NAFTA AND MAQUILADORAS

Is the Growth Connected?

William C. Gruben and Sherry L. Kiser

Courtesy of *Twin Plant News*

After Canada, Mexico and the United States adopted NAFTA in 1994, the growth of Mexican maquiladora plants soared. These plants typically import U.S. inputs, process them and ship them back to the United States. Because maquiladoras involve U.S.–Mexico trade and their growth acceleration coincided with NAFTA's inception, many concluded that the trade agreement caused this growth. However, after examining the relationship, we find that what explains maquiladora growth before NAFTA can also explain it after NAFTA.

There is no doubt maquiladoras are an important part of Mexico's international trade picture. Year in and year out, maquila plants are responsible for more than 40 percent of Mexico's exports.[1] Over the years, with or without NAFTA, the maquiladora industry has grown substantially, but a superficial examination could suggest NAFTA made a difference. During the five years prior to NAFTA, maquiladora employment grew 47 percent. But over the first five years after NAFTA, employment growth soared 86 percent (*Chart 1*). This growth was not simply a matter of existing plants taking on more workers but of rapid expansion in the number of plants. The 1,789 in-bond plants at the end of 1990 grew to 2,143 at the end of 1993—just before NAFTA—and to 3,703 by the end of 2000.

The commentators who concluded that NAFTA made maquiladoras grow represent a broad spectrum: university professors to journalists to businesspeople. Professor Francisco Carrada-Bravo argues, "The acceleration of foreign direct investment under NAFTA also contributed to the creation of more than a half-million new employment opportunities in the U.S.–Mexico border region…tied to the expansion of the maquiladora industry."[2] Journalist Nancy San Martin maintains, "NAFTA continues to drive the growth of the maquiladora industry."[3] And John Balla, writing in a trade magazine focusing on maquiladoras, declares, "Without doubt, NAFTA has resulted in a dramatic increase in activity in the maquiladora industry."[4]

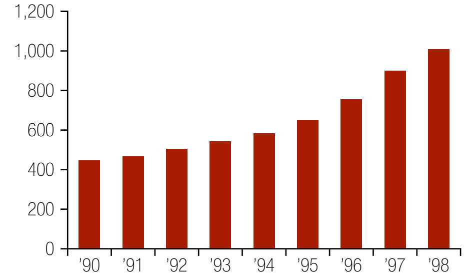
Examining the Evidence

Despite all that has been written supporting a direct correlation between maquiladora growth and NAFTA, technical literature proving a connection one way or the other is scarce. Moreover, NAFTA might have discouraged maquiladora operations in general. For example, NAFTA allows U.S.–Mexican production-sharing operations in the maquiladora mode but without the maquiladora program.

By 1999, the majority of imports that earlier had been processed under the maquiladora program for entry into the United States could enter duty-free without any connection to maquila plants. The options other than the maquiladora program include (1) NAFTA's regular and accelerated phase-ins of tariff eliminations, (2) duty-free treatment of certain products from all most-favored-nation suppliers and (3) the Automotive Products Trade Act.[5] To the extent that membership in the maquiladora program involved additional paperwork, such membership in the age of NAFTA might have seemed unnecessarily costly.

Chart 1
Maquiladora Employment

Number of workers (in thousands)



SOURCE: Instituto Nacional de Estadística, Geografphía e Informática.

Environmental restrictions may have created another disincentive to operate under the maquiladora program. In some cases, waste-handling and treatment regulations were stricter for maquiladoras than for other Mexican plants making the same products and exporting to the United States. Manufacturing firms' ability to obtain duty-free benefits under NAFTA without additional cost or environmental restrictions—which maquila industry membership would impose—could have encouraged such firms to operate outside the maquiladora program post-NAFTA.

On the other hand, NAFTA may have encouraged maquiladora expansion by eliminating all Mexican programs that favored specific industries. When these programs disappeared, some firms had to switch to the maquiladora program to continue importing inputs duty-free to Mexico.[6]

By allowing duty-free treatment of textile and apparel products, NAFTA may have caused maquila growth in that sector.[7] More generally, some processed products—including inputs that enter Mexico under the maquiladora program post-NAFTA—are able to reenter the United States more cheaply in NAFTA's wake.[8] Pre-NAFTA, duties had to be paid on components not of U.S. origin that were used in the assembly of the maquila product. After NAFTA, products could contain foreign components as long as the products were classified as having a designated percentage of components of North American origin.

NAFTA also eliminated quotas, which especially impacted the textile industry. With no constraints on the amount of textiles that could be exported back to the United States, textile firms may have had an incentive to construct maquila operations in Mexico. Many observers have concluded that NAFTA's treatment of the textile/apparel sector has significantly affected the maquila growth in that industry.

What Is a Maquiladora?

A maquiladora is a labor-intensive assembly operation. In its simplest organizational form, a Mexican maquiladora plant imports inputs from a foreign country—most typically the United States—processes these inputs and ships them back to the country of origin, sometimes for more processing and almost surely for marketing.

The maquiladora program itself permits the inputs and the machinery used to process them to enter Mexico without payment of import tariffs. On the return to the country of origin, again most typically the United States, the shipper pays only such return import duties as are applicable to the value added by the manufacturing process in Mexico. The return trip is not under the jurisdiction of the maquiladora program. The tariff arrangements involve the law of the country to which the processed product is reshipped. Even though most Mexican maquiladora activity entails shipments from and to the United States, it is important to emphasize that other nations are permitted to operate under the maquiladora program.

Why Maquiladora Growth?

Some factors suggest NAFTA may substantially encourage maquiladora growth. Others indicate NAFTA may have little impact. Still others suggest NAFTA may actually discourage maquiladora growth. If indeed NAFTA discourages growth, what factors could have driven such significant expansion?

In fact, recent econometric testing shows that the same factors long known to explain the ups and downs of maquiladora growth can explain post-NAFTA maquiladora employment growth as well.[9] If NAFTA has any influence, it is negative, not positive. Both before and after NAFTA, three factors account for the majority of fluctuations in maquiladora employment in either direction.

The first factor is the growth rate of U.S. industrial production. Maquiladoras can be seen as part of the U.S. industrial production process: When production grows faster, maquiladora employment goes up in the same year. The effect is not only positive but also relatively quick. Rising manufacturing activity in the United States quickly results in new orders for the maquiladoras.

The last two factors that explain maquiladora employment fluctuations are Mexican-to-U.S. and Mexican-to-Asian manufacturing wage ratios. While the relationship between U.S. industrial production growth and maquiladora growth is positive, the relationship between these wage ratios and maquiladora growth is negative. In other words, when Mexican wages increase relative to foreign wages, maquila employment growth declines.

And these wage impacts occur with a lag. Maquiladora owners respond quickly to changes in U.S. industrial production, usually within a year. In contrast, it takes two years for maquiladora owners to adjust employment in response to changes in wage ratios. Devaluations play an important role in shifting the ratio of Mexican to U.S. or Asian wages. Owners wait to see how permanent the new exchange rates will be in real terms (after adjustment for inflation differences between the two countries) before they make decisions about hiring or firing. Devaluations or currency appreciations are important because U.S. firms, which dominate Mexican maquiladora activity, make cost decisions in dollar terms since their bottom lines are expressed in dollars. A long-lived change in the buying power of a dollar in Mexico—especially when the dollar is used to hire a worker—will affect a factory owner's decision to locate his operation in Mexico, the United States or Asia.

These variables have strong explanatory power for changes in maquiladora employment. However, when a variable is included to account for NAFTA's role, it has a negative, albeit insignificant, effect. Certainly NAFTA has had an important impact on Mexico–U.S. trade. But NAFTA is not responsible for the portion of such trade coming through maquiladoras, despite what so many analysts have concluded.

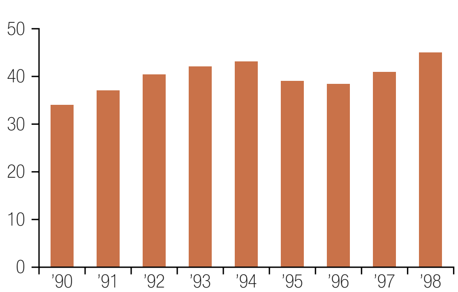
Bad Predictions Make Bad Policy

Why is it relevant that these analysts have not proved their claims? The answer perhaps lies in future trade agreements. The next time the United States enters into a free trade agreement, it will be useful to have an idea of the real—rather than the alleged—impact of the last one. Likewise, when other nations enter into free trade agreements, we may want to know the impact such agreements will have on their trade. We may especially want to assess the impact if we are concerned that a new agreement to which the United States is not a party may divert trade from our nation as other countries buy more from each other. In fact, an assessment of the real impact in that case might be a motivation for trying to enter the agreement.

In any case, if maquiladora production and trade were linked to NAFTA, their importance for modeling NAFTA's impacts would be markedly different than if NAFTA did not influence a large portion of U.S.–Mexico trade. For example, if maquiladora activity is not affected by NAFTA, perhaps estimates of NAFTA's impact on U.S.–Mexico trade ought to use data that doesn't include maquiladora trade.

Also, even though as of January 1, 2001, maquiladoras have been phased out as a phenomenon separate from NAFTA, they may deserve quite different modeling and policy consideration if they are indeed linked to the agreement. We can only measure these links while it is still statistically possible to consider maquiladoras as separate entities. Chart 2, which shows the ratio of maquiladora exports to total Mexican exports, demonstrates how important these implications may be. Trade is a complicated process. So are changes in trade policy.

Chart 2
Mexican Maquiladora Exports as a Percentage of Total Mexican Exports



SOURCE: Instituto Nacional de Estadística, Geographía e Informática.

Gruben is a vice president and director of the Center for Latin American Economics, and Kiser is an associate economist and coordinator of the center at the Federal Reserve Bank of Dallas.

Notes

1. Within the maquiladora industry and more generally along the U.S.–Mexico border, the terms *in-bond plant*, *maquila*, *maquiladora*, *maquiladora de exportación* and *twin plant* are treated as synonymous. We accordingly use these terms interchangeably. For a brief description of the industry, see the box titled "What Is a Maquiladora?"
2. Francisco Carrada-Bravo, "Business Education and Joint Enterprise in the NAFTA Countries," Working Paper, Department of World Business, Thunderbird—The American Graduate School of International Management (Glendale, Ariz., 1998).
3. Nancy San Martin, "Overworked and Underage," *Dallas Morning News*, March 5, 2000, pp. A1, A31–A33.
4. John A. Balla, "Data Transfer: What's New?" *Twin Plant News*, November 1998, pp. 55–56.
5. Ralph J. Watkins, "Implications of the North American Free Trade Agreement for Mexico's Maquiladora Industry and the Use of the Production Sharing Tariff Provision," in *Production Sharing: U.S. Imports Under Harmonized Provisions 9802.00.60 and 9802.00.80, 1989–1992* (Washington, D.C.: U.S. International Trade Commission, 1994).
6. Elsie L. Echeverri-Carroll, "Industrial Restructuring of the Electronics Industry in Guadalajara, Mexico: From Protectionism to Free Trade," Bureau of Business Research, University of Texas (Austin, 1999).
7. Textile and apparel products historically entered the United States under special trade restrictions. Liberalization of such trade has also had to be specific to such products. For apparel that had entered under 9802.00.80, only the value of U.S.-cut fabric pieces and U.S.-made fasteners, such as buttons and zippers, came in free of duty. Under 9802.00.90, the value added in Mexico, including labor and overhead, also enters the United States duty-free. For additional discussion, see *Production Sharing: Use of U.S. Components and Materials in Foreign Assembly Operations, 1995–1998*, USITC Publication 3265 (Washington, D.C.: U.S. International Trade Commission, December 1999).
8. Three general categories of U.S. tariff policy historically applied to imports of maquiladora products. The first (Harmonization Tariff Schedule 9802.00.60) permits the importation of "fabricated" but unfinished metal products processed abroad. Duties are assessed on the value added in Mexico rather than by levying an import tariff on the product's total value. The products are required to have been processed in the United States before being sent abroad. Products in this category must be further processed in the United States upon their return. The second of the three categories (Harmonization Tariff Schedule 9802.00.80) allows an article assembled in Mexico from U.S.-made components to be exempt from import duties on the value of these components. These products need not involve metal components. The third category is the most generous. If the goods assembled or manufactured in Mexico contain at least 35 percent Mexican content upon import into the United States, they are eligible for treatment under the U.S. Generalized System of Preferences, or GSP. Mexican GSP-eligible items may enter the United States duty-free.
9. See William C. Gruben, "Do Maquiladoras Take American Jobs?: Some Tentative Econometric Results," *Journal of Borderlands Studies*, Spring 1990, pp. 31–45; William C. Gruben, "Did NAFTA Really Cause Mexico's Explosive Maquiladora Growth?" Federal Reserve Bank of Dallas *Economic and Financial Review*, forthcoming; and Jose Luis Hernandez and Rodolfo Navarrete Vargas, "Determinantes del crecimiento del empleo en la industria maquiladora de exportación en México," in *Maquiladoras: Primera Reunión Nacional Sobre Asuntos Fronterizos*, ed. Arturo Garcia Espinosa (Monterrey: Asociación Nacional de Universidades e Institutos de Enseñanza Superior and the Universidad Autónoma de Nuevo Leon, 1987), pp. 221–47.