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Maquiladora Downturn: Structural Change or Cyclical Factors?

A Dallas Fed conference explores the causes and possible cures of Mexico's flagging maquiladora industry.

Mexico's maquiladora industry is slowly recovering from its worst crisis in almost 40 years. Between October 2000 and March 2002, the industry lost 278,000 jobs—a 21 percent decline.

During the hardest months of the maquiladora recession, many questioned the industry's future. Some observers pointed to the ongoing U.S. recession and the American industrial sector's poor performance as the main causes of the industry's fall. Others pointed to structural factors, such as higher Mexican wages and increasing foreign competition. This raises the following questions: How much of the maquiladora downturn was due to the business cycle? How much was due to structural change? Is the maquiladora industry ready to face rising global competition?

With these issues as a backdrop, the El Paso and San Antonio branches of the Federal Reserve Bank of Dallas organized a conference titled "Maquiladora Downturn: Structural Change or Cyclical Factors?" This article summarizes papers and speeches presented at the conference, held November 21, 2003, in South Padre Island, Texas.

KEYNOTE REMARKS

As an introduction to the event, Antonio O. Garza, Jr., U.S. Ambassador to Mexico, pointed out that the creation of the maquiladora industry made history as the Mexican government's first step toward free markets and global competition. Garza noted that maquiladoras make up the largest component of U.S.–Mexico trade, and 79 percent of their ownership is in the hands of U.S. companies.

"The list of Mexico's top 100 maquiladora employers is a who's who of U.S. firms," Garza said. The list includes Delphi Corp., Mattel, Ford Motor Co., Tyco International, General Electric Co., Solectron Corp., Johnson & Johnson and ITT Industries. The importance of maquiladoras to the U.S. economy lies in the 26,000 companies located throughout the United States that supply maquiladoras with machinery, raw materials and components.

According to El Paso Branch research, the maquiladora industry represents about 9 percent of Mexico's formal employment. It is Mexico's main source of foreign exchange—more than $18 billion last year—and provides 55 percent of the country's manufacturing exports.

Garza pointed to important challenges ahead for both Mexico and the United States if they are to retain the benefits of the maquiladora partnership. Proximity is a major economic advantage for Mexico, but terrorism now poses new barriers to the smooth flow of legitimate goods between the two countries. A number of new programs are being adopted to speed up pedestrian traffic and preclear cargo. The two countries are sharing databases and software to keep people moving once the US-VISIT program is implemented and to ensure that the new bioterrorism law will not become a bottleneck for goods moving by rail, truck or ship.

On Mexico's side, challenges to competitiveness include high business taxes, expensive highway tolls and a lack of energy reforms, especially for electricity.

CURRENT ECONOMIC CONDITIONS AND THE STATE OF THE MAQUILADORA INDUSTRY

Garza pointed out that one of the chief reasons for the maquiladora slowdown was the U.S. industrial recession and that this was coming to an end. Speakers on the first panel examined this issue in depth.

Harvey Rosenblum, senior vice president and director of research at the Federal Reserve Bank of Dallas, began with a quote from the Oct. 15, 2003, Beige Book: "The pace of economic expansion (U.S.) has picked up since the last report. Ten of the twelve districts indicate that activity has been expanding, while two report steady levels of economic activity."

Rosenblum provided data to support the U.S. economy's growing strength and its readiness for continued strong growth in 2004. Subsequent events have borne this out. At the time of the conference, U.S. manufacturing—critical to maquiladora expansion—had just resumed growth following the invasion of Iraq. We have now seen industrial production grow strongly in nine of the last 10 months.

Everardo Elizondo Almaguer, deputy governor of Banco de México, focused on the Mexican economy, where he did not yet see clear signs of recovery. He stressed that Mexico's closest ties to the U.S. economy come through the industrial sector—the weakest part of the U.S. economy and the slowest to recover. However, the Mexican economy was expected to gain from the ongoing U.S. expansion, in what Elizondo called a "pull" effect.

Elizondo was in the mainstream of most of the day's panelists in pointing to a combination of factors that led to the recent maquiladora downturn: U.S. recession and slow recovery, international competition and lack of Mexican economic reforms. He felt that cyclical factors dominated recent events, however, and that the U.S. industrial recovery would be the light at the end of the tunnel.

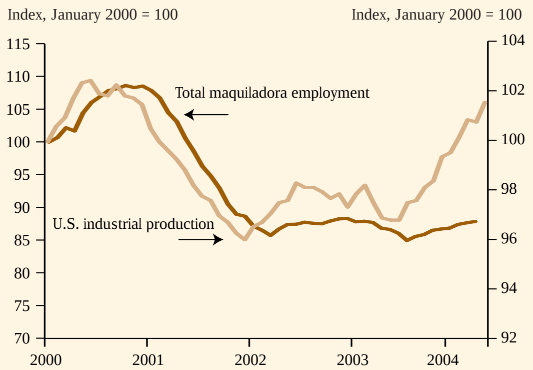
Throughout the 1990s, and especially after 1994, the correlation between the U.S. and Mexican economies increased.[1] To understand why industrial production is so dominant in the relationship, one should look at trade between the two countries. In 2003, Mexico sent 91 percent of its exports to the United States and bought 62 percent of its total imports from the United States. The two largest U.S. exports to Mexico, electrical machinery and road vehicles, are also the most important U.S. imports from Mexico. These top imports from Mexico are the same goods that leave the U.S. as exports but return as assembled goods. Under the maquiladora scheme, equipment, machinery, supplies and raw materials can be imported temporarily into Mexico duty-free. Products are assembled and/or manufactured on the Mexican side and exported back to the United States for further processing and selling. The maquiladora link leaves Mexican and U.S. industrial production tightly bound to each other, with maquiladoras effectively operating as an extension of U.S. manufacturing into Mexico (*Chart 1*).

Looking at prospects for recovery of the maquiladora industry, John Christman, Maquiladora Industry Services director for Global Insight, noted that maquiladora employment lags U.S. industrial production by only two or three months. He said the industry had gone through its worst crisis since its inception in the 1960s. From October 2000 through March 2002, maquiladora employment fell 21 percent, while production dropped 8 percent. Maquiladora employment at the time of the conference was at levels last observed in 1998.

According to Christman, the maquiladora industry must reinvent itself to compete in the global market. The new model for maquiladoras should include emphasis on attracting and retaining high-tech plants; high-complexity plants, tailored to high-end customers, with quick, just-in-time response for customers in volatile markets; investment in capital-intensive plants; full-fledged efforts at vertical integration of the industry and

Chart 1

Maquiladora Employment Closely Follows U.S. Industrial Production



SOURCES: Federal Reserve Bank of Dallas El Paso Branch, with data from Instituto Nacional de Estadística Geografía e Informática and Federal Reserve Board.

more value-added production; prompt leveraging and taking "overnight" advantage of new U.S. and global competitive factors; and a maquiladora business model with engineering and R&D at the plant level.

The key for such a new model to materialize, Christman said, is the elimination or streamlining of the government jungle of rules and regulations. The chief competitive sectors of the future are automotive parts and components; aerospace; electronics (large-size LCD flat-screen TVs); software; metalmechanics; and medical/hospital instruments and supplies. Global Insight forecasts that the maquiladora industry will return to 2000 employment levels, but not until 2008.

Enrique Castro, vice president of the National Maquiladora Industry Council (CNIME is its Spanish acronym), claimed that the industry had not only lost more than 270,000 jobs from its employment peak, it had also lost the opportunity to add 120,000 jobs in each year of recession.

According to Castro, the maquiladora industry is an important economic link between border states in both countries. Texas, California, Arizona and New Mexico export 62 percent of their finished goods to Mexico, and 70 percent of that stays in Mexican border states. In addition, it is estimated that 78 percent of the imported goods used by the maquiladora industry (components and services) comes from the United States.

Castro added that 85 of the top 100 maquiladora employers are U.S. and Japanese companies. It is estimated that 26,000 companies with headquarters in the United States supply raw materials and components to the maquilas, and between 1990 and 2002 more than 500,000 new U.S. jobs shared a common supply chain with Mexican maquiladoras. To preserve the binational benefits and continuity of the maquiladora system, Castro called for government incentives for technology, job training and supplier development. Mexican jobs lost to China, for example, will be accompanied by jobs lost in the U.S. supply chain.

MAQUILADORA INDUSTRY AND GLOBAL COMPETITION

The second panel zeroed in on competition in a changing world economy. Ralph Watkins, program manager for the U.S. International Trade Commision, addressed factors affecting export and investment competition between Mexico and China.

Watkins emphasized production sharing as an important aspect of globalization. Production sharing, also known as cross-border manufacturing networks, occurs when the processes used to manufacture a good are conducted in more than one country. Such rationalization of production allows companies to reduce costs or improve response time, thereby becoming more competitive and increasing profits.

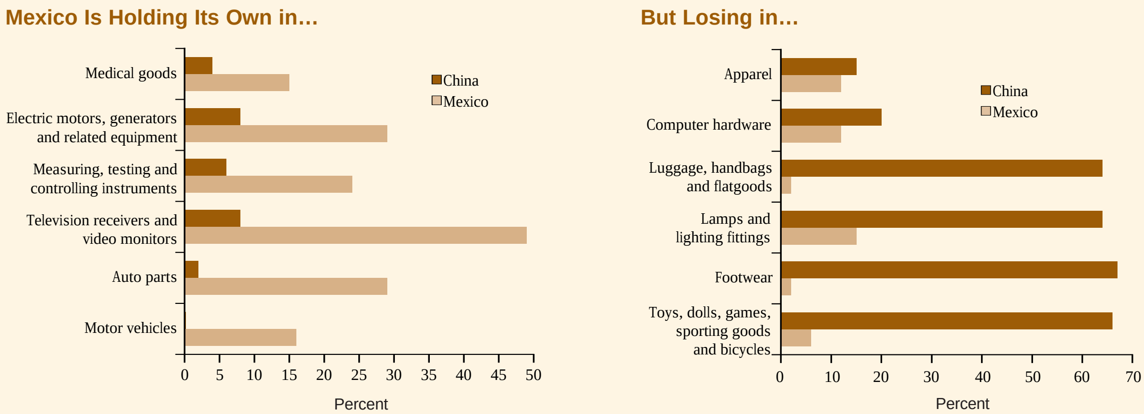
According to Watkins, Mexico can compete more effectively with China in the U.S. market in high- to medium-value-added sectors where there is a high ratio of weight to value (major appliances, large-screen TVs), where competition is based more on quality than price (medical goods, instruments), where there are frequent design changes or where it is vital to protect intellectual rights. China has gained in low-value-added, commoditized sectors, such as apparel, luggage and footwear (*Chart 2*).

Watkins makes his case by looking at official Mexican statistics from Instituto Nacional de Estadística Geografía e Informática (INEGI). From March 2002 through March 2004, the top three winners were transportation equipment (+17,424 jobs), electric and electronics equipment (+9,607) and machinery equipment (+2,447). The top four losers were apparel and textiles (–21,524 jobs), furniture (–3,644), toys (–1,082) and leather goods (–548).

Robert Berges, director of Latin America Equity Strategy with Merrill Lynch, also explored the Mexico vs. China issue. Berges described Mexico's evolution as a trading nation from a commodity exporter, mainly oil, to an exporter of manufacturing products to the United States. For example, only 11.7 percent of Mexico's total exports are commodity-based, compared with 51.2 percent for Chile, 37.5 percent for Argentina and 28.1 percent for Brazil. However, Mexico is the least diversified by trade destination, with about 84 percent of its exports going to the United States, compared with Chile's 19.1 percent,

Chart 2

Mexico vs. China: Share of Total U.S. Imports Supplied by China and Mexico in Selected Categories, 2002



SOURCE: Compiled by the U.S. International Trade Commission from Department of Commerce statistics.

Argentina's 12 percent and Brazil's 25.7 percent. This leaves Mexico vulnerable to shifts in U.S. industrial production.

In 2003, Mexico lost share in 13 of its top 20 exports to the United States. China cannot be blamed for all of this loss, Berges pointed out. The threat began among low-value-added maquilas, where wages are the most important decision-making factor. Indirect costs such as government fees, taxes and benefits pushed Mexico's total wage bill to more than four times that of China, for example, making the loss of competitiveness inevitable when wages are critical (*Table1*).

Even electronic products such as printed circuit boards for personal computers and printers, mobile phones, modems and disk drives are becoming commoditized and highly price-sensitive. Moving production to low-wage countries has become essential for business survival, Berges said.

Mexico's proximity to the United States gives it an edge, allowing it to remain competitive as an outsourcing destination in industries characterized by constant changes in design specifications, short inventory cycles and bulky items. The automotive industry is the perfect example. According to Berges, it should be safe from the "China threat" because original equipment manufacturers maintain low inventories and high-value, just-in-time delivery. Further, autos are heavy and bulky, making shipping an issue. Finally, auto parts need frequent retooling, making them impractical to produce in China for the U.S. market. Mexico can dominate production of several electronic products that have similar characteristics, such as large-screen TVs and appliances.

Berges puts much of his argument in terms of a product cycle, where products are created and tested in the United States, manufactured initially in long production runs in Mexico and finally commoditized in China. The more quickly and readily commoditized the product, the easier to move its production to China.

William C. Gruben, vice president of the Federal Reserve Bank of Dallas and director general of its Center for Latin American Economics, discussed the impact of the 2001 U.S. business cycle slowdown on the maquiladora industry. He presented the results of an econometric model that attributes more than 80 percent of maquiladora employment declines in 2001 and 2002 to changes in U.S. aggregate demand and increases in the cost of doing business in Mexico, as measured by the relation of Mexican wages to non-Mexican wages. Nevertheless, Gruben concluded, structural factors such as China's 2001 entrance into the

Table 1

Labor Cost Average Across Industries

	Mexico	China	Hungary	Malaysia	California
Hourly average wage	$1.47	$0.47	$1.60	$1.39	$16.60
Benefits and taxes*	101%	52%	61%	56%	26%
Total integrated wages	$2.96	$0.72	$2.58	$2.17	$20.84

*Includes social security, saving fund, transport, discount tickets, INFONAVIT income sharing, Christmas bonus, Afore (pension fund contribution), medical expenses, among others. Does not include payroll tax.

SOURCE: Mexico Ministry of Economy.

World Trade Organization and North American Free Trade Agreement Article 303 also caused significant negative impacts on maquiladora employment, especially in the textile, apparel and electronics sectors.[2]

PERSPECTIVE ON REFORM

An important issue throughout the day's discussion was the status of proposed Mexican economic reforms in energy, labor law, tax structure and telecommunications—reforms regarded as essential for making Mexico more efficient and attractive to foreign investment. Luis Rubio, director general of Centro de Investigación para el Desarrollo, A.C., a Mexico City think tank, offered perspective on why such important legislation had stalled.

Rubio described the remarkable extent of economic reform that has swept through Mexico in the last 25 years. Public spending has been reduced, and the banking system has passed from public, to private, to largely foreign hands. But the most important lever for change has been the transition from a closed to an open economy, with trade now 50 percent of gross domestic product (GDP) instead of 20 percent.

The General Agreement on Tariffs and Trade and NAFTA were the instruments for opening the Mexican economy, but, Rubio argued, the urgency for further reforms has largely died since 1993. The reforms have not raised living standards, and many Mexicans feel cheated by the lack of personal progress. Corruption, a continuing division between rich and poor, and a lack of government leadership, he said, are to blame for frustration with the past and inability to move forward.

Previous reforms were driven by the executive branch, which, ironically, lost much of its power as a result, Rubio said. Future reforms now pit Congress against the executive, with no clear rules of engagement. The proposed reforms in Mexico are desperately needed, according to Rubio, and there is an important agenda that extends beyond what is currently proposed—to deal with unions and government and private monopolies, promote political cooperation and rule of law, and establish a framework for a true market economy. The question is whether Mexico still has the political vision and the will to move forward on such an agenda.

MAQUILADORA RECESSION: STRUCTURAL OR CYCLICAL?

The third panel discussed the role of structural and cyclical factors in the recent maquiladora recession. Lack of infrastructure investment is often cited as a barrier to economic development in Mexico. Alejandro Castañeda Sabido, professor at El Colegio de México, analyzed how infrastructure investment—specifically increased government spending on highways and electricity generation—affected the growth rate of the Mexican manufacturing sector.

Both types of public infrastructure spending were found to have a significant effect on overall manufacturing growth, Castañeda said. For example, 10 percent growth in the stock of capital investment in highways results in an increase of 0.6 to 1 percent in manufacturing output. A 10 percent increase in the stock of capital investment in electricity leads to a manufacturing increase of 1.9 to 2.9 percent. Castañeda concluded that if the Mexican government wants to promote manufacturing growth, it should promote infrastructure investment.

James Gerber, director of the Center for Latin American Studies at San Diego State University, directly addressed the question of cyclical versus structural change and concluded the answer is both. Gerber used a dynamic time-series model that considered a mix of cyclical and structural factors to identify individual contributions to the downturn. The model included cyclical factors such as the U.S. manufacturing recession and U.S. and global declines in foreign direct investment (FDI), plus structural issues such as the long-run decline of trend growth rates, rising Mexican wages in dollar terms and global competition, including China.

Structural factors such as changes in U.S. commercial policy and wage differentials contributed significantly to the job drop, according to Gerber. For example, the Caribbean Basin Trade Partnership Act of 2000 gave textile and apparel industries in Caribbean and Central American countries the same access to U.S. markets as Mexico's access under NAFTA. He also noted that low-wage, unskilled industries are the most threatened. Based on survey data, Gerber estimated that approximately 40 percent of electronics maquilas compete primarily on the basis of price, as do many or most apparel manufacturers. The interior of Mexico, where wages are lower, does not have infrastructure comparable with China's coastal regions.

Even so, some of the downturn is primarily cyclical and relates to the slowdown in world economic output and the recession in U.S. manufacturing. On a positive note, Gerber said that although global FDI has been down, Mexico's share of it has been basically unchanged. And within Mexico, FDI directed to maquiladoras has been constant at 18 to 25 percent. In other words, global investors are not seeing Mexico or the maquilas differently than before the downturn.

Ernesto Acevedo Fernández, director of macroeconomic analysis in Mexico's Ministry of Finance and Public Credit, also discussed the causes of the maquiladora recession. He began by describing the maquiladoras' rise and fall in the 1990s. Between 1994 and 2000, the industry's annual production grew 13.8 percent on average, and its exports increased to almost $80 billion, representing 47.7 percent of total Mexican exports. The industry became Mexico's main generator of employment and foreign exchange.

However, in mid-2000 the industry began to slow, Acevedo said. Production decreased almost 20 percent during 2001, and 18 percent of maquiladora plants shut down between mid-2000 and August 2003. Employment contracted dramatically.

Why a slowdown? Acevedo listed weak external demand, higher cost of labor and services in Mexico, commercial and fiscal regulations, and international competition as the main causes. Acevedo's economic model estimates that 80 percent of the decline in maquiladora exports was due to a decline in U.S. demand for maquiladora products, given that the correlation coefficient between U.S. industrial production and maquiladora activity is 0.9 and elasticities of maquiladora exports to U.S. industrial production and aggregate demand are 2 and 1.7, respectively.[3]

If external demand explains 80 percent of the changes in maquiladora exports, what about the other 20 percent? Acevedo blamed a combination of increasing costs (in the form of higher wages and more expensive services) and rising international competition. Certainly Chinese exports to the United States have rebounded to rates they enjoyed before the recession, while Mexican exports are still lagging. China's market share has continued increasing, with China now the second most important supplier to the U.S. economy. Meanwhile, Mexican exports to the United States have remained almost constant, around 11 percent of the U.S. total.

Acevedo also did a Granger causality analysis to explore the relationship between Mexican and Chinese exports. It sought to determine whether Chinese exports to the United States displace Mexican exports or whether Chinese and Mexican components are complements, with both needed to produce the finished product. Acevedo found that only five of the top 15 Mexican exports compete head-to-head with China. In 10 industries, growing Chinese exports actually represent growth opportunities for Mexico (*Table 2*).

Javier Mancera, director of international affairs for Public Strategies of Mexico, noted the broad coincidence of opinion among speakers concern-

Table 2
Complementary Relationship of Mexican and Chinese Exports

Products	Change in market share* Mexico	China
Substitutes		
Parts and accessories of automatic data processing machines and units thereof	–2.6	4.8
Input and output units for computers and other data processing machines	–1.9	8.2
Transmission apparatus for fax, television and radio transmitters	–3.6	2.2
Women's/girls' trousers, overalls and shorts, woven cotton	–3.1	.8
Transmission/reception apparatus for CB/amateur radios, fax and cellular phones	–6.0	7.2
Complements		
Parts for seats.	2.7	.8
Boards and panels for voltage not exceeding 1,000 volts	4.5	.5
Digital processing units	29.8	2.3
Modems for digital line systems	18.7	1.6
Automatic regulating or controlling instruments	1.7	.7
Ignition wiring sets for vehicles, aircraft and ships	.8	0
Other motor parts for vehicles	1.2	.3
Parts solely for spark ignition internal combustion-type engines	2.1	.3
No evidence		
Television receivers	–11.9	5.1
Radio receivers for motor vehicles	–6.6	2.1

* Between March 2002 and February 2003

SOURCE: Ernesto Acevedo, "Causes of Recession in Maquiladora Industry," presented at Federal Reserve Bank of Dallas conference, Nov. 21, 2003.

ing the causes of the industry's current problems but said that the industry's future will involve some difficult political battles. He cited the maquiladoras' poor image in much of the country—often associated with labor force abuse and smuggling in the popular mind, and especially in Mexico City.

However, the other side of the ideological fight could point to this same industry as having become a major source of economic growth and foreign exchange in Mexico—too important to be dismissed. Mancera cited the maquiladora industry's recent success in reversing a highly unfavorable presidential decree as the kind of politics in which the industry must engage in the future. He said that Mexican cities bordering the United States must become more articulate in bringing their case to Mexico City as their economic circumstances become increasingly tied to the health of the maquiladora industry.

THE FUTURE OF THE INDUSTRY

The final panel addressed the maquiladora industry's future. Gordon H. Hanson, professor at the University of California, San Diego and research associate at the National Bureau of Economic Research, started by delineating the causes of maquiladora success in the 1990s. He offered four reasons for the maquiladoras' expanding role in Mexican exports: (1) the ability of multinational firms to divide production across borders through global outsourcing; (2) Mexico's low wages relative to the rest of North America; (3) U.S. and Mexican trade policies that initially gave maquiladoras special advantages in exporting to the U.S. market; and (4) Mexico's proximity to the large, rich U.S. economy.

The Mexican maquiladora industry can also be a cyclical liability, Hanson said. The industry creates few linkages with the rest of the economy because maquiladoras import about 97 percent of intermediate inputs used in their manufacturing processes. Consequently, maquiladoras are footloose establishments that can easily relocate to other countries if local costs rise.

These disadvantages suggest that while maquiladoras can generate rapid export growth, they may also increase the economy's sensitivity to global shocks. Maquiladoras may be more responsive than other exporters to changes in costs or output demand. They may expand rapidly when times are good, but they may also contract sharply when times are bad—what Hanson calls "the bullwhip effect." Implicitly, maquiladoras may become shock absorbers for U.S. firms over the course of the business cycle. The key to the industry's future is backward and forward integration into the local supply chain.

Jorge Carrillo of El Colegio de la Frontera Norte (COLEF) addressed supply chain integration using as an example Tijuana's maquiladora electronics sector. Carrillo said firms are well integrated in the region with high intermaquila trade: 54 percent of sales are local, as are 33 percent of purchases. Most of the plants use advanced technology, lagging the state of the art by an average of only 2.3 years. In addition, skilled workers represent 25 percent of total employment, and best practices such as Kaizen, work teams and Six Sigma are used by high- and low-skilled plants alike.

Carrillo presented his well-known maquiladora-generation classification: (1) manual assembly, labor-intensive; (2) manufacturing with lean production and some autonomy; (3) design, knowledge-intensive. To explore what a fourth generation of maquiladora might look like, COLEF surveyed 298 plants in three important maquiladora cities: Tijuana, Mexicali and Ciudad Juárez. Using index, factor and cluster analysis to classify existing plants, six types emerge (*Table 3*). Carrillo's vision of the fourth-generation maquiladora is one that is logistic-intensive and a master of supply chain management. It may be a consortium of several plants and functions, a "condominium" of several companies in the same plant, or a regional headquarters coordinated in Mexico.

The final speaker was Alejandro Dieck, chief of staff of Mexico's Ministry of the Economy. After reviewing the maquiladora industry's recent performance, Dieck offered a realistic perspective of the future backdrop against which the industry will operate. Mexico can no longer offer the lowest wages, and it is unwilling to offer the kind of tax incentives some competitors have given. Such incentives are fiscally imprudent and a violation of World Trade Organization and Organization for Economic Cooperation and Development rules, Dieck said.

Table 3
Exploring the Fourth Generation of Maquiladoras

Type	Percent of sample*	Technology	Autonomy	Integration into local supply chain
I	13	Low	Moderate	Moderate
II	5	High	Low	Low
III	12	Moderate	High	Low
IV	16	Moderate	Low	High
V	27	High	Moderate	Low
VI	28	High	High	High

* Does not add to 100 due to rounding error.

SOURCE: Jorge Carrillo, "Maquiladoras: Productive Evolution and Competitiveness," presented at Federal Reserve Bank of Dallas conference, Nov. 21, 2003.

Mexico can, however, offer an open economy with free trade agreements with 32 nations, low country risk, macroeconomic stability, rule of law and proximity to the United States, the world's largest market, Dieck said. Mexico is moving toward a further opening of trade; energy, labor, tax and telecommunications reform; and some targeted incentives for research and development. With these advances, Mexico offers an attractive setting for future foreign investment.

SUMMARY

In answer to the question posed by the conference title—whether the recent setback to maquiladora production is cyclical or structural—the speakers said it is both. The U.S. economy, particularly industrial production, is the No. 1 determinant of performance, and the recent maquiladora downturn has largely been a reflection of poor conditions in the United States.

But the story does not end just with cyclical events. Foreign competition offering cheap labor has made serious inroads into Mexico's maquiladora sector. Rising wages in Mexico's export sector have made the country partly a victim of its own success. As Mexican wages have risen, apparel, textile and toy production has moved to China, Vietnam or Bangladesh. There remain, however, important areas where Mexico will continue to compete based on proximity and improved skills: bulky items such as autos and appliances; goods with complicated production cycles; output for which quality is more important than price; and instances in which intellectual property must be protected.

We heard different views on the prospects for success in Mexico's efforts to implement essential economic reforms. Luis Rubio reminded us that it is easy to get caught up in the democratic change that has occurred over the past 25 years and simply extrapolate such progress forward. Some speakers did exactly this, assuming some success in fiscal, energy and telecommunications reform will soon improve the competitive environment. Rubio could point to no successful reform over the past decade, however, and was less sanguine about the future.

An improved competitive backdrop is essential because the next generation of maquiladoras must move up the product cycle, draw higher levels of management and engineering skills, and perhaps assume regional leadership positions in their companies. As the plants move from labor- to capital-intensive, we cannot expect a return to 18 percent annual job growth. There will be less job growth, but the mix of jobs will move to higher wage, higher productivity positions. Output growth and productivity, rather than jobs, will measure the success of the next generation of maquiladoras.

– Jesus Cañas
Roberto Coronado
Bill Gilmer

Cañas and Coronado are economic analysts and Gilmer is vice president in charge of the El Paso Branch of the Federal Reserve Bank of Dallas.

NOTES

Information on participants and their presentations at the conference, "Maquiladora Downturn: Structural Change or Cyclical Factors?" can be found at www.dallasfed.org/news/research/2003/03maquiladora.html.

1 "Business Cycle Coordination Along the Texas–Mexico Border," by Keith R. Phillips and Jesus Cañas, forthcoming, and "La Relación de Largo Plazo del PIB Mexicano y de sus Componentes con la Actividad Económica en los Estados Unidos y con el Tipo de Cambio Real," by Daniel G. Garcés Díaz, *Documentos de Investigación*, Banco de México, March 2003.

2 NAFTA Article 303 essentially requires Mexico to treat non-NAFTA materials imported by maquiladoras the same as the identical materials imported by nonmaquilas or any other Mexican company.

3 The correlation coefficient is a measure of how well trends in the predicted values followed trends in the actual values in the past. The correlation coefficient is a number between 0 and 1. If there is no relationship between the predicted and actual values, the correlation coefficient is 0 or very low. A perfect fit gives a coefficient of 1. Elasticity is a measure of the degree of responsiveness of one variable to changes in another. An elasticity coefficient higher than 1 implies a high degree of responsiveness.

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