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Report to Congressional Requesters

July 2003

INTERNATIONAL TRADE

Mexico's Maquiladora Decline Affects U.S.-Mexico Border Communities and Trade; Recovery Depends in Part on Mexico's Actions

03-891

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Highlights

Highlights of GAO-03-891, a report to congressional requesters

Why GAO Did This Study

Mexico's maquiladoras have evolved into the largest component of U.S.–Mexico trade. Maquiladoras import raw materials and components for processing or assembly by Mexican labor and reexport the resulting products, primarily to the United States. Most maquiladoras are U.S. owned, and maquiladoras import most of their components from U.S. suppliers. Maquiladoras have also been an engine of growth for the U.S.–Mexico border. However, the recent decline of maquiladora operations has raised concerns about the impact on U.S. suppliers and on the economy of border communities.

Because of these concerns, GAO was asked to analyze (1) changes in maquiladora employment and production, (2) factors related to the maquiladoras' decline, and (3) implications of recent developments for maquiladoras' viability.

www.gao.gov/cgi-bin/getrpt?GAO-03-891.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Loren Yager at (202) 512-4347.

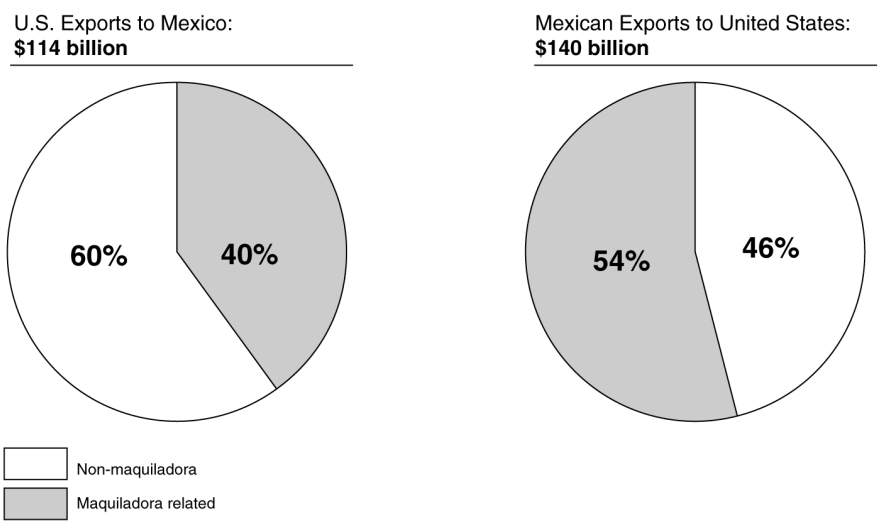
What GAO Found

After growing rapidly during the 1990s, Mexican maquiladoras experienced a sharp decline after October 2000. By early 2002, employment in the maquiladora sector had contracted by 21 percent and production had contracted by about 30 percent. The decline was particularly severe for certain industries, such as electronics, and certain Mexican cities, such as Tijuana. The downturn was felt on the U.S. side of the border as well, as U.S. exports through U.S.-Mexico land border ports fell and U.S. employment in manufacturing and certain other trade-related sectors declined.

The cyclical downturn in the U.S. economy has been a principal factor in the decrease in maquiladora production and employment since 2000. Other factors include increased global competition, particularly from China, Central America, and the Caribbean; appreciation of the peso; changes in Mexico's tax regime for maquiladoras; and the loss of certain tariff benefits as a result of the North American Free Trade Agreement.

Maquiladoras face a challenging business environment, and recent difficulties have raised questions about their future viability. Maquiladoras involved in modern, complex manufacturing appear poised to meet the industry's challenges. Still, experts agree that additional fundamental reforms by Mexico are necessary to restore maquiladoras' competitiveness. U.S. trade and homeland security policies present further challenges for maquiladoras.

Maquiladora Component of U.S.-Mexico Trade, 2001



Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

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Abbreviations

BIP	Border Industrialization Program
CBI	Caribbean Basin Initiative
CNIME	Mexico's National Council of the Maquiladora Export Industry (Consejo Nacional de la Industria Maquiladora de Exportación)
FAS	Free-Alongside-Ship
GDP	Gross Domestic Product
ITA	Information Technology Agreement
ITC	International Trade Commission
MSA	Metropolitan Statistical Area
MEDC	McAllen Economic Development Corporation
NAFTA	North America Free Trade Agreement
PROSEC	Sectoral Promotion Program (Programa de Promoción Sectoral)
USTR	Office of the U.S. Trade Representative
WTO	World Trade Organization

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United States General Accounting Office
Washington, D.C. 20548

July 25, 2003

The Honorable Max Baucus
Ranking Minority Member
Committee on Finance
United States Senate

The Honorable Jeff Bingaman
The Honorable Kay Bailey Hutchison
United States Senate

Mexico's Maquiladora program, which was established in 1965 to attract investment and create jobs along the U.S.-Mexico border, has evolved into the largest and most dynamic component of U.S.-Mexico trade. U.S. companies own the vast majority of maquiladora plants, and maquiladoras import about 80 percent of their components from U.S. suppliers. With double-digit growth rates in output and employment until its peak in the last quarter of 2000, maquiladora-based production has been one of the engines of regional employment and income growth for the U.S.–Mexico border. However, over the past 2 years, the level of employment and production in maquiladora operations has declined sharply. This decline has led a number of observers to express concern about the future viability of maquiladoras. Some observers in the United States are also concerned that the decline of Mexico's maquiladoras could adversely affect U.S. companies that supply these plants and could hurt the economy of border communities.

In response to your concern about the significance of these developments, this report analyzes (1) the ways in which the communities along the U.S.-Mexico border are integrated and how maquiladoras have contributed to U.S.-Mexico interdependence; (2) recent changes in maquiladora production, employment, and cross-border trade; (3) factors that have affected employment and production in the maquiladora sector; and (4) factors that could affect the maquiladora industry's future viability.

To address these objectives, we met with U.S. and Mexican government officials in Washington, D.C., and Mexico City. We contacted business and nonprofit sector representatives, academicians, and other experts on the maquiladora industry in the United States and Mexico, and we reviewed extensive documentation and academic research provided by these sources. We obtained and analyzed official data on employment and trade trends from both U.S. and Mexican government agencies. We also

conducted a series of semistructured interviews with 29 representatives of business associations consisting of maquiladora-specific and principal industry sector organizations at the local and national levels. We relied on business associations because, as representatives of the maquiladoras, they could comment on issues facing their members, such as increased competition, and could explain the reasons for plant closures, changes in employment levels, and other changes within the industry. We conducted site visits in three major border "twin cities": San Diego, California–Tijuana, Baja California; El Paso, Texas–Juarez, Chihuahua; and McAllen, Texas–Reynosa, Tamaulipas.

Results in Brief

A variety of social and economic factors link U.S. and Mexican border communities, and maquiladoras play a significant role in this interdependence. Trade figures indicate that the four U.S. border states account for about 62 percent of U.S. exports to Mexico, while 70 percent of these exports were destined for Mexican border states. Border communities are also drawn together socially by family and educational ties and economically by twin-plant production and retail commerce. Residents in the twin cities cross the border about one million times every day to work, shop, attend classes, visit family, and participate in other activities. The maquiladora sector, which relies heavily on imports from the United States and represents the principal industrial activity on the Mexican side of the border, drives cross-border economic integration as well as the increasing U.S.-Mexico interdependence. However, the border is a diverse region, and the extent of interdependence between communities along the border varies widely.

After growing rapidly during the 1990s, Mexican maquiladoras experienced a sharp decline in production and employment after October 2000. In early 2002, employment in the maquiladora sector had contracted about 20 percent, losing nearly 290,000 jobs, and production had contracted about 30 percent. The decline was particularly severe in certain industries and cities. For example, maquiladora employment in the Mexican electronics industry declined 31 percent between 2000 and 2002, and Tijuana, a city with significant maquiladora electronics manufacturing, experienced a 30 percent decline in maquiladora employment. In addition, overall manufacturing production in the Mexican border region began declining in 2000. The downturn was felt on the U.S. side as well. For example in 2001, the value of U.S. exports through U.S.-Mexico land border ports fell by 10 percent. Similarly, employment on the U.S. side of the border declined in manufacturing and certain other trade-related sectors. Despite these

contractions, overall U.S. border employment grew in most U.S. border metropolitan statistical areas.

According to government researchers, academicians, and industry representatives, both cyclical and structural factors have contributed to the decline in Mexico's maquiladora employment and production since 2000. Representatives of industry groups emphasized, and our economic analysis confirms, that the cyclical downturn in the U.S. economy has been a primary factor in the decline of the maquiladoras. However, industry sources and other experts noted that Mexico's maquiladoras also face increased global competition in the U.S. market, particularly from China, Central America and the Caribbean. The real appreciation of the peso relative to the dollar and key competitors' currencies has heightened such pressure. Additionally, industry representatives indicated that Mexican government policies such as changing the tax regime applied to maquiladoras have created a climate of uncertainty for investors. Meanwhile, owing to commitments undertaken under the North America Free Trade Agreement (NAFTA), Mexico has now phased out some benefits to the maquiladora sector.

Factors affecting the recovery of Mexico's maquiladoras include recent industry and government actions and the prospect of future Mexican reforms. The recent decline of the maquiladoras has added impetus to the ongoing evolution in the industry toward more sophisticated manufacturing and prompted the Mexican government to take several steps in support of the maquiladoras. For example, the Mexican government has greatly expanded the number of components that can be imported by maquiladoras and other firms with little or no duty assessments. However, government, industry, and other experts agree that additional fundamental reforms by Mexico, in areas such as energy and labor practices, are still necessary to restore the country's attractiveness as a business and investment location. Though difficult, tackling such reforms is made more urgent by U.S. trade and homeland security policies that are likely to present further challenges for maquiladora operations.

Background

Mexico's Maquiladora program has been a central feature of the U.S.-Mexico border. The U.S.-Mexico border stretches nearly 2,000 miles, from the Pacific Ocean in California to the Gulf of Mexico in Texas. Four U.S. states (Arizona, California, New Mexico, and Texas) and six Mexican states (Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas) make up the border. Texas contains the longest section of the

U.S. border with Mexico, with several large and numerous small border crossings across the Rio Grande. Compared with Texas, California's border with Mexico is relatively short, but it includes San Diego–Tijuana, the single busiest U.S.-Mexico border crossing. Arizona's principal border crossing with the Mexican state of Sonora at Nogales plays a significant role in agricultural trade. The relatively small border crossings between New Mexico and Mexico reflect the sparsely populated areas in that region of the border. Figure 1 shows the U.S.-Mexico border, including all U.S. and Mexican border states, some Mexican border cities with varying concentrations of maquiladora plants, and some ports of entry on the U.S. side of the border.

Figure 1: Map of U.S.-Mexico Border Twin Cities

Source: GAO.

During the 1990s, the population along the border experienced significant growth. On the U.S. side, the population increased by 21 percent, considerably more than the overall U.S. population, which grew by 13.2 percent. Some cities on the U.S. border experienced significant increases in population, such as Yuma, Arizona, and McAllen, Texas—respectively, the

third and fourth fastest growing metropolitan areas in the United States. Population on the Mexican side of the border increased even more rapidly, growing by 32 percent between 1990 and 2000. The majority of the border's residents live in communities along the border that are composed of twin cities—a city on each side of the border—such as San Diego–Tijuana and El Paso–Juarez. The San Diego–Tijuana area alone has a combined population of about 4 million, and the El Paso–Juarez area has a population of 1.9 million.

The Maquiladora[1] program was first established by the government of Mexico in 1965 as part of the Border Industrialization Program (BIP) and maquiladoras have been a driving force in the development of the U.S.-Mexico border region. Under the BIP, Mexico encouraged foreign corporations to establish operations along the northern border to provide employment opportunities for Mexican workers displaced after the termination of a temporary cross-border work arrangement known as the Bracero Program.[2] Also known as "in-bond" plants,[3] maquiladoras were allowed to import temporarily, on a duty–free basis, raw materials and components for processing or assembly by Mexican labor and to re-export the resulting products, primarily to the United States.

The maquiladoras have undergone a dynamic evolution over the last four decades. In the mid-1960s, maquiladoras consisted primarily of basic assembly operations taking advantage of Mexico's low labor costs. By the 1980s, U.S. multinationals representing various industrial sectors established maquiladora plants along the U.S.-Mexico border. Japanese and European companies also established maquiladora plants in Mexico to compete in the U.S. market. Since the 1980s, some firms moved from low-skilled assembly work to more advanced manufacturing operations. Researchers from Mexico's Colegio de la Frontera and San Diego State

[1]*Maquiladora* is a term derived from the Spanish word *maquilar*, which is the service a miller provides when he grinds wheat into flour. Similarly, a *maquiladora* provides assembly services without necessarily taking ownership of the goods being assembled.

[2]The Bracero Program allowed Mexican citizens to work on a temporary basis in the United States between 1942 and 1964. It was initially designed to address labor shortages in the U.S. agricultural and railroad industries during World War II.

[3]When the BIP was established, companies with assembly plants in Mexico would deposit a bond with the Mexican Department of Commerce and Industry (Secretaría de Comercio y Fomento Industrial) for the value of the duty on imported components and machinery. The bond would be returned when the finished products assembled using the imported components were exported.

University note that the number of "technical workers" employed by maquiladoras increased significantly from the early 1980s to the 1990s. Some maquiladoras now employ workers in development and design as well as manufacturing. For example, Delphi Automotive in Juarez, the largest private employer among maquiladoras in Mexico, now has a sophisticated research and development center that employs hundreds of highly skilled workers and engineers.

Over the years, as maquiladoras evolved and expanded, the term *maquiladora* has come to be used loosely to refer to almost any subsidiary plant of a foreign company involved in export from Mexico, particularly those located along the U.S. border. However, the Maquiladora program continues to be quite distinct from other efforts initiated by the Mexican government to encourage exports.[4] Firms must register with the government of Mexico to be considered maquiladoras and, once registered, are eligible for several key benefits, such as preferential tariffs on inputs and machinery, and simplified Mexican customs procedures. In this report, we define maquiladoras as those firms officially participating in Mexico's Maquiladora program.

In addition to the Maquiladora program, the U.S.-Mexico trade relationship has also been influenced by other important developments such as NAFTA. NAFTA was concluded between the United States, Mexico and Canada in 1992 and entered into force on January 1, 1994. This agreement provided, among its other provisions, for the elimination of tariffs and other barriers to U.S.-Mexico bilateral trade by 2008. It also required Mexico to change certain provisions of the Maquiladora program, such as elimination of duty-

[4]Among the most important of these programs is PITEX (Program for Temporary Importation to Manufactured Exports), established in 1990 as another government of Mexico program that allows companies to import components duty-free. PITEX requires companies to export a minimum of 30 percent of their total annual sales. Companies operating under PITEX are more commonly located in the interior of Mexico and typically use more Mexican components than do maquiladoras, which are primarily located in Mexico's northern border region. The type of employment and production data the Mexican government collects on maquiladoras is not available for PITEX firms. The U.S. International Trade Commission (ITC) issues an annual report on production-sharing trade, including between the United States and Mexico, as part of its *Industry, Trade, and Technology Review* series. In that report, the ITC considers trade under the Maquiladora program and the PITEX program as production-sharing trade. For comparison of Mexico's imports and exports under the Maquiladora Program and PITEX by Harmonized Tariff chapters, see Ralph Watkins, U.S. International Trade Commission, "Production-Sharing Update: Developments in 2001," *Industry Trade and Technology Review*, USITC, pub. 3534, July 2002, appendix C.

free benefits for imports of components from non-NAFTA countries. U.S.-Mexico trade has expanded sharply since NAFTA's inception. Much of this trade involves "production sharing," whereby final goods are produced with parts, labor, and manufacturing facilities from the United States and Mexico. Because it enables firms to increase specialization, take advantage of low labor costs in Mexico, and attain other efficiencies, production sharing is a key benefit to U.S. companies under the Maquiladora program.

Maquiladoras Contribute to Integration along the Diverse U.S.-Mexico Border

A variety of social and economic factors create strong linkages between communities on both sides of the U.S.-Mexico border, and maquiladoras play a critical part in this interdependence. Residents in the twin cities cross the border about one million times every day to work, shop, attend classes, visit family, and participate in other activities. Maquiladoras have increased trade between the United States and Mexico and have helped to develop the economies of several border regions. While communities along the U.S.-Mexico border share certain traits, each region is distinct.

Multiple Social and Economic Ties Fuel Integration at the Border

A wide range of social ties—educational, political, cultural, and familial—contribute to integration along the U.S.-Mexico border. For example, certain U.S. universities in border cities offer combined degrees or exchange programs with their counterparts on the Mexican side. In some schools, such as the University of Texas at El Paso and the University of Texas–Pan American, Mexican nationals cross the border regularly to attend classes. Political interaction and cooperation between local authorities of twin cities enhance integration. Cultural and family ties also contribute significantly to integration at the border. The U.S. counties with the highest concentration of Hispanics are located along the southwest border, and by far most of the Hispanics in southern border states are of Mexican descent.

Trade and retail sales contribute to economic interdependence at the border. Approximately $200 billion in trade went through the U.S.-Mexico border in 2002. Much of U.S.-Mexico trade occurs between border states. For example, 62 percent of U.S. exports to Mexico originated in Texas, California, Arizona, and New Mexico; of this, 70 percent was destined for Mexican border states. Research by the Federal Reserve Bank of Dallas indicates that trade between the United States and Mexico has positive effects on border communities, because U.S. border cities typically provide

a variety of services such as transportation and customs brokerage.[5] Retail sales to Mexican nationals also contribute significantly to the economies of cities on the U.S. side of the border. According to one estimate, retailers in Texas annually make an estimated $15 billion in sales to Mexican shoppers. In McAllen, Texas, 35 percent, or about $700 million worth, of retail sales are made to Mexican nationals. Residents from Tijuana make 1.5 million trips per month into the San Diego area, mainly to shop. In El Paso, Juarez residents account for more than 20 percent of retail sales. On the other hand, because of the high cost of pharmaceuticals in the United States, a growing number of U.S. residents regularly cross the border into Mexico to purchase prescription drugs.

Maquiladoras Drive U.S.–Mexico Trade and Border Integration

Maquiladoras import most inputs from the United States and export most of what they produce back to the United States. Growth in U.S.–Mexico trade and economic interdependence at the border during the last decade can be explained to a great degree by the participation of maquiladoras in supplying a strong U.S. market during the 1990s. Mexican exports increased by about 340 percent between 1993 and 2001, in large part because maquiladora-related exports increased by over 400 percent during this time, according to a report by the Mexican Commission on Northern Border Affairs.[6] By 2001, maquiladoras accounted for 41 percent of total Mexican trade with all countries – 34 percent of Mexico's imports and 48 percent of its exports (see fig. 2). Trade with the United States makes up a significant share of maquiladora trade. In 2001, 79 percent of maquiladora imports of components and parts for production were from the United States and 98 percent of their exported products were destined for the U.S. market. Maquiladora trade between the United States and Mexico totaled about $121 billion in 2001, with maquiladora exports ($75 billion) accounting for more than half of Mexico's total exports to the United States.[7] Border cities are typically seen as the primary beneficiaries of growing U.S.-Mexico trade. However, states such as Florida, Tennessee,

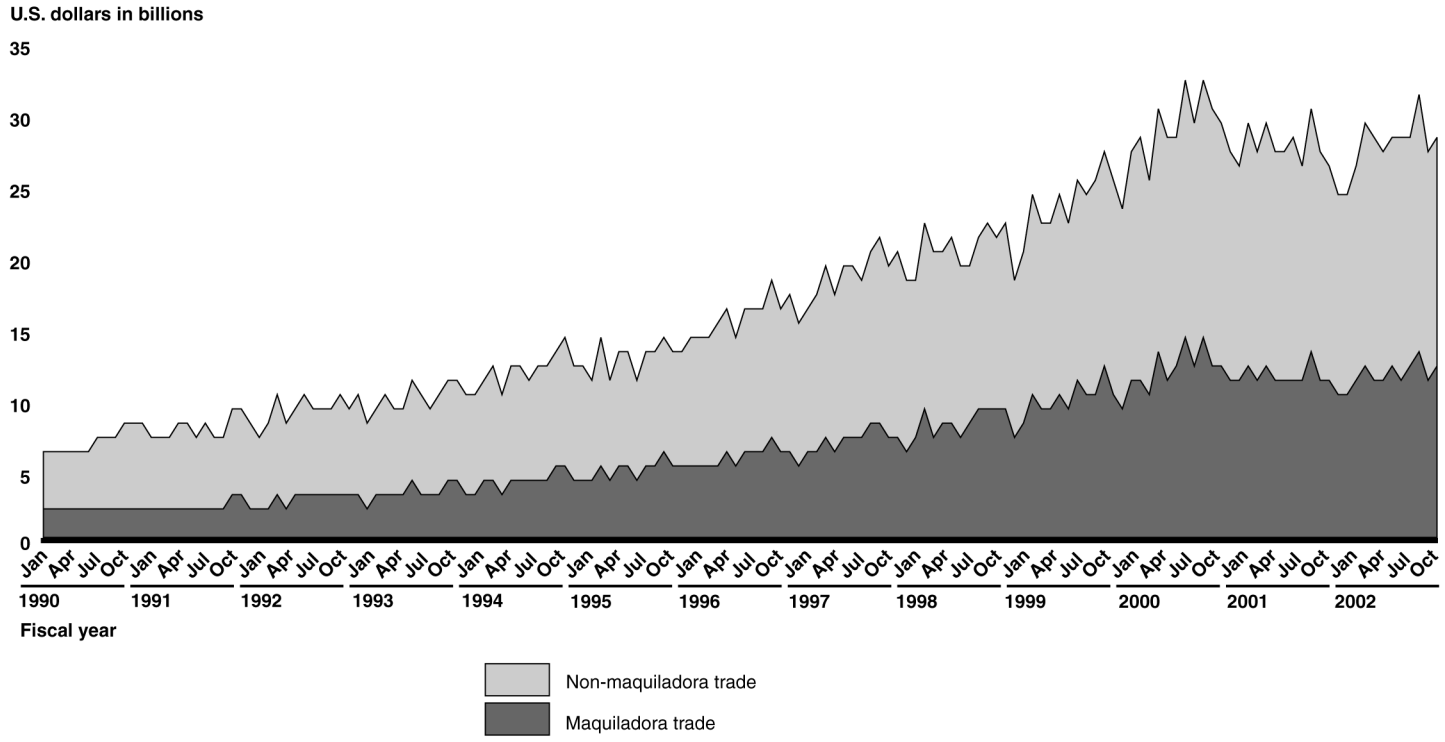
[5]Lucinda Vargas, Federal Reserve Bank of Dallas, "The Binational Importance of the Maquiladora Industry", *Southwest Economy*, Issue 6, November/December, 1999.

[6]*Northern Border Regional Development Program, 2001-2006 (Programa de Desarrollo Regional, Frontera Norte 2001-2006)*, Commission on Northern Border Affairs (Comisión para Asuntos de la Frontera Norte).

[7]Exports from PITEX assembly plants ($46 million), accounted for another one-third of Mexican exports to the United States.

and Ohio, which doubled their exports to Mexico during the second half of 1990s, have also benefited from growing U.S.-Mexico trade.

Figure 2: Maquiladoras' Share of Mexico's Trade 1990-2002



Source: Bank of Mexico (Banco de Mexico).

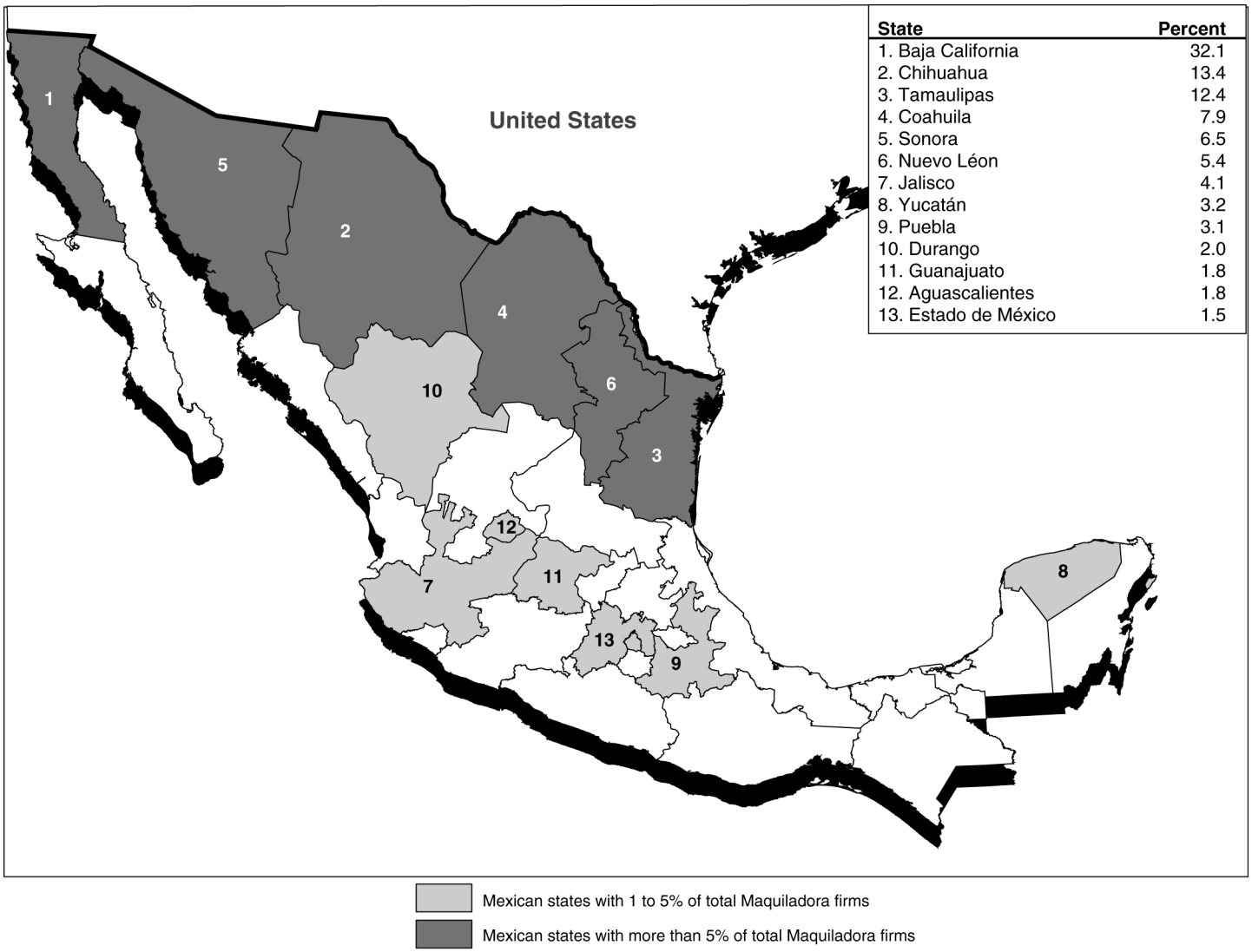
Furthermore, maquiladoras are directly connected to U.S. companies through ownership and production ties. The list of Mexico's top 100 maquiladora employers includes such U.S. firms as Delphi, RCA, Ford Motor Company, Tyco, General Electric, General Instruments, Johnson & Johnson, and ITT. All told, 79 percent of the top 100 maquiladora employers are from the United States. Maquiladoras are important to the United States because they are a strategic means by which U.S. companies stay competitive in the global marketplace. By offering lower production costs, maquiladoras enable U.S. companies to produce goods more cheaply in Mexico than in the United States. In essence, maquiladoras and U.S. companies are part of a greater production-sharing model, which is an important part of overall North American production. Moreover, more than

26,000 U.S.-based companies, located mainly in the Midwest, supply maquiladoras with raw materials and components.

The Mexican border region has benefited in terms of job creation from the dominant presence of maquiladoras on the Mexican side of the border. Overall, 77 percent of all maquiladora establishments are located in the six Mexican border states shown in figure 3. Also, about 83 percent of maquiladora employment was located in border states. During most of the 1990s, maquiladoras represented more than half of the industrial activity in the states of Chihuahua and Tamaulipas. During the same time period, the maquiladoras represented nearly three quarters of industrial production in the state of Baja California, which contained almost one third of Mexico's maquiladora firms.

Cities on the U.S. side of the border have benefited from the large flow of trade created by maquiladoras. Between 1990 and 2002, more than half a million jobs were added to the U.S. border region, including jobs in services, retail trade, finance, and transportation, and after 1995, employment growth in the U.S. border region exceeded the U.S. national average (see app. I for details). The employment gains are particularly notable, because the border region historically has had high rates of unemployment. Some studies have outlined the effect of overall border economic trends on local border communities. For example, researchers estimated that in one Texas border community, in 2001, services and supplies purchased by maquiladoras amounted to $136 million and a total of 32,577 jobs were sustained by maquiladoras and related manufacturing activity.

Figure 3: Map of Mexico Showing Share of Maquiladora Establishments, by State



State	Percent
1. Baja California	32.1
2. Chihuahua	13.4
3. Tamaulipas	12.4
4. Coahuila	7.9
5. Sonora	6.5
6. Nuevo Léon	5.4
7. Jalisco	4.1
8. Yucatán	3.2
9. Puebla	3.1
10. Durango	2.0
11. Guanajuato	1.8
12. Aguascalientes	1.8
13. Estado de México	1.5

Source: Center for Analysis and Economic Projections of Mexico (Centro de Analisis y Proyecciones Economicas de México).

The same researchers estimated that 15 percent of maquiladora workers' salaries was spent in the region on goods and services. In one Arizona border community, researchers surveyed maquiladora workers and found that workers who crossed the border to shop made an average of 5.5 trips a month and spent about $35 on each trip. Almost one third of retail sales in

the same Arizona community are attributed to Mexican nationals, according to local sources.

Despite their role in generating employment in Mexico, the maquiladoras' benefit to the country remains a subject of some debate. Some express reservations about the maquiladoras' ability to generate economic development for Mexico, since these plants have generally been unable to establish a network of domestic inputs providers or create significant linkages to the internal Mexican economy. In April 2002, for example, the former Mexican Foreign Minister noted that without proactive Mexican government policy to set up domestic suppliers, the benefits of the maquiladora industry would never extend beyond the border. In addition, critics in the environmental and labor movements on both sides of the border also assail these plants.[8] Some environmental groups claim that maquiladoras are responsible for the growing pollution problem in the border region. Similarly, some labor organizations criticize the maquiladoras for the low wages paid to workers and for allegedly poor working conditions.

Border Has Distinct Regions with Varying Degrees of Integration

Although communities along the U.S.-Mexico border share certain traits, they are also quite distinct. The level of integration between cross-border twin cities depends on location, population, economic profile, and cross-border political cooperation. We observed some of these differences during fieldwork in three border areas: McAllen–Reynosa, El Paso–Ciudad Juarez, and San Diego–Tijuana.

McAllen–Reynosa. McAllen and Reynosa are economically interdependent. Both are medium-size cities, McAllen with a population of about 569,000, and Reynosa with about 420,000, and there are no other sizeable urban areas nearby on either side of the border. Officials at the McAllen Economic Development Corporation (MEDC) capitalized on the interdependence between McAllen and Reynosa and incorporated it into their economic strategy for the region starting in 1988. At that time, McAllen had high unemployment and Reynosa's economy was based on

[8]We have prepared several reports on environmental and labor issues related to maquiladoras. See *U.S.-Mexico Trade: Assessment of Mexico's Environmental Controls for New Companies*, GAO/GGD-92-113 (Washington, D.C.: Aug. 3, 1992) and *U.S.-Mexico Trade: The Work Environment at Eight U.S.-Owned Maquiladora Auto Parts Plants*, GAO/GGD-94-22 (Washington, D.C.: Nov. 1, 1993).

subsistence farming. Working with political leaders in McAllen and Reynosa, MEDC developed a strategy based on promoting industrial development in Reynosa, recognizing that if companies opened maquiladoras there, McAllen would benefit by providing inputs and offering management, engineering, warehousing, trucking, legal, and accounting services. In the 14 years since its establishment, MEDC has recruited 178 companies to the area, in diverse manufacturing sectors, such as electronics, auto parts, and telecommunications.

El Paso–Ciudad Juarez. Although El Paso and Ciudad Juarez are also closely integrated, such ties have developed differently than in McAllen–Reynosa. Ciudad Juarez is a larger metropolitan area, with a population of 1.2 million, and it is home to more maquiladora employees than any other Mexican city. On the U.S. side, El Paso and the neighboring communities in southern New Mexico are much smaller. El Paso's economy has been shaped by economic activity in Ciudad Juarez, especially that of providing services to maquiladoras. In addition, Juarez residents contribute to El Paso's economy by purchasing items ranging from cars to clothing and services such as financial and health services. In 2001, there were approximately 46 million northbound crossings via the three international bridges that connect the two cities. However, business leaders and other observers whom we met in the El Paso–Juarez area frequently noted that integration and economic dependence between El Paso and Juarez occurred spontaneously, rather than by design. The development of maquiladoras on the Mexican side occurred much earlier than in Reynosa and was largely attributed to individual efforts by entrepreneurs in Juarez and El Paso that began in the 1960s, rather than to a collective vision. However, in recent years, in Santa Teresa, a nearby border community in southern New Mexico, developers created a strategic plan to build an industrial park as a supplier base, with warehouse and distribution facilities, to service maquiladoras. The Santa Teresa port of entry opened 11 years ago. Developers envisioned that this border crossing would serve as an alternate point of entry to El Paso for cross border trade.

San Diego–Tijuana. The dynamics of integration between San Diego and Tijuana are notably different from other cross-border twin cities. In this area, economic dependence is more one-sided. Unlike El Paso or McAllen, San Diego is a large metropolitan area in its own right, with a population of close to 3 million. Many of the major economic activities in San Diego, including defense and space manufacturing, biosciences, and tourism, are not directly connected to Tijuana. While Hispanics account for at least 50 percent of the population in most U.S. counties along the Southwest

border, they account for only about 27 percent of the population in San Diego County, suggesting lower levels of family ties or connections to Mexico. In contrast, Tijuana, with a population of about 1.2 million, is heavily dependent on maquiladoras, and the city is closely tied to the U.S. market. In addition to U.S. companies, Tijuana has also been the preferred location for Japanese and Korean maquiladora investments, which have made this area the world's leading producer of color televisions. More than 600 maquiladora plants, employing approximately 150,000 people are located in Tijuana. Moreover people in Tijuana are more likely to cross the border to shop or do business in San Diego than vice versa; in fact, it is estimated that two out of three residents of San Diego have never been to Tijuana. In contrast, Tijuana residents spend between 3 to 5 billion dollars in purchases in the San Diego region, mostly in the communities adjacent to the border. In addition, 7 percent of economically active people in Tijuana work in San Diego, earning an estimated $650 million a year in wages and salary income.

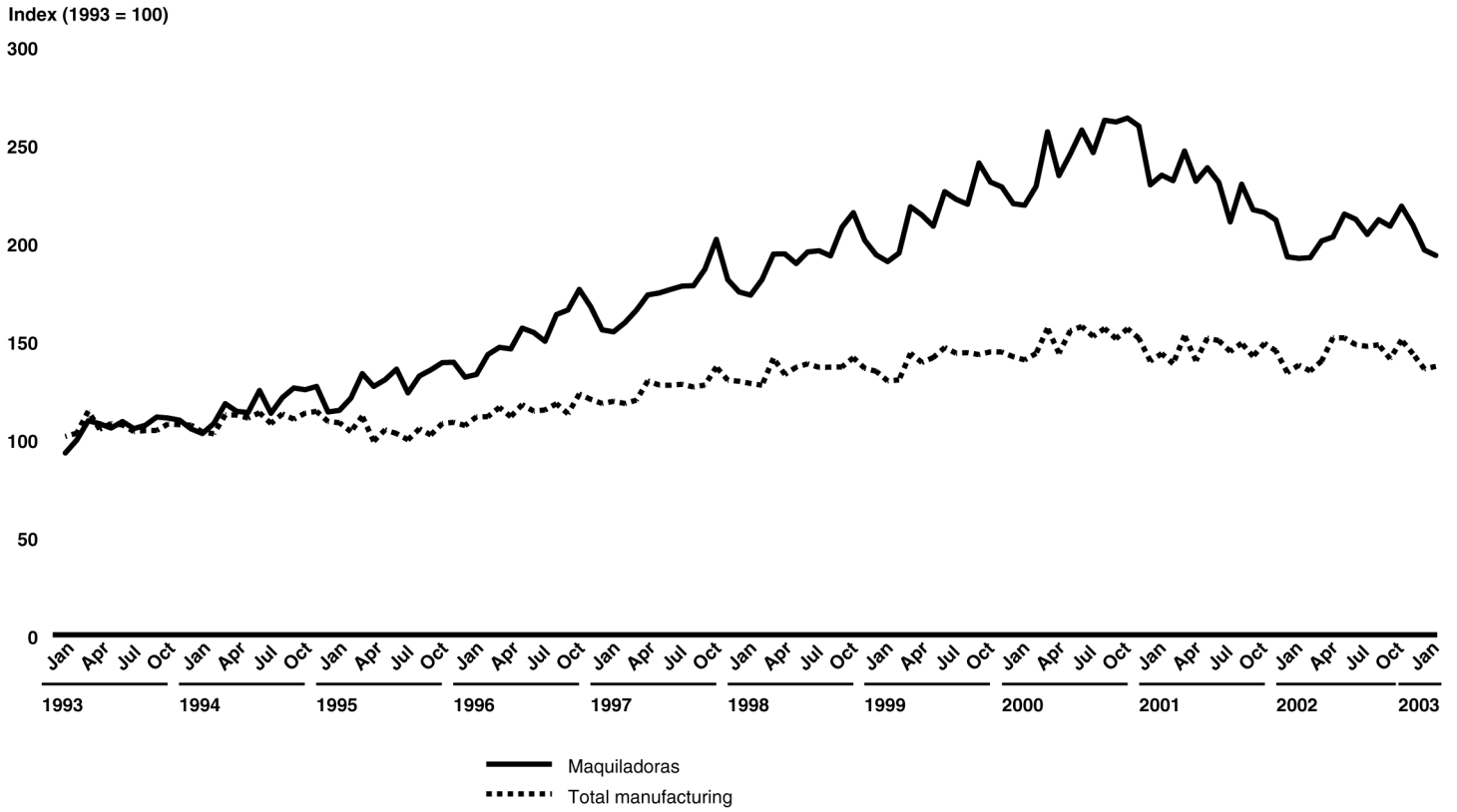
After Rapid Growth, Maquiladoras and Border Region Experienced Declines Beginning in 2000

Maquiladora production and employment grew rapidly throughout the 1990s but declined sharply after October 2000. Within the diverse maquiladora sector, the decline was particularly steep in certain industries and in some border cities. Overall, Mexican manufacturing production in the border region also declined and cross-border trade flows fell. At the same time, U.S. border employment in manufacturing and certain other trade-related sectors contracted. Nevertheless, the U.S. border region continued to experience stronger employment growth than did the United States as a whole.

Maquiladoras Grew Rapidly in the 1990s, with Growth Varied by Region and Industry

During the 1990s, maquiladoras proved to be one of the more dynamic components of Mexican manufacturing. Maquiladora production increased by 197 percent from January 1993 until its peak in October 2000, while overall manufacturing production in Mexico increased by only 58 percent in the same time period (see fig. 4). During that time period, maquiladora employment tripled, adding more than 900,000 jobs to the Mexican economy. In 2000, maquiladoras accounted for about 4 percent of total employment and about 20 percent of manufacturing employment in Mexico.

Figure 4: Growth in Maquiladora and Total Mexican Manufacturing Production, 1993–2002



Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

Note: Certain statistics on Mexican industrial production were not available for years prior to 1993.

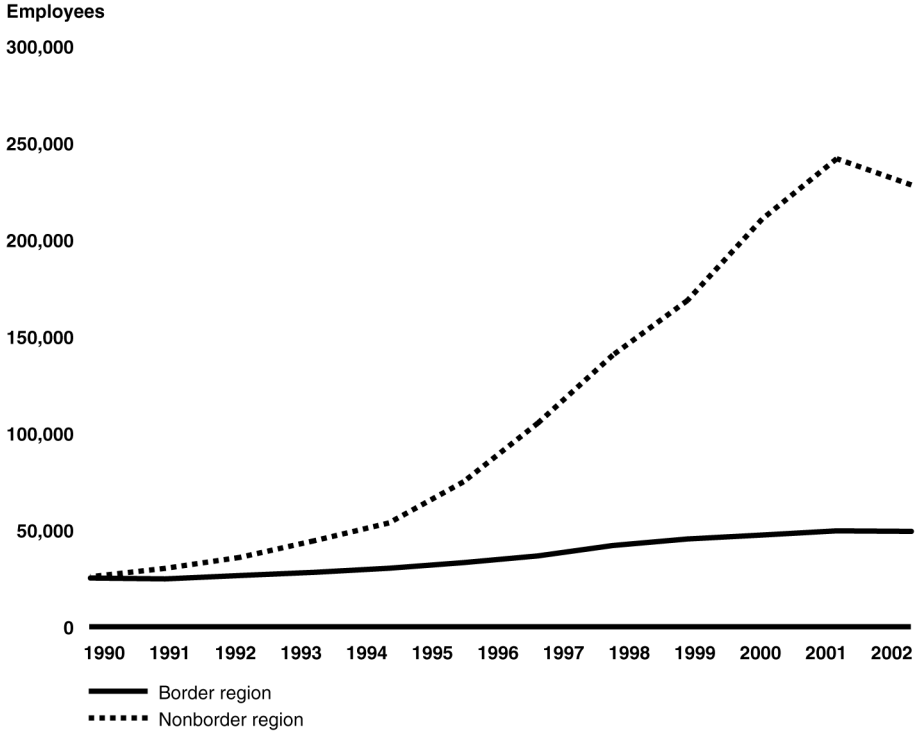
With respect to employment, most major Mexican border cities and industrial sectors experienced growth in maquiladora employment over the decade, although some grew faster than others. For example, Tijuana and Mexicali tripled their maquiladora employment, and the electronics industry more than doubled its maquiladora employment in the border region. The electronics industry, which was already the largest maquiladora employer, added more than 200,000 jobs in the border region during the 1990s. For the Mexican border region as a whole, maquiladora employment rose 145 percent—from 342,555 in January 1990 to 839,200 in October 2000 (see app. V, table 8, for more information). While maquiladoras have typically been concentrated in the border region, maquiladora employment growth throughout the rest of Mexico was actually higher than in the

border region during the 1990s. Growth in the nonborder region was particularly strong in the textile and apparel sector, in which employment rose in the nonborder region from about 22,000 in 1990 to about 224,000 jobs in 2001 (fig. 5). As a result of the stronger growth in the nonborder region, the share of textile and apparel maquiladora employment in the border region fell from 49 percent in 1990 to 17 percent in 2001.[9] Much of the investment in the apparel sector occurred in anticipation of duty-free treatment for most U.S. imports of apparel from Mexico under NAFTA in 1999.[10]

[9]Data on textiles and apparel in the border region were available annually only through 2001. The National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática) provided us data broken down by industry and region through October 2002.

[10]For information about investment in Mexico's textile and apparel sector in 1999, see Larry Brookhart and Ralph Watkins, U.S. International Trade Commission, "Production-Sharing Update: Developments in 1999," *Industry Trade and Technology Review*, USITC, pub. 3335, July 2000, p. 15.

Figure 5: Maquiladora Textile and Apparel Employment, Nonborder and Border Regions, 1990–2001



Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

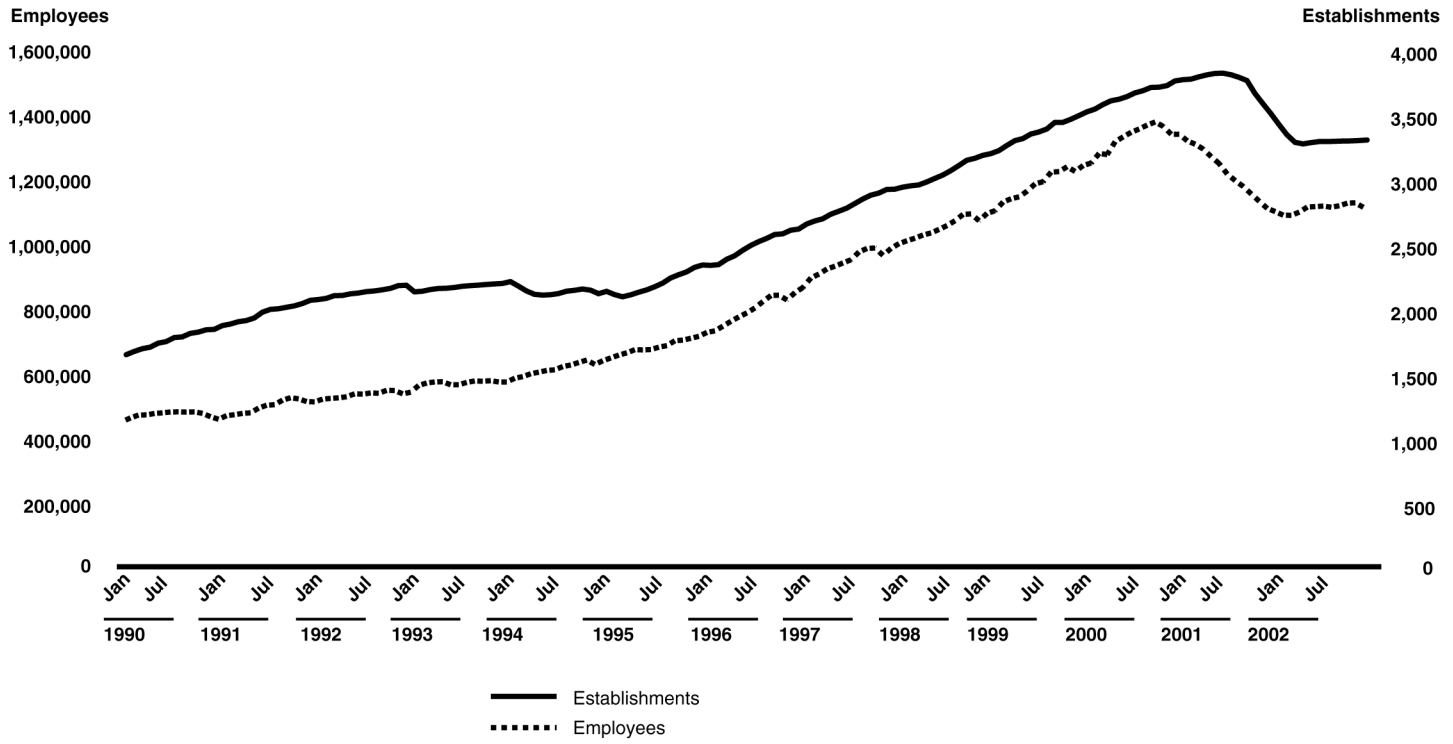
Maquiladora Decline Started in 2000, Unevenly Affecting Industries and Border Cities

After growing since the program's inception over 35 years ago, particularly in the 1990s, Mexican maquiladora production and employment began to decline sharply in late 2000. Maquiladora production declined about 30 percent from late 2000 to early 2002. At the same time, maquiladora employment contracted about 20 percent, losing nearly 290,000 jobs nationally, about 174,000 of which were located in the border region.[11] Similarly, the number of maquiladora establishments (factories) in operation began to decline as well (see fig. 6). Nevertheless, even with the

[11]Mexico's National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática) defines the border region as the 41 municipalities located along the U.S.-Mexico border.

pronounced declines, the overall numbers of maquiladora employees remain at levels similar to those in 1998–1999.

Figure 6: Maquiladora Employment and Establishments, 1990-2002



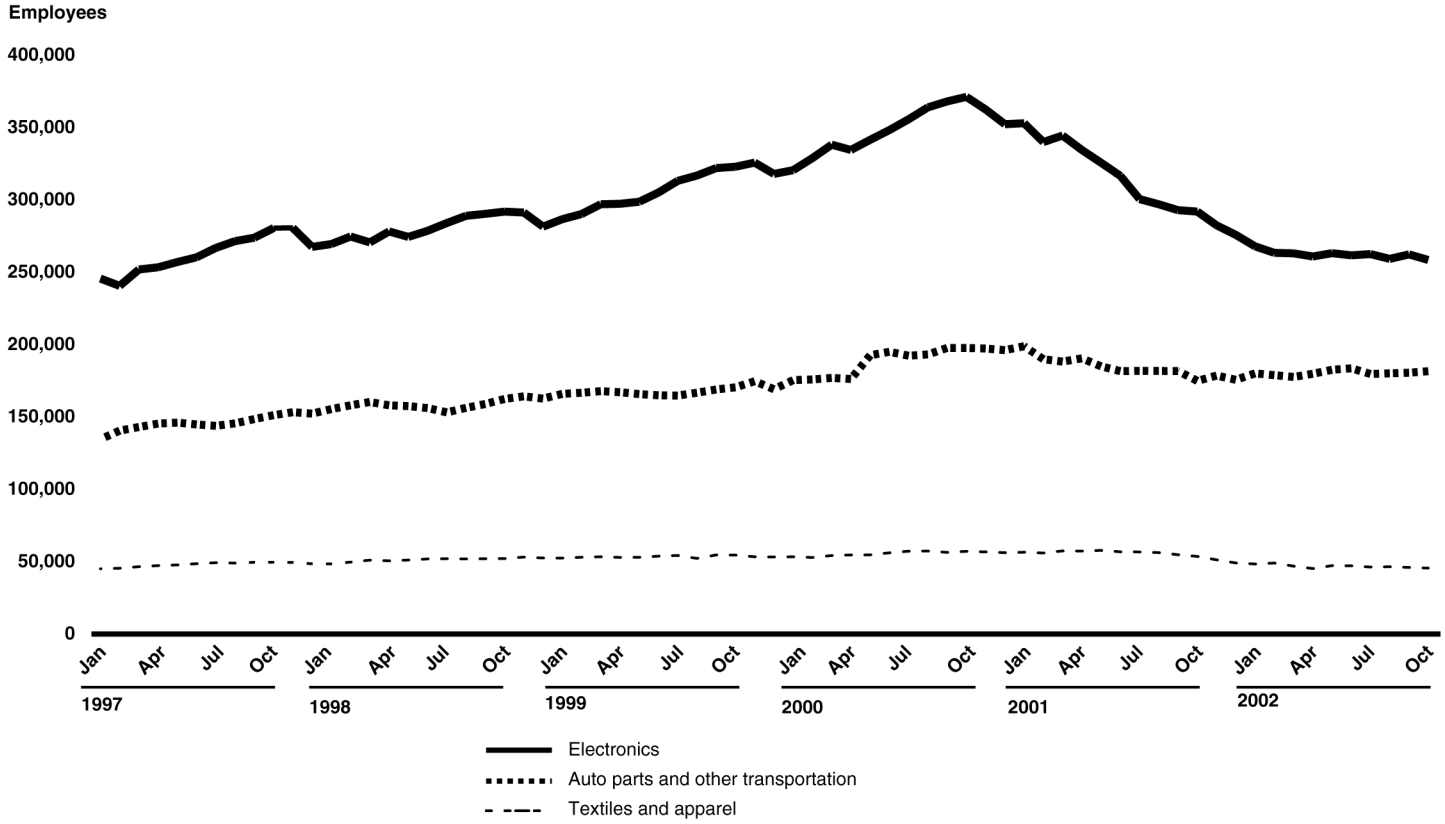
Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

While the Mexican maquiladora downturn was evident both nationally and in the border region, certain industries experienced larger declines (see fig. 7). For instance, in the border region, the electronics industry experienced one of the steepest and largest maquiladora employment declines of any industrial sector, contracting by 31 percent and losing more than 112,000 jobs in the 2-year period between October 2000 and October 2002.[12] In contrast, the automobile and auto parts industry experienced a less severe

[12]Nationally in Mexico, the electronics and electrical components sector declined by 32 percent from September 2000 through April 2002.

maquiladora employment decline of 13 percent (about 24,000 jobs) in less than a year, before resuming some growth in November 2001. Textiles and apparel also experienced a steep employment decline, falling by 26 percent and losing more than 12,000 jobs. Nationally, the textile and apparel industry lost more than 70,000 jobs. In all other border industrial sectors combined, maquiladora employment declined by about 16 percent over a little more than a year but has grown by about 4 percent since January 2002.

Figure 7: Mexican Maquiladora Employment in the Border Region by Industrial Sector, January 1997–October 2002



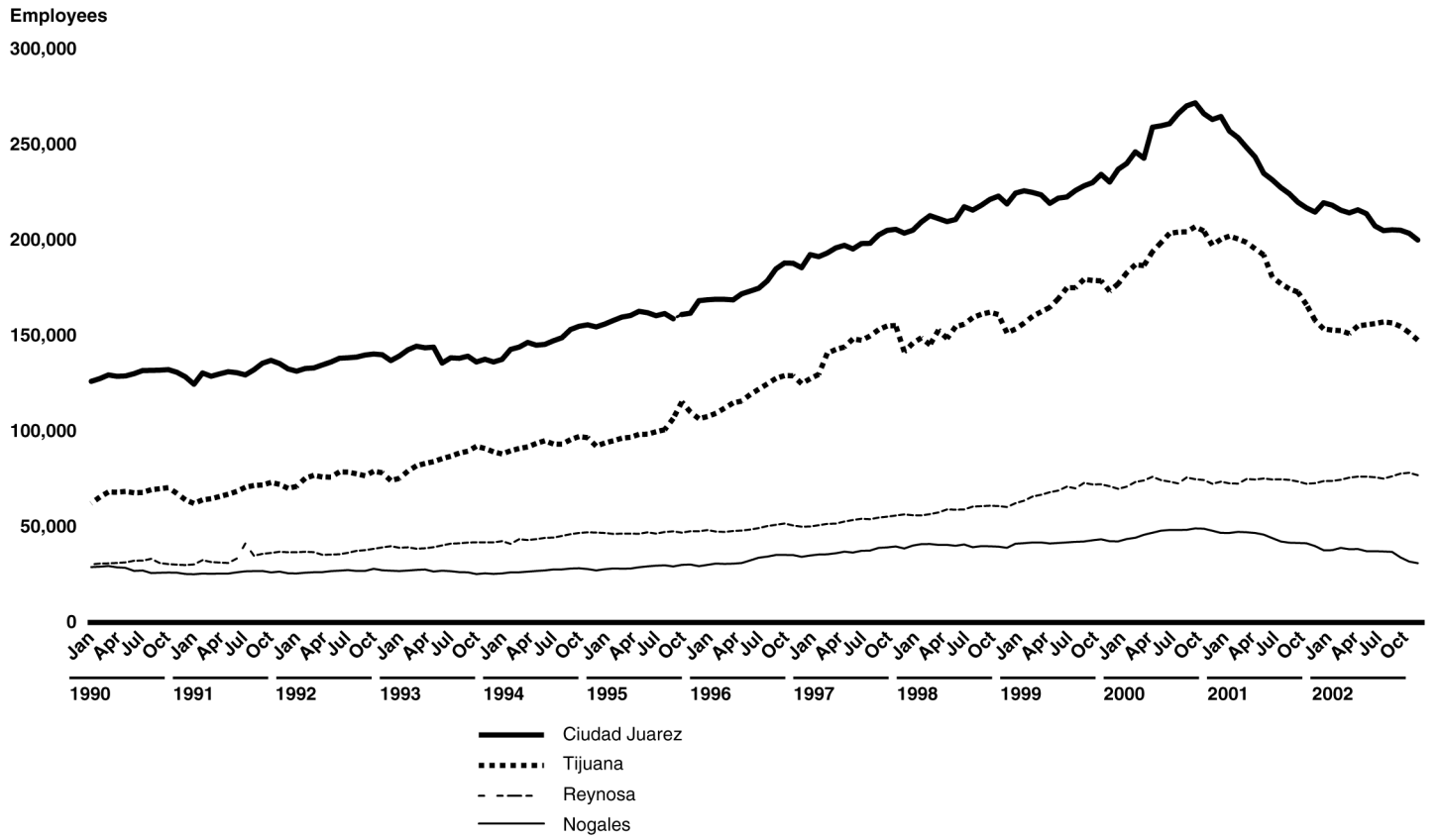
Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

Note: Data broken down by industrial sector in the border region were available only through October 2002.

As figure 8 illustrates, the decline in maquiladora employment also affected cities in the Mexican border region differently. The two largest border

cities, Juarez and Tijuana, both experienced significant declines in maquiladora employment, accounting for over half of the total jobs lost in the border region. After peaking in October 2000, by December 2002, maquiladora employment had fallen 27 percent in Juarez and 30 percent in Tijuana. The smaller city of Nogales, Sonora, experienced one of the sharpest percentage changes in maquiladora employment in the border region, declining by 44 percent. In contrast, the city of Reynosa experienced a decline of only about 5 percent between September and December 2000, and its maquiladora employment has since rebounded, with 7 percent growth since January 2001. Reynosa's decline in electronics and auto parts employment was much less severe than other cities.

Figure 8: Mexican Maquiladora Employment, by Border City, January 1990 - December 2002



Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

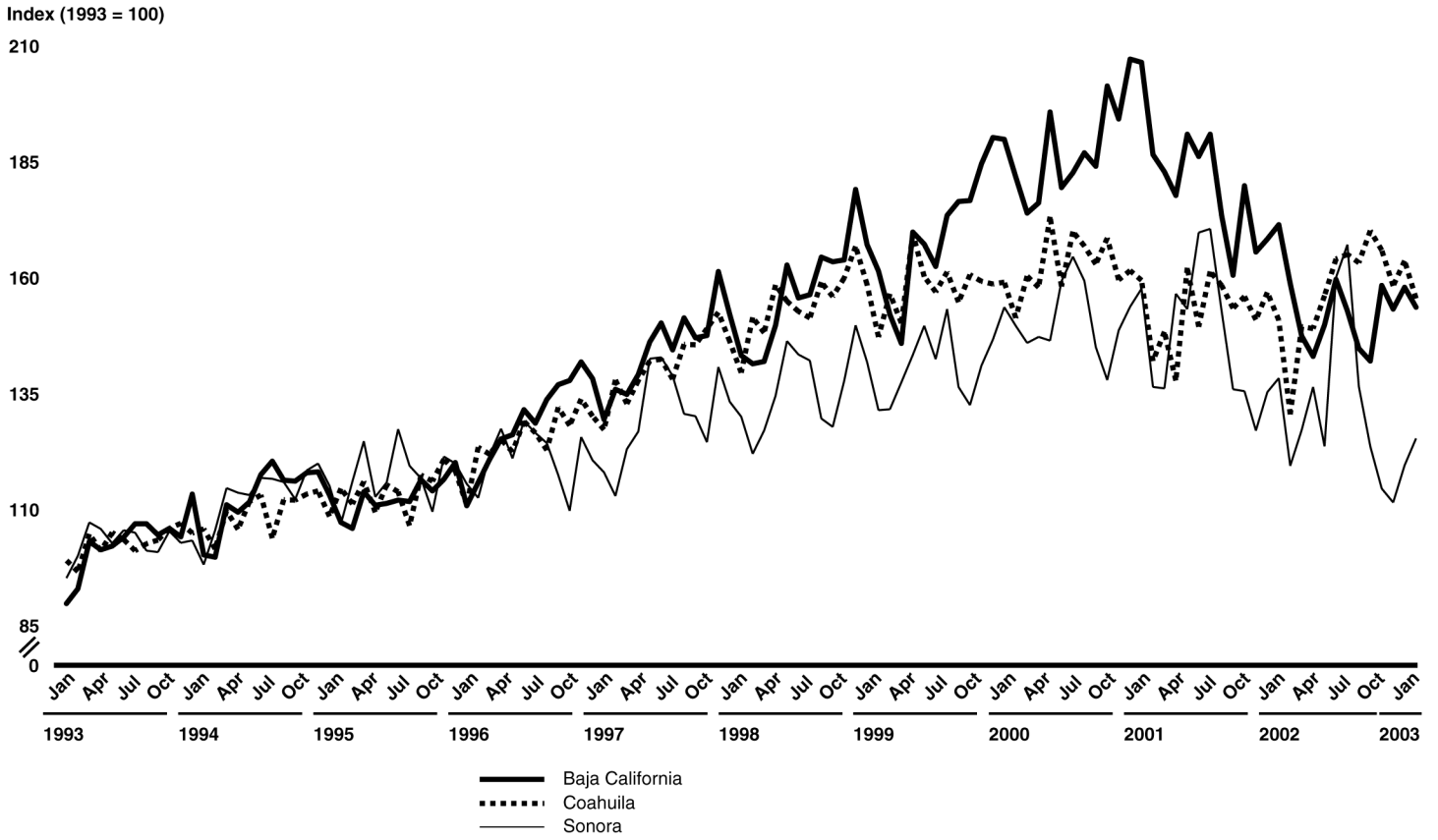
Mexican Border Experienced Overall Decline in Manufacturing and Cross-Border Trade

The decline in Mexico's maquiladora production contributed to a decline in overall manufacturing production in Mexico's border region.[13] Figure 9 shows the growth of manufacturing production for three Mexican border states: Baja California, Coahuila, and Sonora. Baja California, the state with the largest share of maquiladoras, grew more rapidly than the other border states but also experienced the largest decline in overall manufacturing production after October 2000. Similarly, manufacturing production in Coahuila, Nuevo Leon (not shown), and Sonora also experienced downturns beginning in late 2000 and early 2001.[14]

[13]Overall manufacturing production consists of manufacturing by both maquiladora and nonmaquiladora manufacturing companies. The growth in both maquiladora production and total manufacturing production in Mexico is shown in figure 3.

[14]Data on manufacturing production were not available for the Mexican border states of Chihuahua and Tamaulipas.

Figure 9: Growth of Manufacturing Production in Mexican Border States, 1993–2002



Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

During the maquiladora decline, exports, imports, and overall trade through U.S.-Mexico land border ports also dropped. The value of cross-border trade dropped 5 percent in 2001 and remained flat in 2002, owing in large part to the 10 percent decline in U.S. exports to Mexico through these ports. Although each of the four major land border ports experienced some decline, Nogales experienced the greatest decline, losing about 20 percent of its value between 2000 and 2002 (see app. IV, table 7, for levels of U.S. trade with Mexico through the four main land border points). Maquiladoras, which accounted for 40 percent of U.S. exports to Mexico and 54 percent of Mexican exports to the United States in 2001, contributed to this decline.

U.S. Border Employment in Manufacturing and Transportation Services Fell, but Overall Employment Growth Continued

The decline in Mexico's maquiladoras was also felt on the U.S. side, as manufacturing employment in border municipalities declined by 6 percent overall from 2000 through 2002.[15] Other U.S. sectors related to trade also experienced declines in employment at the border. U.S. border employment in transportation and public utilities, which includes trucking and warehousing, was down 4 percent, and employment in wholesale trade was down 3 percent overall. Similar to the maquiladora employment declines in Mexico, employment declines on the U.S. side of the border also varied by region. For example, manufacturing employment declined by 18 percent overall in Texas' border cities, and employment declines in wholesale trade and transportation and in public utilities were more pronounced in Arizona. (App. I provides a detailed analysis of employment trends in the U.S. border region.)

Despite the contractions in manufacturing and certain other trade-related sectors, other sectors in the U.S. border region grew. As a result, total nonagriculture-related employment in the border area grew by 4 percent even after the U.S. economic slowdown began in 2000 and national employment contracted 1 percent through 2002. Some border metropolitan areas maintained even stronger employment growth. For example, the McAllen area grew by 9 percent between 2000 and 2002, while Laredo grew by 6 percent, and San Diego and Las Cruces grew by 5 percent each over the same period. On the other hand, El Paso's overall nonfarm employment fell, primarily because its mix of industries is weighted towards sectors that have been shrinking (see app. I for details).

Cyclical and Structural Factors Cited in Maquiladora Decline

The decline in maquiladora production and employment since the last quarter of 2000 is attributable to both cyclical and structural factors. Government researchers, academicians, economic studies, and industry representatives agree that the cyclical downturn in the U.S. economy has been a primary factor in the decline. However, industry sources and other experts emphasized that the maquiladoras have also been adversely affected by structural factors, such as increased competition in the U.S. market, particularly from China, Central America and the Caribbean, and by the strength of the Mexican peso, which has further eroded the

[15]The U.S. border municipalities for which appropriate employment data through 2002 were available are San Diego, California; Yuma, Arizona; Las Cruces, New Mexico; and Brownsville, El Paso, Laredo, and McAllen, Texas.

maquiladoras' competitiveness. Changing Mexican tax policies have also contributed to the maquiladora decline by creating a climate of uncertainty for foreign investors. Meanwhile, owing to commitments undertaken under NAFTA, Mexico has phased out some of the key benefits of the Maquiladora program.

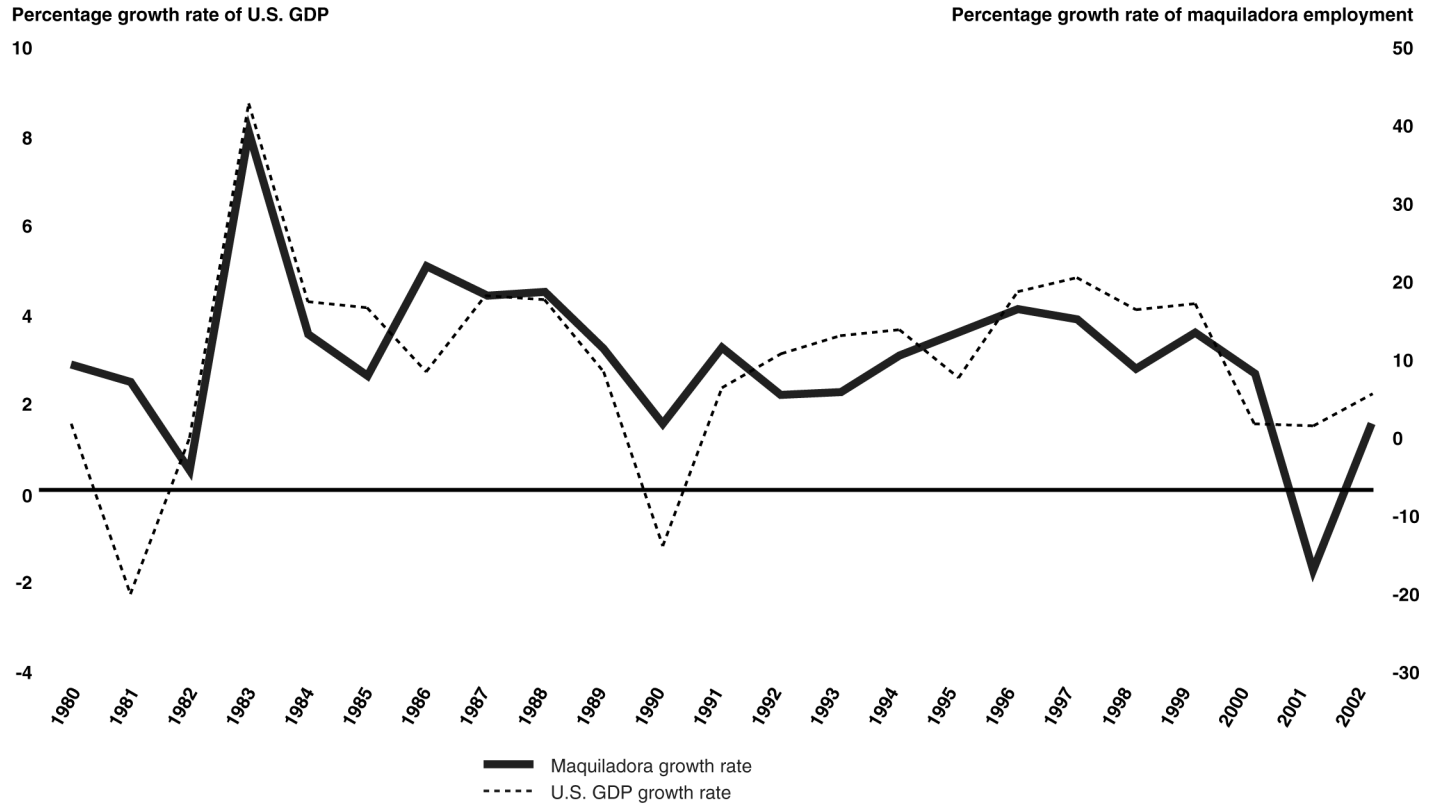
It is clear from our research that all of these factors were at work before and during the recent maquiladora downturn, and that each was changing in a direction adverse for maquiladora production and employment. However, the sheer number of simultaneous changes over a relatively brief period makes it difficult to isolate or quantify the impact of individual factors. Although many government, academic, and industry sources generally refer to the cyclical downturn in the U.S. economy as a principal factor in the decrease in maquiladora employment and production since the last quarter of 2000, there is no such agreement on the relative importance of other factors associated with the decline of the maquiladoras. Therefore, the order in which we present these other factors is generally based on the results of our semistructured interviews with industry associations (see app. VI).

U.S. Economic Slowdown Adversely Affects Maquiladoras

In explaining the decline in maquiladora production and employment beginning in the last quarter of 2000, government, academic, and industry sources generally emphasized the role of the downturn in the U.S. economy. Of the 23 industry association representatives we interviewed whose membership had experienced a decline in production or employment, about three-quarters cited the recent downturn in the U.S. economy as a major factor. As noted earlier in this report, maquiladora production is often linked to U.S. manufacturing through production-sharing arrangements. In fact, about 98 percent of maquiladora production is destined for the U.S. market. Thus, it is not surprising that the maquiladoras are very sensitive to fluctuations in U.S. manufacturing and demand. Our analysis of economic data supports the conclusion of experts and interviewees, demonstrating that historically maquiladora employment typically grows when the overall U.S. economy expands and is negatively influenced when the U.S. economy slows down (see app. II for a discussion of the effect of the economic downturn in the United States on employment for various maquiladora industrial sectors). Moreover, maquiladora employment has been even more sensitive to changes in U.S. manufacturing production, particularly in sectors such as textiles and autos, and a sharp drop in U.S. manufacturing has characterized the present U.S. economic slowdown.

As figure 10 illustrates, maquiladora employment shows a correlation with U.S. economic performance over the past two decades. On average, maquiladoras added almost 118,000 employees annually from 1995 to 2000.[16] During this period, U.S. annual economic growth averaged 3.6 percent. However, in 2001, as U.S. economic growth slowed to 1.4 percent, the maquiladoras lost nearly 229,000 jobs.

Figure 10: Annual Growth Rates of U.S. Gross Domestic Product and Maquiladora Employment, 1980-2002



Sources: GAO analysis based on Bank of Mexico (Banco de México) data on employment and U.S. Department of Commerce, Bureau of Economic Analysis data for U.S. GDP.

[16]Maquiladoras reached their peak employment level of 1.3 million employees in October 2000.

Moreover, although the Mexican economy as a whole is very closely linked to that of the United States, the maquiladoras appear to have been affected by the U.S. economic slowdown more severely than the Mexican economy overall. While Mexico's economy contracted .2 percent in 2001, it resumed growth at .7 percent in 2002. However, the maquiladora sector declined both years 9.2 percent and 8.3 percent, respectively.[17] Of the industry associations indicating that their membership had experienced a decline in employment or production, about half reported that the maquiladoras had been more negatively affected by the U.S. economic downturn than had other businesses in Mexico.

Mexico Faces Increased Global Competition in the U.S. Market

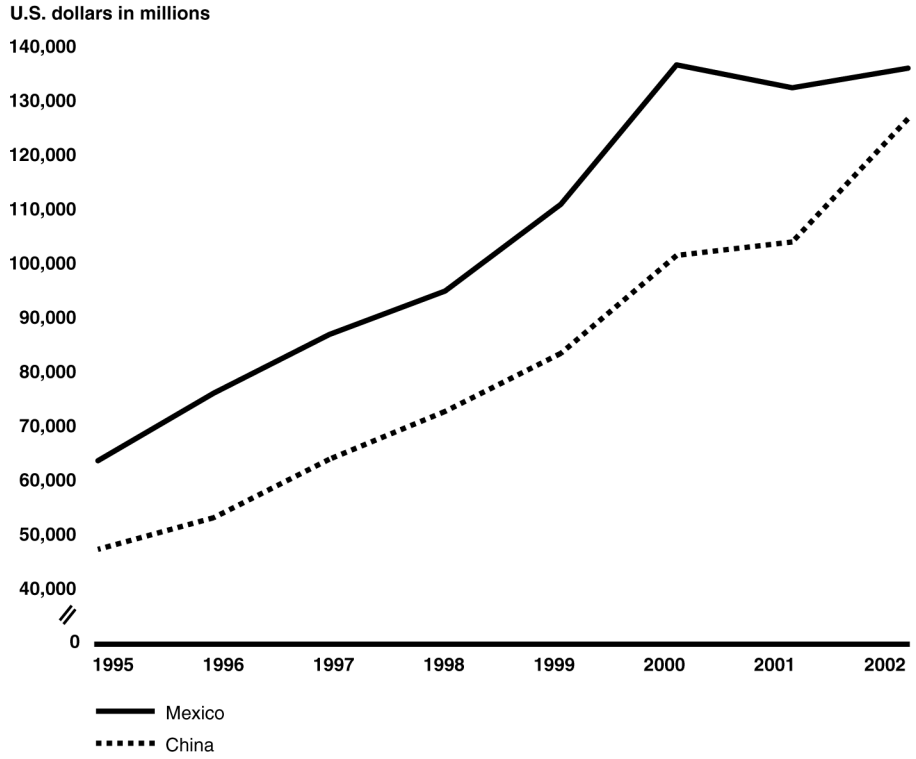
Among the 23 industry associations that indicated a decline in their memberships' employment or production, mounting foreign competition in the U.S. market was the most frequently offered explanation for the decline of the maquiladoras over the past 2 years. Over one-half of the representatives of industry associations referred specifically to the role of China in the maquiladoras' decline. One maquiladora spokesman, for example, suggested that China's entrance into the World Trade Organization (WTO)[18] has made that country a more attractive choice for foreign direct investment, while foreign investment in Mexico's maquiladoras has decreased.

Among the major suppliers of imports to the United States, Mexico ranked second and China third in 2002. As figure 11 illustrates, both Mexico and China experienced significant growth in exports to the United States from 1995 to 2002. However, between 2000 and 2002, U.S. imports from Mexico grew at a slower pace than those from China. As a result, the gap between Mexico and China narrowed in China's favor.

[17]The figure for 2002 is preliminary, based on data available through September.

[18]China formally joined the WTO in December 2001.

Figure 11: Value of U.S. Imports from Mexico and China, 1995–2002



Source: U.S. International Trade Commission.

As appendix III details, Mexico recently lost market share in 47 out of 152 major U.S. import categories. At the same time, China gained U.S. market share in 35 of those 47 import categories, including toys, furniture, electrical household appliances, television and video equipment and parts, and apparel and textiles. Some of these industries represent significant sectors of maquiladora production.

Recent International Trade Commission (ITC) staff research suggests that while Mexico does face increased competition from China in the U.S. market, some sectors are more threatened than others.[19] According to the

[19]Ralph Watkins, U. S. International Trade Commission, "Mexico Versus China: Factors Affecting Export and Investment Competition," *Industry Trade and Technology Review*, USITC, pub. 3534, July 2002, p. 11ff.

ITC staff research, a growing share of some textiles and apparel products sold in the United States are being produced in China rather than Mexico. In contrast, this staff research notes that within the machinery sector, the data did not indicate a shift in competitiveness away from Mexico towards China. Mixed results are apparent in the electronic products sector. Mexico lost U.S. market share to China in the telephone and telegraph equipment segment in both 2001 and 2002, and Mexico's gain in the computer hardware segment in 2001 was more than offset by a sharp loss to China in 2002.

The ITC staff research noted above concludes that China has competitive advantages over Mexico in terms of labor costs, electricity costs, and diversity of component suppliers. In this context, it is worth noting that wages along the U.S.-Mexico border, where the maquiladoras are concentrated, tend to be higher than in other areas of Mexico.[20] More recent ITC staff research indicates that the cost of water for industrial uses (important in the textiles industry) and corporate income tax rates are lower in China. On the other hand, the ITC staff research suggests that Mexico's comparative advantages include lower transportation costs, shorter transit time, and lower international communication costs. Mexico also provides greater protection for intellectual property, more transparency in regulation and administration, and a network of free-trade agreements with third countries.

Several industry representatives noted that Mexico also faces increased competition from countries in Central America or the Caribbean. One industry spokesperson noted that the U.S. decision in May 2000 to grant NAFTA-parity access to Caribbean Basin Initiative (CBI) countries had eroded Mexico's ability to compete in the U.S. apparel market, particularly because a number of Central American and Caribbean countries have lower labor costs than Mexico. According to a Mexican economic research group, manufacturing wages in Mexico are almost 67 percent higher than in the Dominican Republic and about 92 percent higher than in Honduras.[21]

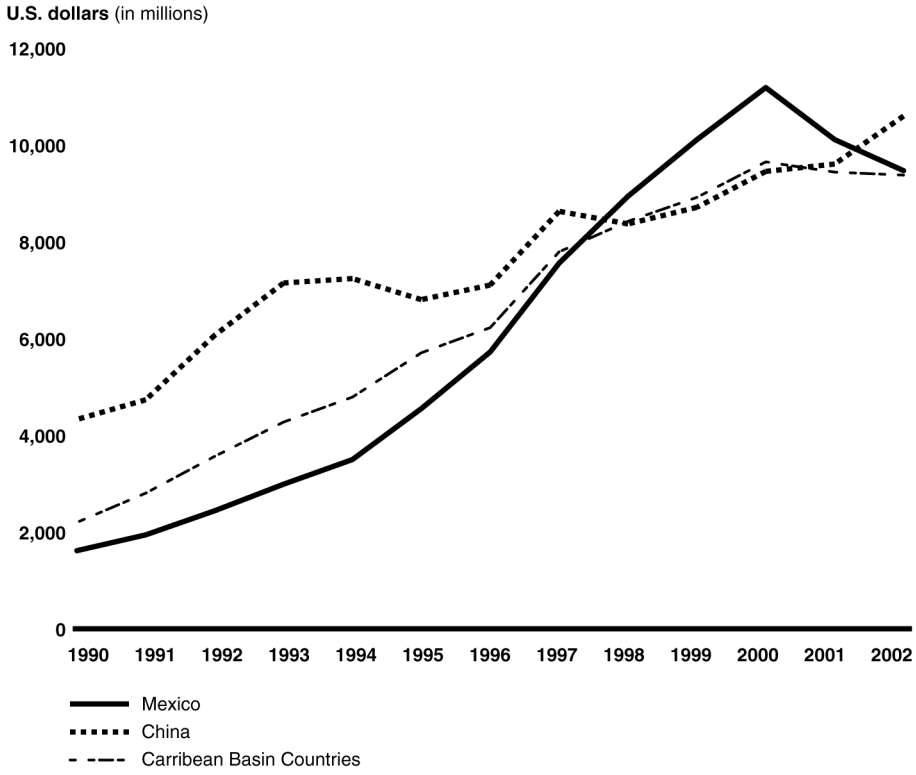
[20]Average wages in Mexico's six border states are higher than in other regions of Mexico except the central area around Mexico City.

[21]Actual figures: Mexico: $2.5/hour; Dominican Republic: $1.5/hour; Honduras: $1.3/hour. Source: "Perspectives of the Maquiladora Industry in the Mexican Economy" (Perspectivas de la Industria Maquiladora en La Economía Mexicana), Center for Analysis and Economic Projections of Mexico (Centro de Análisis y Proyecciones Económicas de México), December 9, 2002.

The heightened global competition from China and CBI countries is part of a larger phenomenon in which the benefits enjoyed by maquiladoras and other Mexican producers have eroded as U.S. trade preferences or liberalization accorded to other countries have expanded. The recent experience of the Mexican textiles and apparel industry, one of the major maquiladora sectors, illustrates this point. In 1994, NAFTA gave Mexico preferential access for its textiles and apparel. Other countries' exports to the United States and Canada generally did not receive similar advantages.[22] U.S. imports of Mexican textile and apparel products grew rapidly, with Mexico's share of total U.S. imports in this sector doubling from 7 percent in 1994 to 14 percent in 2000 (see fig. 12). Mexico surpassed both China and the Caribbean Basin countries to become the largest supplier to the U.S. market. However, under the Trade and Development Act of 2000, the United States allowed textile and apparel products from Caribbean Basin countries that met certain requirements to receive preferential access to the U.S. market. This legislation also stipulated that to benefit from the special treatment, CBI-based apparel operations must use U.S.-made inputs, and, according to a Mexican textile industry association, operations have shifted from using Mexican textiles. In addition, under the WTO Agreement on Textiles and Clothing, all quotas on textile and apparel products are being phased out by 2005. For some products quotas have already been removed. Despite the recent U.S. recession and a decline of total U.S. imports of textiles and apparel by 5 percent between 2000 and 2002, U.S. imports of textiles and apparel from China rose 12 percent, making China again the largest foreign supplier to the U.S. market. Figure 12 shows these changing patterns of U.S. imports in textiles and apparel from Mexico, China, and CBI countries.

[22]U.S. nonreciprocal trade programs, such as the Generalized System of Preferences for developing countries and CBI for Caribbean and Central American trade partners, generally excluded textile and apparel from special preferences. Canada is an exception, also receiving benefits through NAFTA.

Figure 12: U.S. Imports of Textiles and Apparel from Mexico, China, and Caribbean Basin Countries, 1990–2002



Source: GAO analysis of official U.S. trade statistics from the Bureau of the Census.

Note: Caribbean Basin Countries are those eligible for the Caribbean Basin Trade Partnership Act preferential access. These countries are Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

Industry Representatives Blame Strong Peso for Loss of Competitiveness

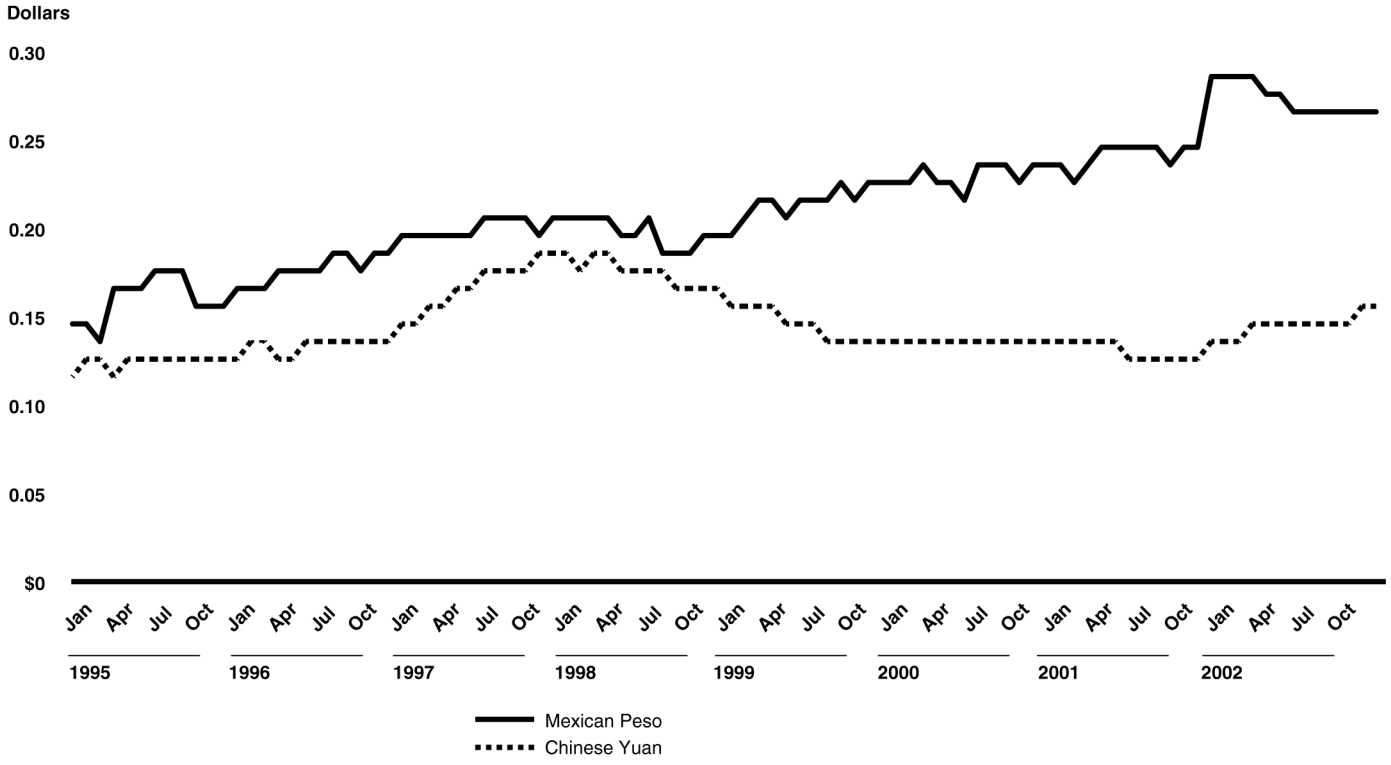
Many industry representatives whom we contacted also called attention to the role of the strengthening Mexican currency in eroding the maquiladoras' competitiveness. Historically, growth periods in the maquiladoras have been associated with devaluations of the peso. For example, after the peso was devalued in 1984, there was a 3-year surge in U.S. automotive industry investments in maquiladora plants. Similarly, according to a study by the El Paso Branch of the Federal Bank of Dallas, the peso devaluation in December 1994 played a key role in spurring the expansion of Mexico's maquiladoras during the second half of the past

decade.[23] However, beginning in the last quarter of 1998, the Mexican peso consistently appreciated against the dollar in real terms, a trend that continued while the maquiladoras experienced their greatest employment decline, from the end of 2000 to the beginning of 2002 (see app. II for the relative dependence of maquiladora employment on the real peso exchange rate). As the peso appreciated in real terms, maquiladora operating expenses increased.

Moreover, this real appreciation of the Mexican peso took place as the currencies of some of Mexico's East Asian competitors were depreciating against the dollar. For example, figure 13 compares the performance of the Chinese yuan to the Mexican peso, in real terms, between 1995 and 2002. Unlike the peso, the yuan has actually depreciated since early 1998.

[23]William C. Gruben, Federal Reserve Bank of Dallas, "Was NAFTA Behind Mexico's High Maquiladora Growth?" *Economic and Financial Review*, Third Quarter 2001.

Figure 13: Real Dollar Exchange Rate of Mexican Peso and Chinese Yuan, 1995–2002



Source: U.S. Department of Agriculture, Economic Research Service.

Changes in Mexican Tax Policies Raise Investor Uncertainty

Among industry groups whose members had experienced losses in employment or production, about two-thirds of those we interviewed indicated that uncertainty resulting from Mexican government tax policies was a major factor in the maquiladoras' decline. These groups noted that such uncertainty had caused some firms to withdraw from, or downsize, their operations in Mexico and had also discouraged new foreign direct investment in Mexico. In particular, industry representatives said that frequent changes to the fiscal regime had increased the tax burden and administrative costs to maquiladoras. They were also concerned that the frequent changes reduced the maquiladoras' ability to develop long-term investment plans.

In addition to the duty-free treatment on import of parts, components, and other inputs, maquiladora plants enjoyed, at least until the mid-1990s, a virtual freedom from taxation. Though legally subject to income taxes, in practice, the companies paid only a small assets tax, a flat minimum of 2 percent of the value of the maquiladora's assets. Moreover, the maquiladoras were permitted to use the cost of wages to offset their tax on assets. This virtually eliminated taxes for some maquiladoras. According to experts, the twin benefits of duty-free import and minimal taxation were primary incentives for foreign firms to establish manufacturing operations in Mexico.

The tax regime applicable to maquiladoras remained constant for almost 30 years but began to evolve rapidly in the 1990s. The most significant of these tax changes, the treatment of what are known as "permanent establishments" is frequently noted by industry groups and others as a cause of investor uncertainty about the industry.

A permanent establishment typically is a branch of a company from one country that is doing business in another "host" country, and which may be taxed in that host country. According to U.S. Treasury officials, permanent establishment is a concept found in virtually all double taxation treaties. Mexico adopted the permanent establishment concept as part of its income tax law in 1981. According to U.S. Treasury officials and Mexican tax experts GAO consulted, Mexico essentially exempted maquiladoras from the tax that could be imposed on permanent establishments until 1998. However, starting in 1998, Mexico began seeking to treat the foreign parent companies of maquildoras as having permanent establishments in Mexico for tax purposes. By treating the maquiladoras as permanent establishments, the Mexican government could subject the foreign parent companies to taxation, potentially allowing Mexico to increase the revenues it collects from maquiladora operations.

The right of the Mexican government to tax maquiladoras as permanent establishments was affirmed in the U.S.-Mexico tax treaty of 1992. However, U.S. companies with maquiladora operations in Mexico were concerned that Mexico's application of permanent establishment to their maquiladora operations would subject them to double taxation. This could occur if Mexico imposed a broad definition of how permanent establishments could be taxed that the U.S. Treasury would not accept, because it would prevent the U.S. parent company from getting a full credit in the United States from the taxes actually paid in Mexico. Resolution of potential problems, such as double taxation, associated with the treatment

of maquiladoras as permanent establishments has necessitated a series of additional bilateral agreements between the United States and Mexico. It took several years and several different iterations to finally resolve such practical problems, and this caused a prolonged period of uncertainty for maquiladoras. Other changes in Mexico's tax regime have contributed to the climate of investor uncertainty. In 2002, for example, Mexico limited the ability of businesses, including maquiladoras, to take a tax credit on salaries. According to industry representatives, this provision could have significantly increased the tax burden on some maquiladoras. However, according to Mexican officials, this tax provision has subsequently been ruled unconstitutional.

NAFTA Phased Out Some Maquiladora Benefits

The phasing out of maquiladora benefits as part of NAFTA was also cited by industry associations as a major factor in the decrease in maquiladora production and employment. When NAFTA was signed in 1993, it envisioned fundamental changes to the maquiladora model. The most significant of these changes was embodied in Article 303 of NAFTA, which eliminated duty drawback (or refunds of duties)[24] for inputs of non-NAFTA origin as of January 1, 2001, if the final products incorporating these inputs are to be subsequently exported to another NAFTA country. For various reasons, notwithstanding the 7-year grace period provided, the maquiladoras did not develop a network of domestic suppliers in Mexico. As a result, implementation of Article 303 has adversely affected the competitiveness of maquiladoras that rely on non-NAFTA suppliers for inputs and resulted in closure of some maquiladora firms.

According to officials with the Office of the U.S. Trade Representative, some aspects of the Maquiladora program were not consistent with NAFTA's trade objectives. For example, the duty drawback provisions of the Maquiladora program were in conflict with NAFTA's rules of origin requirements. Under NAFTA's rules of origin, goods traded among NAFTA partners are allowed duty-free status only when the goods comprise a minimum percentage of North American content. However, the Maquiladora program provided duty drawbacks for inputs imported to Mexico from any source, including non-NAFTA countries, undermining the duty-free benefits that North American products were to receive in Mexico as a result of NAFTA. Second, such drawback programs represented an

[24]"Duty drawback" refers broadly to the refund, waiver, or reduction of customs duties owed on imported goods, on condition that the goods are subsequently exported.

advantage for exporters versus firms involved in production for the domestic market, since the latter would not receive an equivalent duty drawback. In negotiating NAFTA, the United States hoped to reverse this advantage, which led to the development in Mexico of an economic system with separate production tracks for exports and for goods destined for domestic consumption. In fact, U.S. officials explained that they envisioned the gradual phasing-out of maquiladoras with the implementation of NAFTA, as duty-free treatment would apply to all trade among NAFTA member countries.

The rationale behind Article 303 was to encourage firms to develop North American suppliers for critical inputs by providing an incentive for maquiladoras to shift sourcing of components or inputs to North America, including Mexico. The development of a network of North American suppliers would mean that more value would be added during the production process in Mexico, the United States, and Canada.The elimination of duty drawback would necessitate significant changes in the sourcing of maquiladora inputs, particularly for maquiladora operations of some Japanese and other Asian companies that were heavily dependent on certain inputs from the Far East. The implementation of Article 303 was therefore scheduled for January 1, 2001, 7 years after NAFTA's entry into force, to allow the maquiladoras to relocate their supply chain to North America. However, a network of Mexican domestic suppliers for the maquiladoras largely failed to materialize during this period. Maquiladora observers have suggested several explanations, principally the scarcity of credit in Mexico to support entrepreneurial activity and the lack of an entrepreneurial culture among Mexican businesses.

Under NAFTA, Mexico could have chosen to counter the loss of duty drawback following implementation of Article 303 by reducing or eliminating its most favored nation duties on key inputs. U.S. officials note that Canada eliminated hundreds of its most favored nation duties before Article 303 took effect. Instead, in order to cushion the impact of NAFTA Article 303, Mexico instituted a measure known as the sectoral promotion program with targeted and reversible tariff reductions.[25]

Since Article 303 was implemented, maquiladoras that depend on inputs from outside North America have seen their competitiveness erode. Some maquiladoras have reported production cost increases of up to 20 percent

[25]See discussion of the sectoral promotion program (PROSEC) below.

due to the implementation of Article 303. Japanese, Korean, and Taiwanese companies involved in maquiladora production have been particularly affected by the implementation of Article 303 and have led the way in relocating from Mexico to other countries. Industry associations we contacted, representing maquiladoras in the Tijuana area, where Asian-owned maquiladoras are concentrated, as well as an association representing Japanese business in Mexico, attributed the departure of maquiladora firms from Mexico, at least in part, to the implementation of Article 303.

Maquiladora Downturn Spurs Some Positive Changes, but Fundamental Challenges to Future Viability Remain

Significant challenges continue to confront Mexico's maquiladoras, although recent industry and government action and the prospect of future Mexican reforms may bolster prospects for maquiladoras' recovery. The downturn during the past 2 years has accelerated ongoing industry evolution and has been a catalyst for several industry and government changes to improve the competitiveness of the sector. However, maquiladoras still face fundamental challenges. For the most part, meeting these challenges depends on further action by the government of Mexico, but some of the challenges are related to U.S. policies that are likely to put additional pressure on maquiladoras.

Maquiladoras Face Serious Challenges and Questions about Viability

The factors described in the previous section as having a role in the maquiladora's recent decline still confront the industry. As a result, some Mexican government officials have stressed the need to move beyond the current "maquiladora model" to attract a new generation of more technologically advanced operations that would allow Mexico to remain competitive.

Given the continuous evolution of maquiladora operations, Mexico's maquiladora industry is now a complex sector with substantial diversity. One academic expert concludes that as firms become involved in more sophisticated, capital-intensive operations, they are less likely to close and move their plants because of cyclical downturns such as the one maquiladoras faced after 2000. Some Mexican maquiladoras are now recognized as having sophisticated production and management methods. According to industry experts, such maquiladoras are better positioned to weather the maquiladora downturn and deal with continuing challenges. Nevertheless, researchers point out that the transition to more advanced

production practices is quite uneven.[26] Many maquiladoras remain oriented toward lower-skill activities that involve few Mexican inputs besides labor. The downturn of the last several years has resulted in a shake-out involving some losers, notably among this type of operations.

Downturn Catalyst for Industry and Government Efforts to Improve Competitiveness

One positive aspect of the recent maquiladora downturn is that it has spurred some actions by industry and the government of Mexico to restore Mexican competitiveness. In the face of increased global competition, maquiladoras are seeking to capitalize on Mexico's unique competitive advantages, particularly those associated with that country's proximity to the United States and its growing network of free trade agreements. For example, noting the recent establishment of plants in Juarez by several computer manufacturing firms, one industry analyst explained that Mexico's quick time-to-market location is essential for the success of both new products as well as repairs in the computer value chain. Similarly, a senior industry expert noted that the growth of automotive maquiladoras, in northern and central Mexico, underscores the competitive advantages resulting from the efficient combination of U.S. and Mexican inputs. According to this source, notwithstanding the arrival of new competitors, the Mexican automotive industry is poised to take advantage of the full opening of the regional North American automotive market that will occur in 2004. Mexico also stands to benefit as a direct and indirect automotive sector exporter to the United States and other countries with which Mexico has signed trade agreements.

Some industry sources reported unexpected benefits associated with the recent losses experienced by the maquiladoras. According to industry representatives in Juarez, the rapid pace of maquiladora growth had put intense pressure on local infrastructure during the late 1990s. Local authorities simply could not keep up with the demand for health, education, and other services associated with the dramatic increases in population growth that accompanied the expansion of maquiladoras. They viewed the slowdown of the past 2 years as a welcome respite.

In addition, a number of industry representatives noted that the downturn has resulted in significant drops in employee turnover and in the associated hiring and training costs. Prior to the downturn, they said, maquiladoras in

[26]James Gerber and Jorge Carrillo, "*Are Tijuana's and Mexicali's Maquiladora Plants Competitive*?" San Diego Dialogue, July 2002.

some border cities reported very high employee turnover rates because the rapid growth in maquiladora establishments allowed workers to continuously find new jobs in other plants. One expert suggested that such turnover in some border cities had reached 80 percent at the height of the maquiladora boom. Consequently, employers had significant hiring and training costs and were forced to keep some positions overstaffed to compensate for the turnover. This could have more fundamental implications for the ability of some maquiladoras to build a highly skilled workforce, since it is not feasible to invest in significant training for workers whose expected tenure with a firm is only a few months. Industry sources told us that the turnover rates had dropped sharply since the downturn, and some maquiladoras report that this has had a positive effect on administrative costs as well as the cost of training new employees.

Finally, industry sources stressed the importance of Mexican government action for the development of a favorable business environment that can respond quickly to changing market forces faced by maquiladoras. In response to industry pressure, the Mexican government recently undertook several measures in support of the maquiladoras, primarily aimed at easing irritants.

- On May 12, 2003, the Mexican government issued a decree modifying certain aspects of the Maquiladora program.[27] The reforms are aimed primarily at simplifying regulations that apply to companies that provide support and logistic services to maquiladoras, and to enhance legal certainty for Mexican exporters, including maquiladoras. An important provision of the new decree will be streamlined customs requirements for companies with several subsidiaries operating under the Maquiladora program. This would allow such companies greater flexibility in the transfer of finished or semi-finished products from one subsidiary to another. The decree also contains provisions that would reduce administrative costs and procedures. For example, a maquiladoras will only have to submit a single report on an annual basis, which can be submitted electronically. Based on initial industry reaction, it is unclear whether the new decree will satisfy critics seeking greater legal certainty and improved incentives for maquiladoras.

[27]Decree for the Development and Operation of the Maquiladora Export Industry (Decreto que reforma el diverso para el fomento y operación de la industria maquildora de exportación), Official Daily Gazette (Diario Oficial), May12, 2003, Section 1, page 107.

- In response to the recent crisis in the maquiladora industry, Mexico has greatly expanded its sectoral promotion program (PROSEC). First launched in November 2000, PROSEC was intended to reduce the impact of NAFTA Article 303 (which became effective January 1, 2001) by providing that duty rates on imported inputs from non-NAFTA suppliers of either 0 or 5 percent. Initially, maquiladora industry representatives complained that PROSEC was too restrictive because it applied to very few imported inputs. However, throughout 2001 and 2002, the list of products eligible for tariff reduction under PROSEC was progressively expanded to include more than 16,000 products from 22 industry sectors, including electronics and textiles and apparel.

- In September 2002, the Mexican government provided additional support to the maquiladoras through a program called the Information Technology Agreement (ITA) Plus.[28] ITA Plus immediately removed tariffs from inputs, parts, and components used in the electronic and high-technology sectors, regardless of the country of origin. It also provided for the gradual removal of tariffs from semifinished and finished products in those sectors. According to Mexican officials, in addition to lowering tariffs on electronic and high technology inputs, ITA Plus may help to reduce the administrative burden on the maquiladoras.

- The Presidential Council for Competitiveness was created in July 2002 to promote investment, increase employment, and accelerate Mexico's economic growth. A cooperative effort between government and business that is chaired by the Minister of Economy, the council's activities include the creation of fiscal stimulus packages for export factories in twelve different sectors of the economy, including maquiladoras as part of the in-bond industry. One objective of the council is the development of manufacturing clusters, which will deepen the supply chain in Mexico. In support of the work of the council, the Secretariat of the Economy has agreed to fund, through the National Council of the Maquiladora Export Industry (CNIME), a comprehensive study on the maquiladora industry.

[28]The Information Technology Agreement (ITA) was negotiated under the auspices of the WTO and concluded in 1996, eliminating tariffs on information technology products by the participating members. Mexico has not joined the WTO ITA, but chose to unilaterally eliminate tariffs on certain information technology products in its ITA Plus initiative. However, because Mexico did not commit to these tariff cuts in the WTO, it may change them at any time.

- Recent agreements between the United States and Mexico have largely resolved the threat of double taxation of U.S. firms that was raised by Mexico's efforts to define maquiladora parent companies as permanent establishments, discussed above. As a result of a Second Additional Protocol to the U.S.-Mexico tax treaty, signed in 2002, the United States will be able to provide a foreign tax credit to U.S. firms that have paid income taxes to Mexico with respect to their maquiladora operations. Mexico has also independently announced that it will make no changes to existing agreements on permanent establishment until 2007.

These steps by the Mexican government seem to reflect wider recognition by officials in Mexico City of the maquiladoras' importance to Mexico. Industry representatives complained that the Mexican government was slow to respond to the challenges faced by the maquiladoras. According to these representatives, the Mexican government initially took "a wait and see" approach to the maquiladoras decline, in the belief that labor-intensive maquiladora operations leaving Mexico would be readily replaced by better paid, more profitable industries. As job losses continued in the first three months of 2002, maquiladora representatives pressured the government to implement remedial measures.

Future Challenges Remain, Involve Difficult Reforms

Notwithstanding the initiatives discussed above, government, industry and academic sources suggest that meeting remaining challenges to the future success of the maquiladoras will, in some cases, require fundamental Mexican reforms in several areas, including energy, infrastructure and labor. However, the initiatives Mexico is pursuing in these areas may be difficult to bring about.

Some Consider Energy Reform Vital to Mexico's Competitiveness

Government officials and industry representatives stated that there is an urgent need for energy reform in Mexico. Energy sector reform is important to the maquiladora industries because they require reliable and competitive energy prices to compete with suppliers in other nations. The ITC, for example, has noted that electricity and industrial water costs are two areas in which Mexico is less competitive than China. The Fox administration maintains that without energy reform, Mexico may experience a power crisis as early as 2004, and it introduced an energy reform bill in August 2002. The legislation stalled in the Mexican Congress, however, because some legislators opposed aspects of reform dealing with privatization that would entail amending the Mexican constitution.

Upgrading and Modernizing Mexican Infrastructure Is Critical

Maquiladora and other Mexican industry associations cite improving Mexico's infrastructure as critical to advancing Mexico's competitiveness. According to a report by the Mexican Government Commission for Border Affairs, the six Mexican states that border the United States share the advantage of an adequate basic infrastructure, with a road network variously described as good, fluid, or satisfactory. However, even in this region, about 32 percent of the Mexican federal highways are in poor condition. Another study found that critical problems persist in Mexico's road infrastructure, notably, limited public or private investment in highways in recent years. Some maquiladora representatives we spoke with cited infrastructure shortcomings as a disincentive for potential investors in maquiladoras.

Need for Mexican Labor Reform Acknowledged

According to Mexican labor officials, as part of its platform to modernize Mexico and improve its international competitiveness, the government has sought to reform the labor code. Maquiladora representatives stated that improvements in labor productivity depend on reform of labor regulations to provide increased flexibility to employers. The Fox administration has responded to this need for labor reform by developing a labor reform package that represents a compromise between labor groups, business, and government. Key elements of the reform package include the use of secret ballots in union elections, the allowance of more than one union to represent worker interests, expanded employer flexibility to hire workers on a trial basis, and a strengthened binding arbitration process. This reform package was not passed by the Mexican Congress before congressional elections were held in July 2003, in part because it lacked consensus support within the Mexican labor movement.

Worker Skills in Mexico Must Be Improved

A consultant for the maquiladora industry cites worsening shortages of trained labor in most cities where maquiladoras are concentrated as among the challenges confronting the industry that the government must address. One academic study[29] of the maquiladoras' viability found that to develop more technology-intensive operations, Mexico needs a large number of highly educated workers. However, according to the Commission on Border Affairs, the data indicate a low level of educational attainment in the economically active population along the border, with over one-third of adults having completed only primary education or less. The search for

[29]John Sargent and Linda Matthews, The University of Texas-Pan American, Center of Economic Studies, *Boom or Bust: Is it the End of Mexico's Maquiladoras?* Working Paper #2002-6, August 2002.

better educated workers has led a number of companies to establish assembly plants in cities further from the border, with better reputations for good public secondary education and trade schools.[30]

U.S. Policies May Exert Additional Pressure on Maquiladoras

Action by Mexico is key to the maquiladoras' future viability, particularly since U.S. approaches to trade liberalization and homeland security may put additional pressure on maquiladora operations. Industry representatives noted that present U.S. policies in these areas could undermine current benefits and reduce future competitiveness.

U.S. Trade Liberalization Could Affect Maquiladora Development

Regarding U.S. trade policy, the future development of the maquiladora industry in Mexico may also be affected by further changes in competitors' access to the U.S. market. The United States is engaged in trade negotiations in several venues, including the Doha Round among the 146 members of the WTO, the Free Trade Agreement of the Americas (FTAA) involving 34 nations of the Western Hemisphere, and the U.S.-Central America Free Trade Agreement. These negotiations may reduce barriers to non-NAFTA countries' products to levels similar to those enjoyed by NAFTA participants, Mexico, and Canada. For example, in the WTO, the United States has proposed to eliminate all industrial tariffs by 2015, and in the FTAA, the United States has proposed to phase out textile and apparel tariffs within 5 years after the agreement is implemented, if its hemispheric partners reciprocate. As we concluded in a 2001 report,[31] expansion of trade benefits to wider numbers of competitors, while benefiting U.S. consumers and other trade partners, dilutes the benefits of prior trade preferences. Some business association representatives that we interviewed expressed concern that future U.S. trade agreements would erode benefits provided to Mexican suppliers in the U.S. market under NAFTA. Representatives for one industry association expressed hope that the United States would use negotiations such as the FTAA to strengthen regional competitiveness relative to global competitors such as China.

[30]For a discussion of the trend for new maquiladora investments to be located in the interior of Mexico see Rubén Mata, U.S. International Trade Commission, "Recent Developments in Mexico's Assembly Industry," *Production Sharing: Use of U.S. Components and Materials in Foreign Assembly Operations, 1994-1997*, USITC, pub. 3146, Dec. 1998, pp. 2-10ff.

[31]U.S. General Accounting Office, International Trade: *Comparison of U.S. and European Union Preference Programs*, GAO-01-647 (Washington, D.C.: June, 2001).

U.S. Homeland Security Measures Could Slow Cross-Border Movement of Goods and Personnel

Maquiladora industry experts also expressed concern that U.S. security measures instituted at ports of entry after September 11, 2001, could erode the Mexican maquiladora industry's advantage of proximity to U.S. markets. Of particular concern are U.S. government measures that require advance notice for transborder shipments of goods and additional information on the entry into and departure from the United States of every foreign citizen.[32] Companies that use just-in-time operations, an important element in some maquiladora operations, could be especially hurt by requirements related to advance notice for shipments, because they could not ship goods immediately on receiving an order.[33] Firms that rely on regular and efficient movement of workers and service operations across the border could be especially affected by the information requirements for Mexican workers who cross the border frequently. For example, at one major border crossing in downtown El Paso, less than a mile from Interstate 10, significant congestion would result if U.S. authorities had to screen traffic bound for Mexico to obtain information from every departing alien. Successful implementation of these new requirements will require close coordination of U.S. and Mexican national and local officials as well as adaptation of the private industry to the new requirements.

Conclusion

Both the United States and Mexico have an interest in the future of maquiladoras given their central role in U.S.-Mexico trade and the border economy. Partly driven by maquiladoras, Mexico has assumed a more prominent place among U.S. trade partners in recent years, becoming the United States' second leading trading partner, after Canada. Moreover, production and employment linkages have developed between

[32]Two measures regarding advance notification of cargo shipments are cause for industry concern: (1) an informal U.S. Customs proposal that would require trucks to declare the contents of their cargo 4 hours before they enter the United States and 24 hours before they enter Mexico, which falls under the Advance Electronic Information provision of the Trade Act of 2002 and has not yet gone into effect and (2) a U.S. customs measure known as the 24-hour rule, effective since December 2, 2002, which requires ships traveling to U.S. seaports to declare the contents of their cargo 24 hours before they depart from a foreign port – 19 CFR 4.7(b)(2). Regarding entry of foreign citizens, at issue is an Immigration and Naturalization Service mandate that is part of Section 110 of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996.

[33]Customs officials noted that they are keenly aware of the importance of "Just in Time" delivery and have taken that into account in any programs proposed for cargo clearance. Customs also intends to offer a program known as Free and Secure Trade to speed the clearance of known shippers, importers and carriers, and assist in moving traffic border-wide.

maquiladoras and producers throughout the United States and are based on the high volume of U.S.-generated components used in maquiladora operations. Businesses in communities on the U.S. side of the border provide services to the maquiladoras, such as customs brokerage and commercial transportation. Retail sales to Mexican citizens in U.S. border communities contribute substantially to U.S. business and tax receipts. The decline in Mexico's maquiladora production and employment has already taken its toll on cross-border trade and trade-related employment in certain U.S. border communities. Maquiladoras have become an even more important element of the Mexican economy, particularly over the decade of the 1990s, when maquiladora growth propelled Mexico into the ranks of the world's leading exporters and generated 900,000 new jobs. Employment created by maquiladoras on the Mexican side of the border has become a mainstay of economic activity in that country. The decline over the past 2 years has served as a catalyst for further transformation of the industry, as well as Mexican industry and government efforts to restore competitiveness. The challenges still confronting maquiladoras and the pressure from U.S. trade and homeland security policies lend urgency to Mexican efforts to create an environment where cross-border links between U.S. and Mexican firms and communities can continue to prosper.

Agency Comments and Our Response

We provided a draft of this report for comment to five U.S. government agencies: Department of State, the Office of the U.S. Trade Representative, U.S. Customs and Border Protection (formerly U.S. Customs), Department of the Treasury, and the U.S. International Trade Commission. We also asked for comments from three Mexican government agencies: the Ministry of the Economy (Secretaría de Economía) the Ministry of the Treasury (Secretaría de Hacienda), and the National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática). We received informal written comments from all of these U.S. and Mexican government agencies, except Mexico's Ministry of Economy. In addition, the Department of State provided formal written comments, which are reprinted in appendix VII.

In general, all of the agency comments were technical or editorial in nature, which we incorporated as appropriate in the text of our report. In addition, U.S. ITC staff had more extensive comments related to our decision to exclude firms operation under the so-called PITEX program from the general scope our work, noting that PITEX firms are important in certain sectors, such as autos, and account for a substantial share of Mexico's total exports to the United States. While we recognize that firms operating under

PITEX are an important element in U.S-Mexico production-sharing operations, as are maquiladoras, we limited our report to the Maquiladora program for several reasons. First, our requesters specifically expressed an interest in the maquiladora industry and the effects of the recent decline of the maquiladoras along the U.S.-Mexico border. Unlike maquiladoras, which are still concentrated along the border, firms operating under the PITEX program are spread throughout Mexico. Secondly, the data the government of Mexico collects on maquiladoras are significantly more extensive and are not altogether comparable to the data collected on PITEX firms. Thus, there would have been problems in comparing the two types of operations. Finally, the data available on PITEX firms suggest that they have experienced trends in recent years not unlike those observed among maquiladoras. Including data on PITEX firms would not have significantly altered our message.

We are sending copies of this report to other interested members of Congress, the Secretary of State, the Secretary of the Treasury, the U.S. Trade Representative, the Secretary of the Department of Homeland Security, the Commissioner of Customs, and the Chairman of the U.S. International Trade Commission. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you, or your staff, have any questions about this report, please contact me on (202) 512-4347. Other GAO contacts and staff acknowledgments are listed in appendix VIII.

Loren Yager
Director, International Affairs and Trade

Structure of Employment Growth in the U.S.-Mexico Border Area

This appendix examines U.S. employment changes along the U.S.-Mexico border and explores whether employment in the border areas of the United States has been disproportionately affected by the recent slowdown in U.S. economic activity and the associated decline in cross-border trade between the United States and Mexico. For the purpose of this analysis, the U.S. border with Mexico is defined as the metropolitan statistical areas (MSA) closest to the U.S.-Mexico border, comprising the MSAs for San Diego, California; Tucson, Arizona; Las Cruces, New Mexico; and El Paso, Brownsville, Laredo, and McAllen, Texas.[1]

U.S. employment in the border area increased by approximately 591,000 jobs between 1990 and 2002, largely owing to the overall national trend in employment growth. For example, according to our analysis, 60 percent of the jobs gained were due to the growth of the national economy. However, 230,000 of those jobs could be linked to local factors, that is, factors associated with the area's attractiveness for employment creation. Most of the new jobs were added from 1995 to 2002. However, the ways in which each border subregion benefited from the employment growth vary considerably.

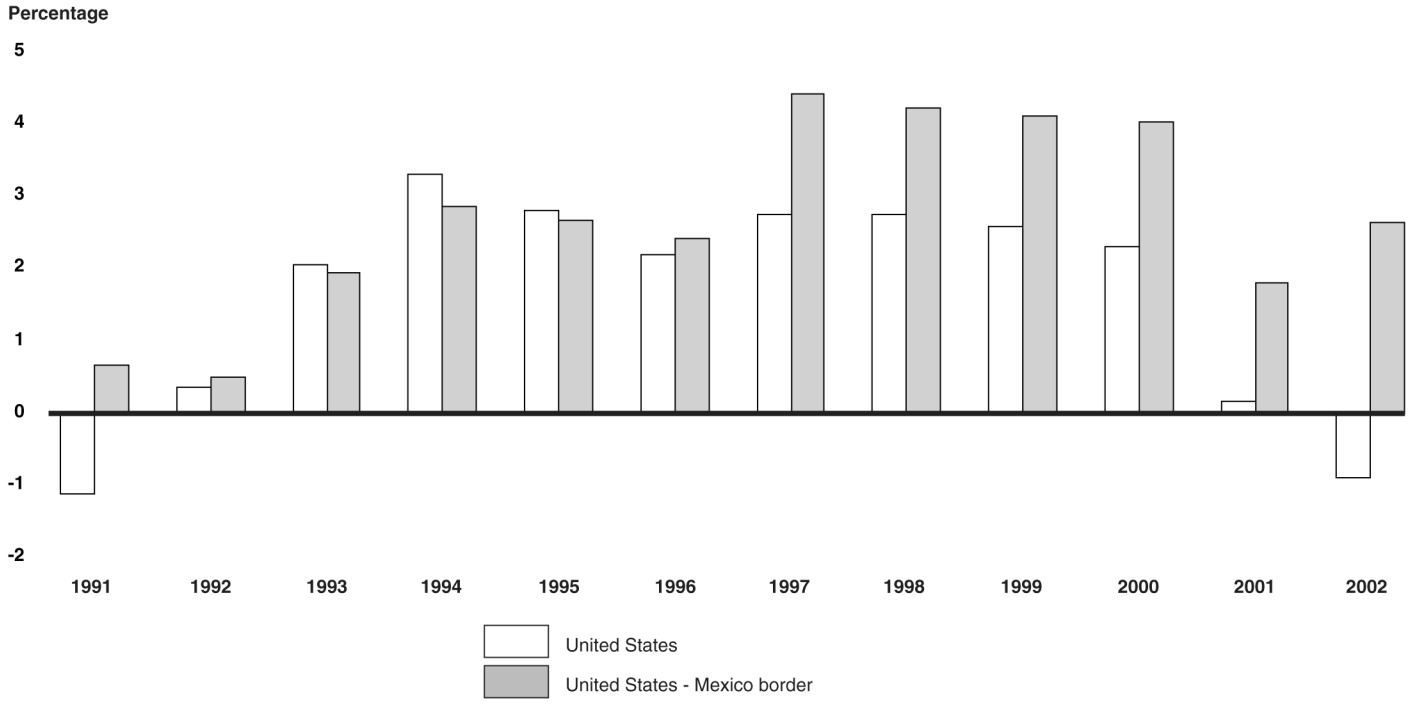
U.S. Border Employment Outpaced Nation's since 1995

U.S. employment in the U.S.-Mexico border area grew by 35 percent between 1990 and 2002, gaining 591,000 jobs. The services sector was the largest employer and accounted for approximately 48 percent of the job growth (282,000 jobs) during this period. Other sectors with notable employment growth were retail trade (93,000 jobs); finance, insurance, and real estate (20,000 jobs); transportation and public utilities (31,000 jobs); and government (128,000 jobs). As figure 14 shows, total nonfarm employment growth rates in the border region were generally similar to those observed for the United States from 1993 to 1995. However, employment growth in the border MSAs exceeded employment growth at

[1]The U.S. border with Mexico is defined by the states of California, Arizona, New Mexico, and Texas. However, a meaningful description of the border would require the exclusion of large portions of each of these states. Many analysts define the border in terms of the contiguous counties that have direct geographical links with Mexico. According to this definition, the U.S.-Mexico border consists of the counties of San Diego and Imperial in California; the counties of Yuma, Pima, Santa Cruz, and Cochise in Arizona; the counties of Hidalgo, Luna, and Dona Ana in New Mexico; and the counties of El Paso, Hudspeth, Culberson, Jeff Davis, Presidio, Brewster, Terrell, Val Verde, Kinney, Maverick, Dimmitt, Webb, Zapata, Starr, Hidalgo, and Cameron in Texas.

the national level after 1995.[2] Furthermore, growth of nonfarm employment in the border area continued even after the U.S. economic slowdown began in 2001. Laredo and McAllen grew fastest, followed by Brownsville, Tucson, Las Cruces, and San Diego.

Figure 14: Nonfarm Annual Employment Growth in the United States and in U.S. Metropolitan Statistical Areas at the U.S.-Mexico Border, 1991-2002



Source: GAO calculations using Department of Labor, Bureau of Labor Statistics data.

Some border industries experienced a decline in employment in 2001 and 2002, particularly manufacturing (down 6 percent), transportation and public utilities (down 4 percent), and wholesale trade (down 3 percent) (see table1). As table 1 shows, declines in manufacturing were relatively more severe in Texas (down an average of 18 percent), while declines in wholesale trade and transportation and public utilities were more

[2]Given that NAFTA was implemented in 1994, the graph suggests that NAFTA had an employment-stimulating effect in the border counties.

pronounced in Arizona (down 9 and 11 percent, respectively). A closer look at Texas further shows that the manufacturing, transportation, and public utilities sectors declined after 2000 in all four Texas border MSAs.

Table 1: Employment Growth of the United States and U.S. Metropolitan Statistical Areas at the U.S. Mexico Border by Industry: 1990–2002 and 2000–2002

		Total nonfarm	Construc-tion & mining	Manufac-turing	Transportation & public utilities	Wholesale trade	Retail trade	Finance, insurance, & real estate	Services	Government
United States	2000-2002	-1%	-1%	-9%	-4%	-4%	0%	2%	2%	3%
	1990-2002	20%	22%	-12%	17%	8%	19%	16%	47%	16%
US-Mexico Border	2000-2002	4%	5%	-6%	-4%	-3%	7%	6%	5%	8%
	1990-2002	35%	48%	-7%	43%	13%	27%	21%	65%	37%
San Diego, CA	2000-2002	5%	9%	-1%	-1%	-1%	8%	4%	6%	8%
	1990-2002	30%	46%	-5%	40%	14%	22%	14%	59%	26%
Tucson, AZ	2000-2002	2%	-1%	-4%	-11%	-9%	3%	7%	0%	9%
	1990-2002	42%	43%	21%	14%	32%	24%	35%	60%	49%
Las Cruces, NM	2000-2002	5%	0%	3%	-5%	8%	6%	0%	8%	6%
	1990-2002	37%	50%	-8%	31%	56%	35%	25%	111%	14%
Brownsville, TX	2000-2002	2%	7%	-19%	-4%	7%	6%	0%	5%	6%
	1990-2002	47%	96%	-14%	66%	22%	38%	5%	93%	53%
El Paso, TX	2000-2002	-1%	-2%	-17%	-10%	-9%	4%	12%	1%	8%
	1990-2002	22%	46%	-24%	31%	-4%	26%	35%	43%	38%
Laredo, TX	2000-2002	6%	-6%	-22%	-5%	-10%	14%	11%	10%	13%
	1990-2002	62%	3%	-22%	82%	12%	45%	63%	106%	81%

(Continued From Previous Page)

		Total nonfarm	Construction & mining	Manufacturing	Transportation & public utilities	Wholesale trade	Retail trade	Finance, insurance, & real estate	Services	Government
McAllen, TX	2000-2002	9%	4%	-18%	0%	0%	9%	11%	19%	12%
	1990-2002	69%	92%	-25%	120%	11%	55%	56%	165%	71%

Source: GAO calculations using U.S. Department of Labor, Bureau of Labor Statistics data.

Analysis of Employment Trends

To analyze the factors at the national and local levels that contributed to the employment trends described above, we employed a methodology known as shift-share analysis that decomposes employment growth (or decline) in a region over a given time period into three components: the national growth effect, the industry-mix effect, and the local (competitive) effect.

1. *National growth effect.* The national growth effect is that part of a regional change in total employment ascribed to the national growth rate of total employment. It assumes that the region's employment growth matches the overall national rate. The national growth component is the change that would be expected given that the local area is part of a changing national economy.[3]

   Our analysis shows that from 1990 through 2002, the border counties gained 339,100 jobs due to economic trends at the national level (see table 2). However, the actual gain occurred prior to the year 2000 as an estimated 15,800 jobs were lost due to the national trend in 2001 and 2002. The border area's biggest employer, the service sector, had the highest national growth component (97,300 jobs), followed by the government (71,200 jobs), and retail trade sectors (65,900 jobs). Our analysis incorporating possible differences among the border subregions shows that from 1990 through 2002, nonfarm employment growth in San Diego accounted for nearly 50 percent of the increase in employment due to employment expansion at the national level.

[3]For example, during the time period 1990–2000, nonfarm employment in the United States grew by 20 percent (i.e., from 109.4 million to 130.8 million). Therefore, the national growth component of any region within the United States during this period would be 20 percent of the the region's 1990 employment.

2. *Industry-mix effect.* An industry-mix effect is the amount of change that a region would have experienced had each of its industries grown at their industry national rates, less the national growth effect. This component identifies the share of local job growth that can be attributed to the region's mix of industries and seeks to address whether employment growth in an area outpaced the nation owing to a concentration of faster growing industries.

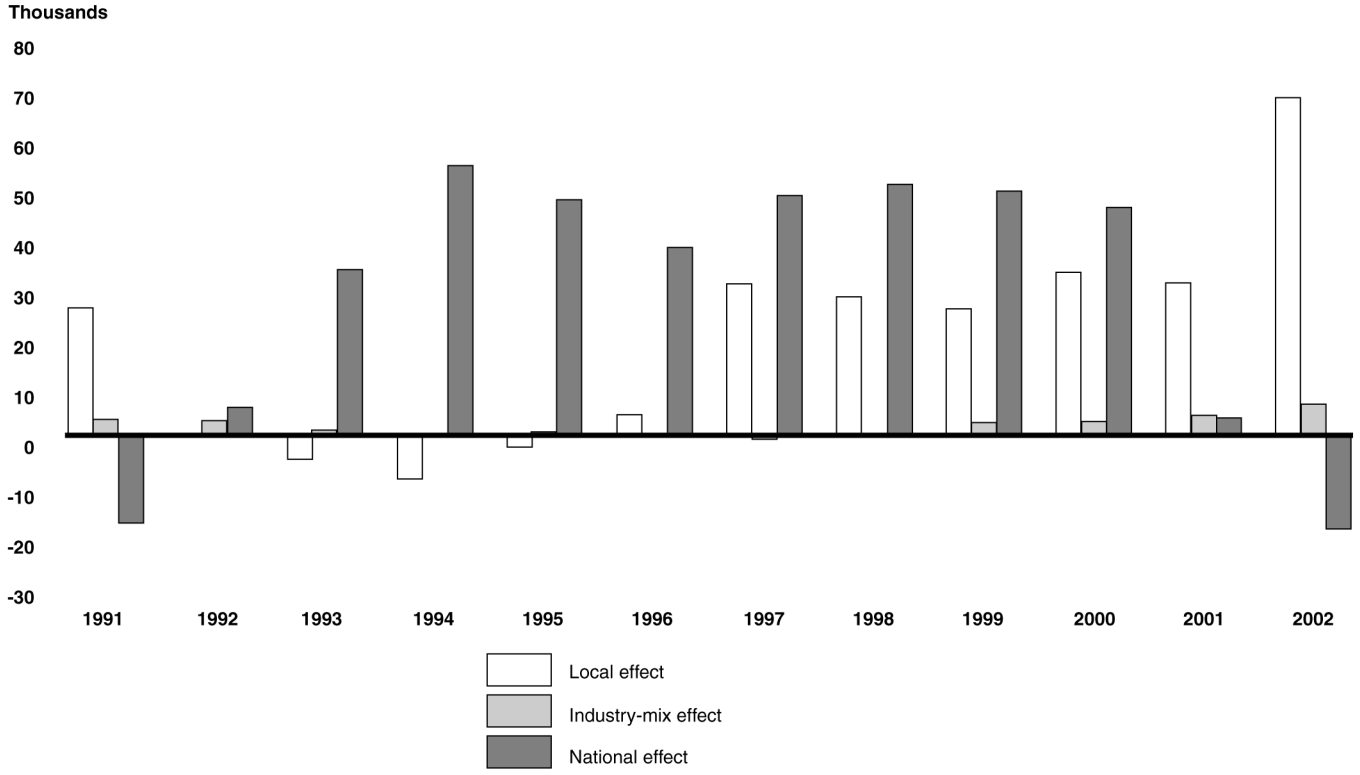
   For the period 1990 to 2002, the border area gained 21,200 jobs owing to a concentration of faster growing sectors there than in the nation as a whole. This gain in total employment was achieved primarily with employment gains in the services (114,400 jobs) and construction and mining (4,200 jobs), and it occurred despite employment losses totaling 95,200 jobs from other sectors, notably manufacturing (69,800 jobs), government (10,500 jobs), and wholesale trade (8,500 jobs). Moreover, 47 percent of the employment growth due to the industry-mix effect occurred between 2001 and 2002. In subregions, the industrial mix component for all sectors decreased total nonfarm employment during 1990–2002 only in El Paso, Texas.

3. *Local (competitive) effect.* A local (competitive) effect seeks to isolate the extent to which factors unique to the local area have caused growth or decline in regional employment. The effect is defined as the employment change that remains after the national and industrial mix components have been accounted for, and it is therefore the purely regional aspect of the region's employment growth. If a region's competitive share is positive, the region is considered to have local advantage in promoting employment growth. This advantage could result from such factors as local businesses having superior technology, management, location, market access or the local labor force's having higher productivity, lower wages, or both. A negative competitive share component could be caused by local shortcomings in any or all of these aspects.

   Local conditions appear to have been a significant factor in the increase in U.S. border employment, particularly since 1995. Across all sectors, the competitive share component—employment growth attributable to local conditions—totals to a net addition of 230,000 jobs. This indicates that the border area was competitive in securing additional employment from 1990 through 2002. As figure 15 shows, nearly all of these employment gains were realized in the years since 1995. Furthermore, 43 percent of border area employment gains owing to

local factors were achieved between 2001 and 2002. The top three sectors in competitive share gains in employment from 1990 through 2002 were services (70,600 jobs), government (67,200 jobs), and manufacturing (37,500 jobs). However, for the 2000–2002 period, the transportation and public utilities sector showed a reduction in jobs (approximately 300 jobs) owing to local factors. In addition, factors unique to the local area caused employment declines in certain subregions and sectors during 1990–2002, notably, in Laredo, Texas, in construction and mining; El Paso, Texas, in wholesale trade and services; Brownsville, Texas, in finance, insurance, and real estate; Tucson, Arizona, in transportation and public utilities; and Las Cruces, New Mexico, in government employment. Furthermore, subregions in Texas generally lost their local edge in securing manufacturing employment from 1990 through 2002 and this loss was more pronounced in 2001 and 2002. Similarly, owing to local factors from 2001 to 2002, Tucson, Las Cruces, and El Paso lost jobs in transportation and public utilities; Tucson, El Paso, and Laredo lost employment in wholesale trade; and El Paso lost service employment; and Brownsville and Las Cruces lost employment in the finance, real estate, and insurance sector.

Figure 15: Employment Gains (Losses) in Nonfarm Employment in Metropolitan Statistical Areas at the U.S. Mexico Border Due to National, Industry-mix, and Local Effects



Source: GAO calculations using Department of Labor, Bureau of Labor Statistics data.

Table 2: Components of Employment Changes by Sectors in U.S. Metropolitan Statistical Areas at the U.S. Mexico Border, 1990–2002

Employment in thousands

		Total nonfarm	Construction & mining	Manufacturing	Transportation and public utilities	Trade	Wholesale trade	Retail trade	Finance, insurance, and real estate	Services	Government
Local effect											
US-Mexico Border	2001-2002	98.1	7.5	10.8	(0.3)	31.1	0.9	29.4	3.6	23.3	25.1
	1990-2002	230.5	21.6	37.5	17.1	35.4	4.3	29.0	5.3	70.6	67.4
San Diego, CA	2001-2002	67.0	6.9	10.7	1.6	19.5	1.3	17.8	1.4	16.1	10.8
	1990-2002	91.2	14.0	10.4	8.2	12.6	3.0	8.5	(0.5)	29.8	16.6
Tucson, AZ	2001-2002	6.3	0.1	2.0	(0.9)	1.8	(0.6)	2.2	0.7	(2.2)	4.8
	1990-2002	42.3	2.2	9.7	(0.8)	4.6	1.6	2.4	2.1	7.6	16.9
Las Cruces, NM	2001-2002	2.7	0.0	0.4	(0.0)	0.7	0.2	0.6	(0.0)	1.0	0.6
	1990-2002	6.8	0.4	0.1	0.2	1.7	0.4	1.3	0.1	4.7	(0.4)
Brownsville, TX	2001-2002	2.6	0.4	(1.2)	0.0	2.0	0.5	1.4	(0.1)	0.9	0.7
	1990-2002	18.6	1.5	(0.2)	1.4	3.7	0.5	3.0	(0.3)	6.7	5.9
El Paso, TX	2001-2002	0.5	(0.2)	(2.9)	(1.0)	1.5	(0.6)	2.1	1.0	(0.7)	2.9
	1990-2002	7.6	1.4	(5.1)	1.3	1.2	(1.5)	2.6	1.5	(1.6)	9.0
Laredo, TX	2001-2002	4.3	(0.2)	(0.2)	(0.2)	1.9	(0.2)	2.0	0.2	1.1	1.6
	1990-2002	16.5	(1.0)	(0.2)	3.9	2.9	0.1	2.8	0.9	4.1	5.9
McAllen, TX	2001-2002	14.7	0.5	(1.1)	0.2	3.6	0.3	3.2	0.5	7.1	3.8
	1990-2002	47.5	3.2	(1.7)	2.9	8.8	0.2	8.4	1.5	19.3	13.6

(Continued From Previous Page)

Employment in thousands

		Total nonfarm	Construction & mining	Manufacturing	Transportation and public utilities	Trade	Wholesale trade	Retail trade	Finance, insurance, and real estate	Services	Government
Industrial-mix effect											
US-Mexico Border	2001-2002	10.0	(0.6)	(20.6)	(3.1)	(1.5)	(3.0)	2.4	3.4	17.2	15.2
	1990-2002	21.2	4.2	(69.8)	(1.8)	(12.6)	(8.5)	(1.8)	(2.8)	114.4	(10.5)
San Diego, CA	2001-2002	5.1	(0.3)	(11.7)	(1.5)	(0.8)	(1.7)	1.3	2.2	10.1	7.2
	1990-2002	16.5	1.4	(38.9)	(0.9)	(6.8)	(4.8)	(1.1)	(1.8)	68.4	(4.9)
Tucson, AZ	2001-2002	2.3	(0.1)	(3.0)	(0.3)	(0.2)	(0.4)	0.4	0.5	2.9	2.6
	1990-2002	7.5	1.1	(8.9)	(0.2)	(1.8)	(1.0)	(0.3)	(0.4)	19.7	(1.9)
Las Cruces, NM	2001-2002	0.7	(0.0)	(0.3)	(0.1)	(0.0)	(0.0)	0.1	0.1	0.4	0.6
	1990-2002	0.6	0.2	(0.9)	(0.0)	(0.3)	(0.1)	(0.0)	(0.1)	2.3	(0.6)
Brownsville, TX	2001-2002	0.5	(0.0)	(1.1)	(0.2)	(0.1)	(0.1)	0.1	0.1	0.8	0.9
	1990-2002	0.0	0.2	(3.8)	(0.1)	(0.6)	(0.4)	(0.1)	(0.1)	5.1	(0.6)
El Paso, TX	2001-2002	(0.1)	(0.0)	(3.3)	(0.4)	(0.2)	(0.4)	0.3	0.3	1.6	2.0
	1990-2002	(4.6)	0.6	(12.8)	(0.3)	(1.6)	(1.3)	(0.2)	(0.2)	11.0	(1.4)
Laredo, TX	2001-2002	0.4	(0.0)	(0.2)	(0.4)	(0.1)	(0.1)	0.1	0.1	0.4	0.5
	1990-2002	1.0	0.3	(0.5)	(0.2)	(0.4)	(0.3)	(0.0)	(0.1)	2.2	(0.3)
McAllen, TX	2001-2002	1.2	(0.0)	(1.1)	(0.2)	(0.1)	(0.2)	0.2	0.2	1.0	1.4
	1990-2002	0.2	0.4	(3.9)	(0.1)	(1.0)	(0.7)	(0.1)	(0.1)	5.7	(0.9)
National effect											
US-Mexico Border	2001-2002	(15.8)	(0.9)	(1.6)	(0.7)	(3.6)	(0.6)	(2.9)	(0.8)	(4.9)	(3.2)
	1990-2002	339.1	17.5	40.0	15.4	80.5	14.7	65.9	17.1	97.3	71.2

(Continued From Previous Page)

Employment in thousands

		Total nonfarm	Construction & mining	Manufacturing	Transportation and public utilities	Trade	Wholesale trade	Retail trade	Finance, insurance, and real estate	Services	Government
San Diego, CA	2001-2002	(8.6)	(0.5)	(0.9)	(0.4)	(1.9)	(0.4)	(1.6)	(0.5)	(2.9)	(1.5)
	1990-2002	182.8	8.7	21.7	7.2	42.4	7.9	34.5	11.0	58.0	33.8
Tucson, AZ	2001-2002	(2.5)	(0.2)	(0.2)	(0.1)	(0.5)	(0.1)	(0.4)	(0.1)	(0.8)	(0.5)
	1990-2002	54.5	3.8	4.8	2.3	12.2	1.8	10.4	2.2	16.9	12.3
Las Cruces, NM	2001-2002	(0.4)	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)	(0.1)	(0.0)	(0.1)	(0.1)
	1990-2002	8.9	0.5	0.5	0.3	1.9	0.2	1.7	0.4	1.9	3.4
Brownsville, TX	2001-2002	(0.8)	(0.0)	(0.1)	(0.0)	(0.2)	(0.0)	(0.2)	(0.0)	(0.2)	(0.2)
	1990-2002	16.8	0.5	2.3	0.8	4.3	0.7	3.6	0.6	4.4	3.9
El Paso, TX	2001-2002	(1.8)	(0.1)	(0.2)	(0.1)	(0.4)	(0.1)	(0.3)	(0.1)	(0.4)	(0.4)
	1990-2002	42.8	1.9	8.1	2.3	10.2	2.3	8.0	1.6	9.4	9.2
Laredo, TX	2001-2002	(0.5)	(0.0)	(0.0)	(0.1)	(0.1)	(0.0)	(0.1)	(0.0)	(0.1)	(0.1)
	1990-2002	10.5	0.8	0.3	1.7	3.0	0.5	2.4	0.4	1.9	2.4
McAllen, TX	2001-2002	(1.1)	(0.1)	(0.1)	(0.0)	(0.3)	(0.0)	(0.3)	(0.0)	(0.3)	(0.3)
	1990-2002	22.7	1.3	2.3	0.8	6.5	1.2	5.3	0.8	4.8	6.2
Total employment change											
US-Mexico Border	2001-2002	92.3	6.0	(11.4)	(4.1)	26.0	(2.7)	28.8	6.2	35.6	37.1
	1990-2002	590.8	43.4	7.7	30.7	103.4	10.4	93.1	19.6	282.3	128.1
San Diego, CA	2001-2002	63.4	6.0	(1.9)	(0.3)	16.8	(0.7)	17.5	3.1	23.3	16.4
	1990-2002	290.5	24.1	(6.8)	14.5	48.2	6.2	42.0	8.7	156.2	45.6

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Employment in thousands

		Total nonfarm	Construction & mining	Manufacturing	Transportation and public utilities	Trade	Wholesale trade	Retail trade	Finance, insurance, and real estate	Services	Government
Tucson, AZ	2001-2002	6.1	(0.2)	(1.3)	(1.3)	1.1	(1.0)	2.1	1.0	(0.1)	6.9
	1990-2002	104.4	7.1	5.6	1.3	14.9	2.4	12.5	4.0	44.2	27.3
Las Cruces, NM	2001-2002	3.0	0.0	0.1	(0.1)	0.6	0.1	0.6	(0.0)	1.3	1.1
	1990-2002	16.3	1.1	(0.3)	0.5	3.3	0.5	2.9	0.4	8.9	2.4
Brownsville, TX	2001-2002	2.3	0.3	(2.4)	(0.2)	1.7	0.3	1.4	0.0	1.5	1.4
	1990-2002	35.5	2.2	(1.7)	2.1	7.3	0.8	6.5	0.2	16.2	9.2
El Paso, TX	2001-2002	(1.4)	(0.3)	(6.4)	(1.6)	0.9	(1.1)	2.0	1.2	0.4	4.4
	1990-2002	45.8	3.9	(9.8)	3.3	9.9	(0.5)	10.4	2.9	18.8	16.8
Laredo, TX	2001-2002	4.2	(0.2)	(0.4)	(0.6)	1.7	(0.3)	2.0	0.3	1.4	2.0
	1990-2002	27.9	0.1	(0.4)	5.4	5.5	0.3	5.2	1.2	8.2	7.9
McAllen, TX	2001-2002	14.7	0.4	(2.2)	(0.0)	3.2	(0.0)	3.2	0.6	7.8	4.9
	1990-2002	70.4	4.9	(3.3)	.	14.3	0.7	13.6	2.2	29.8	18.9

Source: GAO analysis using U.S. Department of Labor, Bureau of Labor Statistics data

Note: Numbers in parentheses indicate employment losses.

Effect of U.S. Economic Conditions on Employment in Mexican Maquiladoras

Our statistical analysis shows that the key factors cited in our semistructured interviews as responsible for the maquiladora downturn—namely, the U.S. general economic slowdown, particularly in U.S. manufacturing, and the real peso-dollar exchange rate—are significant determinants of maquiladora employment. We found a strong relationship between maquiladora employment and U.S. economic conditions. This relationship is stronger than that between maquiladora employment and the real peso-dollar exchange rate, but considerably weaker than that between maquiladora employment and changes in U.S. manufacturing shipments. We also found that maquiladora sectors are more sensitive to changes in U.S. manufacturing shipments than to broader U.S. economic conditions.

A major reason for the rapid growth of the maquiladora industry has been its direct tie to the U.S. economy, particularly to U.S. manufacturing. As a result, the maquiladoras are partly independent of Mexico's internal economic trends. This independence from the Mexican economy has made the industry a stabilizing force when the Mexican economy heads into recession.[1] However, the direct tie to U.S. manufacturing also makes the industry predisposed to U.S. business cycles. As mentioned previously in the main body of this report, the number of maquiladoras and the employment they generate has declined from a peak reached in 2000.[2] This decline has been attributed to several factors. The most important of these factors is the downturn in the U.S. economy. An additional factor that has been alleged to contribute to the apparent decline has been cost increases due to increases in the inflation adjusted value of the peso relative to the dollar, i.e., the real exchange rate of the peso.[3] This appendix investigates the relationship

[1]For example, in 1995, when Mexico's GDP fell by 6 percent, employment in the maquiladora industry grew by more than 9 percent. During 1998, when export earnings by the oil industry were off significantly, the maquiladora industry became the largest source of foreign revenue. See, Gerber, J, "Whither the Maquiladora? A Look at the Growth Prospects for the Industry After 2001," *Comercio Exterior*, Bancomext. 9:3, 1999.

[2]In comparison to 2000 figures, latest statistics (November 2002) show 452 fewer maquiladora companies consisting of 310 garment maquiladoras, 56 electronic and electric accessory maquiladoras, 69 furniture assembly maquiladoras, and approximately 17 companies in the rest of manufacturing.

[3]The real exchange rate reflects the relative price of goods. It is the nominal exchange rate adjusted for differences in inflation rates between trading partners.

between maquiladora employment in Mexico and U.S. economic performance and the real peso exchange rate.[4]

To determine the link between maquiladora employment and U.S. economic conditions, we assembled data on maquiladora employment in total and by main sectors as well as data on U.S. GDP on a quarterly basis from January 1980 to December 2002. We then converted all of these data to their natural logarithms and performed a regression of maquiladora employment on the real peso-dollar exchange rate and the real U.S. GDP.[5] The results of the regression are presented in table 3.

[4]Maquiladoras are particularly sensitive to movements of real exchange rates since they generate their revenues in dollars by exporting their output to the United States while incurring production costs (labor and other local inputs) in pesos. An appreciation of the real exchange rate of the peso makes goods made in the United States cheaper relative to their cost in Mexico. For example, in 2002, Mexico had an average annual rate of inflation in consumer prices of 5.7-percent, while the United States had an average inflation rate of 2.4-percent. Consequently, the peso lost purchasing power inside Mexico at a rate of 5.7 percent, but if its exchange rate were not allowed to adjust, its loss of purchasing power in the United States would be 2.4 percent. As a result, the goods purchased in the United States would be 3.3 (5.7 percent minus 2.4 percent) percent cheaper relative to their cost in Mexico. The peso-dollar exchange rate has, in effect, appreciated in real terms even if the nominal exchange rate does not change. An appreciation of real exchange rate of the peso, therefore, makes maquiladoras less competitive in the U.S. market.

[5]The regression equations we estimated are represented by the following relationship:

$$\ln X_j = \alpha + \beta \ln Y + \gamma \ln \Omega + \varepsilon$$

Where X_j is Maquiladora employment, Y is U.S. Gross Domestic Product, Ω is the exchange rate of the dollar relative to the peso, and α, β, γ are positive constants to be estimated. J represents the maquiladora sectors and ln indicates natural logarithms.

Table 3: Summary of Regression of Maquiladora Employment and U.S. GDP and Real Peso Exchange Rates

	Constant	U.S. GDP in billions of chained 1996 dollars	Real pesos per dollar	R-square
Total maquiladora employment	-19.76	3.68	0.17	0.99
	0.46	*0.05*	*0.05*	
Textile products	-29.50	4.64	-0.31	0.97
	0.90	*0.09*	*0.10*	
Footwear & leather products	-12.98	2.32	0.70	0.80
	1.15	*0.12*	*0.12*	
Furniture products	-33.03	4.77	0.47	0.94
	1.28	*0.13*	*0.14*	
Transportation equipment	-33.77	4.94	0.87	0.93
	1.40	*0.15*	*0.15*	
Electronics	-12.15	2.73	0.11	0.98
	0.41	*.04*	*.04*	
Electrical & electronic machinery	-4.71	1.74	0.22	0.96
	0.37	*0.04*	*0.04*	
Electrical & electronic materials & accessories	-17.04	3.24	0.06	0.98
	0.52	*0.06*	*0.06*	
Other manufacturing	-18.82	3.56	0.15	0.99
	0.40	*0.04*	*0.04*	

Source: GAO analysis of Bank of Mexico (Banco De México) data on maquiladora employment, U.S. Department of Commerce, Bureau of Economics data on GDP, and U.S. Department of Agriculture, Economic Research Service data on exchange rates

Note: Numbers in italics are standard errors. All estimated coefficients were significant at 99 percent of confidence.

As table 3 shows, maquiladora employment is very sensitive to U.S. economic growth and the exchange rate. Our results show that a 1 percent rise (or fall) in U.S. GDP increases (decreases) total maquiladora employment by 3.68 percent, while a 1 percent rise in the real peso exchange rate decreases maquiladora employment by 0.17 percent.[6] Maquiladora employment is consequently more responsive to changes in

[6]It should be noted that other factors not explicitly captured in our estimates may also affect maquiladora employment.

the U.S. economy than to changes in the real exchange rate of the peso.[7] In addition, maquiladora employment in the automotive sector is most responsive to change in U.S. GDP, while maquiladora employment in electrical apparatus and machinery is least responsive. The automotive sector is also the most responsive to real exchange rate variations, while the electrical materials sector is least responsive.

To investigate the stability of our estimates, we divided our sample into three separate time periods: 1980 to1985, 1986 to1993, and 1994 to 2002. Respectively, these three periods correspond roughly to the periods before and after the implementation of Mexican economic policy reform and after the implementation of NAFTA. Our analysis of the effect of U.S. GDP and the real peso-dollar exchange rate on total maquiladora employment during these three periods is shown in table 4. As the table shows, the responsiveness of maquiladora employment to U.S. economic conditions and the real peso exchange rate is fairly consistent with our results in table 3. However, the strongest maquiladora employment responsiveness to U.S. GDP growth occurred in the pre-NAFTA reform period (1986 to 1993). The post-NAFTA period (1994 to 2002) has a lower response coefficient for GDP and a higher response coefficient for exchange rates. It should be noted that the peso depreciated considerably in December 1994, after the onset of the "peso crisis."

[7]It should be noted that the peso-dollar exchange rate has been more volatile then U.S. GDP during this period.

Table 4: Summary of Regression of Maquiladora Employment and U.S. GDP and Real Peso Exchange Rates for Three Subperiods

	Constant	U.S. GDP in billions of chained 1996 dollars	Real pesos per dollar	R-square
1980-85	-18.34	3.51	0.14	0.97
	1.32	*0.16*	*0.05*	
1986-1993	-25.58	4.38	0.02[a]	0.97
	4.01	*0.43*	*0.12*	
1994-2002	-16.75	3.31	0.34	0.92
	1.95	*0.20*	*0.11*	

Source: GAO analysis.

[a]All coefficients were significant at least at 95 percent of confidence, except the coefficient for peso-dollar exchange rate (1986-1993).

Note: Numbers in italics are standard errors.

We also looked into whether the U.S. manufacturing sector has a unique effect that cannot be captured by overall U.S. GDP. To do so, we obtained data on U.S. manufacturing shipments and performed a set of regressions similar to those we performed using GDP. The results of our analysis appear in table 5.

Table 5: Summary of Regression of Maquiladora Employment and U.S. Manufacturing Shipments and Real Peso Exchange Rates

	Constant	U.S. manufacturing shipments in 1996 dollars	Real pesos per dollar	R-square
Total maquiladora employment	-72.36	6.73	0.48	0.78
	5.17	*0.40*	*0.21*	
Textile products	-103.44	9.07	0.22[a]	0.89
	4.73	*0.37*	*0.19*	
Footwear & leather products	-42.45	3.97	0.73	0.52
	5.42	*0.42*	*0.22*	
Furniture products	-95.34	8.27	0.78	0.65
	8.67	*0.68*	*0.35*	
Transportation equipment	-94.21	8.23	1.21	0.60
	9.47	*0.74*	*0.38*	
Electronics	-54.51	5.20	0.35	0.85
	3.19	*0.25*	*0.13*	
Electrical & electronic machinery	-31.81	3.35	0.43	0.86
	1.95	*0.15*	*0.08*	
Electrical & electronic materials & accessories	-66.96	6.21	0.32	0.83
	4.04	*0.32*	*0.16*	
Other manufacturing	-70.33	6.55	0.47	0.79
	4.80	*0.38*	*0.19*	

Source: GAO analysis.

[a]Coefficient was not significant at 95 percent. All other coefficient estimates are significant with at least a 95 percent level of confidence.

Note: Numbers in italics are standard errors.

As can be seen from table 5, a 1 percent change in U.S. manufacturing shipments induces an employment growth in maquiladoras of approximately 6.7 percent. Overall, the table shows, the maquiladora employment's response to changes in U.S. manufacturing shipments is larger than its response to changes in U.S. GDP. We also found that certain maquiladora sectors, such as textile products, furniture and transportation equipment, are particularly sensitive to changes in U.S. manufacturing shipments.

Mexico-China Competition in the U.S. Market for Imports

Although U.S. imports from Mexico ($130.8 billion)[1] exceeded those from China ($109.2 billion) in 2001, these figures represented a decline of 3.2 percent for Mexico and an increase of 1.9 percent for China. In 2002, both countries experienced growth, but U.S. imports from China grew faster than U.S. imports from Mexico. This development, coming at a time of decreased maquiladora employment and increased plant closings, has led to speculation that Mexico is losing ground because of China's production cost advantages.

To highlight the competition between Mexico and China, we selected U.S. imports items from Mexico in 1995 and 2002, with a value of more than $100 million in 2002. We also obtained information on U.S. imports from China that matched the categories of the imports from Mexico. We then selected U.S. imports for which the share from Mexico had declined between 1995 and 2002 and matched them with imports for which the share from China had increased between 1995 and 2002.

In 2002, the United States imported from Mexico 152 categories of items valued at more than $100 million each. The total value of these items was $123.1 billion, while the total value of the same categories of items from China was $88.2 billion. From 1995 to 2002, the share of U.S. imports from Mexico decreased for 47 of the 152 categories. For these 47 categories, in 2002, the total value of imports from Mexico was $25.5 billion and the value of imports from China was $23.4 billion. China's share of U.S. imports increased for 35 of the 47 categories. The total value of these 35 items was $20 billion for Mexico and $23 billion for China.

Table 6 shows the top 25 U.S. import categories in which imports from China increased, while imports from Mexico declined between 1995 and 2002. As the table shows, Mexico and China appear to be in direct competition for several import categories. Although a direct causal link is difficult to establish, China seems to have gained U.S. market shares at the same time that Mexico has lost them in some import categories, such as toys, furniture, electrical household appliances, television and video equipment and parts, and apparel and textiles. Maquiladoras are

[1]The figures used in the analysis presented in this appendix are from the U.S. International Trade Commission. They differ somewhat from figures cited earlier in this report for U.S. imports from Mexico, which were provided by the Mexican National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

concentrated in the categories where China appears to have gained U.S. market shares.

Table 6: Top 25 U.S. Imports from China for Which China's Share of U.S. Imports Grew, while Mexico's Share Declined between 1995 and 2002

Dollars in million

	Mexico			China		
Item	Value of U.S. imports in 2002	Share in U.S. total imports 1995	Share in U.S. total imports 2002	Value of U.S. imports in 2002	Share in U.S. total imports 1995	Share in U.S. total imports 2002
Toys, puzzles, scale models	$180	4.5%	2.2%	$6,927	73.3%	84.3%
Furniture and parts thereof	595	6.9%	4.7%	4,932	12.2%	38.7%
Articles and equipment for general physical exercise, etc.	176	5.4%	4.8%	2,011	28.7%	55.3%
Electrical transformers, power supplies for adp machines or units	1,625	25.4%	24.8%	1,553	10.8%	23.7%
Electromechanical domestic appliances	408	24.8%	20.6%	1,062	35.8%	53.5%
Television receivers, including video monitors and video projectors	4,797	65.6%	47.5%	860	2.6%	8.5%
Made-up articles of textile materials	340	29.6%	19.1%	839	33.9%	47.1%
Articles of jewelry and parts thereof	158	2.9%	2.6%	524	1.0%	8.6%
Parts for television, radio, and radar apparatus	1,021	34.7%	24.3%	523	3.6%	12.5%
Stoves, ranges, grates, cookers, barbecues, braziers, and similar nonelectric domestic appliances	325	42.5%	26.8%	467	7.1%	38.5%
Exports of articles imported for repairs etc.; imports of articles exported and returned	3,870	11.6%	11.5%	371	1.0%	1.1%
Articles of stationary, of paper or paperboard	116	20.6%	16.5%	349	33.1%	49.6%
Electric filament or discharge lamps and parts thereof	244	18.0%	16.0%	341	7.0%	22.4%
Unrecorded media	266	12.5%	9.5%	333	10.3%	11.9%
Brassieres, girdles, corsets, braces, suspenders, garters, and similar articles	201	18.8%	11.8%	309	5.2%	18.2%
Garments of textile fabrics, made-up of fabrics of felt or nonwovens	233	46.9%	28.1%	252	18.7%	30.4%
Trailers and semitrailers; other vehicles, not mechanically propelled; and parts thereof	113	40.7%	14.7%	165	8.4%	21.4%
Articles of aluminum	180	22.3%	22.3%	162	7.0%	20.1%

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Dollars in million

Item	Mexico			China		
	Value of U.S. imports in 2002	Share in U.S. total imports 1995	Share in U.S. total imports 2002	Value of U.S. imports in 2002	Share in U.S. total imports 1995	Share in U.S. total imports 2002
Women's or girls' slips, petticoats, briefs, panties, nightdresses, pajamas, negligees, bathrobes, and similar articles	196	9.0%	9.0%	149	4.4%	6.8%
Centrifuges; filtering or purifying machinery and apparatus	449	19.7%	15.5%	136	1.7%	4.7%
Petroleum oils and oils from bituminous minerals (other than crude)	569	2.4%	2.1%	96	0.0%	0.4%
Safety glass, consisting of toughened (tempered) or laminated glass	279	41.6%	41.0%	84	0.6%	12.3%
Orthopedic appliances; splints etc.; artificial parts of the body; hearing aids and other appliances	143	13.0%	5.2%	82	2.0%	3.0%
Sanitary fixture including ceramic sinks, washbasins and pedestals, baths, bidets, water closet bowls and flush tanks, urinals	210	51.4%	44.4%	71	0.0%	15.0%
Measuring or checking instruments, parts and accessories thereof	141	8.7%	7.8%	39	0.3%	2.2%

Source: GAO calculation using U.S. International Trade Commission data.

U.S.–Mexico Trade, by U.S. Port, 1999–2002

Trade with Mexico through U.S.-Mexico border crossings dropped in 2001 and remained flat in 2002. Whereas, total trade through the 4 major land border ports fell by 5 percent in 2001, U.S. exports to Mexico through these ports fell by 10 percent. The port of Nogales, Arizona, experienced the sharpest decrease in trade, with total trade declining by 9 percent in 2001 and 13 percent in 2002. Table 7 provides information on U.S. imports, exports, and total trade with Mexico by border crossing. The four border crossings examined—Laredo, El Paso, San Diego, and Nogales—are Customs districts that represent 33 individual ports of entry along the U.S.-Mexico border.

Table 7: Trade Flows through Major U.S.-Mexico Land Border Crossings

	U.S. dollars in millions				Percent change		
	1999	2000	2001	2002	1999-2000	2000-2001	2001-2002
Exports							
Total All Ports	**692,821**	**780,419**	**731,026**	**693,257**	**11%**	**-7%**	**-5%**
Laredo, TX	45,351	57,659	52,081	48,937	21	-11	-6
El Paso, TX	13,171	18,045	16,299	16,476	27	-11	1
San Diego, CA	10,760	12,662	12,342	12,873	15	-3	4
Nogales, AZ	5,631	7,325	6,217	5,366	23	-18	-16
Border subtotal	**74,913**	**95,691**	**86,939**	**83,652**	**22**	**-10**	**-4**
Imports							
Total all ports	**1,024,766**	**1,216,888**	**1,141,959**	**1,163,549**	**16%**	**-7%**	**2%**
Laredo, TX	51,611	63,298	62,877	65,351	18	-1	4
El Paso, TX	21,007	24,333	24,151	24,938	14	-1	3
San Diego, CA	19,077	22,263	21,303	23,013	14	-5	7
Nogales, AZ	10,516	13,050	12,477	11,112	19	-5	-12
Border subtotal	**102,211**	**122,944**	**120,808**	**124,414**	**17**	**-2**	**3**
Trade (exports+imports)							
Total all ports	**1,717,587**	**1,997,307**	**1,872,985**	**1,856,806**	**14%**	**-7%**	**-1%**
Laredo, TX	96,962	120,957	114,958	114,288	20	-5	-1
El Paso, TX	34,178	42,378	40,450	41,414	19	-5	2
San Diego, CA	29,837	34,925	33,645	35,886	15	-4	6
Nogales, AZ	16,147	20,375	18,694	16,478	21	-9	-13
Border subtotal	**177,124**	**218,635**	**207,747**	**208,066**	**19**	**-5**	**0**

Source: U.S. Department of Commerce, Bureau of the Census, official trade statistics.

Note: Values for imports are general imports at customs value, and values for exports are total exports at Free-Alongside-Ship (FAS) value.

Maquiladora Employment Statistics

After growing rapidly throughout the 1990s, Mexican national maquiladora employment peaked in October 2000 and declined sharply through March 2002. However, the rise and decline in maquiladora employment varied by state and city. As table 8 shows, the city of Tijuana experienced both the greatest percentage increase in maquiladora employment (233 percent from 1990 through October 2000) and the greatest decline (30 percent through December 2002). For each state or city, table 8 shows the number of jobs in 1990, followed by the number of jobs at the peak of employment (usually around October 2000) and at the lowest point, or trough, following the peak. The table also includes the changes in employment in absolute and percentage terms. The rise and decline of maquiladora employment also varied by industry. Table 9 shows employment changes for three key industries—electronics, autos and parts, and textiles and apparel—along with details on the rise, peak, and trough for the top five border region cities in terms of maquiladora employment.

Table 8: Maquiladora Employment by State and City, 1990–2002

Industry/ area	Jobs-1990	Jobs at peak	Date of peak	Change in jobs: 1990 to peak	Percent change in jobs: 1990 to peak	Jobs at trough	Date of trough	Duration: peak to trough	Change in jobs: peak to trough	Percent change in jobs: peak to trough	Jobs in 12/02	Percent change in jobs: trough to 12/02
All Industries												
National	446,436	1,347,803	Oct-00	901,367	202%	1,060,173	Mar-02	1 year, 6 months	-287,630	-21%	1,084,911	2%
Border states	402,432	1,045,410	Oct-00	642,978	160	829,954	Feb-02	1 year, 5 months	-215,456	-21	834,216	1
Baja California	87,657	293,248	Oct-00	205,591	235	215,837	Apr-02	1 year, 7 months	-77,411	-26	218,887	1
Coahuila	30,952	116,428	Oct-00	85,477	276	102,683	Dec-01	1 year, 3 months	-13,745	-12	116,258	13
Chihuahua	163,953	336,995	Oct-00	173,042	106	253,722	Oct-02	2 years, 1 month	-83,273	-25	262,558	3
Sonora	38,924	111,591	Nov-00	72,667	187	70,525	Dec-02	2 years, 2 months	-41,066	-37	70,525	0
Tamaulipas	80,947	187,581	Oct-00	106,634	132	161,139	Jan-02	1 year, 4 months	-26,442	-14	165,988	3
Nuevo León	13,868	72,878	Sep-00	59,010	426	50,423	Mar-02	1 year, 7 months	-22,455	-31	52,181	3
Border cities	342,555	839,200	Oct-00	496,645	145	665,637	Aug-02	1 year, 11 months	-173,563	-21	667,046	0
Juarez	122,231	264,241	Oct-00	142,010	116	192,485	Dec-02	2 years, 3 months	-71,756	-27	192,485	0
Tijuana	59,870	199,428	Oct-00	139,558	233	140,069	Dec-02	2 years, 3 months	-59,359	-30	140,069	0
Matamoros	38,360	69,989	Oct-00	31,629	82	52,396	Jan-02	1 year, 4 months	-17,593	-25	55,183	5
Reynosa	23,541	68,199	Sep-00	44,658	190	64,877	Dec-00	4 months	-3,322	-5	69,389	7
Mexicali	20,729	65,494	Oct-00	44,765	216	49,056	Apr-02	1 year, 7 months	-16,438	-25	55,191	13
Share of border states in national	90%	78%									77%	
Share of border cities in national	77%	62%									61%	

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Industry/ area	Jobs-1990	Jobs at peak	Date of peak	Change in jobs: 1990 to peak	Percent change in jobs: 1990 to peak	Jobs at trough	Date of trough	Duration: peak to trough	Change in jobs: peak to trough	Percent change in jobs: peak to trough	Jobs in 12/02	Percent change in jobs: trough to 12/02
Share of 5 border cities (above) in the overall border	77%	80%									77%	

Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

Note: The "share of border states in national" is the percentage share that maquiladora employment in border states makes up of national maquiladora employment in Mexico. The "share of border cities in national" is the percentage share that maquiladora employment in the 41 Mexican border municipalities makes up of national maquiladora employment. The "share of 5 border cities in the overall border" is the percentage share that the five border cities listed in the table make up of total maquiladora employment in the 41 border municipalities that comprise the border region.

Table 9: Maquiladora Employment by City and Industry, 1990–2002

Industry/ area	Jobs-1990	Jobs at peak	Date of peak	Change in jobs: 1990 to peak	Percent change in jobs: 1990 to peak	Jobs at trough	Date of trough	Duration: peak to trough	Change in jobs: peak to trough	Percent change in jobs: peak to trough	Jobs in 10/02	Percent change in Jobs: trough to 10/02
Electronics												
National	166,501	468,254	Sep-00	301,753	181%	320,282	Apr-02	1 year, 8 months	-147,972	-32%	326,229	2%
Border cities	142,330	360,857	Oct-00	218,527	154	248,163	Oct-02	2 years, 1 month	-112,694	-31	248,163	0
Juarez	48,647	111,023	Oct-00	62,376	128	68,908	Aug-02	1 year, 11 months	-42,115	-38	71,100	3
Tijuana	27,598	97,551	Oct-00	69,953	253	61,971	Apr-02	1 year, 7 months	-35,580	-36	64,566	4
Matamoros	17,806	32,052	Oct-00	14,246	80	18,486	Feb-02	1 year, 5 months	-13,566	-42%	19,177	4
Reynosa	13,809	31,073	Sep-00	17,264	125	28,299	Jan-01	5 months	-2,774	-9%	29,049	3
Mexicali	8,257	32,963	Sep-00	24,706	299	21,656	Jun-02	1 year, 10 months	-11,307	-34%	23,270	7
Share of border cities in national	85%	77%									76%	

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Industry/ area	Jobs-1990	Jobs at peak	Date of peak	Change in jobs: 1990 to peak	Percent change in jobs: 1990 to peak	Jobs at trough	Date of trough	Duration: peak to trough	Change in jobs: peak to trough	Percent change in jobs: peak to trough	Jobs in 10/02	Percent change in Jobs: trough to 10/02
Share of 5 cities (above) in border	82%	84%									83%	
Autoparts and other transportation												
National	104,487	250,635	Oct-00	146,148	140	218,289	Oct-01	1 year, 1 month	-32,346	-13	233,747	7
Border cities	77,200	188,572	Jan-01	111,372	144	164,599	Oct-01	10 months	-23,973	-13	171,289	4
Juarez	39,272	98,821	Oct-00	59,549	152	82,798	Oct-02	2 years, 1 month	-16,023	-16	82,798	0
Tijuana	1,021	6,701	Jan-01	5,680	556	3,647	Dec-01	1 year	-3,054	-46	4,826	32
Matamoros	14,086	21,376	Apr-01	7,290	52	15,543	Oct-01	7 months	-5,833	-27	21,073	36
Reynosa*	4,753	14,624	Sep-00	9,871	208	13,470	Dec-01	1 year, 4 months	-1154	-8	14,450	7
Mexicali	3,010	7,247	Dec-00	4,237	141	6,063	May-01	6 months	-1,184	-16	7,353	21
Share of border cities in national	74%	75%									73%	
Share of 5 cities (above) in border	80%	79%									76%	
Textiles and Apparel												
National	42,464	294,855	Jul-00	252,391	594	224,230	Mar-02	1 year, 9 months	-70,625	-24	240,315	7
Border Cities	20,891	47,493	May-01	26,602	127	34,908	Apr-02	1 year	-12,585	-26	35,217	1
Juarez	8,634	10,649	Jul-97	2,015	23	4,592	Apr-02	4 years, 9 months	-6,057	-57	4,857	6
Tijuana	2,483	9,875	May-01	7,392	298	6,782	Apr-02	1 year	-3,093	-31	7,394	9
Matamoros	368	2,537	Sep-99	2,169	589	1,662	Jan-02	2 years, 5 months	-875	-34	1,675	1
Reynosa	925	3,141	Oct-99	2,216	240	2,089	Jul-02	2 years, 10 months	-1,052	-33	2,267	9
Mexicali	2,454	2,758	Nov-97	304	12	1,429	Mar-02	4 years, 4 months	-1,329	-48	1,562	9

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Industry/ area	Jobs-1990	Jobs at peak	Date of peak	Change in jobs: 1990 to peak	Percent change in jobs: 1990 to peak	Jobs at trough	Date of trough	Duration: peak to trough	Change in jobs: peak to trough	Percent change in jobs: peak to trough	Jobs in 10/02	Percent change in Jobs: trough to 10/02
Share of border cities in national	49%	16%									15%	
Share of 5 cities (above) in border	71%	61%									50%	

Source: National Institute of Statistics, Geography and Information Technology (Instituto Nacional de Estadística, Geografía e Informática).

Notes: Data on the border region broken down by industrial sector were only available through October 2002.

Data listed for textile and apparel jobs in Matamoros in 1990 are for 1994. Data were not available for prior years for that city and industry.

The “share of border cities in national” is the percentage share that maquiladora employment in the 41 Mexican border municipalities makes up of national maquiladora employment. The “share of 5 border cities in the overall border” is the percentage share that the 5 border cities listed in the table make up of total maquiladora employment in the 41 border municipalities that comprise the border region.

Objectives, Scope, and Methodology

Our work focused on employment and production trends on the U.S.-Mexico border and recent trends in the maquiladora industry. We also analyzed data on overall U.S.-Mexico trade and compared trends along the border with developments in the broader U.S. and Mexican economies. To complete our objectives, we conducted interviews with government officials in the U.S. and Mexico, as well as semistructured interviews with 29 industry associations. Between November 2002 and February 2003, we conducted site visits in three areas of the border with a considerable maquiladora presence: McAllen, Texas–Reynosa, Tamaulipas; El Paso, Texas–Juarez, Chihuahua; and San Diego, California–Tijuana, Baja California. Our selection criteria consisted of two characteristics integral to the maquiladora industry: (1) the number of maquiladora employees and (2) the number of maquiladora plants.

In addition to conducting site visits in selected border areas, we met with U.S. officials and traveled to Mexico City to meet with Mexican government officials. In the United States, we met with officials from the Department of State, Office of the U.S. Trade Representative, International Trade Commission, Environmental Protection Agency, Immigration and Naturalization Service, Department of Labor, Department of Transportation, Department of the Treasury, and U.S. Customs. In Mexico, we met with officials from the Ministry of Economy; Ministry of Labor; National Institute of Statistics, Geography and Information Technology; Ministry of Treasury; Ministry of Government; and Ministry of Environment. We obtained, reviewed, and analyzed data from maquiladora industry experts, nongovernmental organizations, and Mexican and U.S. government agencies.

We also met with academics at educational institutions in Mexico and the United States, including San Diego State University; the University of California, Los Angeles; University of California, San Diego; University of Texas at El Paso; Colegio de la Frontera, Tijuana; Universidad Nacional Autónoma de Mexico; and Universidad Autónoma Metropolitana de Xochimilco. In addition, we met with numerous representatives of industry and nongovernmental organizations as well as other maquiladora experts.

To understand how communities along the U.S.-Mexico border are integrated and the role that maquiladoras play in U.S.-Mexico interdependence (objective 1), we interviewed experts on the maquiladora industry, academics, and representatives of nongovernmental organizations. We reviewed extensive documentation and academic research provided by these sources, analyzing economic, social, and

political linkages between border communities and the influence of the maquiladora industry in the border region. We identified similarities and differences between border communities with regard to social and economic integration.

To review the status and trends in trade, employment, and output (objective 2), we obtained original official data on employment and trade from both U.S. and Mexican government agencies. We analyzed the data to identify trends in employment and production in the U.S.-Mexico border area. We compared our analysis of trends along the border with developments in the broader U.S. and Mexican economies. For example, for the United States, we conducted a shift-share analysis that decomposes employment growth (or decline) in a region over a given time period into three components: the national growth effect, the industry mix effect, and the local (competitive) effect. To assess the quality and reliability of the data, we conducted in-person meetings with government officials of the National Institute of Statistics, Geography and Information Technology in Mexico City to discuss the methodology for collecting the data and any known limitations or biases. For instance, statistics on maquiladora employment and production are affected when companies leave the program. Although establishments and employees are no longer considered part of the maquiladora sector and statistics correctly show a decline in maquiladora employment, the firms and employees may still remain in operation outside of the program. We also analyzed the data sources for internal consistency, as well as external consistency with other sources of information, such as our structured interviews. Although both U.S. and Mexican statistics have some limitations, we consider the data sufficiently reliable to present general trends and magnitudes in production, employment and trade.

To identify the factors that have affected employment and production in the maquiladora industry (objective 3), we analyzed economic data and conducted semistructured interviews. Specifically, to determine the link between maquiladora employment and U.S. economic conditions, we assembled data on maquiladora employment in total and by main sectors as well as quarterly U.S. GDP data from January 1980 to December 2002. We then converted all of these data to their natural logarithms and performed a regression of maquiladora employment on U.S. real GDP, U.S. manufacturing shipments and the real peso-dollar exchange rate. The semistructured interviews were conducted in person and by telephone with 29 representatives of business associations, consisting of organizations

representing principal industrial sectors involved in maquiladora operations, and maquiladora associations at the local and national level.

Of these 29 organizations, 23 reported their members experienced a decline in employment and/or production. We asked these 23 organizations to discuss the major reasons for the maquiladoras' recent decline. We relied on business associations to identify the factors affecting employment and production in the maquiladora industry, because of the direct experiences of their membership with plant closures, changes in employment levels, and other company changes. We also relied on associations to comment generally on issues facing the industry, such as increased competition, and for information on overall industry trends. In selecting potential interview participants from maquiladora and other business associations, to ensure representation throughout the industry, we considered three criteria: geographic location, industry sector, and country of origin or region of representation.

Of the 29 associations interviewed, 17 were maquiladora associations and 12 were industry-specific associations. The maquiladora associations were primarily identified through the membership list for Mexico's National Council of the Maquiladora Export Industry (Consejo Nacional de la Industria Maquiladora de Exportación -- CNIME) that has a membership including 22 maquiladora associations located across Mexico. We contacted all 22 members and the national association, and we completed interviews with the national association and 14 local member associations. We completed additional interviews with two maquiladora associations that were not members of CNIME, but were included to broaden representation of country of origin/region of representation (i.e., Japan and the United States). Of the 12 industry-specific associations, we sought interviews with associations representing major industrial sectors, specifically targeting the electronics, automotive, and apparel sectors.[1] Of the 29 associations, Mexico, the United States, and Japan were the country of origins/regions of representation included.

[1]We identified major industry sectors with information presented in MEXICO*NOW* on the 100 largest maquiladora firms. Although the service industry was one of the largest, it represents a very diverse group of operations with too little in common to allow the identification of factors of the recent industry downturn that would be applicable to all of the industry's members. Therefore, we sought to interview participants that represented the electronics, automotive, and apparel sectors.

We developed 14 questions for the semistructured interview guide, based on previous research. Six questions were closed ended, and eight were open ended. Participants' responses to the open-ended items were content-analyzed by two trained coders, and intercoder reliability values were computed. Reliability values ranged from 58 percent to 100 percent. The coding category scheme was modified until 100 percent agreement was reached between the two coders. The results will not be generalizable outside our sample; however, we believe we have included associations in a way that is as balanced and inclusive as possible within the number of interviews we were able to conduct.

To identify the implications of recent developments in the maquiladora industry for the border region and U.S.-Mexico trade (objective 4), we analyzed documents and interviews citing factors that might influence the recovery of maquiladora production. We also analyzed the debate about the viability of the industry and some initiatives to identify and address its recovery. The information on foreign laws in this report does not reflect our independent legal analysis, but is based on interviews and secondary sources.

We performed our work from July 2002 through July 2003 in accordance with generally accepted government auditing standards.

Comments from the Department of State

United States Department of State

Washington, D.C. 20520

Dear Ms. Westin:

We appreciate the opportunity to review your draft report, "INTERNATIONAL TRADE: Mexico's Maquiladora Decline Affects U.S. - Mexico Border Communities and Trade; Recovery Defends in Part on Mexico's Actions," GAO-03-891, GAO Job Code 320147.

The enclosed Department of State comments are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Sue Saarnio, Bureau of Western Hemisphere Affairs, at (202) 647-8209.

Sincerely,

Christopher B. Burnham
Assistant Secretary for
Resource Management and
Chief Financial Officer

Enclosure:

As stated.

cc: GAO/IAT - Kim Frankena
State/OIG - Luther Atkins
State/WHA - J. Curtis Struble
State/H - Paul Kelly

Ms. Susan S. Westin,
Managing Director,
International Affairs and Trade,
U.S. General Accounting Office.

Department of State Comments on GAO Draft Report
"INTERNATIONAL TRADE: Mexico's Maquiladora Decline Affects U.S.- Mexico Border Communities and Trade; Recovery Depends in Part on Mexico's Actions"
(GAO-03-891, GAO Code 320147)

This GAO report presents a good factual discussion of the downturn of Mexico's Maquiladora industry. We applaud GAO's efforts in this well-documented and well-researched report.

The report's discussion of the related issue of Mexico's competitiveness in world trading markets merits further study. In particular, we call to GAO's attention an excellent study of this multi-faceted issue "Economic Competitiveness in Mexico: Recent Evolution, Prospects and Repercussions for the United States" published in April 2003 by the Center for Strategic and International Studies. The American Chamber of Commerce in Mexico City also recently has completed extensive research on this subject.

The State Department also would like to call to GAO's attention announcements made by the Mexican government at the June 9-10, 2003, U.S.- Mexico Partnership for Prosperity conference in San Francisco, California, regarding Mexican efforts to maintain competitiveness. At that event, high-level U.S. and Mexican officials held discussions with senior executives of U.S. and Mexican companies to address ways in which Mexico could continue to differentiate itself in the world economy. The Mexican Government made important announcements in the areas of customs, corporate transparency, investment and fiscal incentives. These measures were taken at the recommendation of a private sector Partnership for Prosperity steering committee working with Mexican government officials and the U.S. Embassy in Mexico and the U.S. Foreign Commercial Service.
Those efforts will continue under the auspices of the Partnership for Prosperity.

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