(by country and year of establishment)

<u>Country</u>	<u>Year</u>	<u>Corporation</u>
Hong Kong	1961	Fairchild Carter
Taiwan	1964	General Instrument Philco-Ford RTW
	1967	RCA
	1969	Philips
	1970	Texas Instruments
Korea	1964	Fairchild
	1965	Motorola Signatics
	1970	American Micro
	1971	Varadyne
Singapore	1968	Fairchild
	1969	Air Reduction SGS Stemen Continental Services
	1970	Texas Instruments National Intersel
	1971	Electronic Array
Mexico	1968	Fairchild Transitron
	1969	Motorola American Micro
	1970	General Instrument Sprague

Source: Chang (1971), p. 43, based on field interviews.

Korea. Korea experienced a similar history to Taiwan's, but with more social disruption. Japanese colonial rule from 1910 to 1945 created in Korea, as in Taiwan, an independent, militarized, repressive authoritarian state that in the 1930s adopted national planning to industrialize the colony. The state protected and subsidized chosen industries (and the Japanese family investment groups that operated them)—with heavy industry in the north, such as steel, chemicals, and hydroelectric power, and light industry in the south, where the best rice-producing lands were to be found. Under Soviet auspices, North Korea reacted to the lifting of Japanese control in 1945 with a social revolution, during which many northern entrepreneurs, professionals and educated workers fled to the south. Under U.S. influence, the southern landlords held the state in the south, maintaining power by police and military force without promoting economic development. The civil war from 1950 to 1953 left South Korea clearly under U.S. hegemony and slated to play the same role as Taiwan: an economic periphery to foster Japanese economic growth.

The U.S. channeled massive amounts of economic and military assistance to the new South Korean government under Syngman Rhee. South Korea pursued import substitution just a few years behind Taiwan, protecting key industries with overvalued exchange rates and protective tariffs, and eliminating the influence of the landlords through land reform. As in Taiwan, the authoritarian government, heavily militarized with U.S. support, enforced a regimented discipline in the factories, keeping women workers at the bottom of the economic ladder. The state chose favored Korean families to take over Japanese industries and to build up their wealth with state-protected monopolies. The huge military was used to stifle democratic demands, but at the same time provided upward mobility and training to future bureaucrats and corporate managers (Cumings, 1984, pp. 22-26). The phase of easy import substitution ended in South Korea in the early 1960s when protectionist barriers and domestic demand were no longer sufficient to spawn new industries. Unlike in Taiwan, however, the transition to an export-led phase was violent. The military cleared the way with a coup in 1961.¹⁶ By 1964 the military

government under Park Chung Hee had devalued the Korean currency, removed tariff barriers, promoted tax incentives for exports, and provided guarantees and transportation cost subsidies to foreign investors. To further attract foreign corporations, the government opened an export processing zone in Masan in 1965. As in Taiwan, these steps were taken in the context of long-range planning by the state, through the Economic Planning Board (similar to the famous Japanese ministry of industry and trade, MITI). Park created the Korean CIA to ensure the party's power and autonomy. The KCIA, as an arm of the executive, eventually "penetrated nearly every arena of Korean life, with agents in factories, central and local government offices, and university classrooms" (Cumings, 1984, p. 29).

Thus, in both Korea and Taiwan the rise of export processing came on the heels of import substitution. Yet, unlike the Latin American experience, the import substitution phase in Korea and Taiwan never included the workers or middle classes in a competition for political power. Repressive, authoritarian governments excluded them in the 1950s under import substitution and easily continued to exclude them in the 1960s under the export-led strategy. Moreover, the Taiwanese and Korean governments maintained a tight control over, and involvement in, the economy during both import substitution and the export-orientation phases.

Hong Kong. This British crown colony has never pursued an import substitution strategy. By the 1950s, with an open economy from over a century of experience as a free port for international commerce, Hong Kong could easily take advantage of its international transportation, communication, and banking infrastructure to promote the export of light manufacturers. In the late 1940s and early 1950s China's social upheavals produced an influx into Hong Kong of capital, entrepreneurs, and skilled workers, especially in the textile industry, which further set the stage for manufactured exports. With the absence of minimum wage regulations and scant union activity, foreign capital was already finding Hong Kong a haven for export processing by the late 1950s (Fajnzylber, 1981, pp. 121, 126; Lin and Ho, 1980, p. 11, cited in Fajnzylber, 1981).¹⁷ While not as overtly

repressive as in Taiwan and South Korea, labor legislation in Hong Kong banned general unions, sympathy strikes, and political strikes (Henderson, 1989, p. 136). The government played an important role in the economy, but one that was largely supportive of the needs of private capital, for example, by subsidizing the private cost of labor through free public training, welfare payments, and subsidized housing (Taylor and Kwok, 1989).

Latin America and the Caribbean. In light of Latin America's experience with import substitution, the question becomes not why was so much of Latin America passed over by the international assembly industry, but rather, why did the international assembly industry come to Latin America at all? One could also ask, in light of the social and political relations of import substitution in Latin America, why did any of these countries even try to attract an industry built on cheap, disciplined labor with few domestic linkages?

First, with the exception of Puerto Rico and Haiti, none of the initial efforts to attract assembly industry in Latin America was part of a full-fledged effort to promote a national strategy of export manufacturing.¹⁸ Second, the efforts that were made were small, involve relatively few countries in Latin America, and usually originated as a development strategy for a particular region—an undeveloped region (e.g., Manaus in the Brazilian Amazon),¹⁹ a labor surplus region (e.g., Mexico's northern border region after the U.S. halted the Bracero program for Mexican farmworkers), or a geopolitically strategic region (e.g., Iquique and Punta Arenas in the northern and southern border zones of Chile). In each case the export processing efforts were tangential to an overall import substitution strategy. Even the tiny Caribbean nations (except Haiti) that pursued assembly forms continued to depend on either raw material exports or import substitution for the mainstay of their economy (see fig. 5).

What prompted foreign investors to set up assembly industries in Latin America? The bulk of early assembly investment in Latin America went to Mexico and Haiti (fig. 2). Wages in Mexico (counting mandatory benefits) were

double those in Asia in 1970 (fig. 6). Nevertheless the proximity of Mexico attracted firms from the U.S. that could not go to Asia—small firms and firms whose products had low value-to-weight ratios. Also, Mexico attracted large multinationals that wanted to spread their country risk by locating additional assembly plants outside of Asia—e.g., Fairchild Semiconductor, Motorola, and General Instrument (see fig. 4).²⁰

Haiti was a clear departure from the Latin American norm of import substitution and labor mobilization. "Papa Doc" Duvalier, the corrupt and repressive dictator from 1957 until his death in 1971, began an all-out recruitment of foreign assembly industry in the late 1960s. Boasting the lowest wages in the Western Hemisphere,²¹ the Duvalier regime repressed all union activity in order to maintain the country's comparative advantage in attracting foreign investment. Duvalier's son, continuing in his father's steps, established an industrial park for foreign assembly plants in the capital city of Port-au-Prince near the country's leading airport and seaport. Assembly industry became the engine of Haiti's remarkable economic growth during the 1970s. From the stagnation of the 1950s and 1960s, Haiti reached a rate of growth of GNP of nearly six percent in 1973, while annual construction growth topped thirteen percent (Garrity, 1974, p. 208). Assembly industry continued to grow in Haiti until the early 1980s, when social and political unrest could no longer be contained. "Baby Doc" was overthrown in 1986.²²

Thus, with few exceptions, the difference in social relations attendant upon import substituting industrialization in Latin America and Asia was the main reason why Latin America has played such a small role in the international assembly industry and Asia such a large one. As Ruth Pearson (1986, p. 74) aptly states,

Latin American industrialization strategy represented a different political project from that pursued in SE Asia: a political project which has seen organized labor play a major role. Although this often resulted in the defeat of the labor movement—frequently via the intervention and repression of the military—it never wiped out the tradition of the organized industrial working class in Mexico, Chile, Argentina, Brazil and Colombia, which was based on the expansion of domestic industry. . . .

Figure 5

EXPORT PROCESSING ZONES IN
LATIN AMERICA AND THE CARIBBEAN

	<u>Date Established</u>	<u>No. of Mfg. Firms</u>	<u>Main Industries</u>
I. LATIN AMERICA			
Brazil			
Manaus	1968	-200 in 1983	electric and electronic appliances
Chile			
Iquique	1978	0 in 1983	
Punta Arenas	1975	2 in 1983	textiles, cannery
Colombia			
Palmaseca	1970	13 in 1984	shoes, apparel
Barranquilla	1971	32 in 1983	textiles, metal work
Cucuta	1972	2 in 1983	shoes, wood products
Buenaventura	1973	n.a.	
Santa Marta	1974	5 in 1984	apparel, shoes
Cartagena	1982	4 in 1984	wood products
Costa Rica*			
Moin	n.a.	3 in 1982	apparel, electronics
El Salvador			
San Bartolo	1974	9 in 1983	apparel, electronics
Guatemala**			
Santo Tomas de Castillo	1972	3 in 1984	sporting goods, textiles
Honduras***			
Puerto Cortes	1978	5 in 1982	apparel, furniture
Mexico****			
Border Region	1966	622 in 1984	electronics, shoes, apparel
Nicaragua			
Las Mercedes	1976	3 in 1978 none in 1984	clothing

Figure 5 (cont'd)

	<u>Date established</u>	<u>No. of Mfg. Firms</u>	<u>Main Industries</u>
Puerto Rico Mayaguez	1962	9 in 1983	textiles meat processing
Panama Colon	1969	3 in 1984	bicycle assembly

Source: Currie (1984).

*By 1988 Costa Rica had 9 free zones with 40 firms, 40 percent of which were U.S.-owned, and 5,035 employees.

**By 1988, the Guatemalan zone had ten firms, three of which were U.S.-owned.

***By 1988, the Honduran zone had 26 firms, 30 percent U.S.-owned, with 3,874 employees.

****The Border Region in Mexico refers to the 31 kilometer strip along the U.S. border.

II. CARIBBEAN

Barbados (9 EPZs)	n.a.	19 in 1988	apparel, electronics
Dominican Republic (16 EPZs)	n.a.	235 in 1988	apparel, shoes, electronics
Haiti (2 EPZs)	n.a.	40 in 1988	apparel, sporting goods, electronics
Jamaica (4 EPZs)	n.a.	36 in 1988	apparel, food processing
OECS* (9 EPZs)	n.a.	67 in 1988	apparel, electronics

Source: U.S. Department of Commerce, Caribbean Basin Initiative Office, 1989.

*Organization of eastern Caribbean states—data cover Antigua, Dominica, Grenada, St. Kitts, St. Lucia, and St. Vincent.

Figure 6

WAGE DIFFERENCES IN ELECTRONICS ASSEMBLY BY COUNTRY, 1970

(average hourly earnings, including supplementary
compensation in U.S. dollars)

<u>Country</u>	<u>Semiconductors</u>	<u>Consumer Electronics</u>
Taiwan	n.a.	\$.14
Hong Kong	\$.28	.27
Singapore	.29	n.a.
Jamaica	.30	n.a.
Korea	.33	n.a.
Mexico	.61	.53
Ireland	.70	n.a.
Dutch Antilles	.72	n.a.
Japan	1.30	.58
Canada	2.11	3.50
U.S.	2.97	2.69

Source: Compiled from U.S. Tariff Commission, Economic Factors Affecting the Use of Items 807.00 and 806.30 of the Tariff Schedule of the U.S., Washington, D.C., 1970, p. A-90, reported in Chang (1971), p. 27.

Far from a natural spread of mature industries and their labor intensive processes to ever cheaper labor locations around the globe, the rise of the global assembly industry is a story of corporate strategy and specific social, economic, and political relationships.

III. LINKAGES

A. The Extent of Local Linkages in the Asian Tigers

From the host country's point of view, the viability of an export-led development strategy based on the assembly industry depends on the extent to which the industry can create beneficial links with the host economy in addition to the direct employment and foreign exchange generated. Probably the single most important link is known as "backward linkages" (Hirschman, 1958), that is, the degree to which national inputs are used in the production process.²³ The nature of assembly industry—based as it is on the importation of components, the use of cheap labor to perform the assembly "service," and the reexport of the final products—has justified its being dubbed an "enclave" in much of the literature (Kindleberger, 1968).²⁴

Figure 7

GROWTH OF DOMESTIC INPUTS IN ASIAN ASSEMBLY MANUFACTURING

Source: Compiled from Spinanger (1984, p. 79), using data provided by export processing zones (three-year floating averages used; Singapore data include purchases from other EPZ firms in the country as domestic inputs).

Nevertheless, the four Asian tigers have used assembly industry as a springboard to broader and deeper industrialization. Spinanger's (1984) calculations of imported versus domestic inputs among assembly plants in Asian export processing zones show graphically the tremendous rise in the percentage of domestic inputs for South Korea and Taiwan (see fig. 7): the proportion of domestic inputs among assembly plants in export processing zones rose from 13 percent in 1972 to 32 percent in 1977 for South Korea, and from 5 percent in 1967 to 27 percent in 1978 for Taiwan. Singapore's proportion of domestic inputs remained rather flat but very high:²⁵ 40 percent in 1972, peaking at 45 percent in 1977, followed by 43 percent in 1979.²⁶ While comparable figures are not available for Hong Kong, Henderson (1989) reports the emergence of seven locally owned semiconductor manufacturers in Hong Kong that supply consumer electronics plants with subassemblies (pp. 140-141).

Not only have the four newly industrializing countries of Asia been able to develop domestic suppliers for the foreign assembly plants, they have created some domestic industries that are competitive with the foreign firms. In Taiwan, for example, foreign electronics assembly helped spawn a domestic electronics industry making computer clones for the world market (Spinanger, 1984, p. 84). Taiwan is also producing its own telecommunications equipment, precision machinery, optical instruments, and biotechnology. South Korea is well known for its production of consumer durables for the international market. Hong Kong's locally owned semiconductor firms have moved beyond subcontract assembly into advanced circuit testing and wafer manufacturing (Henderson, 1989, pp. 140-141).

With the local supplier base growing and wages rising (see fig. 8), assembly plants in all four countries have been upgrading to higher technology products and processes, in which labor costs make up just a small part (Henderson, 1989, p. 126).²⁷ This trend is not restricted to electronics: Some textile and apparel assembly plants have invested in automated equipment, while others are moving production to cheaper labor locations.²⁸ Currie describes her case study of a Hong Kong textile firm that was doing both: automating its production in Singapore and

Hong Kong—not so much to reduce labor costs as to improve quality control—while at the same time shifting some production to Malaysia (the firm also tried manufacturing in the U.S., but found the labor force "insufficiently versatile") (Currie, 1984, p. 30). Assembly industry in the Asian tigers has

Figure 8

THE GROWTH OF MANUFACTURING WAGES IN THE ASIAN "TIGERS"

(average monthly industrial wages per worker in U.S. dollars)

	<u>1964</u>	<u>1988</u>
I. Asian "Tigers"		
South Korea*	\$302	\$633
Taiwan*	325	598
Singapore*	416	547
Hong Kong*	363	544
II. Other Asian Countries		
Thailand	n.a.	80
Philippines	n.a.	75
Malaysia	n.a.	55
Indonesia	n.a.	55
China**	n.a.	40

*Includes bonuses and overtime

**Excludes state subsidies

Source: Compiled from Lee (1989), p. 78, and Yang (1989), p. 45.

become a much higher value-added activity and qualitatively different from the original labor intensive assembly.

A number of scholars have concluded—sometimes reluctantly—that while assembly industry in the Asian tigers started off as typical enclaves, it eventually established backward linkages to the firms in the host country (e.g., Schive, 1988). These "success stories" have prompted some economists to generalize a pattern: "'First-stage' international sourcing within a divisible production process—such as the location of semiconductor or television assembly in a developing country—then gives rise to 'second-stage' international sourcing—the transfer to the developing country of input production as well" (Lim and Pang, 1982, p. 591).

Figure 9

DOMESTIC MATERIAL CONTENT IN ASSEMBLY
MANUFACTURING FOR SELECTED COUNTRIES

(percentage of total inputs)

	<u>Percentage Domestic Content</u>
Mexico (1979)	2%
Malaysia (1978)	3
Sri Lanka (1980)	3
Singapore* (1979)	42
South Korea (1977)	33
Taiwan (1978)	27

*Includes purchases from other firms in export processing zones.

Source: Compiled from Currie (1984), p. 38, for first three,
and fig. 7 above for last three countries.

In most other countries with export processing, however, domestic linkages have remained small, including in other Asian countries (see fig. 9).²⁹ Mexico's assembly industry shows no trend toward increasing its current 1.5 percent share of domestic content (Wilson, forthcoming). In the Dominican Republic, which has overtaken Haiti as the leading export processing country in the Caribbean, the use of local inputs also remains very small (Thoumi, 1988).

B. Historical Factors

What explains the ability of the four Asian tigers to multiply their linkages from assembly industry during the 1970s? An important part of the explanation lies in unique or unreplicable historical factors: The first factor is the colonial heritage. By World War II Japanese colonial rule in Taiwan and Korea—unlike U.S., British, or Spanish domination in Latin America—had left a substantial manufacturing infrastructure (see above). The Japanese had spun off light industries for which they no longer perceived a comparative advantage. British colonial rule in Singapore and Hong Kong had left an export-oriented infrastructure of transportation, communications, and financial services.

The second important historical factor for all but Singapore was the influx of entrepreneurs, professionals, and skilled workers fleeing Communist upheavals in China and North Korea. This selective migration spurred the formation of local industrial capital, management, and labor force in South Korea, Taiwan, and Hong Kong.

Third, massive U.S. foreign aid helped finance local industrial development. From 1946 to 1978, South Korea alone received nearly \$6 billion in U.S. economic grants and loans, compared to less than \$15 billion for all of Latin America during the same years (Cumings, 1984, p. 24). U.S. military aid to Taiwan and South Korea from 1955 (i.e., after the Korean War) to 1978 surpassed \$9 billion, while all of Latin America and Africa together received \$3.2 billion (Ibid., p. 24).

Finally, there was little threat of U.S. protectionism to thwart the Asian tigers' export growth in the late sixties. Beginning in the early 1970s, however, there was

growing concern in the U.S. about foreign countries—especially newly industrializing countries—subsidizing their exports and protecting their domestic markets. In the mid-seventies the U.S. began to apply "orderly marketing agreements" and "voluntary export restraints," which took on the nature of protective tariffs and quotas (Fajnzylber, 1981, p. 129).

C. Role of the State

Latin American countries trying to get on the export-led bandwagon face major obstacles: a detrimental legacy of social relations accompanying import substitution (see Section II, above), increased protectionism by the advanced countries, and not just a lack of financial capital but massive foreign debt. Despite the differing historical conditions that make an easy transfer of the Asian "lessons" to Latin America impossible, there were some public policies the Asian four pursued to build upon their assembly industry that perhaps have some possibility of replicability in Mexico and other Latin American countries today.

First, all four countries used assembly manufacturing as a stepping stone—a transitory device—toward a full export-led industrialization. In three of the four—Taiwan, Korea, and Singapore—export processing was part of a shift in national commitment from an inward-oriented development strategy to an outward-oriented one. None of the four adopted export processing primarily as a regional development strategy. Those that at first confined their export processing to specified zones, later began to offer nationwide incentives to foreign investors. They began to allow custom-free treatment even to firms that sold part of their product on the domestic market, just to gain access to more foreign exchange and technology (Currie, 1983). Victor Sit (1988) describes this trend for Taiwan:

With the rapid expansion of its exporting sector and the gradual creation of numerous well-planned industrial areas and districts throughout the island, the significance of the EPZs in Taiwan's overall export economy . . . declined. . . . The three EPZs have been more or less stagnant since 1976, and the industrial products exported from them are still highly biased toward labor-intensive types, reflecting Taiwan's former comparative advantage in cheap labor (p. 668).

Similarly, the major export processing zone in South Korea (Masan Free Export Zone), set up near Seoul in 1970, had become stagnant by 1976. "As in Taiwan, the rising overall wage level and the general success of export-oriented industrialization have made new EPZs in South Korea unnecessary" (*ibid.*, p. 668).

Second, the governments of Korea, Taiwan, and Singapore promoted foreign assembly industry in the context of strong government guidance of the economy aimed at protecting and developing the domestic industries that would both supply the assembly plants and also create the basis for a broader-based export-oriented industrialization using domestic firms and technology. The Korean government, for example, has selected different sectors to protect and develop in each of its five-year development plans since 1962. Through strong central control of financial capital, the Korean government collaborates very closely with the private sector (Fajnzylber, 1981, p. 122). The government of Singapore also plays a strong role in guiding the industrialization process. With a small domestic private sector, however, Singapore's government opted to develop domestic industry largely through state-owned enterprises and joint ventures. In 1983 the government had at least partial interest in 450 enterprises, sixty-five of which were in manufacturing (Krause, 1987, p. 117).

The governments of Taiwan, Korea, and Singapore have also pressured private manufacturers to upgrade their technology and directly intervened in capital markets to influence the technology. The governments of both Singapore and Taiwan have created science parks, special zones providing financial incentives to foreign and domestic firms—regardless of market orientation—that invest in R&D, in order to promote greater technology transfer and domestic technology development.³⁰ Even the government of Hong Kong supports a manufacturing design center (the Hong Kong Productivity Center), including a semiconductor design facility. The public education system in Hong Kong has also provided the engineers and technicians that allow the advanced testing facilities, wafer fabrication plants, and at least low-level R&D to operate (Henderson, 1989, p. 141).

Third, the Asian tigers have been rather successful at utilizing foreign investment to achieve national objectives. The governments of Korea, Taiwan, and Hong Kong have kept direct foreign investment to a small role, preferring foreign financial capital (particularly long-term loans).³¹ In 1978, foreign capital's share of manufactured exports varied between 10 and 20 percent in Hong Kong, Taiwan, and South Korea, compared to 25 to 40 percent in Latin America (Fajnzylber, p. 125). Even in Singapore, where foreign capital accounted for over 80 percent of manufactured exports in 1978 (Koh, 1987, p. 25), the government guides foreign investment by tying incentives to particular behaviors such as investing in priority sectors, upgrading capital intensity, or undertaking on-site R&D.

Thus, the Asian experience shows that export-led industrialization does not require a small role for the state, an end to import substitution, or total submission to foreign capital. In other words, to pursue a role in the new global economy, Third World countries need not convert themselves into "passive objects of international market forces" (Fajnzylber, p. 122). On the contrary, to forge domestic linkages from foreign assembly industry and lay the basis for a full-fledged export-oriented industrialization, the Asian tigers (at least three out of four) did quite the opposite: maintained a central role for the state in guiding the economy, pursued a deepening of import substitution, and kept foreign capital within the boundaries of national interest.

IV. NEW TRENDS

A. Social Unrest in the Asian Tigers

There are no "happily ever after" stories in the dialectical play of history. The main factor contributing to the stable growth of export-oriented industrialization in the four Asian tigers may have become the undoing of that stability: the "disciplining" of the labor force. Social unrest in the Asian tigers is now rampant. The labor force is no longer passive. Even in comparatively tame Hong Kong, popular pressure on the government since 1982 has risen to an "unprecedented level" (Lo, 1988, p. 613). In South Korea, where wage increases now far outstrip

productivity increases, student and labor uprisings in the late 1980s eroded the government's long-standing autonomy from social pressure, forcing President Roh Tae-Woo into "an extremely delicate balancing act" (Neff and Nakarmi, 1989, p. 39). In Taiwan the lifting of martial law in mid-1987 unleashed labor strife in the textiles, electronics, auto, and paper industries. Labor shortages have become a problem, particularly in lower wage industries, in Hong Kong, Taiwan, and Singapore (Yang and Nakarmi, 1989, p. 46). The ruling party in Korea is reportedly hoping for a strong recession to put labor back in its place, since the government has been unable to do so (Neff and Nakarmi, 1989, p. 39).

B. China's Entry into Global Assembly Industry

With labor unrest, wages, and labor shortages mounting in the four Asian tigers, the People's Republic of China—with the lowest wages in East Asia, no strikes, and a potentially huge internal market—has become attractive to foreign investors. The Chinese government shifted from an internally oriented development strategy to an externally oriented one in 1978. In the context of this "open door" policy, the government opted to concentrate foreign investment along the isolated and little developed southern coast.

The government established four Special Economic Zones in this region, in which the normal central controls over capital, production, pricing, and markets would be suspended and tax incentives granted. Through joint ventures with foreign investors, the government expected technology, managerial skills, and worker skills to flow into China, as well as capital. Foreign investors, on the other hand, saw these zones not only as providing access to cheap Chinese labor (see fig. 9), but also access to the Chinese market. The most attractive zone to foreign capital (mainly from Hong Kong, Japan, and the United States) has been Shenzhen, a rural area contiguous to Hong Kong.³²

China's mixed experience with the Shenzhen Special Economic Zone has been instructive. Sklair reports that Shenzhen has been successful not just in luring foreign assembly plants interested in cheap labor, but in developing the

infrastructure of the region, creating some backward linkages with the rest of the economy (primarily with Chinese-made steel and electronics components), and upgrading workers skills:

Investments in infrastructure (roads, factories, commercial, tourist, and residential construction, telecommunications, energy) have transformed the area out of all recognition. . . . The technicians and managers from Hong Kong, Japan, Europe, and the U.S. are very much encouraged to pass on their skills and to some extent their techniques to the local Chinese, at all levels. Large numbers of Chinese from other parts of the country have come to Shenzhen to put their skills to use and to upgrade these skills through contact with the new industries. . . . The creation of the SEZ has stimulated the establishment of a new university at Shenzhen, geared to the practical needs of the zone (Sklair, 1986, pp. 8-9).

On the other hand, Chu (1987) reports that Shenzhen turned into "a giant marketplace for foreign-made consumer goods and illegal dealings in foreign exchange" (p. 83). The foreign investment has been primarily in lucrative real estate development (catching pent-up Hong Kong demand for land), rather than factories; and most of the factories have been traditional labor intensive assembly plants. After a decade of experience with the "open door," China has not been able to follow the path of the four tigers.

C. The Search for Manufactured Exports in Latin America

Faced with a shortage of foreign exchange, more Latin American countries adopted export-oriented strategies during 1980s, often citing the Asian tigers as their model. "Non-traditional" exports, particularly manufactured ones, became the fashionable target. Within this spreading export orientation, only Mexico and the Caribbean have given an important role to assembly industry, although Brazil passed legislation authorizing new export processing zones in 1987 (Inter-American Development Bank, 1988, p. 66).

In the mid-1980s, a number of Caribbean countries opted for a full-fledged export-oriented development strategy using assembly industry. Shrinking quotas on traditional agricultural and mineral exports spurred this strategy shift, as did the

creation of the Caribbean Basin Initiative³³ by the U.S. and the parallel agreements with Canada and the European community. New expressions of interest from Hong Kong, Taiwanese, and Korean assembly firms fleeing import quotas also buoyed Caribbean interest in the strategy shift.³⁴

The Dominican Republic has been the most successful Caribbean country to make the policy switch. To lower the cost of exports—and the wages that go into them—the government devalued the currency and opened six new export processing zones between 1988 and 1989, for a total of 13.³⁵ Total direct employment in export processing expanded from 60,000 to 90,000 in that year. In 1989 the government passed a law to ease the red tape for assembly plant investors. The zones now account for over half of all manufacturing jobs, one-third of the Dominican Republic's exports, 25 percent of local value added, and over 8 percent of national employment. Most zone operations remain concentrated in low technology labor intensive assembly—apparel, electronics, and footwear—although recent arrivals have included data entry and computer graphics. Ninety percent of the assembly plants are foreign-owned, even though small local investors are now getting more involved in textile operations. The zones remain "little islands of prosperity on this economically troubled island," with "no prospects for appreciable linkages," according to a 1989 assessment by the Caribbean Basin Initiative Office (U.S. Department of Commerce, unclassified incoming telegram, March, 1989).

Barbados similarly rejected import substitution in its 1983-1987 development plan and concentrated its efforts on attracting assembly industry. Electronic component assembly multiplied five-fold from 1981 to 1984, accounting for half of the island's total exports in 1984 (Long, 1986, p. 38). Jamaica experienced an even more abrupt policy turnaround: During the Manley government of the 1970s foreign capital was not encouraged. But in the 1980s the Seaga government made export-led industrialization the cornerstone of the country's economic development strategy. Devaluations made the Jamaican labor costs among the lowest in the Caribbean. Assembly exports from the Kingston Free Zone multiplied more than

ten times between 1980 and 1984, mostly in textiles and garments. Ninety percent of all the assembly plants are foreign-owned, half from Hong Kong and half from the U.S. (Long, 1986).

In 1980 Trinidad and Tobago also shifted to an export-led strategy, but one based on their natural resources rather than their cheap labor. The government opened the Point Lisas Industrial Estate offering the usual import duty exemptions on raw materials and machinery. But they pursued export-oriented chemical and steel industries, rather than traditional assembly. At Point Lisas, small locally owned firms in fertilizers, plastics, and sports equipment predominate in number. They are labor intensive with simple technology. The large firms, however, account for most of the employment. The huge capital intensive firms in petrochemicals, iron, and steel, account for the bulk of the employment. They make fertilizer, nitrogen, ammonia, methanol, urea, and steel for the export market. Over half of the large firms are totally state-owned, a third are joint ventures between the state and foreign corporations (with 51 percent state capital), and the remainder are totally foreign-owned. Many of the smaller firms are actually spin-offs of the large ones, have been created under licensing arrangements and turn-key contracts with the foreign corporations. There are no textile and electronic firms at Point Lisas. While Point Lisas accounts for less than 1 percent of total national employment, its exports have overtaken sugar as the second largest source of foreign exchange after mineral fuel lubricants (Long, 1986).

Mexico, too, entered a new phase of its assembly industry in the 1980s. The industry grew beyond a regional development strategy to gain national importance after the government adopted a full-fledged export-led strategy in 1982. Two significant trends altered the nature of assembly industry in Mexico during the 1980s: the rise of higher value-added manufacturing and the adoption of flexible manufacturing methods in a significant portion of the *maquiladoras* (see Wilson, 1989). Yet Mexico has not been able to take much advantage of these trends to create local supplier linkages. Like China after ten years, Mexico after twenty-five years has not been able to follow the path of the Asian tigers.

V. POLICY IMPLICATIONS FOR MEXICO

Some of the factors giving rise to the Asian success stories are historically unique and out of Mexico's control to replicate: namely, massive foreign aid from the U.S., selective in-migration of entrepreneurs and skilled workers, and an absence of U.S. protectionism. It is historically too late for Mexico to change some factors: Mexico already started out using the assembly industry as an isolated regional development program rather than as part of a national strategy aimed at export-led development. Mexico already inherited a legacy of organized labor, middle-class, and popular demands that the government during import substitution could not ignore.

Nevertheless, Mexico has probably the most striking similarity to the Asian cases of any Latin American country: a strong, authoritarian state that has been able to channel popular demands through a corporatist political system so as not to threaten the state's autonomy. The Mexican state also was able to guide the country's import substitution process to a much deeper level of industrialization than in most Latin American countries (except Brazil). Moreover, in the 1980s Mexico has gone far in recreating two of the key conditions responsible for the Asian success stories: first, a total national commitment to export-led development; second, a firm hand in disciplining labor, rolling back many of its gains from the period of import substitution.

What are the lessons from the Asian tigers for Mexico? There are four applicable lessons, all of which deal with the role of the state. The cases of South Korea, Taiwan, and Singapore show (1) the need for a strong state to direct the economy; (2) the need for a renewed dedication to import substitution, this time in the context of creating export linkages; (3) the need for a visible hand in channeling foreign capital in ways that satisfy national objectives; and (4) the need to view low wage assembly industry as a transient measure toward higher value manufacturing. To follow the Asian examples, Mexico would have to pursue export-oriented industrialization in the context of a firmly guided import substitution process. While the neo-liberal talk in Mexico about reducing the role

of the state may be more rhetoric than reality, it obscures the necessary debate about how the state can tie foreign-owned export manufacturing into a deeper and broader industrialization process.³⁶

Mexico faces new conditions in the changing global economy not encountered by the Asian tigers that could be a help or a hindrance to export-led industrialization. Many leading-edge multinational corporations have gone beyond large-scale mass production methods to adopt flexible manufacturing techniques. Mexico's assembly workers have shown willingness and ability to adopt the new shop floor methods of flexible manufacturing (see discussion in Wilson, 1989). These new methods involving labor-management cooperation have generated resistance among U.S. unions.³⁷ Taiwanese workers are reportedly too accustomed to authoritarian militaristic discipline on the factory floor to be able to participate freely in labor-management quality circles.³⁸ Foreign factory managers in China have found it hard to increase productivity and quality standards among workers accustomed to guaranteed jobs in state-owned factories (Chu, 1987). In Latin America, Caribbean export manufacturing remains concentrated in routine assembly and is highly dependent on U.S. quotas and tax incentives. Thus, Mexico may be left with a rich opportunity to garner a larger role in leading-edge flexible manufacturing for export. However, initial evidence indicates that it may be even more difficult for Mexico to create local linkage from flexible manufacturing than from more traditional industry (Wilson, 1989).

Mexico needs to take greater advantage of its foreign assembly industry by looking at how the Asian tigers used strong state control to forge local linkages from assembly industry and to upgrade the technology to more capital intensive methods and eventually local R&D. In this light, *maquiladoras* should be seen as a transient measure—by choice and necessity—in an export-led strategy that can lead to a comparative advantage beyond that of cheap labor.

NOTES

1. I would like to thank Myung-Goo Kang, Tchen Tchiang, Amy Glasmeir, Eduardo Barrera, Bettina Bruner, and Steven Morales for leading me to sources of information and challenging my thinking on the issues. I am also grateful to the Commission on International Migration and Cooperative Economic Development (Washington, D.C.) for financing this study.

2. A similar argument can be made with respect to "natural" shifts in comparative advantage (Balassa, 1979).

3. The literature on export processing often ignores the U.S. commonwealth country of Puerto Rico as an early example because of its uniqueness. As part of the export-oriented industrialization strategy of Operation Bootstrap, promulgated in the 1950s to develop the island's economy, the Mayaguez industrial zone was built and inaugurated in 1962. Virtually the entire island had duty-free access to U.S. markets, however, and Mayaguez offered few additional incentives. Rising wage rates (Puerto Rico is subject to U.S. minimum wage laws) eroded the island's attractiveness for export processing, and now the government of Puerto Rico is attempting to garner a twin plant role of higher value-added activity with respect to the rest of the Caribbean.

4. The Shannon export processing zone was created by the government of Ireland in the 1950s in response to the decline of the Shannon international airport as a refueling point for intercontinental air travel. To pursue industrial development, the government realized that the restricted size of Ireland's internal market and its basically agrarian economy necessitated an export-oriented strategy. Ireland's new Industrial Development Authority built the infrastructure for the Shannon industrial zone and marketed it to foreign producers interested in a low-tax, low-labor-cost production site with access to the European market. Wage rates have become high enough now that the development authority is seeking high-technology manufacturing for reexport. (From a speech by Tony Shiels, Industrial Development Authority of Ireland, June 1989, in San Juan, Puerto Rico.)

5. Robert Reich (1983) points out a third strategy often followed: restructuring through mergers and acquisitions to maintain paper profit levels.

6. Ruth Pearson (1986) argues that women were particularly sought, not because they are universally dexterous and docile workers, but because working-class women are almost universally socialized to be dexterous and docile and therefore better suited than men to the fine work of component assembly and stitching. She also argues that the supply of low-wage women workers in the U.S. was declining, thus motivating the move to Third World countries. See also Nash and Safa (1985), Nash and Fernandez-Kelly (1983), and Fernandez-Kelly (1983). Sklair (1989) adds that "docile, undemanding, nimble-fingered, nonunion, and unmilitant workers will be offered the jobs on the global assembly lines, while aggressive, demanding, clumsy, union, and militant workers will not," regardless of sex as soon as employers overcome their stereotypes and find out that women do not have a monopoly on the desired qualities (p. 172).

7. This international strategy was not limited to assembly, but also included higher value-added manufacturing. The U.S. automobile industry became the

7. This international strategy was not limited to assembly, but also included higher value-added manufacturing. The U.S. automobile industry became the leader of this global manufacturing strategy with Ford's "world car" concept of the early 1980s. The concept was ultimately abandoned in the mid-1980s.

8. For workers in advanced countries, the new international division of labor signaled the weakening of organized labor and the loss of jobs and real income. It meant the demise of the big capital/big labor alliance in which workers had been dealt an expanding share of an expanding pie. It meant declining productivity as corporations pursued strategies that did not increase productivity but simply reduced costs. On a public policy level, the new international division of labor accompanied supply side economics, fiscal austerity, measures to deal with protectionist backlashes, and a general weakening of the first world nation state's ability to control capital flows.

9. Grunwald and Flamm (1985) point to an earlier beginning of offshore electronic component production: transistor assembly in the early 1960s. Faced with competition from cheap Japanese transistors (Japanese wage rates at the time were much lower than U.S. wages), U.S. producers followed the lead of the Fairchild Corporation, which set up a transistor assembly operation for the U.S. market in Hong Kong in 1961 in order to take advantage of wage rates lower than those in Japan.

10. The alternative of automating component assembly was rejected because of the rapid pace of technological change in the field and the short life span of new products (product obsolescence), which made investment in costly single purpose machinery unattractive. Flexible automation (i.e., the use of programmable machinery capable of responding rapidly to changes in product design) could have been attractive, but was not well known at the time, particularly among U.S. manufacturers (see Wilson, 1989).

11. Ironically, in response to "voluntary" import quotas set up by the U.S. in the mid-seventies, Japanese television manufacturers began to set up assembly plants in the U.S., bringing in components from Japan and developing countries.

12. The International Multi-Fiber Agreement promulgated by the U.S. set quotas on textile and apparel imports that stifled the growth of Mexican and Caribbean assembly operations in these sectors during the 1970s.

13. Examples of public enterprises created in pursuit of import substituting industrialization include electricity generation and distribution, iron and steel, housing, transportation, food distribution, and even foreign exchange generating enterprises such as mining and petroleum to ensure a steady supply of dollars with which to import the necessary industrial inputs and technologies.

14. Fairchild, which already had plants in Hong Kong and Korea, located in Singapore primarily to spread its offshore country risk, rather than to seek lower wage rates, according to Chang (1971).

15. The Kuomintang was composed of Chinese nationalist mainlanders, led by Chiang Kai-shek, who had fled to Taiwan after being defeated by the Communist army of Mao Tse Tung in 1949. The refugees from mainland China—like the

Cubans in Miami after the Cuban Revolution—including a high proportion of entrepreneurs, professionals, and educated workers.

16. Note the stark contrast between this 1961 military coup in Korea aimed at instituting an export-led strategy with the military coup in Peru at the same time that was aimed at implementing import substitution. While the U.S. was actively supporting modernization strategies in Latin America based on import substitution at this time (through the Alliance for Progress program), Cumings claims that in both Korea and Taiwan the U.S. was actively promoting the switch to export-led industrialization (p. 27).

17. Researchers have since shown that workers' earnings in Hong Kong's manufacturing industry did not keep up with labor productivity increases through the sixties and seventies (Glasmeier, 1989, p. 6).

18. Colombia may also be considered an exception. The government converted several commercial free trade zones to export processing zones in the early 1970s as part of an export-oriented strategy. While Colombia has generated a substantial export-oriented manufacturing sector, little of it is due to the zones. Currie speculates that the zones were used mainly as a way to avoid duties on imported inputs by domestic firms selling to the domestic market. (p. 16).

19. The Bataan Export Processing Zone in the Philippines is another example of using assembly industry to develop an undeveloped region. This isolated zone was built in 1969, not as part of a national export-oriented strategy, but as a highly targeted regional development strategy in a country rife with regional, ethnic, and class unrest.

20. U.S. Tariff Items 806/807 may have influenced some firms to locate in Mexico, as opposed to farther away, because of the preferential tax treatment—beyond host country incentives—given to U.S.-made components that were more easily accessible from Mexico. Ruiz and Tiano (1987) argue that the presence of a large pool of young, unemployed women, many unsupported and with dependents of their own, has attracted assembly plants to the northern border of Mexico.

21. In 1987 Haiti remained the lowest-wage nation in the Caribbean. The wage rate was less than two-thirds that of the Dominican Republic: 38 cents an hour compared to 61 cents an hour (Economist Intelligence Unit Country Report: Cuba, Dominican Republic, Haiti, and Puerto Rico, No. 1, 1987, p. 17.)

22. The only other sizable location for assembly processing in Latin America in the 1960s and 1970s was Manaus, the one-time fashionable and thriving free port in a remote section of the Amazon River in Brazil. Established in 1968, the Manaus Export Processing Zone had over two hundred manufacturers at the end of 1983, mainly in electronic and electrical appliances (calculators, color televisions, electric typewriters) and mainly from Japan and Europe. The average wage for unskilled workers in Manaus in 1983 was U.S. \$.70 to \$.80 per hour (Currie, p. 211).

23. Other important links are technology transfer and skill upgrading (i.e., labor mobility). Backward linkages, however, are probably the most important because they can become the vehicle for technology transfer and skill upgrading.

24. Moreover, for U.S. corporations—the principal participants in the global assembly industry—the U.S. tariff items 806/807 provide added incentive to use U.S. components, since local components would be taxed upon entry into the U.S.

25. These figures include sales from other firms within export processing zones as domestic content.

26. Malaysia's proportion of domestic inputs (other than capital goods) in its assembly industry stayed very low, between 3 and 6 percent from 1974 to 1978, although the percentage of local capital goods (excluding construction) increased from 16 percent to 21 percent over the same years. Spinanger suggests that this rise reflects the increasing purchases of local dyeing machines by textile manufacturers, who are largely local (p. 79).

27. For complex integrated circuits, only 4 percent of entire cost is assembly (Currie, p. 21).

28. Particularly in textiles and clothing, firms from Hong Kong, Taiwan, and South Korea have been investing heavily in overseas assembly, especially Malaysia, Indonesia, Thailand, China, Sri Lanka, and most recently the Caribbean. Quota restrictions in the U.S. and rising wages at home have been the primary motivations.

29. Even in the Shannon region of Ireland, Sklair finds most foreign-owned firms buying few local inputs, despite vigorous efforts by the development authorities to foster local sourcing. Nevertheless, Sklair rates the Shannon experience more highly in terms of technology transfer and local skills upgrading, due largely to the local R&D of some of the foreign firms and the resulting growth of local value added (Sklair, 1988).

30. By 1983, Taiwan's science park near Taipei had thirty firms, with another twelve under construction (Spinanger, p. 78).

31. Korea, for example, has generally kept foreign direct investment to under 10 percent of total long-term credit (Fajnzylber, p. 122).

32. Partly as a buffer or transition zone from this capitalist bulwark (which China is due to incorporate in 1997), and partly to take advantage of the infrastructure, demand, skills, and capital in Hong Kong, the government set up the Shenzhen Special Economic Zone on the Hong Kong border in 1979.

33. The tax incentives offered in President Reagan's Caribbean Basin Initiative starting in 1984 were more liberal than existing U.S. Tariff Items 806/807 (Bennett, 1987, p. 25). Also the Twin Plant provision allowed U.S. firms doing assembly in Caribbean countries to repatriate their profits tax-free if they had a twin plant in Puerto Rico (and if the host country had signed a tax information exchange agreement with the IRS to monitor drug money flows).

34. Korean corporations have created a negative public image for themselves in the Caribbean, however, because of the way they treat workers.

35. According to the U.S. Department of Commerce (Caribbean Basin Initiative Office), the Dominican Republic's manufacturing wage fell to 50 cents a day, not counting benefits, in 1989.

36. There are several danger signs that Mexico's government will have to heed along the route to export-led industrialization: foreign debt, political unrest, labor unrest, and labor scarcity. With respect to the intractable foreign debt problem, Mexico seems to be making some headway in negotiations, as the U.S. recognizes its own interest in reducing the debt. With respect to political unrest, in Mexico—as in the Asian tigers—the government can no longer keep a tight lid on popular political expression. Rather than cracking, however, the government is showing resiliency by recognizing opposition gains in the presidential election, allowing an opposition victory at the state level, and defusing opposition in local elections by substituting nonpartisan neighborhood-based electoral battles for party battles. Concerning labor unrest, the government has had amazing success so far in lowering real wage levels since 1982 without provoking threatening upheavals. With regard to labor scarcity, however, Mexico may face a new turn of events. If Mexican labor sees formal channels for wage demands as useless, it still has options: migrate to the U.S. or withdraw from the labor force. This latter option is a latent threat to the assembly industry, which is still largely a female labor force. If austerity measures make daily life too costly and assembly wages do not improve, maquiladora workers may find family survival requires them to return to unpaid labor in the home to try to reduce the cost of living for the family.

37. The rise of the New Directions movement in the United Auto Workers is a direct expression of this resistance.

38. This observation came from Tchen Tchiang, a Taiwanese doctoral student who is doing a comparison of the assembly industry in Taiwan and Mexico for his dissertation at the University of Texas.

REFERENCES

Balassa, B.

1979 "The Changing International Division of Labour in Manufactured Goods."
World Bank Staff Working Paper No. 329.

Bennett, Karl

1987 "The Caribbean Basin Initiative and its Implications for CARICOM
Exports." *Social and Economic Studies*. 36:2.

Bluestone, Barry, and Bennett, Harrison

1982 *The Deindustrialization of America*. New York: Basic Books.

Chang, Y. S.

1971 "The Transfer of Technology: Economics of Offshore Assembly, the
Case of Semiconductor Industry" United Nations Institute for Training and
Research (UNITAR) Research Report.

Chen, Peter S., ed.

1983 *Singapore Development Policies and Trends*. London: Oxford University
Press.

Chu, David K. W.

1987 "China's Special Economic Zones: Expectations and Reality." *Asian
Affairs*. 14:2, Summer.

Cumings, Bruce

1984 "The Origins and Development of the Northeast Asian Political
Economy: Industrial Sectors, Product Cycles, and Political Consequences."
International Organization 38, 1, 1-40.

Currie, Jean

1984 *Export Processing Zones in the 1980s: Customs Free Manufacturing*.
The Economist Intelligence Unit Special Report No. 190.

Fajnzylber, Fernando

1981 "Some Reflections on South-East Asian Export Industrialization."
CEPAL Review 15, 111-132.

Fernandez-Kelly, Maria Patricia

1983 *For We Are Sold, I and My People: Women and Industry on Mexico's Northern Frontier*. Albany: State University of New York Press.

Frobels, F., J. Heinrich, and O. Kreye

1980 *The New International Division of Labor*. Cambridge: Cambridge University Press.

Garrity, Monique

1974 "The Assembly Industries in Haiti: Causes and Effects, 1967-1973," *Review of Black Political Economy* X, 203-215.

Glasmeier, Amy

1989 "The Hong Kong Watch Industry." Unpublished paper, University of Texas, Graduate Program in Community and Regional Planning, Austin, Texas, June, 23 pp.

Griffith, Winston H.

1987 "Can CARICOM Countries Replicate the Singapore Experience?" *Journal of Development Studies* 24:1, 60-82.

Grunwald, J., and K. Flamm, eds.

1985 *The Global Factory: Foreign Assembly in International Trade*. Washington, D.C.: Brookings.

Henderson, Jeffrey

1989 "The Political Economy of Technological Transformation in Hong Kong." In Michael Peter Smith, ed., *Pacific Rim Cities in the World Economy*. New Brunswick, N.J.: Transaction, pp. 102-155.

Hirschman, Albert O.

1958 *The Strategy of Economic Development*. New Haven: Yale University Press.

Ho, Samuel

1978 *The Economic Development of Taiwan, 1860-1970*. New Haven: Yale University Press.

Inter-American Development Bank

1988 *Annual Report*.

Kindleberger, Charles P.

1968 *American Business Abroad*. New Haven: Yale University Press.

Koh, Ai Tee

1987 "Linkages and the International Environment." In Lawrence, Krause, Koh Ai Tee, and Lee (Tsao) Yuan, eds., *The Singapore Economy Reconsidered*. Singapore: Institute of South East Asian Studies.

Krause, Lawrence

1987 "The Government as Entrepreneur." in Krause, et al. *Singapore Economy*. Singapore: Institute of South East Asian Studies.

Krause, Lawrence, Koh Ai Tee, and Lee (Tsao) Yuan, eds.

1987 *The Singapore Economy Reconsidered* Singapore: Institute of South East Asian Studies.

Lee, Dinah

1989 "China: U.S. Importers Aren't Jumping Ship Yet." *Business Week*, May 15, 45-46.

Lim, Linda Y. C. and Pang Eng Fong

1982 "Vertical Linkages and Multinational Enterprises in Developing Countries." *World Development* 10:7, 585-595.

Lin, Tzong-Biau and Yin-Ping Ho

1980 *Export Oriented Growth and Industrial Diversification in Hong Kong* Hong Kong: Chinese University of Hong Kong.

Lo, Shiu-hing

1988 "Decolonization and Political Development in Hong Kong." *Asian Survey*. 28:6, 613-625.

Long, Frank

1986 "Employment Effects of Multinational Enterprises in Export Processing Zones in the Caribbean." Geneva: International Labour Office, Working Paper No. 42, Multinational Enterprises Programme.

Moulaert, Frank, and Patricia Wilson Salinas, eds.

1983 *Regional Analysis and the New International Division of Labor*. Boston: Kluwer-Nijhoff.

Nash, June, and Maria Patricia Fernandez-Kelly, eds.

1983 *Women, Men, and the International Division of Labor*. Albany: State University of New York Press.

Nash, June and Helen Safa, eds.

1985 *Women and Change in Latin America*. New York: Bergin and Garvey.

Neff, Robert, and Laxmi Nakarmi

1989 "Has the Korean Miracle Run Out of Magic?" *Business Week*, July 3, 38-39.

Pearson, Ruth

1986 "Latin American Women and the New International Division of Labour: A Reassessment." *Bulletin of Latin American Research* 5:2, 67-79.

Reich, Robert

1983 "The Next American Frontier." *Atlantic Monthly* March, 43-58.

Ruiz, Vicki, and Susan Tiano, eds.

1987 *Women on the United States-Mexico Border: Responses to Change*. Boston: Allen and Unwin.

Sassen, Saskia

1988 *The Mobility of Capital and Labor*. Cambridge: Cambridge University Press.

Schive, Chi

1988 "Foreign Investment and Technology Transfer in Taiwan: Past Experience and Future Potential." *Industry of Free China* 70:2, 1-28.

Sklair, Leslie

1986 "Developmental Effects of Foreign Investment: The Cases of Ireland, China, and Egypt and Their Relevance for Mexico." Center for U.S.-Mexican Studies, University of California at San Diego, working paper.

1989 *Assembling for Development: The Maquila Industry in Mexico and the United States*. Boston: Unwin Hyman.

Sit, Victor F. S.

1988 "China's Export-Oriented Open Areas: The Export Processing Zone Concept." *Asian Survey* 28:6, 661-675.

Spinanger, Dean

1984 "Objectives and Impact of Economic Activity Zones: Some Evidence from Asia." *Weltwirtschaftliches Archiv* 120:1, 64-89.

Taylor, Bruce, and R. Yin-Wang Kwok

1989 "From Export Center to World City: Planning for the Transformation of Hong Kong." *Journal of the American Planning Association* 55:3, pp. 309-322.

Thoumi, Francisco E.

1988 "Economic Policy, Free Zones and Export Assembly Manufacturing in the Dominican Republic." Inter-American Development Bank (unpublished paper), March.

Vernon, Raymond

1971 *Sovereignty at Bay: The Multinational Spread of U.S. Enterprises*. New York: Basic Books.

Wilson, Patricia A.

1989 "The New Maquiladoras: Flexible Production in Low Wage Regions." Community and Regional Planning Working Paper Series, No. 9, University of Texas, Austin, Texas.

"The New Maquiladoras and Local Linkages." Community and Regional Planning Working Paper Series, University of Texas, Austin, Texas, forthcoming.

Yang, Dori Jones

1989 "China's Economy is Careening Out of Control." *Business Week*. April 3, pp. 54-56.

Yang, Dori Jones, and Larami Nakanmi

1989 "Is the Era of Cheap Asian Labor Over?" *Business Week*. May 15, pp. 45-46.