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After covering expenses and paying a dividend to shareholders, the Dallas Fed handed \$1.3 billion over to the U.S. Treasury last year, reducing the government deficit.

I am usually identified with the glamorous side of central banking—the work I do with my Federal Open Market Committee colleagues in determining monetary policy. As Dallas Fed president, I am also CEO of a 1,300-employee business that helps keep the payments system humming and our district's banks healthy.

That side of what we do may not be as visible to the public, but it is just as vital to our region's prosperity.

We process a lot of checks here at the Dallas Fed. Last year, we handled 940 million paper checks worth over \$1 trillion. As we move from paper into the digital age, we also process increasing volumes of electronic checks—over 700,000 a day and growing.

We handle cash for the banking system. A total of 6.1 billion banknotes, worth \$106 billion, passed through the Dallas Fed's vaults last year on the way to or from banks all over the Southwest. Our machines sort 90,000 banknotes an hour, plucking out \$517 million worth of worn currency each month for shredding. The average dollar bill lasts 18 months before it is sent to what I call "money heaven."

We supervise and regulate banks. The Dallas Fed's staff monitors 38 state member banks, 450 bank holding companies, and 29 agencies and representative offices of foreign banking organizations in our district. Our professionals are some of the most experienced in the nation, having earned their stripes handling the 1980s Texas banking debacle.

We also run an overnight credit service that allows banks in our district to borrow from us to meet their reserve requirements.

We earn fees from the banking services we provide. Those fees, plus returns earned from assets on our \$40.6 billion balance sheet, allow us to operate these business lines and perform economic research and other functions profitably. In fact, after covering expenses and paying a dividend to shareholders, the Dallas Fed handed \$1.3 billion over to the U.S. Treasury last year, reducing the government deficit.

I am truly honored to be part of an organization with dedicated and talented people who serve the Eleventh District and work to maintain its economic security. Their commitment and achievements are worth celebrating.

A handwritten signature in gold ink that reads "Richard W. Fisher". The signature is written in a cursive, flowing style.

Richard W. Fisher
President and CEO
Federal Reserve Bank of Dallas



Maquiladora Recovery: Lessons for the Future

By Jesus Cañas, Roberto Coronado and Robert W. Gilmer

Competition from low-wage countries around the world has slowly reshaped the maquiladoras' role in U.S.–Mexico production sharing.

Maquiladoras began in 1965 as an economic development program to relieve unemployment and poverty in northern Mexico. The organizing principle was to provide a platform for low-wage labor to perform unskilled assembly operations, with components and completed goods moving across the U.S.–Mexico border duty-free.

These factories have grown to be a major engine of Mexico's economy, providing jobs for 1.2 million workers—a third of the country's manufacturing employment. The industry has encountered booms and busts in recent years, and competition from low-wage countries around the world has slowly reshaped the maquiladoras' role in U.S.–Mexico production sharing.

In 2000–01, a slump in maquiladora employment raised serious concerns about the industry's future. The U.S. recession in 2001 triggered the downturn, which was worsened by the prolonged struggles of U.S. manufacturing in the face of a strong dollar and a drop in investment. Low-wage competition from China and other emerging economies led to questions about whether maquiladora jobs would return once the cyclical recovery began. Had a Mexican industry built on low-wage assembly jobs simply lost an edge it could never reclaim?

Maquiladora employment turned upward again in 2003, offering clues to the long-term future of this important industry (*Chart 1*). Although the assembly plants have lost significant ground in several low-wage sectors, they've found new ways to grow and compete. Productivity has risen rapidly, as have wages. The maquiladora industry isn't dying. Rather, it's maturing and leaving behind its roots as a low-wage industry. Just as important, the industry continues to provide increasing stimulus to the economic growth of both Mexican and U.S. border cities.

Low-Wage Competition

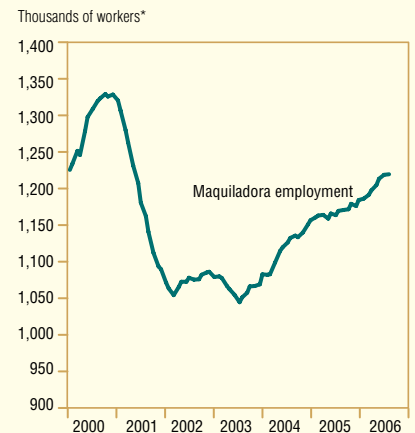
Based strictly on head-to-head com-

petition in hourly wages, Mexico can't win when compared with low-wage countries around the world.¹

Mexico's Economic Ministry, for example, estimates that the country pays average wages and benefits of \$2.96 an hour, a rate highly advantageous when compared with California's \$16.60 an hour but highly unfavorable when compared with China's 72 cents an hour. The U.S. Bureau of Labor Statistics puts Mexican manufacturing wages at \$2.08 an hour, compared with 48 cents in Sri Lanka. The International Labor Organization estimates Chinese manufacturing wages at 25 cents an hour.

This inability to compete on labor costs has been most telling in Mexico's textile and apparel industries. A recent article by William C. Gruben points out that the North American Free Trade Agreement's passage in 1994 gave this industry a privileged position in the U.S. market by keeping it inside the region's tariff walls.² The initial result was a diversion of apparel producers to

Chart 1
Jobs Return After Bust



*Seasonally adjusted.

SOURCES: Instituto Nacional de Estadística Geografía e Informática; authors' calculations.

Mexico to take advantage of tariff-free access to the U.S. market. By 2000, Mexico's apparel employment had quadrupled.

Others then began to seek similar advantages. The Caribbean Basin Economic Recovery Act in 2000 provided Caribbean countries with duty-free entry into the U.S. market. By joining the World Trade Organization in 2001, China gained U.S. access, with tariffs low enough to make its wage advantage decisive. These post-NAFTA changes in trade policy led to a collapse of Mexican textile and apparel employment. The sector's job losses haven't been reversed by the recovery of U.S. manufacturing.

The textile and apparel sector hasn't been a bellwether for the maquiladora industry as a whole. Low-wage job losses haven't been widespread, with textile and apparel's sustained decline shared only by the relatively small leather and toy industries. Other maquiladora sectors have responded positively to the upturn in U.S. manufacturing that began in 2004.

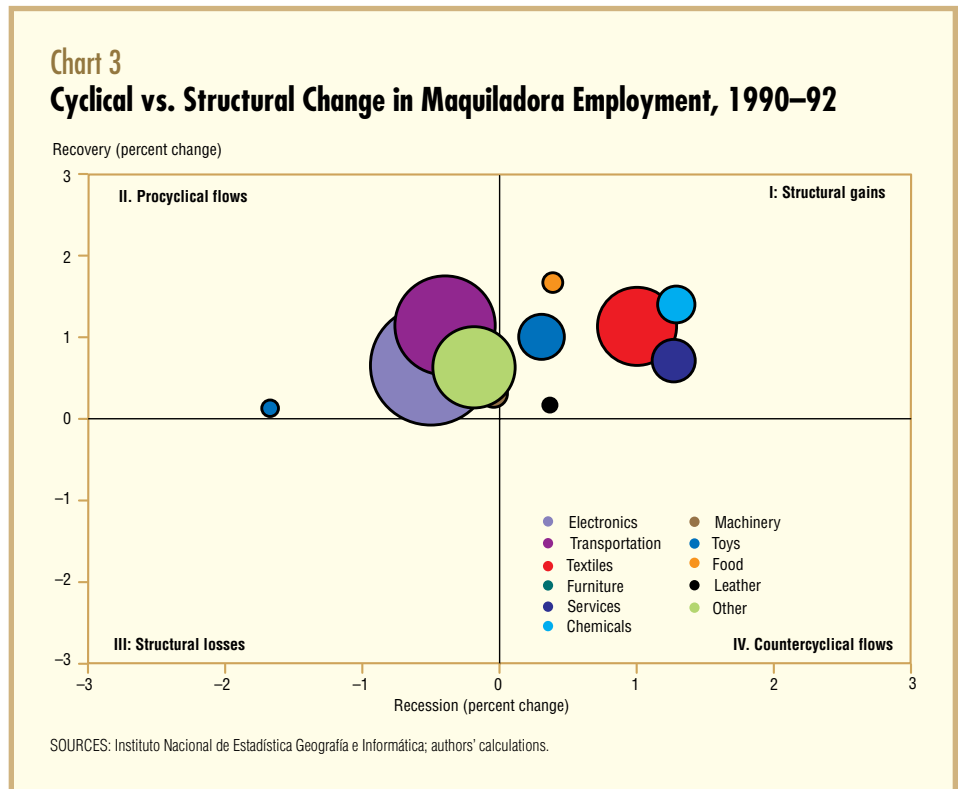
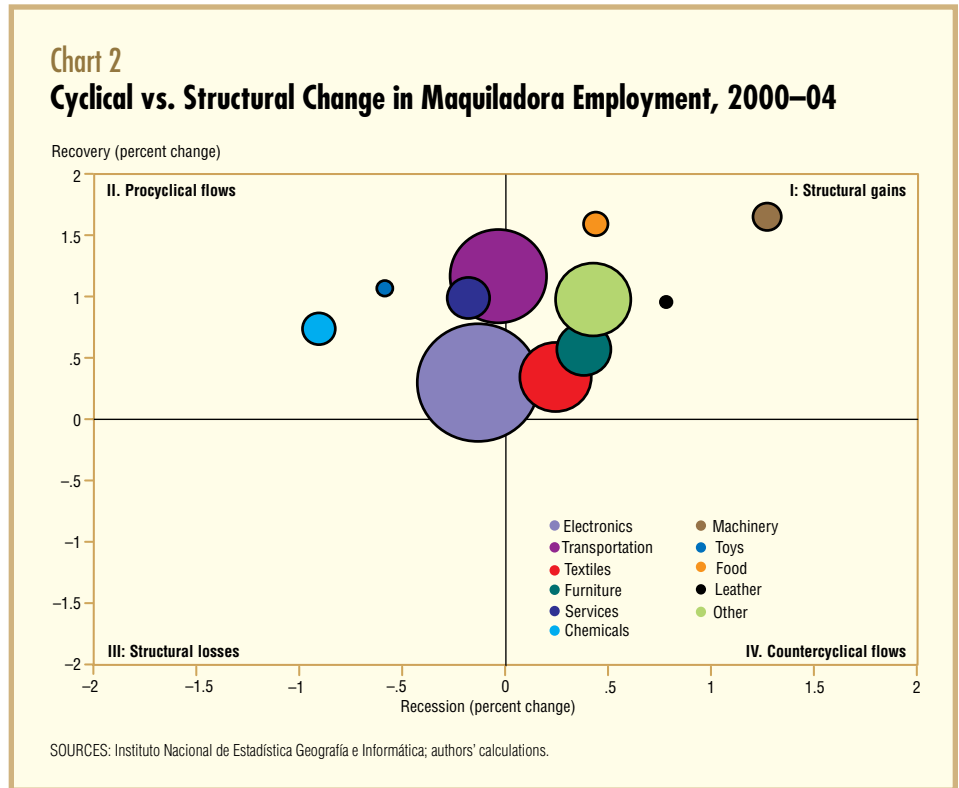
How does Mexico manage to hold its own in other industries if competition based on wages isn't feasible?³ The answer probably lies in a combination of factors related to its geography and experienced labor force:

- Proximity to the U.S. market offers huge advantages. This works for large, bulky items, such as big-screen TVs, freezers and water heaters.
- Proximity also is important when supply chains require quick turnarounds, when changes are frequent or when there's little time to wait for shipments from overseas. Auto parts are one example. For high-fashion jeans, the latest styles can be passé before containers arrive from Asia.
- Goods with high value added relative to labor content, such as medical instruments, are often made in Mexico. The country's skilled and experienced labor force becomes an important advantage.
- Intellectual property used in the production process can be at risk overseas, and Mexico offers better protections than many other countries.

Cyclical or Structural?

Are Mexico's advantages enough to matter for the maquiladoras? To find out, we need to separate cyclical effects from longer-term structural declines or gains.

Maquiladora data cover broad industry categories. Each of them may contain a mix of sectors subject to either cyclical ef-



fects or structural factors, such as low-wage competition. To determine which dominates, we examine data from the recent downturn and recovery.

We assume U.S. manufacturing output defines the maquiladora industry's decline and recovery. We track the fall in maquiladora jobs during the decline in U.S. industrial production from June 2000 to No-

vember 2001 and during its long recovery from November 2001 to May 2004.

To display how recession and recovery affected each sector, we use a four-quadrant graph that separates the maquiladora sectors into groups based on how they performed over the business cycle.⁴ Gains and losses are shown as percentage changes in employment.

Quadrant I (positive, positive): Sectors with structural gains, in which employment grows in recession and recovery.

Quadrant II (negative, positive): Cyclical sectors, which shed jobs in recession and add them in recovery.⁵

Quadrant III (negative, negative): Sectors with structural losses, in which employment declines in both recession and recovery.

Quadrant IV (positive, negative): Countercyclical sectors, which see job counts rise in recession and fall in recovery.

For 2000–04, we find structural gains in only two small sectors—machinery and food (*Chart 2*). Structural losses took place in furniture and three industries we had already anticipated—toys, leather and textiles. The large electronics sector and the transportation industry, which includes automobiles, fall into the cyclical quadrant.

Let's look at similar data for maquiladora employment during the 1990–92 decline and recovery of U.S. manufacturing (*Chart 3*).⁶ In contrast to the recent business cycle, every industry falls into the structural gains or cyclical quadrants. The only industry that seems subject to a larger employment decline than recovery is toys. All told, the 1990–2004 period saw Mexico's maquiladoras move from an advantaged position in creating jobs (quadrants I and II) to a much more competitive one (quadrants II and III).

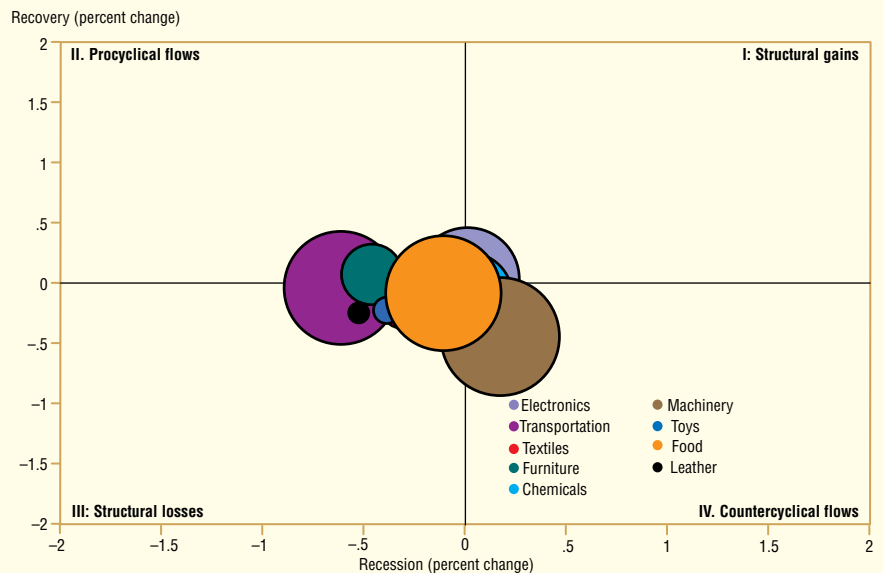
When we examine the corresponding U.S. industries for 2000–04, we see most of them clustering near the point of origin, with some bias toward a small decline in the downturn and less of an upturn in recovery (*Chart 4*). Between 1990 and 1992, the results are similar, though with larger declines in the downturn and more limited recovery in industries such as furniture, autos, leather and electronics.

Production Perspective

The unfolding trends in maquiladora employment don't lead to an optimistic view of the industry's future. Recovery from the 2000–03 downturn is still incomplete based on jobs, and it's apparent the easy structural gains of the past are gone.

The focus on jobs is important and conventional when looking at the maquiladora industry because structural displacement through trade is properly viewed as a key labor market issue and because the maquiladora industry historically has been regarded primarily as a jobs program.

Chart 4
Cyclical vs. Structural Change in U.S. Manufacturing Employment, 2000–04

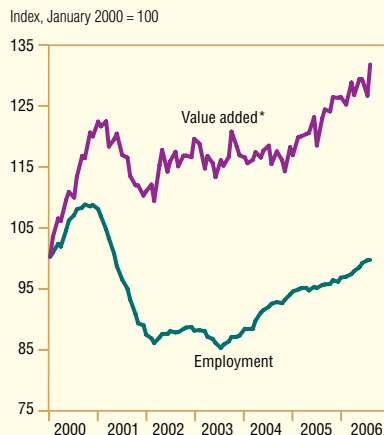


SOURCES: Bureau of Labor Statistics; authors' calculations.

Switching the focus to output rather than jobs, however, turns the story on its head. Measured by real value added, maquiladora production has held up surprisingly well in recent years, especially in light of what was happening to employment (*Chart 5*). After turning down briefly in 2001, output largely recovered and remained flat from mid-2001 to late 2004. It has been growing rapidly for nearly two years now, reaching new highs. According

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Chart 5
Output Recovers Faster Than Jobs



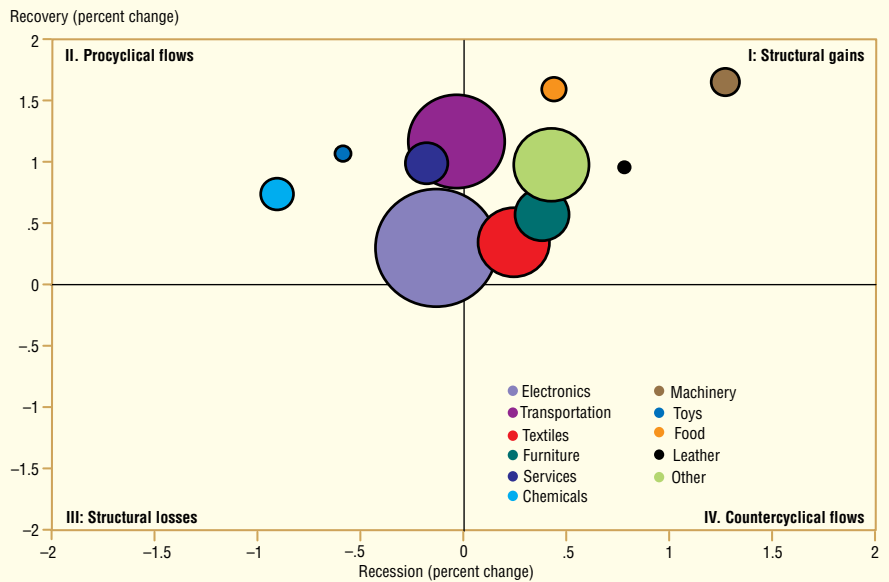
*Real, seasonally adjusted.

NOTE: Output is measured as "value added."

SOURCES: Instituto Nacional de Estadística Geografía e Informática; authors' calculations.

As maquiladora recovery has moved forward, job growth has remained weak and below the prior peak, while output has surged to new highs.

Chart 6
Cyclical vs. Structural Change in Maquiladora Value Added, 2000–04



SOURCES: Instituto Nacional de Estadística Geografía e Informática; authors' calculations.

to production data, the most recent recession was much less significant than the one in the early 1990s.

If we return to the cyclical-versus-structural graphic and replace employment with real value added, we see six sectors in the structural gains quadrant over the 2000–04 decline and recovery—including furniture, textiles and leather (*Chart 6*). Other sectors are in the procyclical quadrant. Growth over

the period was generally positive and widely spread among these industries.

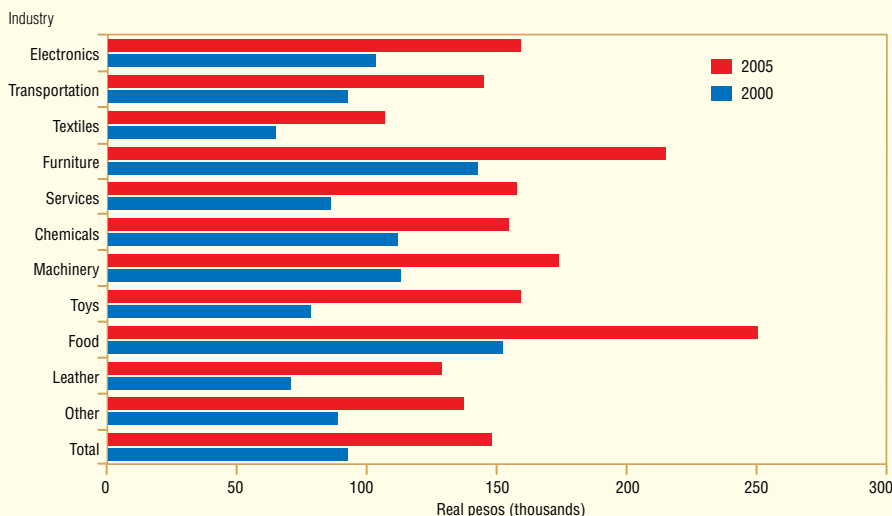
As maquiladora recovery has moved forward, job growth has remained weak and below the prior peak, while output has surged to new highs. The result has been rapid gains in productivity as measured by output per worker, with increases of nearly 60 percent from 2000 to 2005 (*Chart 7*).

Productivity gains have also been a hallmark of recent U.S. manufacturing performance, outweighing either slack demand or foreign competition as a factor in recent job losses.⁷ In the maquiladora industry, we know that a substantial part of the gain in output per worker can be traced to the shift from less- to more-productive industries. The simplest jobs have been lost to foreign competition.⁸ We lack the data to determine how much of the productivity gain was due to industry mix and how much emerged from advances in skills, improved capital or new technology.

Higher productivity has been matched by rapid gains in maquiladoras' hourly wages and benefits. These gains have been shared across all industries, with an average increase of 46 percent between 2000 and 2005. Like rising productivity, higher wages can be traced in part to the loss of the lowest-paid and least-skilled jobs.

No matter what the source of improvements, we are seeing an industry that is rapidly modernizing, paying higher wages

Chart 7
Output per Worker in the Maquiladoras



SOURCES: Instituto Nacional de Estadística Geografía e Informática; authors' calculations.

and ramping up production across all industries. This picture contrasts dramatically with the view of the maquiladora industry based on employment alone.

It's time to stop thinking of the maquiladora industry in terms of its origins as a 1960s-style jobs program. Today, the industry is successfully seeking a more sophisticated and better-paying niche in the ongoing restructuring of North American production sharing.

If maquiladoras generate fewer jobs than they did in the past, this has to be seen in light of labor shortages in northern Mexico, where the industry is primarily located. The maquiladoras are recruiting diligently throughout Mexico, offering bonuses and paying transportation costs to potential workers to persuade them to move north.

Stimulus to the Border Economy

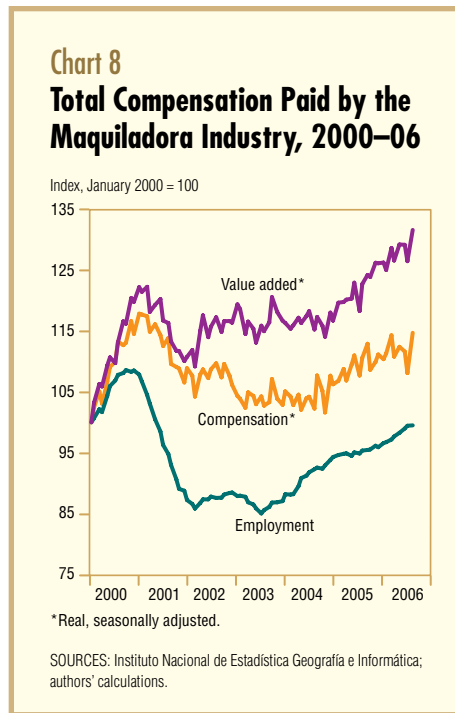
What are the implications for the Texas–Mexico border economy? Maquiladoras have become a dominant force in the region. Keeping and adding maquiladora jobs has become the most important economic factor for cities on the Mexican side. In light of the industry's transitions, however, we need to distinguish between the raw number of jobs and total wages and benefits.

Real compensation per worker tracks an intermediate path between production and employment (*Chart 8*). The decline in jobs during the downturn was 21.8 percent, and the employment recovery still leaves the industry 8.3 percent below the prior peak in 2000. Total real wages and benefits declined 13.3 percent and are now only 2.7 percent short of the prior peak.

Overall, Mexican border cities probably suffered much less during the downturn than the decline in job numbers would suggest, and they're now benefiting more from the recovery.

For cities on the Texas side, maquiladora jobs and wages count to the extent that they affect retail sales. However, output has always been a better measure than employment of the benefits of maquiladora expansion. Inputs to maquiladora production, along with transportation, border security, real estate services and customs support services, are all more closely connected to output than jobs.

A well-known rule of thumb for how U.S. border cities and maquiladoras are linked also suggests that output is the key measure: Every 10 percent increase in maquiladora production drives a 1.1 to 2 per-



cent employment increase in the adjacent U.S. border city.⁹ It also helps explain the strong performance of Texas border cities in recent years—even in the face of a decline in maquiladora employment.

Cañas and Coronado are assistant economists in the Federal Reserve Bank of Dallas' El Paso and Houston offices, respectively. Gilmer is a vice president of the Federal Reserve Bank of Dallas.

Notes

¹ We have used wages as shorthand in the text, but the real story is unit labor costs—a combination of wages and productivity. If Mexican workers were sufficiently productive, they could overcome the wage difference with higher levels of output. However, to close the gap, Mexican workers would have to be 11.8 times as productive as Chinese workers (\$2.96 vs. 25 cents). For basic assembly work, this would be a formidable gap to overcome.

² "NAFTA, Trade Diversion, and Mexico's Textile and Apparel Boom and Bust," by William C. Gruben, Federal Reserve Bank of Dallas *Southwest Economy*, September/October 2006. "The China Challenge to Manufacturing in Mexico," by Ralph Watkins, *Impact Analysis*, November/December 2006, makes similar points about diversion.

³ "Maquiladora Downturn: Structural Change or Cyclical Factors?" by Jesus Cañas, Roberto Coronado and Bill Gilmer, Federal Reserve Bank of Dallas *Business Frontier*, Issue 2, 2004.

⁴ The graphical device is borrowed from Erica L. Groshen and Simon Potter, "Has Structural Change Contributed to a Jobless Recovery?" Federal Reserve Bank of New York *Current Issues in Economics and Finance*, vol. 9, no. 8, August 2003. Our display differs from Groshen and Potter's in that the contraction and recovery dates used are not the

Overall, Mexican border cities probably suffered much less during the downturn than the decline in job numbers would suggest, and they're now benefiting more from the recovery.

NBER business-cycle dates but peaks and troughs in the U.S. industrial production index published by the Federal Reserve Board. These charts have been criticized for being potentially misleading based on the time periods chosen for recovery and expansion. We did enough sensitivity tests to assure ourselves that the simple conclusions we wanted to draw were not the result of dates chosen. See "Can Sectoral Reallocation Explain the Jobless Recovery?" by Daniel Aaronson, Ellen R. Rissman and Daniel G. Sullivan, Federal Reserve Bank of Chicago *Economic Perspectives*, Second Quarter 2004.

⁵ Recovery is the period from recession trough to return to the prior peak.

⁶ The dates for industrial decline were September 1990 to March 1991, and the recovery was complete in March 1992.

⁷ "What Happened to the Great U.S. Job Machine? The Role of Trade and Electronic Offshoring," by Martin Neil Bailly and Robert Z. Lawrence, *Brookings Papers on Economic Activity*, September 2004. This study shows that all the losses of U.S. manufacturing jobs from 2000 to 2003 can be attributed to productivity gains. Holding productivity fixed, 88 percent of the losses would be attributed to slack demand for manufactured goods and only 12 percent to trade.

⁸ To see how a change in mix can raise overall productivity, even with no increase in productivity within sectors, consider this simple example: Sector A has productivity of 10 units per worker and B has 4 units per worker. If employment is divided 50–50, overall productivity is $.5 \times 10 + .5 \times 4 = 7$. If industry mix shifts (due to a loss of low-wage/low-productivity jobs) to 75–25, overall productivity increases: $.75 \times 10 + .25 \times 4 = 8.5$.

⁹ "U.S.–Mexico Integration and Regional Economies: Evidence from Border-City Pairs," by Gordon H. Hanson, *Journal of Urban Economics*, vol. 50, September 2001, pp. 259–87.

Taking the Pulse of Biotech

Biotechnology is risky business. For every start-up that succeeds, between 15 and 20 fail. Houston Branch board member Nancy Chang beat the odds with Tanox Inc., a 20-year-old biotech company that has agreed to be acquired by industry behemoth Genentech Inc.

Q: With such a high failure rate, are biotechs at risk of extinction?

A: Just the opposite. Pharmaceutical companies are realizing that it's so expensive to discover new drugs that they're relying more and more on biotechs for the discovery, development and concept phases. Look at it as Big Pharma relying on the little guy. This way, they don't have to pay for the failures. Eventually, they partner with the smaller biotechs that do pass muster.

Q: You came to the U.S. from Taiwan at age 23, earned a Ph.D. from Harvard and started a biotech company. How did that come about?

A: I was a professor at the Baylor College of Medicine. At the time, we discovered an antibody that neutralized the HIV virus. The department chairman was so excited about the discovery that he suggested we commercialize it.

My husband at the time was just beginning to work on the idea of developing an anti-IgE as an allergy treatment. IgE is the causative agent in allergy diseases. During that time, we also needed additional space for our laboratories. All of these things seemed to happen at the same time, and we thought, "Why don't we start a company?"

We formed Tanox in 1986 to focus on both HIV and allergies. We took the allergy drug from concept to market. Back then, the idea of creating a molecule that could take away the causative agent in allergies was revolutionary and counter to the central dogma.

Twenty years later, after partnering with Novartis and Genentech, we had a drug named Xolair. It was the first antibody ever approved by the Food and Drug Administration to treat moderate to severe asthma. In 2006, Xolair sales were close to \$450 million worldwide. In addition to Xolair, Tanox now has a solid pipeline of new drugs that



includes a viral-entry inhibitor antibody to treat HIV/AIDS. In 2006, Tanox completed a phase 2 trial for this drug showing that it is safe and effective in reducing the HIV viral load in AIDS patients.

Q: What are the biggest challenges facing a biotech start-up?

A: As inventors, we take all of the risk in the beginning. In the end, we partner with bigger companies to get access to the resources we need to make a drug a reality.

Take Xolair. It took us 17 years of steady work to develop. We took risks and staked our careers and Tanox's future on this one drug, taking it from beginning to end. We are fortunate that the drug worked. Sometimes the drugs may not work, and people's careers can be over.

To initiate a human study requires a major commitment for a small company. For instance, for our very first human clinical study

for HIV, just to prepare the materials alone cost \$50,000 per patient, not counting our costs or our time.

When Tanox first started, I put everything I had into the company. We didn't pay ourselves salaries; the company's first telephone system was built on borrowed money. But we did what we had to do to make progress, to grow the company, and these were gutsy, risky moves.

Q: How has globalization changed the pharmaceutical industry?

A: Every biotech company that starts out today is global by necessity. You have to learn how to do business all over the world, to do research and development work outside the U.S., to have partnerships with international companies, to deal with different regulatory agencies in other countries. You have to appreciate that the world is small, but you have to look at it as one big marketplace.

Part of it is the Internet. When you do research, everything you publish is on the Internet. The pace of turning knowledge and new technology into a commodity has become faster, in a way, because so much information is at your fingertips—all you need is the desire to know.

The industry still has a good profit margin, so people naturally want to be in the field. In China, India and other countries, there are both the profit motive and the need for better medicine at cheaper prices, and they are investing in this industry.

Q: Will China emerge as a leader in the pharmaceutical industry?

A: China may have the ambition, but I don't believe its focus at this time is to develop the next generation of drugs. North America will continue to be the leader for new medicine in the next 10 to 15 years.

What I believe the Chinese would like to focus on is providing better health care overall to its people. In doing so, China will expand the market for the current generation of drugs. Even if you're just talking about 1 percent of 1.3 billion people, that's a major market in the making. What is of real

“Every biotech company that starts out today is global by necessity.”



concern is what will happen to the Chinese people as they become more affluent and prosperous. The incidence of chronic conditions such as cardiovascular disease and diabetes will increase, and that will require a lot of resources to manage.

Q: So the opening up of China and other countries has impacted how the pharmaceutical industry has evolved?

A: It definitely has. Before, a majority of the discovery process was done in the United States. Now, a lot of the processes are being offshored to India and China. Many companies are now doing the early phases of drug screening, proof-of-concept studies and even the early phases of clinical development in emerging markets.

Governments outside the U.S. allow you more leeway for drug testing and research. Countries like the United Kingdom, Singapore, China and South Korea are now leading the way with stem-cell research, aiming to build their reputations, competence and competitive advantages in this promising new field while hurdles to U.S. research remain.

Anywhere there are major bottlenecks in the U.S., the industry looks to other countries to get things done. If advances are made overseas, these other countries may gain the upper hand.

Q: What does the future hold for your industry in this country?

A: The good thing is that the U.S. is still the one place where people value creativity. There are savvy investors and hard-driving entrepreneurs in the U.S. who are willing to invest their money, time and expertise on innovative ideas in new drug development. This is one of the competitive advantages that will keep the U.S. at the forefront of pharmaceutical development.

What worries me is the U.S.'s ability to maintain its position as the center of creativity and innovation. For now, most people still have to come to the United States to get educated, which is where it all starts. The best and the brightest of the developing world

continue to come to the U.S. seeking better opportunities; they are the force behind creativity in the U.S. But this, too, is changing. What if, in the future, people no longer want to come to study in the U.S. or no longer have to?

What if the knowledge base stays home?

At some point, we will have to face the tremendous risks of brain drain.

Q: How can the U.S. maintain its edge in medical research?

A: There is a price to pay for being the innovators, but it is also something we have to protect. We cannot look at everything as an economic calculation. We have to preserve creativity and help people understand the benefit of cross-fertilization across different disciplines. Often, new ideas come from a fresh look at old problems.

We need an education system that encourages students to go into science and technology, to do more than manage processes, to do more than be a part of a service industry. From grade schools to universities, creativity must be fostered in order for science to succeed in producing the next generation of medicines.

Q: Where could globalization accomplish more?

A: Until just recently, globalization has not impacted the fighting of AIDS. It is clearly a matter of the haves and the have-nots. Today, you can carry the virus and expect to live a full life—if you have the financial wherewithal to handle this chronic, manageable disease. We have come far in developed nations.

As for the rest of the world, patients from underdeveloped countries have little or no access to these expensive drugs. Beyond the fact that they cannot afford the medicines, these countries also don't have adequate health care delivery systems to

handle drug distribution or provide proper medical and nursing services to patients suffering from this terrible disease.

Q: Clearly, the challenge remains for your industry to continue fighting against the disease.

A: HIV won't be eradicated in our lifetime because of the way the virus stays in the infected cells. It's incorporated into the host DNA and hides there until the patient's immune system weakens. Patient survival depends on the ability to stay ahead of the curve. Adding more challenge to this situation is that the virus keeps changing and can evade all therapeutic intervention. In the U.S., maybe 25 to 30 percent of the virus is resistant to all prevailing drugs.

HIV/AIDS is a disease in which patient advocacy has exerted strong influence on drug development and usage. Patients who have AIDS often live with the virus for years. Many are intelligent and knowledgeable about their disease and the biology of the HIV infection. They know the drugs' efficacies as well as their toxicities and want to see preventive vaccines and more effective antiviral therapies developed. So they have become advocates in the development of drugs to treat HIV.

And that's a good thing. I believe we could accomplish more with other diseases given the same level of interaction and advocacy.

Having surpassed California as the top exporting state in 2002, Texas today sells \$150 billion worth of goods overseas. If Texas were a nation, it would rank among the top 20 exporting countries in the world.

Who are Texas' best customers? Mexico has traditionally been the state's preeminent trading partner—not at all surprising, given its proximity. Geography and the North American Free Trade Agreement (NAFTA) of 1994 helped make Mexico the destination for 35 percent of Texas exports in 2006 (Chart 1). Laredo has become the nation's fourth busiest port district.

Last year, Texas sent 20 percent of its exports to Asia, excluding China; 12 percent to the European Union; and 11 percent to Latin America, excluding Mexico. To a lesser extent, geography and NAFTA also allowed Texans to sell to Canada, which received 10 percent of the state's exports.

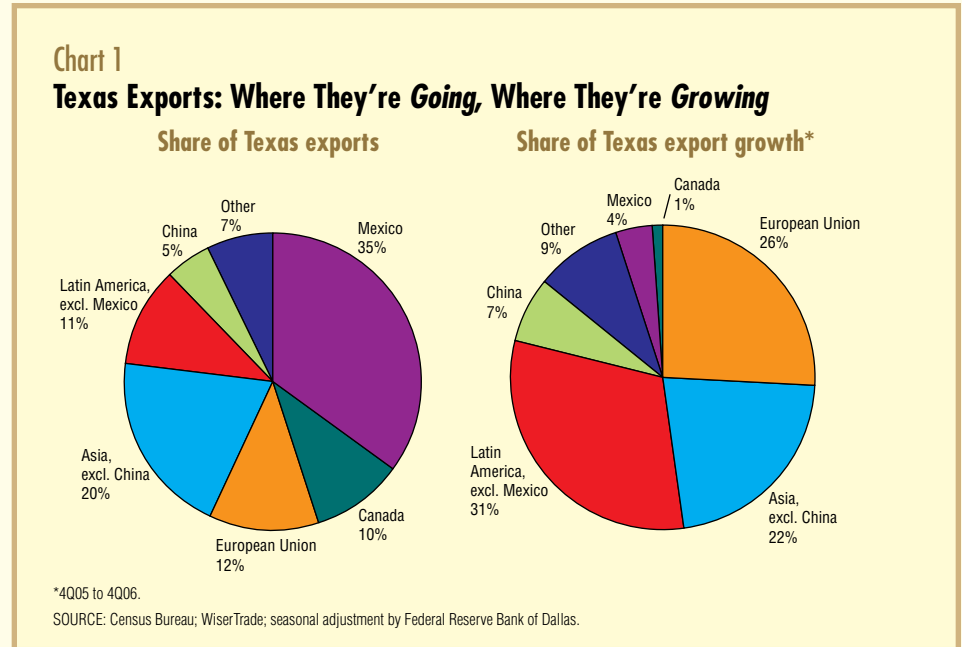
Simply looking at a single year's export shares doesn't give a complete picture of what's driving Texas' overseas sales. Export growth provides a surprisingly different view of how state companies are faring in the global marketplace.

Most important, North America's dominance declines. Mexico, for example, accounted for just 4 percent of Texas' export growth last year. Canada's contribution was a mere 1 percent.

Other major markets meant more to the state's export growth in 2006. Latin America, excluding Mexico, accounted for a whopping 31 percent. The EU's share was 26 percent. Asia, excluding China, logged in at 22 percent. China accounted for 7 percent, even though it had half of Canada's overall market share.

Last year's patterns aren't new. Since 2000, Mexico's share of Texas exports has ebbed from 46 percent to 35 percent, while other parts of the world have seen their shares rise (Chart 2). Latin America, excluding Mexico, has increased from 7.5 percent to 12.6 percent. China, the fastest growing single market for Texas exports, has gone from 1.3 percent to 4.3 percent.

The distribution of exports depends to a large extent on Texas firms' ability to



supply global markets at competitive prices. Larger economic forces, such as growth and exchange rates, may also be at work.

Sales to China may be up as a result of the country's double-digit growth rates as well as its deepening economic ties to the U.S. A sharp depreciation in the dollar's value against the euro in the past year has

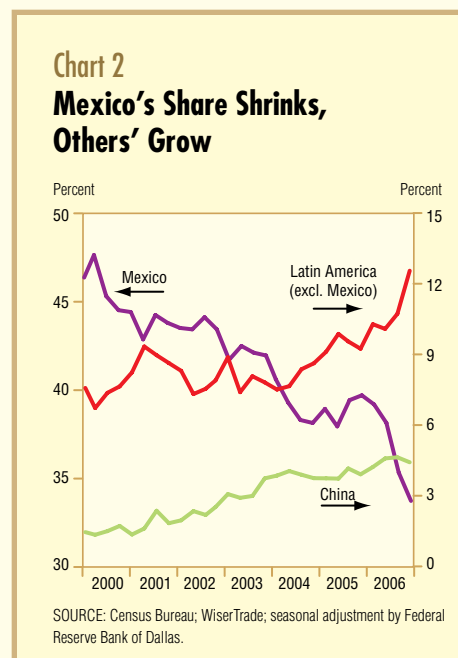
made U.S. products more attractive to Europeans, helping fuel Texas exports to the 25-nation EU.

Globalization has also helped diversify Texas' export markets. Advances in technology, transport and communication have made geographical proximity less important to international trade. Dallas-Fort Worth's top six export markets are across the Pacific, led by China.

For Mexico and Canada, NAFTA's effects may be waning. The two countries' tariffs on most U.S. products are already low, and Texas companies have had years to take advantage of them.

Texas' exports have been a source of economic strength, accounting for 15 percent of state output and one in five manufacturing jobs, according to the U.S. International Trade Commission. Geography dictates that Mexico will continue to be the state's most important trading partner, but Texas companies have proven they can take advantage of markets all over the world.

—Anil Kumar and Ragbav Virmani



Regional Lending in a World of Interstate Banking

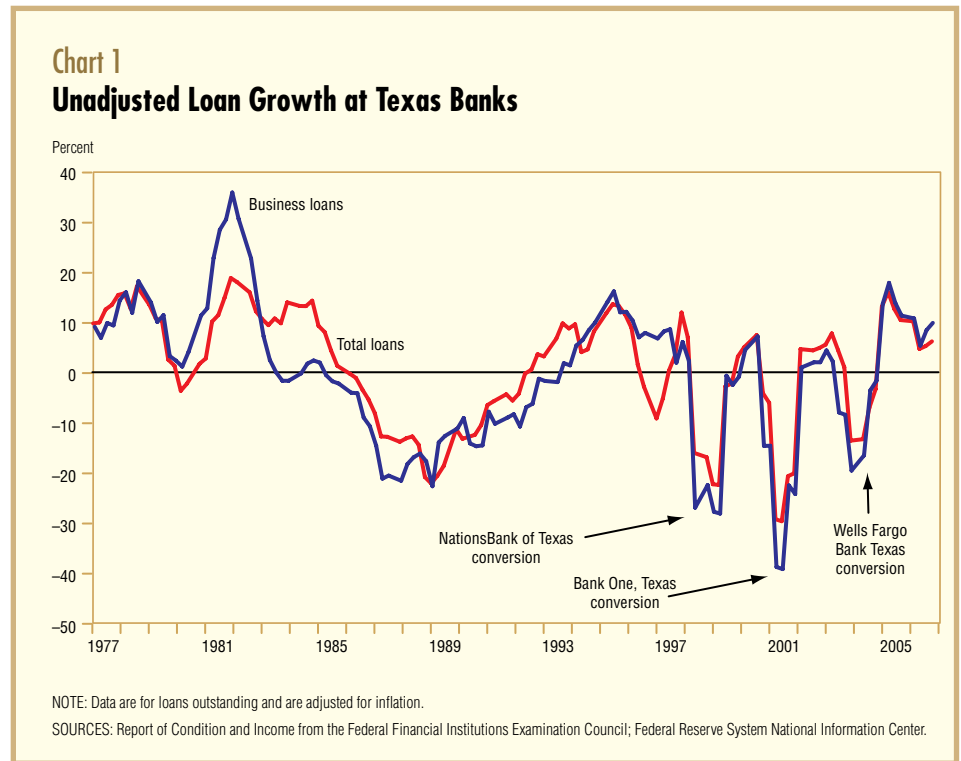
By Kenneth J. Robinson

Texas today can obtain banking services from an institution based in Muleshoe or from one headquartered as far away as New York City. But this wasn't always possible. Federal law once prohibited most banks from branching across state lines. It wasn't until Congress passed the Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994 that institutions and their customers could enjoy the full benefits of interstate banking (see “*Banks vs. Branches*” on page 13).¹

Unfortunately, the same legislation that increased the U.S. banking system's efficiency also muddled the regional lending picture. In Texas, official data on loan volume—which represents the activity of institutions headquartered in the state—was skewed when many Texas-based banks became branches of banks based elsewhere.

Loan growth at Texas banks has been erratic since the late 1990s, giving the illusion of an industry in flux. But when the data are adjusted for interstate branching, a more positive growth pattern emerges.

Lending trends are closely watched because they provide insights into economic activity. Growth and employment reflect capital flows that go to businesses to fund operations and to consumers to buy houses, cars and other durables. If the data don't capture loan activity from outside the state, we can't get a clear picture of the Texas economy.



Measuring Loan Activity

The inflation-adjusted stock of total loans and business loans at Texas banks experienced a sharp run-up in year-over-year growth in the late 1970s and early 1980s, corresponding to the state's oil boom (Chart 1).²

The sustained lending decline that

followed reflects the collapse in oil prices and the regional recession beginning in the mid-1980s. Lending bounced back as the economy recovered in the early 1990s. Despite a booming economy, loan activity became highly erratic in the late 1990s.

Banks that have only branches in Texas aren't required to report their lending in the state. Major players such as NationsBank of Texas, Bank One, Texas and Wells Fargo Bank Texas fell out of state data in the late 1990s and early 2000s, when they converted their operations to branches (Table 1). This resulted in a misleading picture of state loan activity.

As banks became branches, Texas experienced negative loan growth in percentage terms. However, the downward spikes are an accounting artifact. When accounting changes due to branching are not allowed to affect lending growth rates, the spikes disappear and the lending series display a

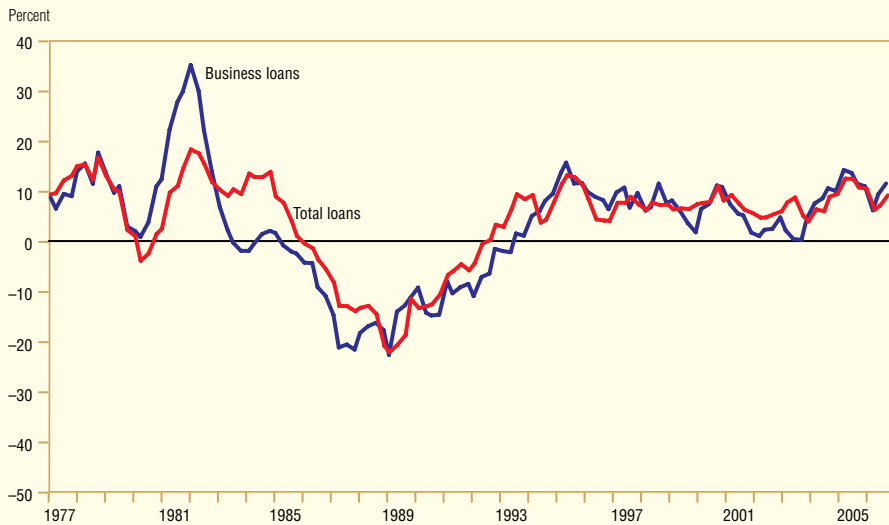
Table 1

Major Texas Conversions: Banks into Branches

Bank	Parent location	Assets	Conversion date
NationsBank of Texas	Charlotte, N.C.	\$63 billion	May 6, 1998
Compass Bank Houston	Birmingham, Ala.	\$7 billion	Oct. 23, 1998
Chase Bank of Texas	New York	\$25 billion	July 31, 2000
Bank One, Texas	Chicago	\$31 billion	Feb. 7, 2001
Comerica Bank Texas	Detroit	\$5 billion	June 29, 2003
Wells Fargo Bank Texas	San Francisco	\$24 billion	Nov. 20, 2003

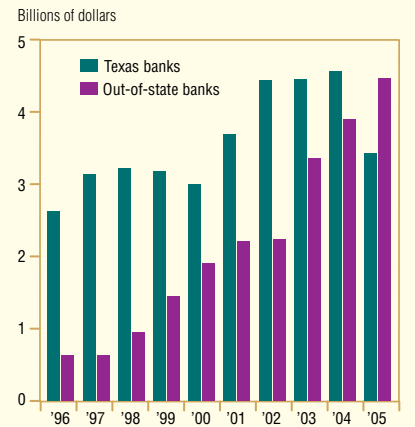
SOURCE: Federal Reserve System National Information Center.

Chart 2
Adjusted Loan Growth at Texas Banks



NOTE: Data are for loans outstanding and are adjusted for inflation.
SOURCES: Report of Condition and Income from the Federal Financial Institutions Examination Council; Federal Reserve System National Information Center.

Chart 3
Small Business Lending in Texas



NOTE: Small business loans are defined as loan originations to businesses with gross revenues of \$1 million or less. A reporting change in 2005 affects comparability with prior years.
SOURCE: Federal Financial Institutions Examination Council.

more regular pattern (*Chart 2*).³

Data on small-business loans also point to a more stable lending environment during the interstate branching period.

Under the Community Reinvestment Act, some banks are required to report the location of their small business lending. From 1996 through 2004, institutions with assets of \$250 million and higher reported the geographic distribution of loan originations to businesses with gross annual revenues of \$1 million or less. Beginning in 2005, only banks with assets of \$1 billion or more were

required to report this information.⁴

While not a complete picture of activity in Texas, these data reveal that until 2005, when smaller institutions dropped out of the sample, the dollar amount of loan originations for both Texas-based and out-of-state banks generally rose (*Chart 3*).

Assessing Economic Impact

Do important inflation-adjusted measures of lending growth at Texas banks—total loans and business loans—correlate with Texas economic activity?

Before interstate branching, loan growth tended to move in tandem with regional economic activity. The volatile, unadjusted lending data don't track as closely with economic activity in Texas after branching arrived in 1998. When the data are adjusted for interstate branching, however, some fairly strong correlations appear.

Correlation coefficients, which measure the extent to which two series move together, provide a straightforward method of determining what regional lending patterns might reveal about the economy. A coefficient of 100 percent means the series move in an identical fashion. A coefficient of zero indicates no relationship between the series. If the coefficient is negative, the series move in opposite directions.⁵

In Table 2, correlation coefficients are calculated for lending activity and year-over-year growth in gross state product, employment growth and changes in the Texas Business-Cycle Index. The first period covers the pre-interstate branching era in Texas, from 1977 to 1997. The second period begins with the introduction of branching in 1998 and runs through 2006. Two sets of correlations are given for this latter time frame. One shows the correlation coefficients using data unadjusted for interstate branching; the other uses the adjusted data series.

In the period before interstate

Table 2
Correlations Between Growth in Texas Bank Lending and Texas Economic Activity
(Correlation coefficients, percent)

	1977–1997 Pre-interstate branching			1998–2006 Post-interstate branching					
	Gross state product	Employment	Texas Business-Cycle Index	Unadjusted data			Adjusted data		
				Gross state product	Employment	Texas Business-Cycle Index	Gross state product	Employment	Texas Business-Cycle Index
Total loans	36	38	36	28	22	23	30	47	48
Business loans	38	48	46	43	32	33	64	68	70

NOTE: Bank data are adjusted for branch conversions and inflation. Gross state product is also adjusted for inflation.
SOURCES: Report of Condition and Income from the Federal Financial Institutions Examination Council; Federal Reserve System National Information Center; Haver Analytics; Federal Reserve Bank of Dallas.

Banks vs. Branches

A bank is a separately chartered institution, with its own management, board of directors, accounting statements and capital. A branch, on the other hand, is a bank office. While branches have managers, they don't have their own charters, accounting statements or boards of directors, and they aren't subject to capital requirements. Branches are cheaper and generally more efficient to operate than banks, yet they offer many of the services head offices do.

With the advent of interstate banking in 1994, the number of banks declined across the nation (*Chart A*). But banking services didn't go away. The number of branches began to grow dramatically, and they now total over 70,000.

The 1994 legislation removing restrictions on interstate banking allowed states to opt out, which Texas and Montana originally did. In 1998, however, Texas relented.* Montana allowed branching in 2001.

Texas, like the nation, has seen a decline in the number of banks, but it now has more than 5,000 branches in operation (*Chart B*).

*The Riegle-Neal Act authorized interstate branching to begin in 1997. The act also imposed a 10 percent nationwide concentration limit for a single institution's control of deposits and a 30 percent statewide limit, but states were free to choose a different limit. Texas has a 20 percent concentration limit. Moreover, Texas law generally prohibits out-of-state institutions from establishing new, or de novo, branches. It requires that any bank they purchase be at least five years old.

Chart A
U.S. Banks and Branches

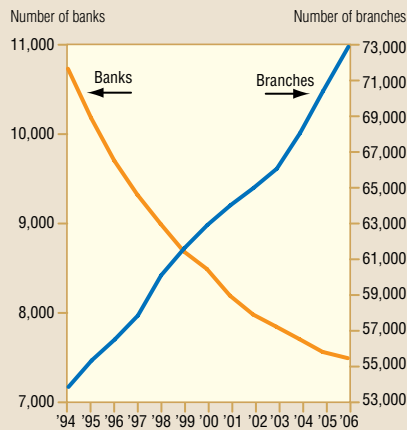
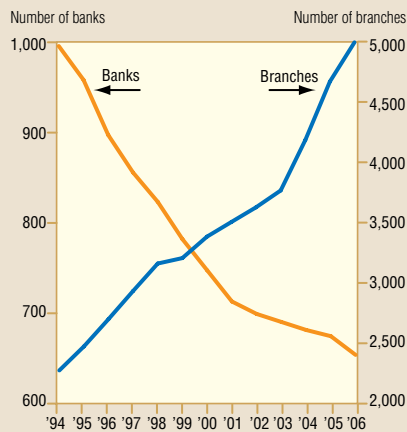


Chart B
Texas Banks and Branches



NOTE: Data are for FDIC-insured commercial banks.
SOURCE: FDIC Summary of Deposits.

Only by adjusting for the effects of interstate banking can we avoid understating the amount of lending taking place in the state.

evidence suggests that interstate banking has helped dampen regional business cycles.⁶ As a result, the U.S. banking industry is likely in better shape now than when it was regionally constrained.

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Notes

The author would like to thank Kelly Klemme for valuable research assistance.

¹ Prior to interstate branching, many states allowed out-of-state bank holding companies to operate banks within their borders. Even prior to these agreements, banks could lend across state lines by establishing loan production offices in different states. Also, many states set up agreements with each other to allow an out-of-state banking presence.

² Some of the lending reported at Texas banks could be extended to customers located outside the state. Loans outstanding are used because all banks report these series, while only larger banks report originations.

³ The adjustment entails removing a bank from the prior year's calculations if it was converted to a branch of an out-of-state bank. In this way, the transformation does not affect the growth rates of the loan series.

⁴ Under the Community Reinvestment Act, banks also report their small business loans based on the size of the loan. These data show Texas banks reported more small business loans in Texas than out-of-state institutions did until 2004.

⁵ It is important to keep in mind that correlation does not imply causation. That is, just because two series are highly correlated does not mean that one series is the result of or causes movements in the other.

⁶ "Bank Integration and State Business Cycles," by Donald P. Morgan, Bertrand Rime and Phillip E. Strahan, *Quarterly Journal of Economics*, November 2004, pp. 1555-84.

branching, the correlations are generally higher for business loans than total loans, as expected, and range from 36 percent to 48 percent. After branching is allowed in Texas, the correlation coefficients using unadjusted data drop off—with one exception. The correlation between gross state product and business loans goes up from 38 percent to 43 percent.

The results using the adjusted data show how interstate branching can affect the data. The correlation coefficients are all higher—in some cases substantially so—than those calculated with the unadjusted data. Again, business loans show the highest correlations, reaching 70 percent when using the business-cycle index as the measure of economic activity.

Overall, a Good Thing

Conventional measures of local lending are inadequate to see the true picture of loan volume on a regional basis. Branches of banks based elsewhere lend in Texas, but their activity is difficult to gauge because they aren't required to report. Only by adjusting for the effects of interstate banking can we avoid understating the amount of lending activity actually taking place in the state.

While interstate branching may render regional lending measures inadequate, it has brought a number of benefits to banks and their customers through reduced restrictions and costs. It also has allowed banks to diversify, so that they are less vulnerable to regional economic shocks. Some

QUOTABLE: *“It looks like the regional economy is following the nation into a soft landing. Texas employment is forecasted to grow 1.7 to 2 percent in 2007.”*

—Pia Orrenius, Senior Economist

ENERGY: Oil, Gasoline Prices Rise from January Lows

After slipping to a 20-month low just above \$50 a barrel in the third week of January, prices for West Texas Intermediate crude oil climbed back above \$60 in March.

Several factors contributed to the rebound. World consumption is extremely insensitive to price in the short run, which means that small changes in the perceived balance of supply and demand can lead to large swings in market prices.

In addition, demand proved robust as cold weather pushed up heating oil consumption, and U.S. gasoline demand was unseasonably high.

On the supply side, growth of non-OPEC output was less than anticipated. Geopolitical tension and Venezuela's

nationalization of foreign oil interests raised concerns about the security of supplies.

Retail gasoline prices increased about 50 cents a gallon from early January to a national average of \$2.65 in late March. Spot and futures prices point to further increases—perhaps 10 cents over the next few weeks.

Rising crude oil prices account for about 70 percent of the gain. The remaining 30 percent represents the spread between gasoline and crude oil prices that occurs before the spring and early summer's increase in demand. The seasonal rise arrived six to eight weeks early this year.

Gasoline futures markets suggest pump prices won't hit last summer's high of more than \$3 a gallon.

—Stephen P. A. Brown

THE BORDER: Laredo's Warehousing Sector May Face Challenges

Nearly half of all land-borne trade between the U.S. and Mexico goes across Laredo's international bridges.

The heavy cross-border flow of goods has shaped the city's economy. Unlike El Paso and McAllen, which rely heavily on maquiladora activity on the Mexican side, Laredo is tied more to the transportation and warehousing sector.

Indeed, Laredo's share of employment in the transportation and warehousing sector is five times larger than the national average.

Now, Mexico and the U.S. have changed the rules. In February, the two countries launched a program under which U.S. officials will inspect incoming trucks on the Mexican side

of the border. The Mexican trucks will then be allowed to travel into U.S. territory beyond the border region.

Open transport was contemplated under the North American Free Trade Agreement of 1994, but U.S. regulations delayed its implementation. The ability of Mexican trucks to travel into the U.S. reduces importers' logistics costs, but it also diminishes the need for warehouse facilities to store goods along the border until they're picked up by U.S. trucks.

Increasing trade and a stable peso have made Laredo one of the border region's most dynamic local economies. The transportation and warehousing sector will be diminished if fewer Mexican trucks unload cargo in Laredo.

—José Joaquín López

SAN ANTONIO: Production Begins for Toyota Pickup Trucks

With much fanfare, Toyota announced in December 2002 that San Antonio would be home to its U.S. plant producing the full-size Tundra pickup truck.

The \$1.3 billion, 2,000-acre manufacturing facility started operations in November, with an annual capacity of 200,000 Tundras, about a tenth of the Japanese automaker's projected U.S. output for 2008. Toyota's San Antonio operation employs nearly 2,000 workers.

In addition to the Toyota plant itself, San Antonio's economy gained an estimated 2,100 jobs with suppliers of seats, fuel tanks, stamped parts, glass and exhaust systems.

The result has been a record year for manufacturing jobs

in San Antonio. Overall, the metropolitan area's factory employment rose by 3,100 last year, or 6.5 percent, the best showing under the present data-classification system, which began in 1990.

San Antonio-produced Tundras arrived in showrooms in February. Because of high and volatile gasoline prices, the Tundra's North American sales declined 16 percent last year, to 124,508. As the San Antonio plant increases supply this year, a major marketing campaign and the prospect of more stable fuel prices are expected to increase sales.

—Keith R. Phillips

Texas Metros Drive State Growth in 2006

The Texas economy expanded at a healthy but measured pace in 2006. Employment rose a solid 3.5 percent in the first half of the year and a slower 1.8 percent in the second. Annual employment increased 2.7 percent, nearly matching its historical average of 2.8 percent and exceeding the nation's 1.8 percent (*Chart 1*).

The pace of job creation jibed with a 3.5 percent rise in the Dallas Fed's Texas Business-Cycle Index, an aggregate measure of the state's economic activity. Although modest compared with 2005, the expansion was widespread across sectors. The indexes for the state's major metropolitan areas also strengthened (*Chart 2*).

All Texas metros recorded employment gains in 2006. Austin led the pack, with overall employment rising 4.5 percent (*Chart 3*) and construction jobs climbing 7.7 percent. The professional and business services sector built on its 2005 gains, adding 4,200 jobs, or 4.3 percent. Factory employment turned around (rising 4.2 percent) as high-tech manufacturing geared up.

Dallas' economy expanded at a moder-

ate pace. Employment surged at a 4.8 percent rate in the first half of 2006 but slowed to a more modest 2.3 percent in the second. All major sectors recorded net gains, including the restructuring high-tech services industry. Gains came largely from leisure and hospitality, education and health, financial services, and professional and business services. Growth in these sectors invigorated demand for office space, contributing to a 3.5 percent increase in construction jobs.

Fort Worth's economy grew more slowly than the rest of the state, with employment rising 2 percent. An expanding hotel industry added to robust job gains in the leisure and hospitality sector (2,400 jobs). Natural resources and construction employment grew 6.5 percent as high natural gas prices spurred drilling activity in the Barnett Shale and demand rose for nonresidential space.

The energy sector continued to fuel the Houston economy. The metro gained nearly 99,000 jobs, with employment rising a torrid 7.1 percent in construction and oil and gas extraction. The professional and business services sector saw brisk job growth of

5.2 percent. This upsurge is supported by healthy demand for professionals tied to oil-related services. Buoyed by record port activity, transportation jobs grew 2.7 percent, and the leisure and hospitality industry saw a 5.6 percent increase.

San Antonio's economy continued on its steady path, posting an increase of 27,200 jobs, up 3.4 percent. The metro's two stalwart sectors—education and health services and leisure and hospitality—added more than 4,500 jobs each. Factory employment grew 5.1 percent, eclipsing growth in all other major metros. In addition, San Antonio benefited from continued growth in financial services and construction.

Economic growth in the border metros also helped propel the Texas economy (*Chart 4*). Through much of 2006, the strengthening peso and expanding maquiladora sector spurred construction, retail sales and job growth. However, recent weakness in the Mexican economy and its maquiladora industry has slowed employment growth in the border region.

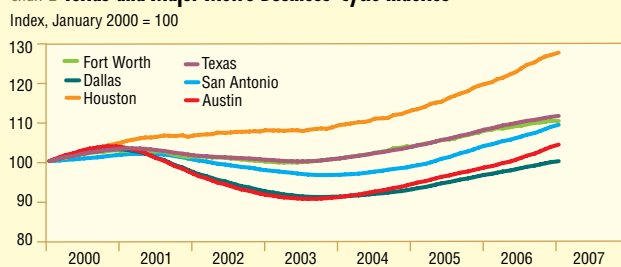
—Laila Assanie

Chart 1 Total Nonfarm Employment Growth



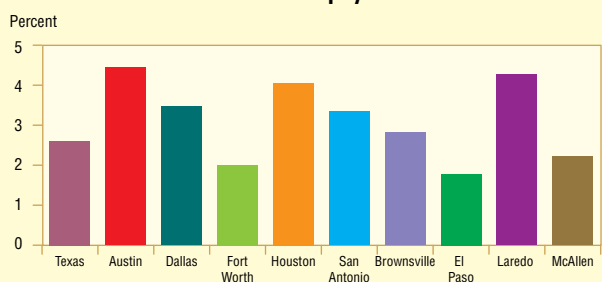
*Seasonally adjusted, annualized rate; data are quarter-over-quarter except 2007 U.S. February/December and Texas January/December.
SOURCES: Bureau of Labor Statistics; Federal Reserve Bank of Dallas.

Chart 2 Texas and Major Metro Business-Cycle Indexes



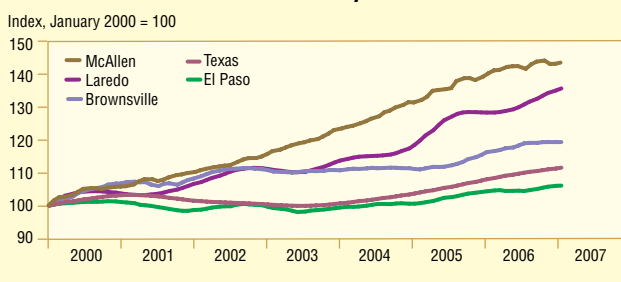
SOURCE: Federal Reserve Bank of Dallas.

Chart 3 Texas and Metro Area 2006 Employment Growth



SOURCES: Texas Workforce Commission; Federal Reserve Bank of Dallas.

Chart 4 Texas and Border Metro Business-Cycle Indexes



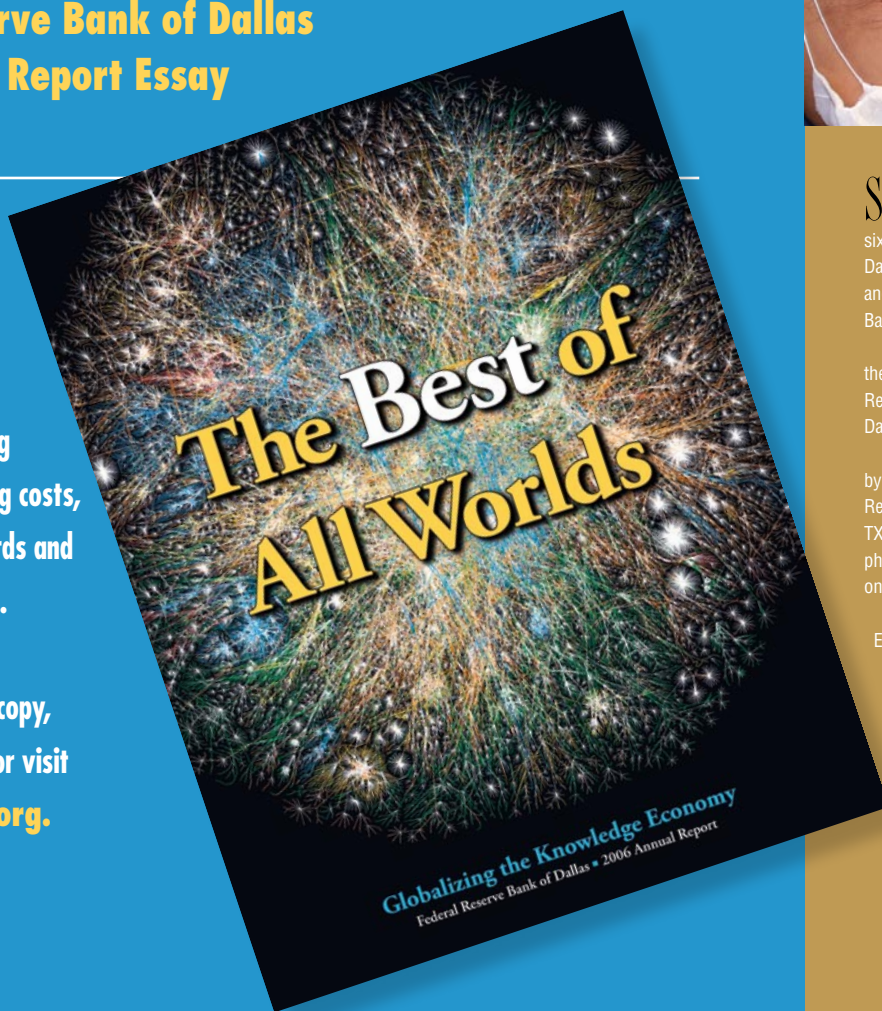
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