

Maquiladoras

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Abstract:

The maquiladora export industry (IME) emerged in Mexico in 1965 and concluded in 2006 in compliance with the Free Trade Agreement among Mexico, the United States and Canada. The IME has been the most important form of industrial development in northern Mexico, characterized at the beginning as an assembly industry, and for hiring workers who were less educated, young, and mainly female. Subsequently, this industry has undergone significant changes particularly in the 1980s and 1990s when manufacturing was introduced, and the industry started to hire male employees, incorporated technical and engineering staff, and produced smaller scale innovations. Currently, this industry is recognized as an expression of the global production networks. The IME has also been an important source of conflict and discussion because of its effects on labor and the environment. In 2006, the companies in the IME became part of the Manufacturing Export Industry (IMEX), and since then, it has been considered a national industry.

Main text:

This is a brief summary of the evolution of the Maquiladora industry export program (IME in Spanish) in Mexico, also known as “maquila.” It is a review of the history of the program, the context in which it was implemented by the Mexican Government in the middle of the 1960s, its effect on workers in major border cities (particularly for women), as well as other changes discussed in the IME for over four decades.

These changes are related to techno-productive levels and processes of technological and organizational learning, and to the participation in global production networks (see also Gereffi and Korzeniewicz 1994). We also review the environmental component of this industry and its effects on cities and workers, as well as NAFTA’s impact on industry, since the rules by which the industry operated disappeared in 2006 in compliance with this trilateral agreement.

The IME in Mexico is part of what is known as processes of international subcontracting and industrial relocation, which were implemented in the 1960s in countries such as Korea, Singapore, Taiwan and Thailand among others, so that industrialized countries may recover their competitiveness and improve their position in the international market. In this process of industrial relocation, big business has been characterized by locating in spaces that ensure the growth of their profit rates and competitiveness, particularly by finding abundant, low-skilled, and therefore, cheap labor. However, since the US economy slowdown in 2003, countries like China are competing strongly with the countries in Southeast Asia, Mexico, and Brazil, because of their abundant available labor, high qualification and low wages (see also Sklair 2002; Carrillo 2010).

In Mexico, the process of subcontracting was implemented once the United States unilaterally cancelled the Bracero Program (1942-1964). This was a legal immigration scheme that gave the United States the option to hire Mexican workers for the railway construction that would connect the East Coast with the West Coast of the United States. Once work was completed, the program was suspended, and in consequence thousands of workers (males) started a sudden return to Mexico (mainly to the northern border cities in

Mexico) seeking alternative employment. The implementation of the IME intended to alleviate the unemployment problem, although, since its inception, this industry has employed mainly women (Barajas 2009).

Since the creation of the IME, it has been characterized for developing production processes based on simple assembly activities (such as packing, assembly of connectors, wires, etc.). The workers hired were mainly young, unmarried women with little education, and therefore, low-skilled labor. Several studies have highlighted the relationship between the employment of women and the characteristics of the production processes of this industry: repetitive, monotonous, meticulous work which requires a high degree of docility (Iglesias 1985; Tiano 1994). Initially the IME evolved from the electronics and garment industries as an “assembly” industry with investment mainly from the United States.

In Mexico, the IME regime emerged in 1965 by a Federal Government decree authorizing the establishment of foreign companies operating under the regime of manufacturing for export along border cities in the North of the country, and in order to support this industry, the government defines a Temporary Machinery, Equipment, and Supplies Import Regime to border areas in border cities of Northern Mexico. In order to fulfill this, the United States Government did the same and made changes to its customs legislation where the counterpart of the IME are articles 806 and 807 of the Customs Code of the United States of America, the Generalized System of Preferences or the Multi Fibers Agreement (MFA).

The IME appears under two regulatory contexts: 1) the existence of a Regime of Free Trade Zones (FTZ) and Export Processing Zone (EPZ), which by 1960 constituted the base for economic growth of Mexico’s major border cities in the Northern border, and 2) with the implementation of the National Program of Border Industrialization (PRONAIIF), which originated the Maquiladora Industry Export Regime with the main goal of promoting the installation of maquiladoras along the Northern border, and thus solve the unemployment problem in the region (Davis, 1985).

And in order to support the development of the borderland industry, in 1971 the Federal Government implemented new policy through the Border Industrialization Program (PIF). As complement to the regulation for this industry, in the same year, a decree is issued with the Agreement by Which the Requisites are set for Temporary Operations of Import and Export of Products (expressed in Mexico’s Custom-Fiscal Code). In addition, other agreements are established to support the integration of this industry to the national economy, through the participation of national capital in international subcontracting processes, as an example, The Agreement for the Return of Indirect Tax and the General Import Tax to the Exporters of Products of National Manufacturing (Davis 1985; Barajas and Almaraz 2011).

Another important element of industrial policy that underpins the IME is the 1973 modification which introduced the Law on Foreign Investment in Mexico, which had a very important effect on the border for the attraction of foreign capital, establishing complementarity of foreign investment to national investment.

Up to 1974, the main objective set by the Mexican Government with this industrial policy was to generate employment in major Northern border cities already experiencing high rates of population growth, due to the strong migration from the countryside to the cities during the 1970s and 1980s. In 1973, the changes to the Foreign Investment Law meant a substantial change that allowed expansion of foreign direct investment in the

industrial sector and broaden investment beyond borders (Davis 1985; Barajas 1989; Barajas and Almaraz 2011).

In the early 1970s, the Federal Government recognized the need for the IME to contribute to a greater transfer of technology to the country, and more significant training of the labor force employed in this industry. This was a response to the harsh criticism by diverse sectors against the low value-added the IME produced, its limited spill-over to other industrial sectors, and towards the training of maquila workers. However, despite these criticisms, few policies were implemented to ensure a solution to these concerns. The changes in regulations continued focusing merely on assuring the expansion of this industry. In 1989, there were several modifications to the program that had a strong impact on its growth: the exemption of import taxes for a greater number of products, the exemption of tax payment on domestic sales between maquiladoras, authorization to sell up to 50 percent of its annual production in the country, and maintaining these companies under a scheme of cost center, therefore, their basic disbursement was the tax on social security for their workers (Gonzalez-Arechiga and Barajas 1989).

The effects of these changes on the EMI regulations were immediate: growth of employment rates, exports, and an expansion of the metal-mechanic, auto-parts sectors, and other new industrial branches such as medical products, and software, among others. In particular, in the late 1980s, international and multinational companies started to relocate parts of their productive processes in Mexico especially in the north. Big and medium size Asian companies (Japan, Korea, Singapore and other countries) considered the Northern border as strategic to access the North American market place. However, after the signing of the Free Trade Agreement (NAFTA), it was proposed that the IME had to contribute to greater inter-industry integration and to boost the development and technology transfer in the regions where it is located.

Under these programs, the IME expanded operations across the border cities and started to operate in the center and south of the country. In the Center of the country, this industry was particularly focused on the automotive industry, as it supplied auto parts to companies. The major industrial centers where IME is located in Northern Mexico have been Mexicali and Tijuana in Baja California; Ciudad Juárez in Chihuahua; Nogales in Sonora; and Matamoros and Nuevo Laredo in Tamaulipas. Between 1980 and 1990, the IME experienced its highest employment growth rates.

Until the 1980s, the electronics and garment industries required a labor force with great manual dexterity; therefore, young unqualified women were hired, and a simple and low cost training was given. This enabled the incorporation of women to the labor market, mainly in the north of Mexico. The relationship between women and new technologies has been observed in this industry. A 1989 study (Barajas and Rodriguez) found that new technologies play a supporting role to the manual labor of women, and that the relationship between women and technology is very constricted. Very often women have to operate microelectronic equipment and machinery, and also, they must intervene in the final stages of the process, such as cleaning or polishing components. In the beginning of the 1980s, the participation of women in organizational schemes such as “Circles of Quality” and “Working Teams” became popular in the maquiladora since they could use their creativity and skills to benefit the productive system. However, this contribution has been scarcely recognized.

In the late 1980s, the maquiladora industry experimented high turnover employment, due to a higher job offer that could not be covered by female workers. In this

labor context, the worker was able to change employment with relative easiness provided working conditions were favorable. However, for the industry, this represented a point of instability that could not be allowed. From 1980 to 1990 there was a significant change in the incorporation of men into the maquiladora market. In 1980, 77.3% of workers were women, and in 1991, this proportion had fallen to the 60.3%. In a study conducted by Barajas and Sotomayor (1995) on turnover workers in maquiladora industry, it was found that the average age of women who joined the industry was 22.7. It was also found that more than 60% of the women in this industry were unmarried, and the average number of children per woman was 2.3 children. As to their origin, it was found that most of the women came from other states of the country, and more than 50% reported having previous work experience. In terms of employment stability, it was found that 29.5% of women who were “head of household” reported to have more than two years on their jobs; while 61.8% of the group was made up of “daughters of family” who declared remaining in their jobs less than a year. It showed that turnover employment has a higher cost for those who are “head of household”.

This increase in employment opportunities enabled males to incorporate to the maquiladora labor market, which was incentivized by the relocation of new industrial processes in the region such as the metal-mechanics, auto-parts, medical products and equipment, among others. These sectors welcomed male workers who quickly joined this industry. This population segment had more schooling, work qualifications and fulfilled the changing needs of the industrial sector represented by the IME (Barajas 2010).

In 1985, Mexico begins its trade liberalization process, and based on the IME success, it ventures into a new industrial development model based on exports. In 1985, the federal government creates the Temporary Imports Program to Produce Articles for Export (PITEX) to strengthen and develop companies that undertake export activities and who were not covered by the maquila regime. PITEX was oriented to provide support through a temporary import permit for raw materials, containers or packaging, fuel, and machinery, among other items, to those individuals and companies who exported goods; and, although the program was implemented nationwide, it was used by regional exporters not maquilas. This scheme was adopted mainly by automobile assemblers who arrived in the country, or through expanded operations such as Ford, Volkswagen, Chevrolet, and Nissan, among others. These companies were already located in the central region of the country, and since the early eighties they had been allowed to do it.

From 1985 to 1990, the annually employment growth rate in the IME was very significant: Mexicali 18.12%, Tijuana 26.21%, Ciudad Juarez 11.51%, Nogales 7.12%, Matamoros 17.09% . However from 1990 to 1995 the employment rate in the IME presented certain deceleration in its growth: Mexicali 4.82%, Tijuana 11.37%, Ciudad Juarez 5.09%, Nogales 1.76%, and Matamoros 2.76%. Conversely, in the 1995-2000 period (after NAFTA was signed) , the maquiladora employment experienced an unusual annual growth, Mexicali 28.94%, Tijuana 20.05%, Ciudad Juarez 12.53%, Nogales 16.57% and Matamoros 10.27%. Nevertheless, during the 2000-2005 period, the maquiladora industry suffered a severe drop in the annually employment growth rate indicator: Mexicali -2.68, Tijuana -2.71%, Ciudad Juarez -2.49%, Nogales -4.42% and Matamoros -3.44% (Barajas 2009).

During the 1990s, the IME was recognized by the business sector as a thriving industry with a great capacity to generate employment, and it was also heavily criticized because of its environmental impact. In specific situations where “dirty” industries left their

waste without proper treatment on Mexican soil, or those who did not comply with the toxic waste control standards, led to protests especially from environmental groups who expressed great concern over the situation. On the other hand, in this period, a significant change was taking place in the composition of the industry; simple assembly industries as well as IME industries were exploring manufacturing, bringing to the region some of the components from their research and development areas. Other state-of-the-art organizational schemes were incorporated such as work circles, just in time delivery (JIT), ISO 9000, 9001 and 9002, and others because of their nature incorporated ISO 14,000 related to the environment.

A 2005 study sought to establish the existing environmental performance level of the maquiladora companies and their relationship with the productive evolution of these companies. This study differed from the working hypothesis which suggested that the capacity and need to implement environmental protection is associated with the maquiladoras' manufacturing evolution level. Through the construction of techno-productive complexity levels and an indicator for environmental performance, it was possible to identify the socio-technical characteristics of the visited maquiladora plants, and they were compared to their industrial upgrading levels and environmental performance (Barajas, Rodriguez, and Garcia 2006).

The NAFTA negotiation among Mexico, the United States and Canada brought to the center of the discussion issues such as labor regulations, the environment, and the need to support the development of the Northern Mexico border region to make it as competitive as the Southern region of the United States. With the signing of the NAFTA in 1994, three important institutions were created: the Commission for Environmental Cooperation (CEC), the North American Development Bank (NAD BANK) and the Border Environmental Commission (BEC). The first was designed to give access to trade disputes among the three countries, either by accusations of unfair competition, or impacts on third parties, among others. The second is intended to aid in the solving of problems related to environmental infrastructure and urban development in border cities of Mexico and United States, and the third is intended to solve environmental disputes at a border level.

With NAFTA, the future of the IME is open to negotiation. A change in the rules of origin was proposed which criminalized maquiladora imports from countries which were not in this agreement. Businessmen linked to the EMI demonstrated the existence of a negative impact on their competitiveness; and in 2001, the Ministry of Economy after negotiations presented a solution, but local industry had already been affected negatively by their inability to broaden participation in the global production chains. The alternative was to create a "list of products" that went indirectly to the US market, even when those products come from Asia. Another important NAFTA agreement is a commitment by the Mexican Government to discipline the IME program for its "unfair competition," given the exceptional rules and guidelines under which the maquila operates; in 2006, this industry moves to yet another program called the Mexican Export Industry (IMEX), and is then regarded as national Mexican industry. As of 2007, the Mexican Government suspended the collection of statistical information which separated the manufacturing sector from the rest of Mexican exports. In doing so a valuable indicator of Mexico's participation in the global production network is lost.

By the end of the 1980s, it was already clear that large international and transnational corporations had been looking for new industrial relocations. Some of these locations along the Northern border are the most useful since they are associated with the

existence of industrial infrastructure and transportation, human capital, research and development infrastructure such as universities and public research institutes. In a study conducted by El Colegio de la Frontera Norte based on the results of the Technological Learning and Industrial Upgrading in the Maquila Export Industry survey, particularly in the electronics, auto-parts sectors and among their suppliers, analyzes the level of organizational and technological development of the IME in Mexico and its relationship with the learning processes and industrial upgrading based on the following considerations: 1. That within the IME, a high level of technological and organizational heterogeneity is regarded as a result of the participation in the sector in which it participates above all the predominant techno-productive complexity level; 2. That an important part of the IME uses cutting-edge technology, but this is not necessarily associated with an increased production complexity or plant organization, nor with a higher value added in the product, or greater autonomy of branch plants in respect to the parent plant. 3. And therefore, the technological and organizational learning processes involving the maquiladora plants are also highly heterogeneous (Carrillo and Barajas 2007).

This was confirmed in a study associated with this research (Barajas, Rodriguez, and Almaraz 2007) that reports a relevant change in the IME in relation to its techno-productive and organizational structure as a consequence of an evolutionary process. The sample surveyed was composed of 293 companies from the electronics and auto-parts sectors in Tijuana, Mexicali, and Ciudad Juarez. By using the cluster technique, it was found that almost 52% of these companies performed basic productive activities (assembly of parts, components or finished products and/or sub-assemblies), 45% performed activities of intermediate character (manufacturing of the final product, manufacturing of input and components, tools, machinery, plastic injection, machined components), and slightly more than 3% of the techno-productive activities are considered as advanced (product design, research and development operations, protocol development). In terms of organizational development level, it was found that nearly 42% of enterprises, at the time of the implementation of the survey, had an organizational structure considered as basic, while 42% was characterized for having an intermediate organizational structure, and slightly above 16% had an advanced organizational structure. The above information reveals that the IME has evolved, so that a simple assembly process is no longer a dominant techno-productive model, and manufacturing is a major relevant factor.

Without a doubt, the institutional environment has been relevant for the development of the IME. Some of the efforts that have supported its development are The Border Governors Conference (which has striven to support this industry since 1980), the Commission Sonora-Arizona (created in 1959, but started acting with greater force at the beginning of 1980), twin cities program, the Chambers of Commerce in the border cities of United States, the camera of the Maquiladora industry's export, among other type of binational and cross-border efforts.

After four decades, the uneven development of the IME has seen the incorporation of males into the workforce and a higher number of technicians and engineers, but these transformations are still not very representative of the changes the industry has experienced. Unfortunately the IME has not achieved a re-signification of work in the maquila. Still present, however, is the vision of low human capital employment tied to low salaries. There has not been an industrial policy that strongly encourages the larger scale formation of human capital in the areas of engineering, research, and development, or world-class technicians. This has inhibited the positive impact of the industry on cities and

regions where it has developed. According to an econometric study which considered the 1980-2006 period, it was found that during the commercial deregulation stage in Mexico, employment growth in the IME had been strongly associated with low labor costs. Therefore, industry growth has been linked to static externalities and, to a smaller degree, to dynamic externalities; and regional impact, technological overflow and/or transfer of knowledge toward the state/regional production network is still considered as very limited (Martinez, Barajas, and Ruiz 2012) despite the qualitative changes seen in the study conducted by Barajas, Rodriguez, and Almaraz (2007).

Just before the 1990s, Mexico's Northern border offered ideal location for US medium and large size electronics and automotive companies that were seeking productive spaces to improve competitiveness. These companies took advantage of important location factors such as the abundant low-skilled labor force and geographic proximity Baja California offered to their markets.

The roads and service infrastructure in the US cities along the northern border were very useful due to the high volume of products assembled by the IME (televisions, refrigerators, stoves, cars, etc.). In this sense, cities such as San Diego, California; Nogales, Arizona; El Paso, Brownsville and Laredo, Texas, and others, were also strongly benefitted by the industrial activity in the Mexican border cities, since here is where the logistic, legal, financial, accounting and distribution divisions are located.

As mentioned earlier, the strong link between US companies and the subcontracting processes in Mexico's Northern border is largely explained by the spatial configuration that links such companies on both sides of the border and beyond. The participation of Mexican businessmen has been historically pronounced in the area of "outsourcing", and through the so-called "shelter companies" or "hostel programs", in which the local capital has had a significant share, although their activities are restricted to provide work management processes and take advantage of the extensive demand for jobs. Along with the IME a number of specialized firms emerged, particularly from the U.S. side of the border. These firms were associated with Mexican law firms that offered technical support (operations, administrative and foreign trade) to maquiladora plants located along the border.

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