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Do Border Economies Generate Comparative Advantages for Small- and Medium-Sized Enterprises? Evidence from the Maquiladora Industry

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Contents

Abstract

Maquiladora assembly emerged to solve a specific problem in a specific region. In the mid 1960s, it was designed to absorb unemployment and to foster industrialization at the US-Mexican border. In the course of its development, it developed considerable dynamics with respect to both regional distribution and technological diversification. Beyond initial intentions, maquiladora assembly proved to be a powerful instrument to foster modernization and international integration of the Mexican economy.

Maquiladora assembly is based on factor price differentials and a favourable location with respect to the US-market. It has been developed by private agents learning to tap these potentials. They successfully intensified labour division among themselves. Most importantly, they invented so-called Shelter Plan arrangements as privately marketed services to overcome risk barriers to international integration. A passive, i.e. liberal stance of economic policy proved to be supportive. The implication for economic policy in transformation economies is that an adequate assignment of responsibilities among market and state is at least as important as efficient labour division among private agents. (D20, F15)

I Introduction: Border Economics and Production Sharing[1]

The common border of Mexico and the United States of America (US) is one of the few places in the world where a poor and a rich country are neighbouring directly along a distance of nearly 2,000 miles (Chart 1).[2] Mexico and the US are different both with respect to their development levels and with respect to their factor endowments. The US is relatively rich in capital but relatively poor in cheap, low skilled labour, while in Mexico it is just opposite. This setting comes very close to that on which the so-called Heckscher-Ohlin-Model is based. In a Heckscher-Ohlin world, one would expect inter-industry trade to develop strongly between the two countries such that Mexico would produce labour-intensive goods and trade them against capital-intensive goods from the US.

However, international economic activity not only reflects different factor endowments and development levels. It also takes account of capital and labour mobility, different degrees of mobility as well as of regulations which may restrict exchange of goods and/or factors of production. Actually, the setting at the US-Mexican border is far more complex than a simple Heckscher-Ohlin world. Indeed, the border is closed for Mexican labour but investment capital is mobile and restrictions to trade are in place. In this setting, the US-Mexican

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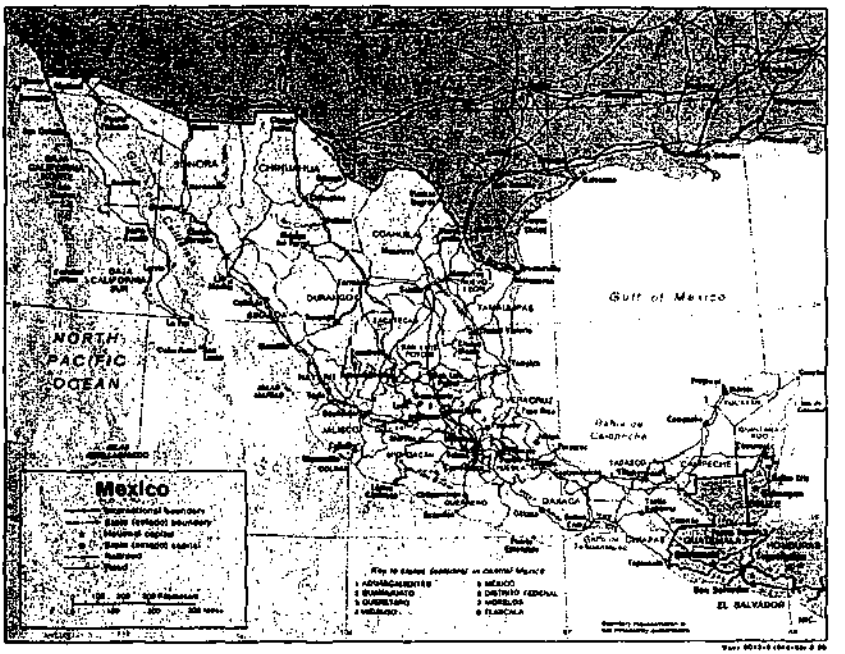
[1] Research for this paper was undertaken with support from the European Commission's Phare ACE Program 1995 "Integrating Small- and Medium-Sized Enterprises in Transition Countries into the European Trade Flows and Co-operation Schemes", Project No. 94-0724-R. The paper has been prepared for the corresponding workshop held in Trento, Italy, in March 1997. I am grateful for the comments of workshop participants and other discussion partners.

[2] Other borders with a similar setting are the Pearl-River-Delta in China/Hong-Kong and the North-South border lines between Western and Central Eastern Europe. In Mexico, the border region consists of 35 municipalities in six federal states. Almost a third of the border population is concentrated in Tijuana and Mexicali, both on the Californian border, and almost a fifth in the largest border city, which is Ciudad Juarez. These three cities account for about half of the border population.

border region has brought about a particular phenomenon of economic integration: the maquiladora[3] or in-bond industry[4].

Chart 1



[3] The term *Maquila* roots in the Arab language where it means *measure*. In Spanish it adopted the meaning of *toll*. It denotes the amount of grain that farmers used to pay the miller for processing their crop. The Mexican factories or the twin-plants were called *maquiladoras*, or *toll manufacturers* as they process inputs — and use machinery — owned by a foreign investor for a fee (Bolin 1984; Mendiola 1996).

[4] The amount of the corresponding import duty and any fine or penalty that could result should the imported goods not be exported within the authorised time period were to be guaranteed by posting a financial bond, hence the term "in-bond" industry, which is used as a synonym for maquiladora industry in many instances (USITC 1990).

Precondition and driving forces for this industry to develop are first, competitive pressures on US-manufacturers fuelled by globalization, second, technical separability of individual stages of the manufacturing process and third, significant factor price differentials between Mexico and the US. Factor price differentials, especially with respect to labour, are resulting from and maintained by different demographic developments in Mexico and the US. Due to a rapidly growing population, Mexico has a large and growing but relatively low-skilled labour force. In the US in contrast, population is growing slower and becomes increasingly educated.[5]

Thus, although the world's most important sales markets for labour-intensive consumer goods, the US has become uncompetitive in producing them. It has to move out labour-intensive productions to low-wage countries. Mexico, compared to developing countries in South East Asia, offers US-based producers an attractive location due to even lower wages on the one hand and due to proximity on the other hand. Transportation from almost any point in the US to the Mexican border results to be cheaper than transportation to any of the Asian or other overseas trading partner of the US (Grunwald 1985a). Thus, Mexico enjoys an important advantage in locational competition.

The purpose of this paper is twofold. First, it analyzes maquiladora-type production sharing with respect to the national Mexican economy as well as with respect to the role and potential of small- and medium-sized enterprises in international integration and on the preconditions therefore. Second, it serves to prepare the discussion, inhowfar the maquiladora case may serve as a blueprint in designing growth-orientated development strategies for the transformation

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[5] Wages for unskilled labour are 8 to 10 US$ per hour in the US, whereas only 1 to 2 US$ in Mexico.

economies of Central and Eastern Europe. Research for this paper is based both on reviewing economic literature and on conducting interviews with industrial parks managers, with a member of the National Chamber of Manufacturing Industry[6] as well as with researchers of the University of Mexico City and El Colegio de México.

II Maquiladora Assembly: Beginnings and Design

The maquiladora industry was established 1965 in the framework of Mexico's Border Industrialization Program.[7] The program was designed to integrate the border region into the national economy by attracting foreign manufacturing and by creating employment. Its implementation received a strong impetus as the United States, reacting to pressure from their labour unions, terminated the so-called Bracero Agreement which since World War II had allowed Mexican farmworkers (braceros) to temporarily enter the US for working in the harvest. When returning, workers partly went to their home places in the interior of the country, partly they stayed at the border, hoping to be contracted again in the US. The Mexican border-city Ciudad Juarez, opposite of El Paso, was heavily

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[6] Cámara Nacional de la Industria de Transformación (CANACINTRA).

[7] The Border Industrialization Program (Programa de Industrialización Fronteriza) basically formalized the establishment of maquiladora plants at the northern border cities. It did so by modifying tariffs and customs procedures. In the border region, it allowed for foreign investment with up to 100 p.c. foreign ownership, including 100 p.c. foreign ownership to real estate, and provided exemption from import tariffs for all items to be re-exported after assembly treatment. Setting up this program implicated the first move of the Mexican government from a domestically oriented development by means of import substitution towards and outward oriented strategy, although only with respect to the northern border (Montemayor Martínez 1992). The 1965 Border Industrialization Program was preceded by the so-called Border Development Program (Programa Nacional Fronterizo — Pronaf) issued in 1962. Pronaf addressed unemployment and social problems in the northern border states. It was created to integrate the border with the interior of Mexico, namely to improve the appearance and operation of the border region and to increase the awareness of Mexican culture and exportable products (Bolin 1991). The program mainly provided funds for establishing physical and social infrastructure as streets, schools, etc.

burdened by returning unemployed workers. At that time, however, the city had little industry and no possibility to employ or host the people.

On this occasion and using funds made available under the Border Development Program, a study was commissioned in order to investigate possibilities and strategies to move towards industrialization. The study proposed to attract US investment into manufacturing and to realize the manufacturing process in so-called twin plants (ADL 1964).[8] The idea of the twin-plant concept is to establish a production system consisting of two plants, one on each side of the border, but both operated by a single management.[9] The plant on the US side would perform the capital- and technology-intensive parts of the process, the plant on the Mexican side would perform the labour-intensive parts. The Mexican plant would receive its machinery from the US and also the components to be assembled. It would return the assembled, semi-finished products duty free to the US twin plant to be finished there and then to be marketed in the US.

In essence, the twin-plant concept constitutes a specific design of international production sharing[10] which combines international trade with international production.[11] It recognizes that the US as the world's largest consumer market offers a huge sales potential for labour-intensive consumer goods while wages put US

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[8] In this study both the concept of a twin-plant was invented and its name was coined. Only later, twin plants were named maquiladoras.

[9] The plant on the US side was initially conceived as the subsidiary of a parent company located elsewhere in the US. However, this is not necessarily so. There are US companies which set up assembly operation in Mexico without establishing a border-located subsidiary (Chart A1). There are also plants in industrial parks on the US side of the border, e.g. at the El Paso airport, which are not necessarily owned by the same companies as the co-operating assembly plants in Mexico (Bolin 1997).

[10] The term "production sharing" has been coined by Peter Drucker and denotes world "economic integration by stages of the productive process" (Drucker 1977).

[11] According to Peter Drucker (1977) "... the old 18th-Century German term *Veredelungsverkehr* (upgrading trade) describes the transaction better than any of the familiar terms of international economics and international trade theory."

producers at a competitive disadvantage. Locating labour-intensive productions on the Mexican border combines wage cost advantages with low transportation cost. It allows to restore US producers' competitiveness on the one side and to employ Mexican workers on the other side. Beyond, US investors benefit from returns on their capital investment, the Mexican economy benefits from foreign exchange generated by exports and, in the course of time, from technology and management know-how transferred jointly with capital investment.

As an organizational device, the study recommended to establish the Mexican plant in a bonded manufacturing zone hosting an industrial park (ADL 1964). Rules to bonded zones were already set in Mexican law — though scarcely practised — as areas where any foreign inputs (machinery, equipment, raw materials, semi-finished products) may be imported duty-free. Manufactured goods could leave the zone with duties payable only when sold on the national market but free from duties and taxes when exported. The industrial park inside the zone should provide manufacturers with all facilities and services they need to set up production and should charge them with an annual rent.[12]

Maquiladora enterprises receive no incentives from Mexican authorities but tariff exemptions. Although incorporated in Mexico, the maquiladora is not subject to ownership control but can be constituted and managed with up to 100 p.c. foreign capital. There are no restrictions with regard to origin of components or profit remissions and only few restrictions to land ownership.[13] For

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[12] Actually, the rent must cover the cost of administration as well as the cost for acquiring investment of foreign manufacturers. This is important as banks will not lend for marketing expenditures of the parks but will give loans only for buildings and real estate (Bolin 1997).

[13] Since 1972, maquiladora plants can be established anywhere in the country by purchasing or leasing real estate for production facilities. If land ownership is to be acquired in the "restricted zone", i.e. within 100 kilometers along the border line or 50 kilometers inland along the coast line, the operation has to be done under a trust agreement through a Mexican commercial bank, renewable after 30 years (Opalín 1990).

an enterprise to acquire the status of a maquiladora, it has to be approved and registered by the Ministry of Economics[14]. US authorities grant benefits to maquiladora assembly by applying incentive tariffs which allow duty-free entry of US materials sent to Mexico for processing and re-entering the US for further processing or sale.[15] Thus, assembled and re-imported products are subject to US taxes only for the value added which has been generated in Mexico.[16]

According to the proposal, the first twin-plant and a new industrial park within a bonded manufacturing zone were realized in Ciudad Juarez. Initially, it was envisaged that the industrial park should be publicly built and managed and that funds would be made available by the federal government. However, due to budget constraints, the government could not provide funding. A Mexican entrepreneur became interested and instead, the park was established as an entirely private enterprise: with private money and on private land. A private management was installed responsible of promoting the park to international investors and to finance itself out of rental income. Actually, this happened to be the probably most important single event in the development of maquiladory-type production sharing. It threw the switch from government involvement and industrial policy to private initiative and privately born responsibility. In short: it left the floor to private agents.

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[14] Secretariat of Commerce and Industrial Development (Secofi).

[15] The US Offshore Assembly Provision (OAP) was instituted in 1930. It consists of two items in the US tariff schedule. Tariff item 806.30 assesses a duty on the foreign value added of US metal products. Item 807.00 grants duty-free entry to other US materials or components. Tariff articles TSUS 806.30 and 807.00 are now HTSUS 9802.00.600 and 902.00.80. For definitions see, for instance, Journal of the Flagstaff Institute (1995).

[16] The US government intended to reconcile the interest of US unions concerned with domestic employment and the interest of US producers worrying about high labour cost jeopardizing their competitiveness. Incentive tariffs should allow for a cost-neutral flow of materials between US enterprises and their foreign subsidiaries (Dillmann 1983, quoted from Nuhn 1994).

III Growth and Development

From a modest beginning, the maquiladora industry has been continuously growing during the past thirty years. From 1965, when twelve maquiladora plants were established, the industry grew to 2,100 enterprises with 640,000 employees generating 5 bill. US$ of net exports in the mid 1990s (Table 1). From 1975 to 1995, the maquiladora industry experienced an average annual growth of 8 p.c. with respect to number of enterprises and of 12 p.c. with respect to employment (Mendiola 1996). Its gross production grew to over 26 bill. US $ in 1995, roughly one fifth of which is value added, mainly representing the content of local labour (Tables 2 and 3). In the beginning of the 1980s, value added even had accounted for nearly a third of gross production but declined to about 20 p.c. in the mid 1990s. It reflects an increasing value of imported inputs, mostly, however, it is due to peso devaluation, as e.g. from 1994 to 1995.

Table 1 – Enterprises and Employment in the Maquiladora Industry 1965–1995

Year	Enterprises (number)	Employment		Net export (bill. US$)
		(1,000)	p.c. of employment in total manufacturing	
1965	12	3,000	.	3
1970	120	20,300	.	80
1975	450	67,200	.	330
1980	620	119,500	4.7	770
1985	760	212,000	8.0	1,280
1990	1,920	460,300	15.5	3,560
1995	2,100	640,000	22.6	5,030

Source: INEGI, quoted from Weintraub (1990) and Mendiola (1996).

Table 2 – Composition of Gross Output in the Maquiladora Industry 1980–1995

Year	Total gross output (bill. US$)	Imported inputs (p.c.)	National gross output		Note: Value added (bill. US$)
			Value added (p.c.)	National inputs (p.c.)	
1980	2,550	68.5	30.3	1.2	770
1985	5,166	74.6	24.7	0.7	1,280
1990	14,226	73.7	25.0	1.4	3,560
1994	26,444	75.8	23.0	1.2	6,080
1995	26,344	79.7	19.1	1.2	5,030

Source: INEGI, quoted from Mendiola (1996).

Table 3 – National Gross Output in the Maquiladora Industry 1980/81 and 1993

Components	All plants	Interior plants	Border plants	Components	All plants
	1980/81				1993
Wages and salaries	63	43	60	Wages and salaries	56
Material and supplies	2	12	3	Various domestic expenses	26
Rents and utilities[a]	19	25	20	Utilities and others	13
Profits[b]	16	20	17	Material inputs and national supplies	5
Total	100	100	100		100

[a]Includes transportation and maintenance. – [b]Includes taxes.

Source: Grunwald (1985a); Consejo Nacional Industria de la Maquiladora de Exportación (1993).

Table 4 – Mexican Foreign Trade 1993–1996

	Value (mill. US$)				Structure (p.c.)			
	1993	1994	1995	1996[a]	1993	1994	1995	1996[a]
Total exports	51.9	60.9	79.5	69.4	100	100	100	100
thereof								
Total manufacturing	41.7	50.4	66.6	...	80	83	84	...
thereof Maquiladora	21.9	26.3	31.1	26.6	42	43	39	38
Total imports	65.4	79.3	72.5	64.2	100	100	100	100
thereof								
Total manufacturing	40.5	56.5	58.4	...	71	71	81	...
thereof Maquiladora	16.4	20.5	26.2	22.0	25	26	36	34
Total trade balance	–13.5	–18.5	7.1	5.5	x	x	x	x
thereof Maquiladora	5.4	5.8	4.9	4.6	x	x	x	x

[a]January to September.

Source: Banco de México (1996b); INEGI (1996b).

Maquiladora assembly has made the Mexican border a fully industrialized region. Also, it began to take a role in the national economy — with respect to production, employment, trade and foreign investment as well as with respect to structural change and economic liberalization. In 1995, maquiladora assembly accounted for 2 p.c. of Mexico's gross domestic product (GDP). This may appear small yet equals about 10 p.c. of GDP in total manufacturing. Maquiladora plants employed about 3 p.c. of the total active labour force, which is more than a quarter of all jobs in Mexican manufacturing and nearly two thirds of manufacturing employment in the border states. Moreover, for each job created directly in a maquiladora plant, one or even two further jobs are generated indirectly in other local enterprises. Thus, maquiladora assembly in total is by now generating employment and income for up to two million people,[17] but plays its most important role probably with respect to foreign trade. It is Mexico's second

[17] In 1994, total population was 93 million people.

important export industry after oil extraction and ahead of tourism and — as based on outward processing — its largest importer of intermediate goods. It has acquired a share of roughly two fifth of all manufacturing exports and continuously generates trade surpluses (Table 4). In certain industries, it accounts for even more than 80 p.c. of all US imports generated by offshore assembly (Table A1).

Sectoral Changes

Maquiladora assembly actually covers the whole range of manufacturing industries with transport equipment, electronics and textiles being the three largest. Textiles were important in the early beginning. Since the 1970s, electronics and electronic machinery have been dominating (Table 5). Although electronics are experiencing a relative decline compared to other maquiladora industries, they remain the largest single industry even in the 1990s, still accounting for one third of employment and nearly half of production. Transport equipment is the second largest and the fastest growing sector, accounting now for about one fifth of both employment and production.

However, looking at the industrial structure only within the maquiladora sector does not yet tell the story as maquiladora industries develop quite differently from their non-maquiladora counterparts. Mostly, they develop much stronger dynamics. Textiles, for instance, have lost importance relative to other maquiladora industries but have been growing in absolute terms. This is remarkable as in the same time the non-maquiladora textile industry has been shrinking considerably (Mendiola 1996). Relatively high dynamics of maquiladora assembly mainly result from its high degree of international integration — thus indirectly from partial liberalization — which seeks extensive regional diversification and forces a continuous updating of technology and organization.

Table 5 – Sectoral Structure of the Maquiladora Industry[a] 1973–1995 (Percentages)

Year		Textiles	Electronics	Transport equipment	Others
1973	Enterprises	24	47	2	27
	Employment	13	68	2	17
	Gross production	10	66	4	20
1979	Enterprises	23	33	7	37
	Employment	16	60	5	19
	Gross production	11	63	4	22
1985	Enterprises	14	36	8	42
	Employment	10	48	19	23
	Gross production	7	47	28	18
1992	Enterprises	18	25	8	49
	Employment	11	35	25	29
	Gross production	5	43	30	22
1995	Enterprises	...	...	...	...
	Employment	15	36	22	27
	Gross production	4	48	22	26

[a]Total gross output=100.

Source: INEGI (1996a); Romero and Paredes (1993).

Regional Diversification

Initially, the maquiladora industry was restricted to locate exclusively at the northern border and it strongly concentrated at certain places — Ciudad Juarez, Tijuana, Matamoros, and Nogales became and still are the most important locations. In 1972, however, restriction to location was abolished and all assembly enterprises in Mexico became eligible for tariff exemption, irrespective of their location.[18] Since then, the maquiladora industry has spread southward all over

[18] Tariff privileges became available for all assembly enterprises except for those in regions with an already high concentration of industry.

the country. Non-border assembly plants were first established within the border states, namely in Chihuahua, Nuevo León and Sonora, then also in central and southern places. Today, each of Mexico's 31 federal states has at least one maquiladora plant (Christman 1993).

Non-border plants are playing an increasingly important role (Table 6). Until now, they have grown to account for about one third of all maquiladora plants and for more than 10 p.c. of employment. On average, they are smaller than plants at the border. Although the entire assembly industry is growing, non-border plants are growing even faster. Both with respect to value added and payroll, they grew twice as fast as border plants in the period of 1973 to 1983 (Tables 7 and A2). Non-border plants benefit from lower wages inside the country. Thus, their payroll per employee is lower although their total payroll is growing faster (Table 8).

Table 6 – Enterprises and Employment of Interior Maquiladora Plants 1974–1995[a]

Year	Enterprises		Employment	
	Number	Share in total maquiladora enterprises (p.c.)	Persons	Share in total maquiladora employment (p.c.)
1973	10	4	4,200	7
1975	36	8	5,100	8
1980	69	11	13,000	11
1983	67	11	16,000	11
1990	485	25	.	.
1995	659	31	77,900[b]	11[b]

[a]Annual average. – [b]End of year.

Source: Mendiola (1996); Banco de México (1996a); Grunwald (1985a, 1985b).

Table 7 – Gross National Output and Payroll by Location of Maquiladora Plants 1973–1983

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Increase (p.c.) 1973–1983
	Current prices (mill. US dollars)											
Gross national output												
All plants	197.0	315.6	321.2	352.2	314.9	438.6	637.9	770.8	977.8	847.0	828.7	321
Border plants	177.5	289.2	290.0	314.4	276.3	386.5	539.7	661.2	846.3	734.2	721.7	307
Interior plants	19.5	26.5	31.1	37.7	38.6	52.0	98.2	109.6	131.5	112.9	106.9	448
Payroll[a]												
All plants	115.5	194.7	194.4	215.6	200.3	262.5	371.4	456.4	597.7	445.8	390.7	238
Border plants	107.7	181.4	180.1	199.9	183.8	241.8	339.6	413.7	537.2	402.4	354.0	229
Interior plants	7.8	13.3	14.2	15.7	16.5	20.7	31.8	42.7	60.5	43.4	36.7	371
	Constant prices (Mexican pesos, 1975=100)[b]											
Gross national output												
All plants	87.2	113.2	100.0	116.7	118.6	142.0	174.7	168.5	178.0	217.9	222.1	155
Border plants	87.1	114.9	100.0	115.3	115.2	138.6	163.7	160.1	170.6	209.2	214.4	146
Interior plants	89.2	98.2	100.0	126.6	150.1	173.9	277.7	247.4	247.2	299.3	295.5	231
Payroll[a]												
All plants	84.5	115.4	100.0	118.0	124.6	140.4	168.0	164.8	179.8	189.4	173.0	125
Border plants	85.1	116.0	100.0	118.1	123.4	139.6	165.8	161.2	174.4	184.4	169.1	99
Interior plants	78.1	107.9	100.0	117.6	140.5	151.6	196.9	211.1	247.2	251.9	222.0	184

[a]Includes wages and benefits. – [b]Deflated by the Mexican consumer price index. The CPI was chosen because first, the wholesale price index covers Mexico City only, and second, value added in Mexico consists primarily of wages, services, and profits, while Mexican materials constitute only a small proportion.

Source: Grunwald (1985a).

Table 8 – Wage development by Location of Maquiladora Plants 1973–1983 (1975=100)

	Payroll per employee[a] in constant prices					
	Mexican pesos[b]			US dollars		
Year	All plants	Border plants	Interior plants	All plants	Border plants	Interior plants
1973	88.3	93.2	51.8	62.0	65.5	36.4
1974	102.1	101.4	112.0	88.6	88.0	97.2
1975	100.0	100.0	100.0	100.0	100.0	100.0
1976	106.5	108.7	85.3	100.3	102.2	80.2
1977	106.8	108.5	91.5	88.2	89.7	75.7
1978	104.1	105.3	92.2	100.0	101.3	88.6
1979	101.4	102.5	91.9	115.4	116.5	104.5
1980	92.7	94.0	82.3	132.1	133.9	117.2
1981	92.3	93.1	86.8	157.7	159.0	148.2
1982	100.3	101.3	92.5	121.3	122.5	111.7
1983	77.1	78.0	70.6	89.5	90.4	81.9

[a]Including fringe benefits. – [b]Deflated by the Mexican consumer price index. CPI was chosen because first, the wholesale price index covers Mexico City only, and second, value added in Mexico consists primarily of wages, services and profits, while Mexican materials constitute only a small proportion.

Source: Grunwald (1985a).

Increasing importance of non-border locations reflects to a large extent agglomerational diseconomies, which developed on the border. Border locations always had and still have the largest agglomerations of maquiladora plants. As these agglomerations were growing continuously, they became heavily ridden with

- bottlenecks in regional infrastructure such as roads and sewers, drainage and water, electricity and telecommunications, as well as shortages in housing, health care and schools,
- high personnel turnover,
- rising prices in markets for local goods and services, and
- environmental pollution (Sánchez Ugarte 1991; Quintana 1990).[19]

Worst, however, were congested bridges. Congestion arose mainly because the development of infrastructure has not kept pace with maquiladora growth.[20] This was mainly attributed to macroeconomic shocks and major imbalances in the financial markets, or rather considered as a consequence of the efforts to cope with them. In the aftermath of the large devaluations of 1976 and 1982 and the hyperinflation of the 1980s, international support — on part of the World Bank, the International Monetary Fund, the US and others — was made contingent on imposing severe restrictions on public budgets. Budget strains led to postponing the improvement of border region infrastructure just when the maquiladora industry has been growing most dynamically (Quintana 1990). However, budget strains can hardly be an excuse. Rather, they make the case for privately financ-

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[19] The Interamerican Development Bank designed a conversion program of several billion US dollars to finance ecological restructuring (Handelsblatt 1995).

[20] It is estimated that necessary improvements of infrastructure will require some 16 bill. US$. However, public funds assigned to infrastructure on both the US and the Mexican side presently account for only 3 bill. US$ each (Nachrichten für Außenhandel 1994).

ing infrastructure and they underscore the importance of, for instance, private industrial parks.

While border locations became congested, interior locations offered advantages in terms of a lower turnover in labour and in terms of lower wages (Haywood 1997). Furthermore, proximity to the US lost importance, partly because increasing technology content made products less sensitive to transport cost, partly because technical progress and improved infrastructure lowered transport cost. In addition, Asian, mainly Japanese, investors began locating maquiladora plants at the pacific border, which was a favourable place to ship in materials from the Far East.

In its move southward, the regional distribution of maquiladora industries did not develop evenly, but rather heterogenously. Most industries are clustering at certain locations. Assembly for transport equipment, e.g., has been concentrated at border locations from the beginning and remained so. The most important place is Ciudad Juarez, which in the 1990s still accounted for half of maquiladora employment in transport equipment. Textiles in contrast have moved inwards. In 1980, about four fifths of all textile assembly plants were located at the northern border. While in 1995, more than half of the maquiladora textile industry located in the interior, mostly grouping in Durango, in Morelos and in the Caribbean peninsula of Yucatán. Yucatán, for instance, is attractive to US enterprises because it offers good air fright connections to Florida. Electronic maquiladoras, mostly Japanese, are clustering in the pacific peninsula of Baja California and in the so-called "Mexican Silicon Valley" in Guadalajara, while food processing maquiladoras are located in Guanajuato.

International and Domestic Integration

Maquiladora assembly is highly integrated internationally. The first generation of maquiladora production was fully integrated with the US but largely isolated from the Mexican economy. This changed, however, in the course of time, especially with increasing technological diversification. In the beginning, maquiladora operations were straight assembly: workers attached Part A to Part B and assembly did not need technology. Many companies, however, which successfully operated their maquiladora plants, became aware that they had gathered a good deal of experience and workers had acquired considerable skill (Mack and Greenbaum 1983). This gave them the possibility to react to competitive pressures with upgrading their production. Thus, the second generation of maquiladora plants began manufacturing the parts and components it had to assemble. Mexico captured a larger share of internationally integrated production and maquiladora assembly acquired a higher degree of vertical integration. Actually, increasing shares of manufacturing — in contrast to simple assembly — make the maquiladora business less labour-intensive but more skill- and technology-intensive.[21] By this, maquiladora workers became the most highly skilled part of the Mexican labour force.

In a third generation of maquiladoras, which is presently emerging, further changes are occurring (Mack and Greenbaum 1983): export processing changes from manufacturing simple parts and components to manufacturing complete systems and subsequently assembling finished products, it changes from stock-buffering to just-in-time production and it changes from sourcing and selling abroad to develop backward and forward links domestically. In these changes

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[21] From 1980 to 1986 the number of engineers employed in maquiladora plants rose from 9,000 to 26,000. In 1989, already 38 p.c. of maquiladora plants used integrated control and about 40 p.c. used robots for their assembly operations (Nuhn 1994).

border locations are taking the lead. Just-in-time production, for instance, is already playing an important role in plants located in Tijuana and Ciudad Juarez (Carillo, quoted from Mendiola 1996).

Since maquiladora assembly has been more integrated with the US than with the Mexican economy, it has been heavily accused to make Mexico dependent on the US and to be failing in terms of integration with the national economy. Unquestionably, US economic development tangibly affects the maquiladora industry. However, these effects only partially work through to the rest of the Mexican economy and they are not necessarily detrimental. Transmission between Mexico and the US works both directly and indirectly. Direct effects result if US business cycle dynamics translate into pro-cyclical changes of labour demand in the maquiladora industry.[22] Indirect, i.e anticyclical effects result when US recession or competitive pressure induce US producers to increasingly shift production to Mexico thus generating additional employment there. This occurred for instance, when US automotive producers experienced a recession from 1978 to 1982. This benefited maquiladora assembly in transport equipment which at that period grew considerably faster than maquiladora assembly on average (Mendiola 1996). Another facet of close links to the US economy is that maquiladora assembly is less affected by domestic shocks. After the Peso crisis in the 1980s, practically all new jobs in Mexico created were in maquiladoras, making the industry an important shock absorber (Drucker 1990). Similarly, in the recession of 1995, maquiladora assembly was the only sector that was left unaffected and continued to develop dynamically (Handelsblatt 1995).

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[22] The elasticity of maquila employment with respect to change of US output is estimated to be 2.25 (Carillo 1991, quoted from Mendiola 1996). This is quite high as it indicates that a 1 p.c. change in US output triggers a more than proportionate change in maquiladora employment (2.25 p.c.).

With respect to integration with the domestic economy, the only criticism which holds good is that of poor integration of domestic suppliers. However, in order to properly assess weak domestic integration, one has to consider first, that outward processing on purpose and by definition establishes both backward linkages (sourcing) and forward linkages (selling) mainly abroad rather than domestically. Second, in the case of maquiladora assembly, regulation strongly reinforced outward orientation. Maquiladora establishments were bound to locate at the border and tariff privileges were contingent on foreign sourcing and foreign selling. Meanwhile, these restrictions were released or even abolished, allowing now for both interior location, domestic sales and domestic sourcing. As a consequence, maquiladora assembly is developing most rapidly at interior locations and successfully sells part of its output on the domestic market.

However, backward linkages are still very weak. Presently, domestic resources are accounting on average for less than 2 p.c. of gross national output (Table 2). While interior plants in certain industries may be sourcing domestically to a considerable extent, their share in total maquiladora assembly is so low that this does not change the general picture (Table 9). The reasons for this are multiple. First, US tariff regulation which required import duties to be paid on the value added and second, tariff privileges for imported inputs granted on part of Mexican authorities both worked as a strong disincentive to source from Mexican suppliers. However, although these regulations have been abolished with the NAFTA agreement becoming effective in 1994, the share of national inputs in maquiladora operations still did not increase significantly.

The third and most important reason for missing backward linkages is that Mexican suppliers are not competitive compared to US or other foreign enterprises: their prices are often too high, the quality of their products is often too low — an impediment especially in electronics — they are often unable to meet

delivery schedules or to keep ready sufficient production capacity. Mostly, this lack of competitiveness results from protection and import-substitution which had governed Mexican industrialization from the 1940s until well into the 1980s (Grunwald 1985a; Octavio Díaz 1990). Several programs were designed to make domestic suppliers more competitive and to integrate them better with the border economy. So far however, these programs have not produced tangible effects.[23]

Table 9 – Domestic Sourcing by Industry and Location of Maquiladora Plants 1975–1991

Industry	Average share of domestically sourced inputs in gross output (p.c.)	
	Border plants	Interior plants
Food	15.5	—
Textiles	0.3	2.6
Leather, shoes	4.5	24.7
Furniture	9.7	5.0
Chemicals	3.2	59.2
Transport equipment	0.6	3.2
Non-electric machinery	0.8	—
Electric machinery	0.2	3.4
Electronics	0.4	2.7
Toys	0.8	—
Services	5.5	53.5
Others	1.0	46.3
Total	0.9	5.8

Source: Zepeda (1994).

[23] Such programs were first set up in the 1970s, when 600 engineers working in maquiladora assembly plants went to Mexico City to show representatives of the domestic Mexican industry the type of articles they were used to accept and to buy as inputs for their production (Haywood 1997). Recent programs were designed in the beginning of the 1990s (Benítez H. 1990; Sánchez Ugarte 1991).

Integration of Small- and Medium-Sized Enterprises

A large part of maquiladora assembly is undertaken by small- and medium-sized enterprises (SME). This holds true not only for maquiladora plants in Mexico but in most cases also for their parent companies, locating in the US or in other industrialized countries. Also industrial parks which render locational services are typically small in terms of employment with park management and accounting staff mostly far below 50 people.[24]

Throughout the development of the industry, maquiladora plants have been medium-sized on average (Table 10).[25] Employment per enterprise has increased slightly over time and at present, border plants have on average some 400 employees.[26] Interior plants prove to be significantly smaller, employing on average less than 150 persons. Parent companies, too, are mostly medium-sized enterprises. Data on foreign investors' enterprise size are not available. From soft evidence, however, it is quite clear that predominantly medium-sized producers take advantage of selling up assembly plants in industrial parks while multinational enterprises constitute a minority.

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[24] Except for the period of construction.

[25] If measured by employment, enterprises with up to 50 employees are considered small, enterprises with up to 500 employees are considered medium size.

[26] For 1987, the OECD reports that a third of all maquiladora plants was small. Most of the plants with total or majority Mexican ownership were small, while the plants with US equity were medium or large, i.e. annual sales were 250,000 US$ or above (Peres Nuñez 1990).

Table 10 – Maquiladora Enterprise Size by Location[a] (1965–1995)

Year	All plants	Border plants	Interior plants
1965	250	...	x
1970	169	...	x
1975	148	...	...
1980	193	...	...
1985	279	...	...
1990	240	...	...
1994	278	284	137
1995	304	389	118

[a]Number of employees per plant.

Source: Mendiola (1996); Banco de México (1996a).

In many aspects, maquiladora assembly produced a pattern of production sharing which is quite different from what theoretical considerations and empirical evidence would suggest for SME. Typically, cross-border activities are dominated by international trade rather than by international production and small- and medium-sized enterprises are typically much less integrated in international production than large enterprises. However, maquiladora assembly relies, on the one hand, on both trading and producing internationally and, on the other hand, it favours international integration of SME. In general, one would expect that contractual control and intermediate forms of co-ordination are the most convenient ways for SME to operate internationally (Schmidt 1996). The main reason for preferring these shallow forms of integration is that SME cannot afford as much risk-bearing as large enterprises can.[27] In maquiladora assembly, nevertheless, both forward and backward linkages, are typically based on deep integration, i.e. on equity control, established by capital investment.

[27] In essence, the risk argument is the sunk-cost argument. Deep forms of integration involve capital commitments into specific investments. If specific investments fail, the capital invested turns to be a sunk cost that cannot be recovered (Pindyck 1991).

Table 11 – Size Structure and Organization Pattern of the Maquiladora Industry

type of enterprise	size of	type and degree of international involvement	type of activity	type of control	type of advantage
parent companies	mostly medium	serving the home market by means of international production sharing	manufacturing: production of consumer goods	*market control* if SME, mostly independently run by its owners *hierarchical control* if MNE	*locational*: is located on its sales market *ownership* marketing know how *internalization*: technological and organizational know how
maquiladora plants	mostly medium	once fully exporting, now increasingly serving the Mexican market	assembly or manufacturing of parts	hierarchy: equity control, minor yet considerable part of Mexican capital	*locational*: cheap labour, cheap transport
industrial parks	small	fully committed to international business	management services	market control if independently run by private Mexican or foreign owners hierarchical control if publicly hold	*locational*: same location as its clients *ownership*: knowledge of Mexican market environment
national maquiladora suppliers	micro and small	not yet significantly involved	assembly or manufacturing of parts, probably also extracting natural resources but winning their competitive edge mostly by services	*market control* if working as subcontractor, possibly partly *hierarchical control* if established as subsidiaries	*locational*: cheap labour

Source: Own elaboration.

This can be explained by the fact that, notwithstanding their limited ability to bear risk, SME have potential advantages in international activities compared to MNE resulting, for instance, from a higher degree of flexibility. Obviously, maquiladora-type production sharing is taking place in a framework which efficiently reduces risk and allows SME to fully exploit their potential advantages. To put it differently, for a small- or medium-sized firm the maquiladora border network may be the only way to do business in a foreign country and to resort to production sharing as a means to cope with global competition (Drucker 1990). Table 11 and 12 attempt to capture the characteristics of maquiladora-type production sharing and the specific division of labour which developed between foreign parent companies, their Mexican assembly plants and industrial parks.

Table 12 – Maquiladora-Specific Assignment of Responsibilities

Sources of Comparative Advantage	Parent Company	Maquiladora Enterprise	Industrial Park
Product quality	x	x	
Reliability of delivery	x	x	
Reputation of the firm	x		x
Skill of workers		x	x
Flexibility of the firm	x		
Quality of management	x	x	x
Good local image and personal contacts			x
Financing capability	x		
Purchasing	x		
Social climate			x

x = major responsibility.

Source: Adapted from Schmidt (1996).

Table 13 – Economic Policy Framework for Maquiladora Assembly

Year	Programs, decrees or laws concerned with ...	Contents
1930	Offshore Assembly (OAP)	US duties are levied only on the foreign value-added contained in imports of a specified range of goods.
1948	Bonded Manufacturing Zone	An area which allows for duty-free imports from anywhere to be manufactured and to leave the zone duty-free if exported.
1962	Border development (Pronaf)	Establishing physical and social infrastructure (streets, schools, ...).
1965	Border industrialization	Promoting industrial settlements and production-oriented infrastructure. Companies exporting 100 p.c. of their production are eligible to import and re-export all necessary raw materials, components, machinery and equipment duty free.
1971	Administrative handling of establishing maquiladoras	Requirement of registering maquiladora establishments and defining a 20 kms zone along the border allowing for preferential treatment of export processing.
1972	Tariff exemptions	Enlarging the regional scope of tariff exemption for export processing operations anywhere in Mexico.
1977	Tariff exemptions	Specification of eligible goods.
1982	Tariff exemptions	Confirming preferences granted to registered maquiladoras.
1982	Control and transfer of foreign exchange	Allowing foreign exchange accounts to private enterprises, obligation to report on foreign exchange operations.
1983	Establishment and operation of maquiladora enterprises; intersectoral commission to co-ordinate maquiladora developments	No allowance for maquiladoras in industrial agglomerations, allowance for domestic sales, increasing national supplies.
1986	Decentralization of the maquiladora industry	Defining preferential zones and offering support for new establishments.
1989	Promotion and regulation of foreign investment	Simplifying administrative procedures, speeding up the purchase of real estate by foreigners.
1994	Free trade (NAFTA)	Removing barriers to trade between Canada, the US and Mexico. Full liberalization is planned for the year 2008.

Source: Adapted from Nuhn (1994) based on Mendez (1991), Villarreal (1988).

IV Reasons for Success

Simple Policy Framework

The creation of the regulatory framework has been driven by close interaction, if not to say bargain, between private actors and public authorities rather than by authorities negotiating bilaterally. Essentially, it represents a deregulatory approach. It is based on horizontal tariff exemptions, granted on part of Mexican authorities and on part of US authorities (Table 13). It is provided that materials to be assembled can be imported to and exported from Mexico tariff-free and that assembled products are taxed in the US only for the value added generated abroad.

In Mexico, the (de-)regulation applied to maquiladora assembly fits well into the general stance of economic policy which became increasingly liberal. Since 1989 industrial and foreign trade policies have been outlined such that measures are not targeting individual sectors or branches but are applicable horizontally, i.e. industry-wide or even economy-wide (Peres Nuñez 1993).[28] Only in the course of NAFTA negotiations, Mexico has partly reverted to sectoral policy and has set up a special program to promote competitiveness and internationalization of the textile and garment industry.[29]

However, a liberal approach to economic policy does not yet sufficiently describe a well-working assignment of responsibilities between the state and the market. Actually, the experience with maquiladora industry also points to the limits of the market, hence to the responsibilities which governments have to take beyond designing rules to international trade and production. In the Mexi-

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[28] Mexico, Ministry of Trade and Industrial Promotion (1989).

[29] Mexico, Ministry of Trade and Industrial Promotion (1992a, 1992b).

can border states, environmental pollution points to the importance of adequately defined property rights to scarce environmental resources and congested social infrastructure points to governments' responsibilities to provide resp. finance so-called public goods. In the case of maquiladora industry, the Mexican government only recently began to address these problems.

Smart Private Institutions

Organization: Private Industrial Parks

Industrial parks are an important organizational device in the development of maquiladora-type production sharing. Such parks can be seen as the hubs of international production networks where foreign and national strands are knotted together (Bolin 1989). However, industrial parks were not invented anew, but have a long series of historical antecedents (Bolin 1991):

- ***Free Ports***, already known in the middle ages, allow for duty-free storage of goods.
- ***Free Trade Zones*** allow not only to store but to also to trade goods (tradables) without paying duties. In a free trade zone, i.e. efficient trade is made possible by selectively putting trade barriers out of rule.[30]

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[30] The first Free Zone on the Mexican side of the border has been established in 1861. It was designed to keep local people from emigrating to Texas (Tamayo 1986; quoted after Weintraub 1990). In the 1930s, further duty-free zones and free perimeters were created in Sonora and Baja California in order to permit duty-free imports of goods from the United States since at that time it was difficult to serve the border region from the economic center around Mexico City. In order to stimulate export industries, these zones were allowed to host Mexican manufacturing enterprises (Bolin 1991). The first decree regulating temporary imports and exports was issued in 1958 (Grunwald 1985a).

- ***Export Zones*** and ***Industrial Free Zones*** permit production of goods and services to be exported duty-free.
- ***Export Processing Zones*** (EPZ) are specialized zones for manufacturing which can be organized as
  - ***privileged zones*** hosting manufacturing enterprises which take advantage of the zone's privileges, e.g. tariff-exemptions, by locating inside. These zones are fenced as duty exemptions apply to machinery, materials and components which are used inside the zone.
  - ***regime-type zones*** hosting privileged manufacturing enterprises, for instance maquiladora plants. As privileges apply to individual factories, customs control is exercised by inspection and documentation only. Regime-type zones do not need nor have a fence.
- ***Industrial parks*** are a means to provide enterprises with the infrastructure necessary for production.[31] Industrial parks are used by many zones. They may be organized as
  - ***real estate industrial parks***, which may be public or privately owned and managed. The main service they offer to their clients is real estate development, including buildings, streets, water, lights, communication, security, etc.

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[31] In Nogales, Sonora, e.g., a free zone and the industrial park had been co-existing for about two years until in 1970, the state and federal government extended the free zone already existing to include the park land (Haywood 1979).

- ***full service industrial parks***, typically private, which go beyond real estate services and offer also locational services and test production.

Maquiladora assembly plants can be established inside or outside industrial parks. Once the knowledge of how to promote a park to investors (which includes selling, leasing, financing) is spread it becomes possible to construct individual buildings for outward processing outside of parks (Bolin 1991). Nevertheless, industrial parks dominate the development of the maquiladora industry. In 1995, there were at least 90 industrial parks in Mexico which accounted for about 80 p.c. of maquiladora enterprises, 67 p.c. of maquiladora employment and 60 p.c. of maquiladora exports (Bolin 1995a).[32]

Specialization: Shelter Plan Arrangements

Competitive pressure forced private park managers to create competitive advantages for their park as compared to other parks. They did so by offering innovative and sophisticated services to their clients.[33] The so-called Shelter Plan was set up[34] which developed the real estate industrial park towards a full service park. The full service park is ready to perform all tasks and to render all services necessary to overcome the differences between two sets of laws, two sets of

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[32] In 1990, 58 industrial parks were in operation and another 16 were projected. Until the 1980s, the only significant concentration of maquiladoras almost entirely outside industrial parks was the one in Tijuana. At the beginning of the 1990s, maquiladora production sharing took place half inside, half outside of export processing zones (Bolin 1991).

[33] "We are learning that an EPZ, though it offers land, infrastructure and buildings, is not primarily a real state business. Instead it is a service business to attract clients which, incidentally, require land and buildings to operate." (Bolin 1989: 5).

[34] The first Shelter plan came into operation 1969 at PINSA, Nogales (Parque Industrial Nogales S.A.).

languages and two sets of cultures.[35] Under a Shelter Plan arrangement, the park manages all the maquiladora plants' relationships with the local community and with local governments. A unique feature of the Shelter Plan is that it goes even further and offers potential clients to run a test manufacturing before making legal commitments, which would mean to invest and incorporate in Mexico. The park provides all facilities and services to run the test including (Bolin 1977a)

- rent of temporary factory space
- contracting temporary employees
- supervision and maintenance
- customs and crossings
- clearing immigration documents for foreign staff people
- accounting
- controlling permits
- training of foreign plant managers for their new environment (labour relations, administration, customs and crossings)
- representation with Mexican and US governments
- incorporation with the Mexican authorities if the client decides to set up a subsidiary in the park.[36]

The client usually only provides his materials, his machinery and some staff people for technical supervision. This limits his risk exposure to the cost of sending these items and persons to Mexico. Test production is done such that

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[35] On this, the Shelter Plan has been characterized as a 'cultural-shock absorber' (Kent 1971; Bolin 1977a).

[36] Actually, in this type of production sharing " ... the management job is split in two." (Drucker 1990). The foreigner runs the business part, while locals run the social task.

the client focuses entirely on the manufacturing process, while the park management undertakes all interactions with the local environment. This allows the client to test his production know-how in the Mexican business environment. If the test yields positive results in terms of product quality, test facilities can be expanded so as to produce commercial quantities and if this works out, too, the client has to decide whether to come in, set up his own company with the already trained personnel, or to continue subcontracting. Should the test not yield positive results, the client may withdraw (Haywood 1979).

Of course, Shelter services have their cost. However, the fee a park charges from its client is usually smaller than the cost the client would incur when managing the foreign environment himself. This cost saving may be most important for small- and medium-sized enterprises. For them the costs of operating abroad are high and often even prohibitive such that they abstain from international integration or resort to shallow forms of integration. Big multinationals, in contrast, may not depend on Shelter services, though even some of them prefer to set up their operations within this scheme (Drucker 1990). With respect to designing an adequate policy framework for the promotion of international integration, the Shelter Plan has a very clear-cut implication: its highlights the role of private promotion[37] and the importance private risk taking.

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[37] "At the beginning, all one can sell is the history or reputation of the backers. ... You need to get to people who understand why services are needed." (Bolin, quoted from Haywood 1979). "From his experience in Nogales, he understood where his potential clients were. Using a special computer program, he sorted out United States Customs and Department of Commerce information on 806/807 trade, isolated the industries most actively involved, and sent mailings to each company in the industry. He followed these up with telephone calls and area meetings. He felt that such intensive and directed efforts were difficult for government to mount. Few governments accepted the high costs incurred in successful promotion. (Ibid) "Government, in contrast, did not understand the way US firms make decisions. Of course, they will make sure that the economics of the project have are sound. But for a location to gain an edge over competing locations, it is crucial to offer a style of life an expatriate manager could enjoy — houses, golf courses, hotes, communications, ..." (Haywood 1979). For a US company to go abroad, the so-called "soft" characteristics are highly important.

In Shelter Plan arrangements the services of promotion and risk taking are subject to sophisticated service subcontracting. The park management is (sub)contracted by the foreign client to render him a certain set of services. The logic of the Shelter Plan is to reduce foreign manufacturers' risks in entering international production sharing — or to put it differently: it reduces the sunk-cost barrier he faces towards foreign investment, thus it induces potentially interested manufacturers to actually step out of their national boundaries into a new environment. The reason which makes the Shelter Plan work is that it relies on agents' specialization according to their comparative advantages: the manufacturer specializes in manufacturing, while locals do the local businesses. For them, it is much less costly to manage location-specific tasks and risks. In essence, the full service industrial park shelters the foreign client from the local environment in such a way that he can nearly operate as if he were at home.

Maquiladora-type production sharing constitutes network relations among domestic and foreign firms. Network activities have been explained by inter-organizational theories as an effective means to facilitate entry in international markets (Gerling 1997). They can be seen as an attempt of enterprises to internalize otherwise external dependencies of resources so as to reduce uncertainty. In entering international markets, information on the yet unknown business environment (law, language, culture, politics) represents such a strategically important resource. The specific feature of maquiladora-type production sharing, namely Shelter Plan arrangements, can be seen as a device to provide resp. to get access to these resources. Resource access is provided within a network structure — or even constitutes this very network — but, interestingly in this case, still relies on market exchange rather than vertical integration into enter-

prises' hierarchies.[38] Actually, agents reduce dependency, hence uncertainty, by mutually exchanging strategically important resources: foreign investors depend on location-specific information, industrial parks on investment capital. In a way, uncertainty is removed or replaced by mutual dependency. This mutual dependency can be seen as the stabilizing factor in this setting.

Integration: Multiple Forms of Ownership and Control

As there are no restrictions to foreign ownership, maquiladora assembly can be realized in many different forms (Opalín 1990):

- The maquiladora plant can be operated as a legally independent ***subsidiary*** of a foreign parent company. This makes the maquiladora plant vertically integrated with the foreign company and subject to ownership control. This setting requires the maquiladora plant to be incorporated in Mexico and the foreign parent company to make a capital commitment.
- The maquiladora enterprise can be integrated by ***subcontracting***. Then again it is vertically integrated with the foreign enterprise but governed by contractual control. This setting does not require the foreign enterprise to make a capital commitment. Subcontracting may be
  - ***production subcontracting*** such that the foreign enterprise subcontracts a fully or majority Mexican enterprise

[38] Other network-based solutions to cope with resource dependency have been developed in South-East Asia, in the Pearl River Delta, and in northern Italy, in the so-called industrial districts (Schmidt 1997; Gerling 1997). In these cases, however, risk reduction is brought about by informal links rather than by market exchange (Table A4).

- to assemble parts or components delivered by the foreign client (simple subcontracting).
- to buy inputs (raw materials, parts and components) on any market and to carry out subsequent manufacturing. This scheme comes close to outright exporting.
- to manufacture the parts or components which subsequently are to be assembled or manufactured.

Each of these variants can be realized as

- idle capacity subcontracting such that the foreign enterprise contracts for only idle or excess capacities of a Mexican manufacturer who mainly sells to the domestic market or who does assembly for two or more foreign firms.[39]
- so-called captive subcontracting, when the Mexican firm produces for only one foreign company.

- ***service subcontracting*** such that the foreign enterprise respectively its Mexican subsidiary subcontracts with an industrial park to render real estate services and/or to render Shelter services. In this setting, control by relational contracting is governing horizontal integration between a service and a production enterprise.

Mostly, maquiladora plants are operated as subsidiaries. In the late 1970s, the majority of them was controlled by foreign capital which nearly entirely came from the US.[40] Over time, the share of non-US investors has increased. In the

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[39] In fact, most firms are doing assembly for two or more foreign firms (Grunwald 1985a).

[40] Data on this issue are inconsistent, reporting shares of foreign capital to vary between 48 p.c. and 90 p.c. Nevertheless, the share of domestic capital in the maquiladora industry is assessed to be substantial (Grunwald 1985a).

late 1980's, more than half of all maquiladora plants were wholly or majority US-owned, about 40 p.c. were wholly or majority Mexican owned and a minority of about 4 p.c. was owned by Japanese, German or Spanish firms (Peres Nuñez 1990). Most non-US investments were and still are undertaken by overseas firms which already had established a subsidiary in the US. The US subsidiary then sets up an assembly plant in Mexico, predominantly to serve the US market. Ownership of industrial parks in Mexico is mostly private, with either full Mexican capital or as a Mexican-US joint venture.

V Maquiladora Assembly as a Pathway to Liberalization

In its beginnings, the maquiladora assembly industry was promoted by granting certain tariff privileges. With economic liberalization, however, it loses its advantage of being relatively little regulated compared to its environment. It is controversial among economists if the maquiladora assembly industry will benefit or not from liberalization. Possibly, the maquiladora case could be used as an excuse for not eliminating remaining barriers to trade. This, however, does not seem to be the case in Mexico. On the contrary, granting tariff exemptions to maquiladora enterprises has only taken the first brick out of the protectionist wall which surrounded the Mexican economy for decades. More than anything else, it seems that economic success of partially liberalizing trade has paved the way to a broader approach of liberalization and towards a deeper integration into the world economy[41]. With removing regulations, the concept of maquiladora export production can be employed anywhere in the country and it increasingly serves as a port of entry for new investors in Mexico (Bolin 1992).

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[41] "... this 180-degree turn would not have been possible but for Mexico's one economic success: the maquiladoras, or industrial parks, ..." (Drucker 1990).

Limited economic opening has exposed part of the Mexican economy to international competition. This forced enterprises to develop their competitiveness so as to take advantage of low labour cost and proximity to the US market. They successfully learned to exploit this potential and even went beyond: by inventing the Shelter Plan as a special device of labour division between nationals and foreigners, they created further competitive advantages. Economic opening towards full liberalization can be expected to work in the same way for the rest of the economy: It increases competitive pressures and, as a response, enterprises increase their competitiveness.

In the framework of the NAFTA Agreement, which establishes free trade between Mexico, Canada and the US, maquiladora enterprises are no longer privileged by exemption from Mexican tariffs, but win from US regulation being removed. For one thing, import duties to be paid in the US on value added generated in Mexico will be eliminated. This makes it attractive for maquiladoras to use more domestic inputs when exporting to the US as it makes domestic suppliers more competitive. Thus, deregulation in the US favours domestic integration of maquiladora assembly. Additionally, maquiladora enterprises get full access to sell their products in the domestic markets which again favours domestic integration. Actually, the regional pattern of sourcing and selling has already been tangibly affected (Bolin 1995b). Full liberalization may turn out to be the most effective instrument for fully integrating the initially isolated maquiladora industry into the Mexican economy.

VI Conclusions

Opening the economic border offered both chances but also exerted pressure on the Mexican economy: on the one hand, it opened the way to benefit from locational advantages such as abundant labour and a favourable location, on the

other hand it exposed part of the national economy to international competition which uncovered any lack of competitiveness. This exerted competitive pressure on national enterprises in such a way that they could only exploit their comparative advantages if they found ways and means to cure or offset their competitive disadvantages such as small size, lack of finance, lack of managerial or technological know-how.

They successfully did so and the maquiladora industry developed remarkably with respect to both regional distribution and technological diversification. Its dynamics essentially initiated modernization of the Mexican economy by integrating it internationally. Reasons for these achievements are: first, private agents have developed organizational devices which support specialization according to comparative advantages. This may be regarded as a necessary condition for success. Second, they designed ownership and control such as to fully benefit from specialization. This may be regarded as a further necessary condition. Furthermore, authorities have designed a sound regulatory framework. This may be considered as a sufficient condition. Regulation in general is liberal and favours outward-orientation. Nevertheless, it heavily relies on one major restriction, namely restricting outward mobility of Mexican workers. This is essential for maintaining — at least short- and medium term — the factor price differential in wages.

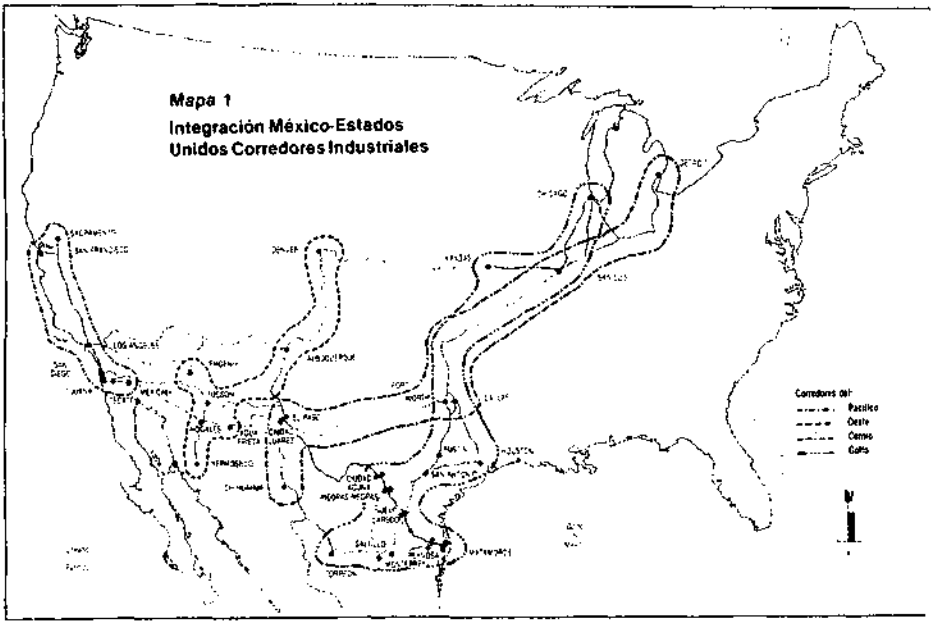
However, there are still tasks to be tackled. First, state authorities have to define property rights to scarce environment resources so as to prevent overly pollution, second, authorities have to care for an adequate supply of social and basic industrial infrastructure and third, adequate deregulation should allow for further integration of maquiladora assembly with the rest of the national economy. With respect to the latter, for national suppliers a free-trade agreement like NAFTA and preferential treatment as by the European Union may work in the

same way as tariff duty exemption once did for the maquiladora industry: to open the way for international integration and to put them in a position to exploit, resp. develop their comparative advantages. This is an intricate task — for enterprises in developing and transition economies alike. However, they are not left on their own: They can get support, most effectively when choosing business partners with coincident interests.

Finally, for small- and medium-sized enterprises — in transition and market economies alike — the main message of maquiladora experiences comes out of the Shelter Plan: the maquiladora case proves that small- and medium-sized enterprises can indeed overcome the risk barrier to international integration and that one means to remove this barrier is marketable services as rendered, e.g., in Shelter Plan arrangements. However, this does not seem to be the only effective way. Alternatively, SMEs' international integration may be facilitated by means of informal contacts among members of the business community, as for instance, in the Pearl River Delta (Schmidt 1997). In each case, specific conditions have to be met. For relying on informal contacts, one has to have close cultural ties or even family relationship, in short: strong trust among business partners. For relying on market exchange, one has to have agents who are both willing and able to render intermediary risk-reducing services. Governments cannot command either.

Appendix

Chart A1



Source: Pradilla Cobos (1994).

Table A1 – US–Mexican Trade Integration by Offshore Assembly 1986

OAP import product category	Total US domestic production	Total US imports	Total OAP imports into the US		OAP imports from Mexico		
						Share of	
	Mill. US$		Mill. US$	Share of total imports (p.c.)	Mill. US$	Total US imports (p.c.)	Total OAP imports (p.c.)
1 Textiles	13,427	975	108	11	87	9	81
2 Apparel	59,833	14,869	1,106	7	282	2	25
3 Wood and paper products	68,958	5,233	344	7	303	6	81
4 Chemical products	62,955	3,700	120	3	66	2	55
5 Footwear and leather products	5,986	7,483	152	2	52	1	34
6 Stone, clay and glass products	14,422	1,193	31	3	18	2	58
7 Iron and steel manufacturing	28,728	3,031	206	7	177	6	86
8 Fabricated metal products	82,742	4,348	276	6	121	3	44
9 Non-electrical machinery	110,482	19,149	1,354	7	185	1	14
10 Office, computing and accounting	46,342	12,650	1,060	8	149	1	14
11 Electrical machinery	53,351	6,379	1,417	22	930	15	66
12 Household appliances	14,811	1,807	228	13	72	4	32
13 Electric lightning and wiring equipment	21,571	1,856	214	12	152	8	71
14 Radio, TV and communication equipment	61,102	11,826	1,516	13	875	7	58
15 Electronic component and accessories	42,578	12,819	1,866	15	1,030	8	55
16 Motor vehicles	188,893	70,710	25,663	36	1,808	3	7
17 Other transportation equipment	49,764	5,801	710	12	14	0	2
18 Scientific, optical and photographic equipment	34,810	7,932	445	6	213	3	48
19 Miscellaneous manufacturing	42,671	10,032	188	2	56	6	30
Total	1,009,365	202,327	37,008	18	6,590	3	18

Source: Méndez et al. (1991).

Table A2 – National Gross Output per Employee by Location of Maquiladora Plants 1974–1983

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
	Current prices (1,000 US$)									
All plants	4.2	4.8	4.7	4.0	4.8	5.7	6.4	7.5	6.7	5.5
Border plants	4.1	4.7	4.7	3.9	4.7	5.4	6.2	7.3	6.5	5.3
Interior plants	5.5	6.1	5.4	5.0	6.3	9.1	8.5	9.1	8.2	6.7
	Constant prices (Mexican pesos, 1975=100)[a]									
All plants	100.1	100.0	105.3	101.6	105.2	104.9	94.3	90.9	115.3	99.0
Border plants	100.4	100.0	106.2	101.3	104.6	100.5	92.7	90.4	114.8	98.8
Interior plants	102.2	100.0	93.8	98.2	105.9	130.7	97.3	86.8	109.8	93.9

[a]Deflated by the Mexican consumer price index. The CPI was chosen because first, the wholesale price index covers Mexico City only, and second, value added in Mexico consists primarily of wages, services, and profits, while Mexican materials constitute only a small proportion.

Source: Grunwald (1985a).

Table A3 – Factors Motivating Locational Choice of Maquiladora Plants in Baja California and Chihuahua

Location	Baja California	Ciudad Juarez and Chihuahua
Authors	Norris, 1986	Edward and Hofman, 1987
Sample	165 enterprises representing 43 p.c. of local maquiladora plants	24 enterprises representing 83 p.c. of enterprises and 87 p.c. of employment of local maquiladora plants
Factors	Most important	
	• Low cost of transport • Low cost of labour • Easy control of production and commercial operations • Availability of labour	• Low cost of labour • Proximity to the US • Availability of labour • Low cost of initial investment
	Less important, though favourable	
	• Energy costs • Legal framework • Business climate • Labour productivity	• Availability of good industrial installations • High productivity • Co-operation of Mexican authorities • No restrictions to financial transfers
	Not important, but favourable	Especially important to high-tech maquiladoras
	• Stability of the (federal) Mexican government • Behaviour of labour unions	• Availability of Mexican technicians, their readiness, ability and effort to become acquainted with complex computerized processes

Source: Romero and Paredez (1993).

Table A4 – Alternative Organizational Solutions to Removing Risk Barriers to International Integration

Region in case	Rio Grande	Pearl River Delta	Northern Italy	Global
Risk reducing intangible resource	Information on resp. acquaintance with the foreign local business environment			
Enterprise size	*Mostly SME*			*MNE*
Organizational devices	Market	Intermediate		Hierarchy
Mechanisms to provide this resource	Price mechanism	Informal links		Rules
	Marketable services	Co-operation		Command
Preconditions	Specific type of agents: intermediaries	Specific quality of relation among agents: trust		Enterprise size
Type of international activity	Outward processing based on subcontracting and FDI	Outward processing based on subcontracting and FDI	Mostly exports	Licensing, subcontracting, FDI

Source: Own elaboration.

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