

**Environmental and socio-economic transformations in developing areas  
as the effect of globalization**

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## **The maquiladora industry impact on the social and economic situation in Mexico in the era of globalization**

**Abstract:** Modern day Mexico belongs to the group of the most industrialized countries of the Latin America, with almost one-fourth of GNP generated by industrial production. The focus point of the present study are maquiladoras (maquilas) – factories which originally specialized in subcontracting, now accounting for almost 50 % of the national exports, providing employment to approx. 10% of the work force available. The origins of such industrial activities date back to the beginnings of the 1960s. The liquidation of the “Bracero” program and industrialization programs initiated by the Mexican government, such as the National Border Program (*Programa Nacional Fronterizo, Pronaf*) and the Border Industrialization Program (*Programa de Industrialización Fronteriza, PIF*), formed legal and economic foundations for the development of ‘maquilas’, which, in the successive decades, showed above-average developmental dynamics (12 plants in 1965 and 2810 plants in 2006). On the one hand, the fact of initial localizing the assembly-plants in the northern states, bordering the USA (Baja California, Sonora, Chihuahua, Coahuila) significantly reduced the costs of transport, yet on the other hand, the imminent industrialization of the border belt increased environmental pollution. This, along with systematic population growth in the northern urban centers (mainly Tijuana, Mexicali, Heroica Nogales and Ciudad Juárez) resulted in the maquiladoras posing an authentic threat to the area’s sustainable development. As a result of the reforms streamlined in the 1980s, and subsequently, the formation of NAFTA in 1994, apart from the assembly-related activities, the plants were given the opportunity to produce and sell goods on the domestic market. The quantitative and qualitative evolution made maquiladoras the second important symbol of the Mexican economy, after crude oil. The purpose of this study is to present the outline of the maquiladoras history, starting from the 1960s, up to the first decade of the 21st century. Unquestionably, their presence and influx of direct foreign investments related thereto, revived the Mexican economy and provided job opportunities (although, even today, the same arouse quite a lot of controversy). The present study contains an attempted assessment of their economic significance and the industry-specific employment policy under the conditions of progressing globalization.

**Key words:** Mexico, Pronaf, PIF, maquiladoras

### **1. Introduction**

Factories specializing in contract work were built in northern Mexico in the 1960s as part of an industrialization program in order to manufacture primarily textiles and electronics. The rise of the so-called maquiladoras (maquilas/IME\*/

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\* Industria Maquiladora de Exportación.

IMMEX<sup>\*</sup>) was a response to the suspension of the Bracero Program, which had provided hundreds of thousands of Mexican workers with an opportunity to work in the United States. The purpose of the maquiladoras was to absorb many of the Mexican workers returning from the United States. This new work opportunity became a major job creator in Mexico in the decades to come and helped limit illegal immigration to the United States. The liberalization of world trade and the emergence of the NAFTA economic pact between the United States, Canada, and Mexico in the 1990s helped stabilize maquiladoras in terms of economy and politics. The mission of the maquiladoras was unique and consisted of lowering labor costs by importing and processing raw materials to be exported as finished products back to the country of origin – normally to the United States. This approach was designed to solve two problems – high manufacturing costs in the United States and high unemployment in Mexico. The very existence of maquiladoras is associated with the “pull theory” (Grosse, 2002) and the idea of Special Economic Zones (SEZ) that offer advantageous business conditions. Special economic zones attract investors, increase employment, and stimulate exports, all of which stimulates economic growth in a given area. A SEZ is defined to be a distinct geographic region, managed by a designated authority offering a package of financial and infrastructural investment incentives (Schweinberger, 2003). Various countries define various types of special economic zones. For example, Ghana, Cameroon, and Jordan offer industrial free zones. Russia offers free economic zones. China (Krupa, 2011), Thailand, and Costa Rica offer free zones. The first special economic zone in Poland was created in 1995. Currently (2012), Poland features fourteen such zones. The first modern SEZ was created in 1942 in Puerto Rico, followed by Ireland (1962), Taiwan (1965), Dominican Republic (1969), Malaysia (1971), Philippines (1971), France (1980), and Great Britain (1984) (Rydz, 2004). Nowadays, 135 countries, including many emerging economies, feature more than 3,000 special economic zones. It is estimated that special economic zones have created more than seventy million jobs, hundreds of billions of dollars in profits, and improved global economic relations. The maquiladora is a single-factory special economic zone. This particular SEZ model is not necessarily driven by geography, which means that maquiladoras can emerge anywhere in Mexico, although in reality most of them are concentrated in northern Mexico (Murray, 2010).

This paper reviews the history and economics of maquiladoras in Mexico since the 1960s. The purpose of the paper is to provide a synthesis of a number of issues contributing to the creation of the maquiladora program in Mexico, also known as IMMEX. The principal research question is: Can the maquilización culture (Hernández, 2000: 81) be treated as an effective solution to the problem of unemployment and bad economy in Mexico? Is it a threat associated with globalization, which reinforces social divisions and exploits the poor? Are maquiladoras contributing to the exploitation of the poor, despite being a major source of economic benefits? In light

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\* Programa para la Industria Manufacturera, Maquiladora y de Servicios de Exportación.

of the globalization-type changes associated with the maquiladora program, has it contributed to Mexico's competitiveness in the global markets? The paper reviews the research literature on the issue of maquiladoras in Mexico, as well as reports provided by Mexico's Instituto Nacional de Estadística y Geografía (INEGI) on the industrial organization of maquiladoras, employment conditions and salaries. The available data are interpreted in terms of both current and historical political and economic issues.

## 2. Roots of the maquiladoras

The origin of the maquiladoras can be traced back to the early 1960s and the end of the Bracero Program in the United States. This caused a mass exodus of Mexican farm workers back to Mexico (Domínguez, Fernández de Castro 2009: 138). The Bracero Program was initiated in 1942 via a series of acts of law and diplomatic agreements between Mexico and the United States. The program made it possible for Mexican workers to find temporary work on farms in the American Southwest. The newly arrived Mexican workers found jobs on farms, usually those producing sugar beets. Some found jobs in industry. The program was created for a number of reasons, but the main factor behind it was a shortage of American farm workers, especially following World War II, when the American economy entered a period of rapid development and more Americans began to migrate from rural to urban and suburban areas (Stacy, 2003: 104).

Furthermore, the spreading of consumerism in the United States resulted in almost two thirds of the world's goods being consumed by the 6% of the world's population who live in the United States (Brown Tindall, Shi 2002: 1177-1178). Another key issue was the difficult economic situation of Mexican farmers. A large percentage of the two million victims of the Mexican Revolution (1910-1917) were peasants (Gonzalez, 2009: 119). Nevertheless, following the revolution, the new Mexican government failed to provide a better standard of living for Mexican peasants. Powerful landowners continued to own their land. The motto of the revolution, "land and liberty" („tierra y libertad"), did not seem to have a real effect on the Mexican countryside. By the end of the 1930s, the profitability of farming decreased to the point where Mexican farmers began to look for other means of support. Almost at the same time, the demand for farm workers in the United States increased. This created hope for the Mexican farmers. A new government agency known as the Extension Service was created as part of the Bracero Program. Its purpose was to house, insure, and train Mexican workers who were later known as Braceros (Gamboa, 1990: 55).

The first stage of the Bracero Program ended in 1947 with the expiration of the bill that had validated it. A new U.S. law known as Public Law 40 was enacted. It obligated employers to incur worker transportation costs (Navarro, 2005: 238). In addition, American farmers started a campaign to keep the Bracero Program in effect. In 1951 Harry Truman signed Law 78 into law, which made the Bracero

Program valid indefinitely. The law did not last very long. It was criticized and suspended in 1964 (Ochoa, Smith, 2009: 170).

Some have argued that the Bracero Program was a form of legalized slavery (Schmidt Camacho, 2008: 110). The program was preserved in a symbolic sense via a number of U.S.-Mexico agreements. In 2000 President George W. Bush suggested that the Bracero Program be revived but to no avail. It is estimated that five million Mexicans took part in the program during the 22 years of its existence (United States of America Congressional Record. Proceedings and Debates of the 107th Congress Second Session: V. 148, Pt. 13, September 20, 2002 to October 1 2002, 2002, pg. 18718). Depending on the state, the workers' wages ranged from 65 to 85 cents per hour. Once the program was suspended, many American farmers continued to hire Mexican workers illegally, even after the 1954 Operation Wetback, when the U.S. Immigration and Naturalization Service deported more than a million illegal Mexican workers (Ong Hing, 2004: 130).

The problem was also not solved by the Immigration Reform and Control Act in the late 1980s, which was designed to punish employers who hire illegal workers. Despite many other initiatives since the 1980s, including increased border patrols, the problem of illegal immigration has not been solved. Illegal Mexican workers have remained attractive to many American employers, as they are willing to work for lower wages and do not require health insurance or other benefits. In addition, the Bracero Program itself has been criticized in Mexico. The mass migration of Mexican workers from northern and central Mexico left these parts of the country with a potential workforce shortage. The program was also criticized by Mexico's Catholic Church, which argued that the program would lead to the dissolution of families. Yet, most estimates indicate that the majority of Mexican migrant workers did substantially benefit from the program. In addition, Mexican workers learned how to use farm machinery and acquired know-how characteristic of advanced agriculture and industry. Hence, the Bracero Program not only provided economic benefits to the Mexican economy, but also changed the country's work ethic and manufacturing culture, all of which expanded the horizons of Mexicans.

Another factor that helped bring about the maquiladora program was an initiative by Mexican President Adolfo López Mateosa (1958–1964) called the National Border Program (Programa Nacional Fronterizo, Pronaf, 1961). The official purpose of this new program was to revitalize the economy, infrastructure and culture of Mexican cities located along the American border (Sklair, 2011: 28). One common feature of both the border cities and the Federal District was the increase in poverty and in crime. The number of jobs was still insufficient, despite ongoing industrialization and service sector growth. High unemployment in rural areas forced rural residents to migrate illegally to Mexican cities or American cities. Some individuals sought temporary employment in cities. Social discontent increased and workers began to strike in the late 1950s. The Mexican government believed that Pronaf would be a tool that could substantially revitalize the Mexican economy

along the American border in the spirit of economic integration. Government intervention, a commonly accepted feature of the Mexican economy, was now to be used to create state-owned and semi-state-owned enterprises. Other elements of this strategy included financial protectionism and tariffs (Kubiatiowicz, 1967: 398).

The primary purpose of the program was to increase the Mexican standard of living along the American border via stabilization and intensive economic development. Existing industries were expanded and new industries were created, all of which generated new jobs. The next goal was to increase tourist traffic beyond family visits. The idea was to improve the image of the local population, which served as the population gateway to Mexico („puertas de entrada a nuestro país”). American tourists were to be drawn in by Mexican crafts, folklore, and a common Mexican-American heritage (Morackis, Serrano, 2007: 8–9). In effect, the Panaf program was designed to help the local economy and change the local culture. This potential transformation created a number of economic opportunities, but also demanded the creation of mechanisms that could help realize stated goals, and then would help evaluate the outcomes. The total effect of the program was to be sustainable regional development in terms of the consumption of goods and services produced in Mexico. The focus was also on the quality and competitiveness of the prices of goods and services.

The next step in the implementation of Pronaf was the creation of an advisory board (cómision asesora) featuring members from different sectors of the economy, including banking, industry, trade, and construction (Bermúdez, 1966: 51). The advisory board worked with the Ministry of National Heritage (Secretaría del Patrimonio Nacional) in order to create sustainable local spatial management plans for border area cities. In addition, a special “mixed commission” (Comisión Mixta de Desarrollo Urbano Fronterizo) worked on new regulatory plans (planes reguladores) (Barragán, 1994: 117). One of the principal beneficiaries of the program is Ciudad Juárez (Chihuahua state), a large border city located across the river from the American city of El Paso. New infrastructure included Abraham Lincoln Boulevard, Museum of Art and History, Camino Hotel, and a conference center. In 1963 the city also acquired El Chamizal – an area contested by the United States and Mexico.

Another key consideration was the building of a road link between Ciudad Juárez and El Paso, which would improve cross-border traffic (Gallegos, López López, 2004: 151–152). Other cities in northern Mexico that benefited from Pronaf included Ciudad Acuña, Heroica Nogales, Matamoros, Mexicali, Nuevo Laredo, Piedras Negras, Reynosa, and Tijuana. The border town of Heroica Nogales (Sonora state) received almost 20% of the total Pronaf budget during the first two years of its existence. The first maquiladora (COMCO) had an initial capitalization of 500,000 American dollars and initially hired 18 workers. Despite being technologically backward, in 1967 Mexico built an industrial park on 60 hectares of land. This investment would be followed by numerous others in the years to come. Other new industrial areas included Terrazas del Cid (9.5 ha), San Ramon (13 ha), and the very

large Ciudad Industrial de Nogales (23 ha), (Nogales Sonora Mexico – Historia – Industrialización de Nogales).

A key task ahead was to form partnerships with American cities across the border. In the 1960s, Mexico began to treat its northern cities as strategic points of contact for trade, especially for exports of its national products. The first positive outcomes of this new approach were observed in the mid-1970s. A revitalized local economy was generating income taxes for the Mexican government. However, certain political problems, including corruption, also arose. Many Mexicans, including José Luis Elías García, became somewhat disenchanted with the economic program and labeled it the “illusion of the sixties” (García, 2009). Furthermore, the new maquiladoras were susceptible to economic downturns in the United States. Inflation, higher interest rates, peso devaluation, and frequent economic crises tended to substantially affect maquiladoras and their employees. Nevertheless, the chief of the maquiladora program, Antonio J. Bermúdez, stated in 1966 that the American model of economic development is a modern model and ought to be imitated by Mexico (Rodríguez, Rivero, 2011: 197). The experienced businessman and politician was one of the principal advocates for maquiladoras in Ciudad Juárez, which has made the city a modern success story (Adler, 2000: 257).

Third, and perhaps the most important factor behind the success of Mexico’s maquiladoras has been the 1960s-era Border Industrialization Program (BIP) (*Programa de Industrialización Fronteriza, PIF*). The program included a number of goals designed to stimulate local economic development. This included job creation, worker training, building effective management skills, transfer of new technologies, as well as industrial development (Anderson, 1990: 142). The PIF program was outlined in a 1965 government document known as the *Programa de aprovechamiento de la mano de obra sobrante a lo largo de la Frontera con Estados Unidos*, which sought to alleviate some of the economic problems of the early 1960s, especially rising unemployment (García Moreno, 1982: 114). The creation of tax breaks for foreign investors led to the establishment of a number of maquiladoras. The next step was to allow American businesses to build plants along the border in Mexico and hire Mexican workers.

The 3,152 kilometer-long border between U.S. and Mexico is not only a political line that divides two economically dissimilar countries, but also a cultural dividing line separating two distinct Americas: Anglo-Saxon America and Latin America (Kubiatowicz, Ratajski, 1967: 151). Six Mexican states border the United States: Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas (García Amaral, 2007: 42). These six states account for 20% of Mexico’s total population and about 40% of the country’s area. The border states were the key population concentration area in 1960. In effect, the Border Industrialization Program became a replacement for the Bracero Program. By converting parts of Mexican border states into special economic zones, the stage was set for the development of maquiladoras, which were to help determine the economic future of the region. Another advantage



was the creation of the Twin Plant Program, which allowed American parts to be used at Mexican plants free of tariffs (Diamond, Diamond, Luetke, 2004: 297).

Mexico's National Committee for Economic Development (Comité de Desarrollo Económico Nacional) identified the northern city of Ciudad Juárez as the most promising industrial center in the early 1950s (Gutiérrez Casas, 2009: 145). The first of five maquiladoras of the A.C. Nielsen Company de México, S.A. began operating in 1966. A total of 32 maquiladoras began operating in Juarez between 1966 and 1970. The new plants handled furniture assembly, shoe making, metal products, and food processing (Gutiérrez Casas, 2009: 149). However, not all Mexican border states introduced maquiladoras in the initial stages of the Border Industrialization Program. One example of this is the northern state of Nuevo León and its capital, Monterrey, where the subcontracting industry did not arrive until 1986 (Fouquet Guérineau, 2007: 137). In 1992, eleven more plants began operating in the state (Fouquet, Mercier, 1994: 4).

According to a renowned historical researcher Tadeusz Łepkowski (1986: 452–453), the Mexican economy of the 1960s and 1970s was deeply entrenched in a structural crisis. An economic recession began in the late 1950s and lasted for several years, severely affecting Mexican agriculture. The next recession began a decade later and served as the starting point for a number of cyclical economic crises in the decades to come. Characteristic features of each crisis were as follows: increasing unemployment, marginalization of the lowest social classes, inflation, higher prices of consumer goods, and a negative balance of payments. This created a systematically growing national debt: 2.3 billion USD in 1965, 9.8 billion USD in 1974, and almost 30 billion USD by 1979. In addition, Mexico's trade dependence on the United States increased, which created the risk of economic exploitation by American companies. It is noteworthy that 6% of foreign investment in Mexico in the 1980s was focused on key sectors of the processing industry, and most of the investment was American.

### **3. Maquiladoras – “children of industrialization”**

Maquiladoras may be informally defined as employment centers (*centros de trabajo*) specializing in the assembling, processing or repairing parts to be exported. This includes electronics, furniture, automotive parts, textiles and other manmade fabrics. Maquiladoras take advantage of lower taxes and can ship finished products abroad without paying tariffs. Semi-finished goods are processed and returned to the original owner as finished goods. The initial idea behind maquiladoras was the return of goods to the country of origin. The word *maquila* comes from Arabic. In medieval Spain, the term was used to describe the system for milling wheat, with the miller accepting part of the flour as payment for his services. Sugar mills in the colonial era West Indies functioned in the same manner. The term later acquired a more industrial meaning (Peña Nossa, 2006: 409–410). However, it always had a production-based connotation. The noun *maquiladora* appeared in the 20<sup>th</sup>

century. Its current meaning implies an export-oriented processing facility (*zona de procesamiento para la exportación, ZPE*) (Ravelo Blancas, Sánchez Díaz, 2005: 118).

Maquiladora researcher Kathryn Kopinak defines the first stage of development as the period 1965–1974, when the first maquiladoras emerged and became an integral part of the Mexican economy (Kopinak, 1997: 10). Yet, the new plants did not hire large numbers of Braceros returning from the United States, and instead chose to hire local women, most of whom were not part of the Bracero Program. In 1971, new tariff laws were enacted, which helped lay the legal groundwork for maquiladoras in the cross-border marketplace. At the same time, the General Office of Statistics (*Dirección General de Estadística, DGE*) was charged with the collection, processing, and publication of all types of data on maquiladoras. The data would show that 455 maquiladoras were operating in Mexico in 1974. Total employment stood at almost 76,000. A recession in the United States in the mid-1970s reduced the pace of maquiladora development. Foreign investors began to pull back capital. A total of 32,000 workers were laid off in only ten months (Kopinak, 1997: 10). Some plants began to bend the law in order to remain profitable.

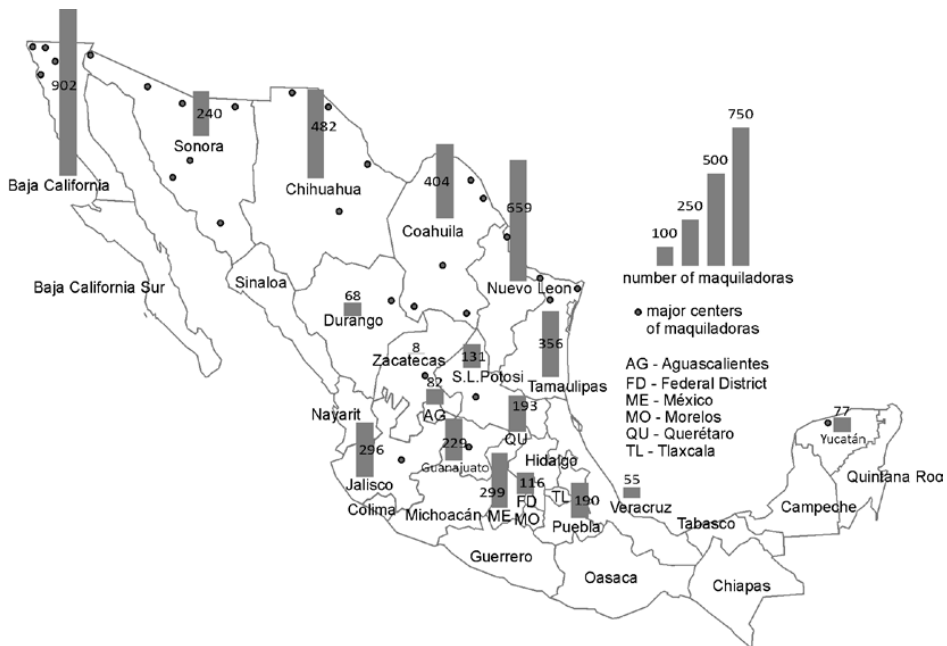


Fig. 1. Number and location of maquiladoras by Mexican state in 2012

Source: Own work based on data obtained from the Estadística de la Industria Maquiladora de Exportación. Instituto Nacional de Estadística y Geografía e Informática (INEGI)

While initially plants were established near the border, this practice changed in the late 1970s, and new plants emerged deeper inside Mexico. The Federal



District (Mexico City) became a popular place to build plants during the third stage of maquiladora development in the period 1977–1982. The dependence of maquiladoras on American capital became even more apparent. The establishment of plants in other parts of Mexico was a problem due to poor local infrastructure, logistics and communications. By 1983 the cost of building new plants in certain parts of Mexico became too high (Kopinak, 1997: 11–12). The Mexican government issued a decree on the status of maquiladoras, which illustrated the financial and non-financial benefits associated with this type of subcontracting. It became clear that the plants generate not just jobs, but create technological integration and revitalize the nation's industrial sector.

**Table 1.** FDI in maquiladoras by country of origin (billions USD), as well as the number of employees and maquiladoras by company

Country	Value of investment		Companies	2006	
	1994–2006	Share		Employment	Plants
USA	23,164	88.4	Delphi (GM)	66,000	51
Japan	533	2.0	Lear Corporation	34,000	8
South Korea	366	1.4	General Electric	20,700	30
Holland	358	1.4	Jabil Circuit	10,000	3
Singapore	308	1.2	Visteon	10,000	16
Switzerland	245	0.9	Whirlpool	7,500	5
Canada	181	0.7	Emerson Electric	5,678	7
UK	172	0.7	Motorola	5,290	2
Finland	160	0.6	Honeywell	4,900	3
Spain	140	0.5	Plantronics	3,600	5
France	134	0.5	Bose	2,900	2
Germany	91	0.3	Mattell	2,578	1
Taiwan	75	0.3			
Cayman Islands	58	0.2			
Italy	33	0.1			
China	32	0.1			

Source: Federal Reserve Bank of Atlanta

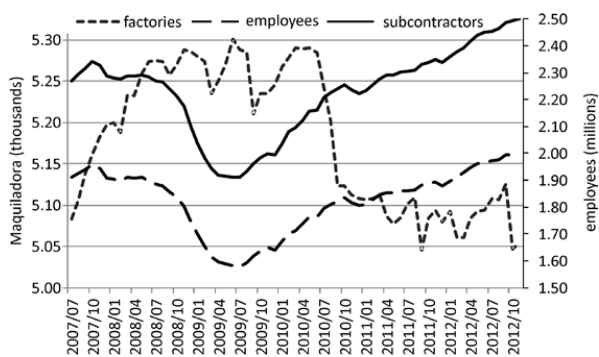
Maquiladoras became even more important in the mid-1990s when Mexico signed the North American Free Trade Agreement (NAFTA). The agreement went into effect on January 1, 1994. It eliminated tariffs on trade between Canada, Mexico, and the United States. Tariffs remained in place for other nations however. A 15-year transition period was created for the elimination of tariffs on industrial goods as well as the cancellation of import quotas. The market for agricultural products was also liberalized (Sloman, 2008: 355). The inclusion of Mexico in the free trade zone made it possible to apply rules of honest competition and helped in the protection of

intellectual property. It has been estimated that the value of goods traded between NAFTA countries has more than doubled since 1994. However, it is also true that in the early 1990s most commercial transactions between Canada, Mexico, and the United States were already free of tariffs. It is assumed that, according to the neoclassical win-win-win strategy, every member state benefits from NAFTA (Spich, 1994: 301). Therefore, the most important goal of NAFTA remains the creation of jobs in the member states. This creates the need to support business growth and the drive to improve competitiveness.

The northern border states became magnets for unskilled workers from across Mexico, especially its southern parts, as well as other countries in Central and South America. By the late 1990s, only oil was generating more profit than maquiladoras. In the years immediately prior to the global economic crisis of 2008, Mexico was absorbing about 30 billion USD per year in foreign direct investment (FDI). Almost half of this amount came from the United States. When American GDP fell by 2.6% in 2009, the economic crisis in the United States substantially affected not only maquilas, but the entire Mexican economy as well. The economy of Mexico contracted more than 6% during this period. However, the American economy rebound soon thereafter and exerted a positive influence on the Mexican economy (Brzozowski 2013). One aspect of the maquiladora program that went beyond the program itself was the ability to legally absorb additional investment. The globalization of the world economy also made it possible for both European and Asian companies to invest in Mexico (Tab. 1). NAFTA offered Mexico the opportunity to restructure its economy and regulate its migration flows, as well as to protect its natural environment in a more effective way.

**Table 2.** Number of maquiladoras and employment values in 1965–2006

Year	Maquiladoras	Employment
1965	12	3,000
1970	120	20,327
1980	620	119,546
1990	1,920	460,258
2000	3,590	1,291,232
2001	3,630	1,198,942
2002	3,003	1,071,209
2003	2,860	1,062,105
2004	2,810	1,115,230
2005	2,816	1,166,250
2006	2,810	1,202,134
<b>2012</b>	<b>5,055</b>	<b>2,000,247</b>



**Fig. 2.** Number of maquiladoras and employment values in 2007–2012

Source: INEGI. Estadística Integral del Programa de la Industria Manufacturera, Maquiladora y de Servicios de Exportación

Other observable benefits of NAFTA include lower manufacturing costs, greater labor efficiency, and easier access to modern technologies. All of this translates into higher GDP, which in 2000 increased in Mexico by 5.5% (*El Banco Mundial, Crecimiento del PIB*). The automotive industry was one of the largest beneficiaries of NAFTA (Fig. 3). Production volumes doubled between 1994 and 2008 (Wójtowicz, 2011: 130) from 1.09 million. vehicles to 2.18 million. vehicles. This would not be possible without the opening of markets and increasing globalization of manufacturing in advanced economies (Dorocki, 2010: 134).

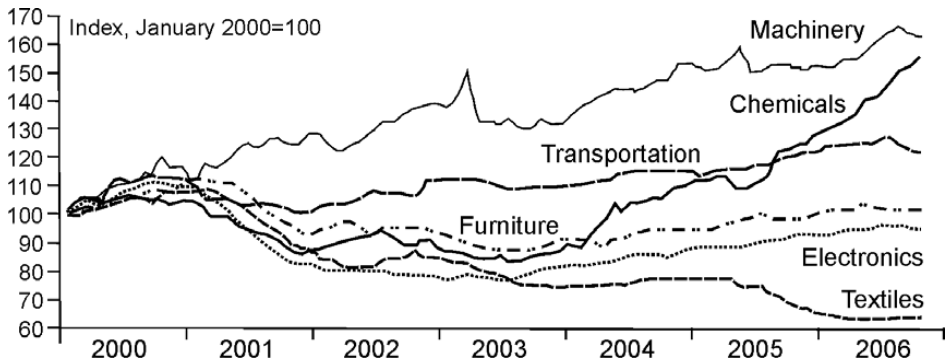


Fig. 3. Maquiladora employment by sector (2000–2006)

Source: Instituto Nacional de Estadística y Geografía (INEGI)

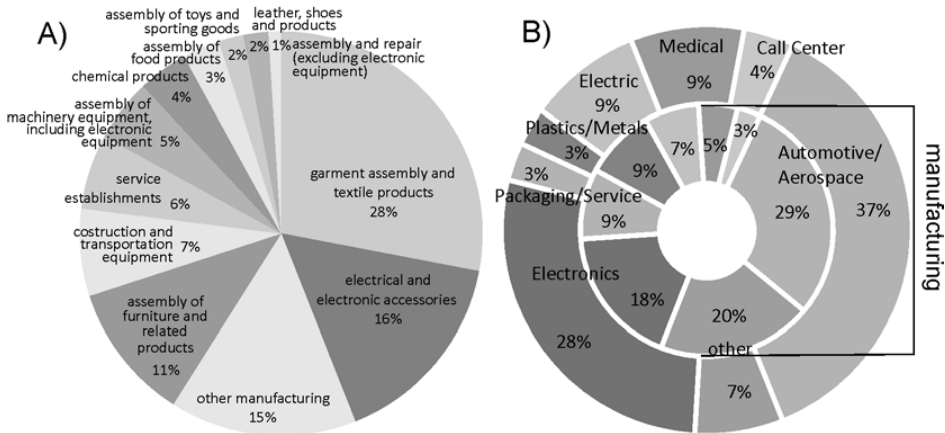


Fig. 4. Maquiladora labor force by branch of industry in 1998 (A), and maquiladora industrial sectors – workforce and manufacturing in 2012 (B)

Source: Instituto Nacional de Estadística y Geografía (INEGI)

Clearly the close proximity of the United States – the largest consumer market in the world – is an important determinant of maquiladora development. The Mexican

model of subcontracting has been adopted by other poorly industrialized nations. It is also noteworthy that maquiladoras have become more specialized over the last 40 years, and today involve the automotive, electronics, and computer sectors of the economy (Fig. 4) (Middlebrook, Zepeda, 2006: 118–122). It appears that the next step would be to adopt high-tech and innovation. Yet, this would involve the need for more qualified workers. The number of maquilas increased systematically until the year 2000, when China began to build its own factories designed to do the subcontracting work. Labor costs in China were even lower than those in Mexico. Another reason for the slightly reduced pace of maquiladora expansion was a crisis in October of 2000, which ended in mid-2002.

#### 4. Nature of the work organization system

According to Jorge Carrillo, one of the key problems associated with maquiladoras has been their dependence on foreign investment, something that Mexican economists also often mention. Wages are yet another issue. In the mid-1960s, the minimum daily pay of a factory worker in Baja California was 3.52 USD. At the same time, a “counterpart” worker across the American border would earn 15 USD per day (Carrillo, 1986: 283). In 1992 the average daily pay in Mexico was 6.80 USD (Gambrill, 4). Obviously, wages and working conditions do not directly affect maquiladora productivity. Actually, the opposite is true. Cheap labor force consisting mainly of women and youth, as well as the absence of labor unions lower production costs.

The maquilización culture trampled upon one of the fundamental resolutions of the Mexican Revolution – the elimination of piece work. Jobs based on piece work exist in modern Mexico with the tacit approval of the Mexican government. It is estimated that the number of workers doing piece work increased by 63% between 1991 and 2000 (Comas Medina, 2002). Supporters of piece work argue that it is more fair, as it pays for actual work. On the other hand, a worker attempting to maximize the number of pieces might do so by performing lower quality work. This system may work well in situations in which quantity is more important than quality.

The vast majority of workers at maquiladoras are women. The same has been true in the past. The number of male workers has been rising slightly since 1983. However, 70% of workers, especially those at maquilas in the automotive sector, are still women. Most of the women come from poorer southern states, where women are usually not financially independent. While the minimum age for employment should be 16, minors are often also hired. A common form of discrimination affects women of child-bearing age, whose legal rights theoretically should be guaranteed by law. Sometimes, prior to employment, pregnancy tests are required. In addition, female workers may be required to use contraception during the course of employment (Richards, 2004: 334). Other questionable practices include routine urine tests to detect pregnancy, which can be used as a reason for terminating employment. In

effect, most maquiladoras look for healthy women aged 16–25 who do not plan to have children.

The ideal maquiladora employee is normally a young woman from the lowest social classes with little education and some American Indian heritage. Many non-governmental organizations such as Service, Development and Peace Organization (Servicio, Desarrollo y Paz, SEDEPAC), Casa de la Mujer – Grupo Factor X or Frente Auténtico del Trabajo (FAT) believe that NAFTA has only slightly reduced the level of discrimination against women in the maquiladora sector. In addition, many workers experience hazardous working conditions that increase their risk of cancer and heart disease, as well as physical injury (Ching Yoon Louie, 2001: 69–71). A characteristic feature of maquiladoras is the stressful work environment that involves repetitive actions at a rapid pace. Other disadvantages include the risk of contact with toxic substances, high levels of noise, as well as vibration that generates dangerous infrasounds. More mundane problems at work include a shortage of specialized equipment and protective clothing.

Transportation to work is rarely convenient. Only some maquiladoras provide their workers with transportation. Increasing overtime can also be a burden. A significant percentage of women seek employment in factories due to a difficult family financial situation, especially when a husband or life partner cannot find work. Growing unemployment leads to growing crime rates, with most victims being women. The killing of women in Ciudad Juárez since 1993 is a prime example of this. The city is one of the top maquiladora centers in Mexico. This is also related to the traditional Mexican dichotomy of machismo – marianismo, where women are expected to be subservient to their husbands, fathers, and even sons. The job of the woman is to manage a household. The lives of rural women (*campesinas*) can be even more difficult. Rural women are also expected to work on the ranch (*ranchitos*), which is often linked with the abandonment of formal education (Ching Yoon Louie, 2001: 66).

The hiring of women by maquiladoras is also largely the result of the compensation model used at many companies, where men earn more than women. Hence, it may be assumed that lower pay at maquiladoras is largely a systemic problem. It is often also said that female employees are more patient and are better with their hands, both qualities being very useful at subcontracting companies (Young, 1987: 110). Maquiladora jobs offered to men are usually technical or managerial in nature. According to Rachel Kamel, a researcher observing workers in the city of Matamoros, female workers at maquiladoras seem to be invisible. Matamoros is located just across the river from Brownsville, Texas. According to Kamel, for many women factory work is the only alternative to prostitution. Then again, many women are sexually harassed in the workplace (Kamel, 1988: 16–17).

Undoubtedly, labor unions at maquiladoras could force management to create better working conditions for women. However, labor unions are either not present or too weak to force management to respect basic employee rights – both

in economic and social contexts. What labor unions can do is offer educational and self-help opportunities, both of which are important for workers at maquilas. Other key problems at maquiladoras include violence against workers who strike and the subsequent dismissals. Additionally, striking workers were often denied the opportunity to find employment at other maquiladoras. One positive note is the increasing use of technology at many maquiladoras since the year 2000, which makes it necessary to hire better educated workers who are also more aware of their rights.

## 5. Conclusions – are maquiladoras a global opportunity or a threat?

Mexican maquiladoras have evolved noticeably over the last fifty years in terms of quality and quantity. The number of maquilas has increased substantially – 160% since 1990, especially in Baja California. Employment has increased 440% since 1990. In terms of quality, the production methods have changed. Three types of maquiladoras are in existence today: (1) oldest plants performing labor-intensive assembly with little mechanization, (2) newer plants doing some manufacturing that requires the use of some advanced technologies, (3) newest plants that require an array of machines and automated industrial processes.

Qualitative changes in manufacturing processes began to occur in 1982. Maquiladoras became more labor-intensive and more productive in terms of assembly. The next goal was to minimize costs by introducing the so-called elastic manufacturing at about 20% of plants. This new process was introduced mainly in Tijuana, Ciudad Juárez, and Monterrey. According to research published by Eduardo Reynoso in 1992, some maquiladoras in the electronics sector began to do more specialized manufacturing by the early 1990s (Galhardi, 1997: 5). One crucial characteristic of maquiladoras since the 1960s has been the predominance of female employees. Only plants manufacturing transportation equipment have been hiring more men – as much as 50% today.

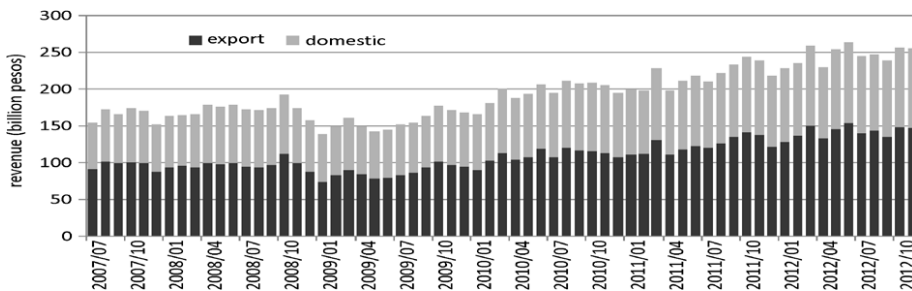


Fig. 5. Maquiladora revenue from the domestic market and from abroad in 2007–2012

Source: INEGI. Estadística Integral del Programa de la Industria Manufacturera, Maquiladora y de Servicios de Exportación

The next characteristic issue at maquiladoras is high employee turnover – between 60% and 150% per year (Fernandez, Carson, 2002: 150). Other problematic issues include long workdays, few opportunities to be promoted, dangerous working conditions, and low pay. The belief that maquiladora employees are unskilled is losing viability. As new technologies are introduced and more Mexican women get better education, more maquiladora employees may be described as skilled or semi-skilled. However, most maquiladoras still require only basic skills from their current employees. New employees are recruited based on gender, age, health, and manual skills.

In 1989, the Mexican government changed the law that stated that all goods made at maquiladoras must be exported. The NAFTA pact of 1994 further changed the way the plants operate by legalizing the sale of maquiladora products in Mexico itself.

In summary, maquiladoras have been a key driver of the Mexican economy since the 1960s. The key downside of maquilas is the apparent exploitation of cheap labor, which generates negative economic and social effects. This reinforces the risky global trend, in which the rich become even richer and the poor become even poorer (Stiglitz, 2005: 23). Instead of raising wages, maquiladoras systematically reduce them. Another problematic issue is the strong link between maquiladoras and the state of the American economy. In many cases, this upsets the equilibrium of sustainable development in northern Mexico. On the other hand, China is the only emerging economy that has more maquiladora-type plants than Mexico. The U.S.-Mexico border consists of a long belt of about 3,000 maquiladoras, employing almost one million Mexicans. It is not possible to unequivocally describe maquiladoras as a global opportunity or a threat to Mexico.

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