Moving Towards a Globally Competitive Regional Economy

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Executive Summary

Moving Towards a Globally Competitive Regional Economy

Regional Economic Indicators
2006 Edition

Background
The idea of Arizona and Sonora as a “single economic region” was conceived in 1993 with the goal of enhancing economic development and growth through increased economic integration between the two states. To achieve this, specific initiatives were identified to encourage more efficient use of complementary resources on each side of the border, to increase the Region’s competitive position within the hemisphere and globally, and to promote the development of the CANAMEX trade corridor with Arizona and Sonora as a hub.

More than a decade later, the impetus for crossborder partnership has remained unchanged. What has changed is the national and global context, with a new set of challenges for transborder regional economic development – from issues of post-9/11 border security, increased competition from China and other low-cost production regions, and economic adjustments in a post-recessionary recovery.

In this new economic environment, the need for closer crossborder collaboration and more efficient use of complementary resources has acquired new significance.

Regional economic indicators
The Regional Economic Indicators for the Arizona-Sonora Region are designed as a tool for measuring progress in selected economic activities, as identified in the strategic vision for the binational economic region. While providing an overview of the Region’s economic foundations, they focus on changes in the Region’s position relative to other border states and the NAFTA trade area. For example, while the Region’s exports may have increased from a year ago, it is important to know whether the increase follows, exceeds or lags behind the average trend in the NAFTA trade area. Thus, the indicators focus on changes in the Region’s relative position. Improvements in the Region’s relative position are interpreted as indices of increasing regional competitiveness.

This report summarizes the Region’s performance in the following areas: (1) the foundations of the Region’s competitiveness, including the maquiladora sector, selected industry clusters and selected aspects of a knowledge-based economy; (2) the Region’s competitiveness in NAFTA and global markets, and (3) the role of the Region’s border ports of entry in facilitating NAFTA trade.

The indicators help answer several key questions pertinent to changes in the Region’s position relative to the U.S.-Mexico border region and the NAFTA trade area. The findings of the analysis of annual changes from 2004 to 2005 are summarized first, followed by comparisons between 1997 and 2005 data.
### 2004-2005 changes

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<td>Has the Region’s competitiveness in NAFTA markets improved?</td>
<td><strong>YES.</strong> In 2005, the Region’s share of NAFTA markets increased modestly from the previous year. The relative share of exports to NAFTA markets increased from 1.5 percent in 2004 to 1.6 percent in 2005. This reflects a steady rise in the absolute value of exports since 2002. Moreover, in 2005, the Region’s exports reached the highest dollar value ever exported to NAFTA markets. At the same time, the Region’s exports grew faster than the average for all of the U.S. and Mexico.</td>
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<tr>
<td>Has the Region’s competitiveness in global markets improved?</td>
<td><strong>YES.</strong> In 2005, the Region’s share of global markets increased modestly from the previous year. The Region’s share of U.S.-Mexico exports to global markets increased from 1.9 percent in 2004 to 2.0 percent in 2005. This reflects both an increase in the dollar value of exported commodities, and higher annual growth than the average for all of the U.S. and Mexico.</td>
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<td>Have the Region’s border ports of entry increased their role as facilitators of trade?</td>
<td><strong>YES.</strong> In 2005, the Region’s border ports of entry processed 7.1 percent of all commodities shipped through U.S.-Mexico border ports of entry compared to 6.5 percent in 2004. This reflects the fact that the value of shipped commodities through the Region’s border ports of entry experienced faster growth than the average for all U.S.-Mexico border ports of entry.</td>
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<td>Have the Region’s border ports of entry become more specialized in terms of crossborder commodity flows?</td>
<td><strong>YES.</strong> The Region’s border ports of entry increased their share of electric and electronic product shipments from 7.5 percent in 2004 to 8.6 percent of the total value shipped through U.S.-Mexico border ports of entry in 2005. The share of machinery and equipment also increased from 4.0 percent in 2004 to 4.7 percent in 2005. However, with regard to plastic products, the third major manufacturing commodity, the Region’s share decreased slightly from 5.1 percent in 2004 to 5.0 percent in 2005.</td>
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Has the Region retained its leading role as a gateway for Mexican agricultural products to U.S. and Canada?

**YES.** Despite a decline from a 48.0 percent share in 2004 to 42.6 percent in 2005, the Region’s border ports of entry still process more than 40 percent of all Mexican agricultural products shipped through U.S.-Mexico border ports of entry. In 2005, despite the highest dollar value of shipments since 1997, the Region’s share of total agricultural product shipments declined, suggesting that other border ports of entry experienced higher growth in 2004.

Has the maquiladora sector in Sonora increased its share of Mexican border states’ employment?

**NO.** In 2005, its relative share of Mexican border states’ employment remained at 8.5 percent. Sonora’s maquiladora employment grew at a slower pace than in all Mexican border states and slower than the national average. In the previous two years (2003-2004), however, the sector’s growth in Sonora was more than twice the average of all Mexican border states, and above the national average.

To get a better understanding of trends in the Region, a longer-term perspective is necessary. While a large number of indicators improved in 2005 compared to 2004, it is necessary to note that many of the indicators are prone to considerable variations from year to year. For example, a single large firm can make a pronounced difference in the value of exports, investments or employment.
1997-2005 Comparisons

The Region’s relative position in 2005 was better than in 1997 in the following areas:

- The Region’s share of border states’ Gross State Product (GSP) increased from 7.3 percent in 1997 to 7.4 percent in 2005, suggesting relatively stronger growth in the Region’s economy.

- Sonora’s share of total foreign direct investment in Mexican border states in 2005 was 5.2 percent compared to 3.9 percent in 1997.

- The relative importance of the Region’s border ports of entry as a gateway to the United States and Canadian markets for Mexican agricultural products increased from 42.0 percent in 1997 to 42.6 percent in 2005.

- The role of the Region’s border ports of entry increased for electrical and electronic shipments between the United States and Mexico from an 8.0 percent share in 1997 to 8.6 percent in 2005.

However, in several important areas, the Region’s relative position has worsened:

- The Region’s share of global exports declined from 2.3 percent in 1997 to 2.0 percent in 2005.

- The Region’s share of NAFTA trade declined from 1.7 percent in 1997 to 1.6 percent in 2005.

- The share of the Region’s border ports of entry in total commodities shipped across the U.S.-Mexico border declined from 8.3 percent in 1997 to 7.1 percent in 2005.

- Sonora’s share of maquiladora sector, the backbone of the Region’s economic integration, declined from 10.1 percent to 8.5 percent of Mexican border states’ maquiladora employment in 2005.

Strengthening the foundations for a globally competitive regional economy

While the Regional Economic Indicators do not offer a formula for action, they do help identify areas in which focused efforts can be taken to better leverage the Region’s complementary capabilities.

Building high-tech industry clusters. The Region has a strong presence in several industries such as aerospace, software and computer services, precision instruments and pharmaceuticals. While the idea of regional transboundary clusters is not new, the conditions for resource integration and workforce coordination need to be reevaluated.

Investing in infrastructure for a knowledge-based economy. Several factors, including R&D investment, creation of a highly skilled workforce and communication networks are vital building blocks of a knowledge-based economy. Developing the infrastructure for a knowledge-based economy requires significant investments in education and technology to improve the Region’s level of performance. Moreover, it requires close crossborder coordination particularly in the area of workforce education and training to meet regional demands.

Improving the Region’s border ports of entry. These gateways play an essential role in facilitating trade. Aside from geographical factors, the volume and composition of commodities that flow through the Region’s border ports of entry depend largely on the efficiency of the physical infrastructure and the quality of service, both of which affect overall transportation costs. Continuing to focus on this area is necessary in order to keep the Region’s border ports of entry competitive in the U.S.-Mexico border region. This is particularly challenging when balanced against border security issues.
Introduction

> The Arizona-Mexico Commission and its sister organization, Comisión Sonora-Arizona, were established in 1972 to promote trade, commerce and cultural exchange between the two states. Two plenary sessions are held each year, one in each state. The June 2006 plenary session in Phoenix, Arizona, was attended by 450 people.

Arizona-Sonora Region

Increasing economic interdependency requires a borderless approach to achieve vibrant and sustainable economic growth that benefits residents on both sides of the border. The Arizona-Sonora Region is best defined as a model of transborder regional economic development created with the purpose of better responding to the challenges of increasing hemispheric and global competition. It is also a real place with a long tradition of economic and cultural ties.

The idea of Arizona and Sonora as a “single economic region” was formally advanced at the 1993 Arizona-Mexico Commission/Comisión Sonora-Arizona plenary session in Phoenix, Arizona. The goal was to enhance economic development and growth through increased economic integration between the two states within the NAFTA framework. To achieve this, the specific aims were to encourage more efficient uses of complementary resources on both sides of the border, to increase the Region’s competitive position within the hemisphere and globally, and to promote the development of the CANAMEX trade corridor with Arizona and Sonora as a hub.

These goals were shaped by the prevailing philosophy of economic development within the NAFTA framework: enhanced regional competitiveness brings higher returns to existing businesses and attracts new investment, which results in an improvement of the region’s prosperity. Improving the standard of living and quality of life of residents in both states has been the overarching goal.

Under the auspices of the Arizona-Mexico Commission and Comisión Sonora-Arizona, a strategic economic visioning project was carried out in partnership with universities in Arizona and Sonora. The resulting binational reports identified the status, opportunities and challenges involved in building a more prosperous and competitive region across the international border. One of the recommendations was to establish a set of indicators as a tool for monitoring progress toward these goals.

Purpose of regional indicators

The main purpose of the Regional Economic Indicators Project is to provide information to decision and policy-makers about economic trends in the Arizona-Sonora Region and to draw attention to those areas where the Region lags behind “average” or “expected” performance.

Originally four major areas of interest were identified: (1) competitiveness in NAFTA and global markets; (2) growth of leading economic sectors; (3) crossborder interactions, and (4) dimensions of quality of life. Since the Project’s inception in 1993, the Region’s economy has evolved, and new economic opportunities have appeared. As a result, the scope of the Project has broadened. In this report, additional indicators are included to reflect the development of the “New Economy,” focusing on selected areas of high technology activity. In addition, the ability of a region to use knowledge and technology to maintain its position in a global economy (i.e., to become a knowledge-based economy) has become increasingly relevant. In this report selected indicators are provided that begin to assess how the Region compares with respect to technological innovation and education, particularly in the areas of science and technology.
Methodology

The methodology is noteworthy in that it yielded an original set of indicators designed to measure the two neighboring states as an economically integrated region. This methodology sets the indicators apart from those available for other border regions, where the indicators remain divided by the international boundary.

The indicators were designed primarily to measure changes in the relative position of the Arizona-Sonora Region in comparison to the entire U.S.-Mexico border region rather than absolute changes in Arizona and Sonora. For example, while dollar figures may indicate an increase in exports from the Arizona-Sonora Region, monitoring the changes in relative shares of exports from the entire U.S.-Mexico border region indicates whether the Region follows, exceeds, or lags behind the average trend. This allows for an assessment of the Region’s competitiveness with respect to the U.S.-Mexico border region as a whole.\(^1\)

Originally, a total of 72 variables were identified based on the economic development literature, inputs from government and private sector representatives, and specific goals of the binational strategic economic development visioning process for the Arizona-Sonora Region. Differences in U.S. and Mexican data availability and comparability reduced the number of indicators to about 30. In seeking to include new items, the number of indicators may change, but they are always considered within a “relative” context.

Previous reports

Since 2000, five annual reports have been published presenting *Regional Economic Indicators for the Arizona-Sonora Region* accompanied by the Region’s *Report Card*.\(^2\)

These reports presented information for each individual indicator in graphic form with a brief interpretation of changes between observed time periods. While information about each indicator will be updated in its original format and available electronically, not all the graphs are printed in this report.

Organization of report

This introductory section is followed by a brief description of the demographic and economic characteristics of the Arizona-Sonora Region in the context of the U.S.-Mexico border region as a whole.

The central part of the report analyzes data for selected sectors of the Region’s economy, denoting changes and trends. Among the questions addressed are:

- Has the Region’s competitiveness in NAFTA and global markets improved?
- Have the Region’s border ports of entry increased their role as facilitators of trade?
- Have the Region’s border ports of entry become more specialized in terms of crossborder commodity flows?
- Has the Region retained its leading role as a gateway for Mexican agricultural products?
- Has the maquiladora sector in Sonora increased its share of Mexican border states’ employment?
- What are the most promising industry clusters that could more efficiently utilize complementary resources on both sides of the border?

The next section provides a set of indicators that measure the extent to which the Region’s economy is becoming one that effectively utilizes knowledge and technology.

The final section summarizes the data findings both in terms of annual and long-term changes, and includes a Report Card that grades the Region on improvements in three separate indices. The implications of the findings are briefly discussed.
Region at a Glance

> The number of people, rate of change and age composition are the basic indicators of demographic vitality of a region. In the Region, Arizona’s population is growing faster, but Sonora’s population has larger percentage of young people.

### Population
Together, Arizona and Sonora had an estimated 8.4 million residents in 2005. Arizona’s population was almost 6 million, ranking as the 18th largest U.S. state in terms of population size. The 16 percent increase from 2000 placed Arizona as one of the fastest growing states in the United States, attracting not only migrants from other states like California, but also large numbers of retirees from around the country, as well as increasing number of immigrants from Latin America. People of Hispanic origin constitute the fastest growing segment of the population, increasing from 18.6 percent in 1990 to 28.0 percent of the population in 2005.

In 2005, the population of Sonora was estimated at 2.4 million, making it the least populous of the six Mexican border states. Sonora’s population growth was slower than other Mexican border states, increasing only 7.6 percent from 2000, compared to 14.3 percent for Baja California, and 9.7 percent for Tamaulipas.

The median age of the population in Arizona was 34 years in 2005. Eight percent of the population was under five years of age, while the population 65 years and older comprised 13.0 percent of the population. The median age of 25 years in Sonora was much younger than in Arizona. From a regional economic perspective, the most relevant consequence of age structure is the relationship between the economically active and dependent population, and the flow of entrants into the labor force. Sonora’s younger age structure makes the Region’s population in general and its labor force in particular, more juvenescenent.

### Economy
In 2004, the combined GSP of the Arizona-Sonora Region was $211 billion, a 53.4 percent increase from 1997. Although smaller than Arizona’s, the Sonoran economy grew 11.0 percent between 2003 and 2004, while the Arizona economy grew 6.5 percent.

A comparison with the entire border region indicates that the GSP of the Region grew at a higher rate compared to the average for all U.S.-Mexico border states, which increased 49.4 percent from 1997.

During the last decade, the structure of Arizona’s economy, as measured in GSP by sector, changed minimally. The services sector’s contribution to GSP continued to increase at the expense of agriculture and mining sectors. The manufacturing sector’s share increased from 13.1 percent in 1990 to 13.8 percent of the state’s GSP in 2000, and then fell to 9.2 percent in 2004.

Sonora’s economy continued to transform more rapidly than that of its neighbor to the north. The manufacturing share of GSP increased from 10.4 percent in 1990 to 19.3 percent in 2000, and then declined to 16.4 percent in 2004. Changes in manufacturing are linked to maquiladora production and the operation of export platforms such as the Ford plant in Hermosillo. Agriculture and mining declined from 15.3 and 8.3 percent in 1990 to 6.6 and 2.5 percent in 2004, respectively.
When the composition of GSP by sector is considered, the economies of the two states are more similar today than 10 to 15 years ago. Both states are dominated by services with declining shares of agriculture and mining. Manufacturing plays a larger role in Sonora’s economy, while the services sector is more important in Arizona.

Crossborder interactions
Crossing the border for shopping, business, health services or visiting family and friends, has a long tradition in the Arizona-Sonora border communities. There are six border ports of entry along the Arizona-Sonora sector of the international boundary. The busiest is Nogales/Nogales, followed by San Luis/San Luis Río Colorado and Douglas/Agu Prieta.

The number of vehicles and people crossing the border is a measure of the economic interdependency between Arizona and Sonora. In 2005, 10.3 million vehicles (including both commercial and non-commercial vehicles) and 32.8 million people crossed the border from Sonora to Arizona. This represented, respectively, a 10.5 percent and 6.2 percent increase from 1997.

Although the number of persons traveling by air between Arizona and Sonora is small in comparison to the number of people crossing through border ports of entry, air passenger traffic between Hermosillo, the capital of Sonora, and Phoenix-Tucson in Arizona, more than doubled between 1997 and 2005.
MAQUILADORA SECTOR

One of the acknowledged “drivers” of the Arizona-Sonora regional economy is the maquiladora sector. In 2005, Sonora was home to 205 maquiladora plants with 81,514 employees, representing 7.3 percent of the total number of maquiladora plants and 6.7 percent of maquiladora employment in Mexico.¹⁰

A number of Sonora’s maquiladora plants are directly owned by companies located in Arizona, such as Motorola. The Sonora maquiladora plants are important customers for goods and services supplied by Arizona businesses.¹¹

Employment

Employment in Sonora’s maquiladora industry peaked in 2000 with 106,457 employees, fell to 70,769 in 2003 and expanded to 81,514 in 2005.

This pattern mirrored Mexico as a whole, where employment in the maquiladora industry peaked in 2000 with 1.3 million employees. Between 2001 and 2003, employment fell, reaching a low of 1.1 million, but recovered to 1.2 million in 2005.

Studies suggest two main reasons for the recent change in maquiladora employment. First, since maquiladora production is closely tied to the U.S. economy, the downturn in production was affected directly by the U.S. recession of the early 2000s. Second, competition from China and other low-wage regions caused a relocation of some high volume production from Mexico.¹²

The post-recession recovery in Sonora employment exceeded the positive trend across the Mexican border states. Between 2003 and 2005, employment in the Mexican border maquiladoras increased 10.1 percent, while employment in Sonora increased 15.2 percent. However, Sonora’s relative share of Mexico-border employment dropped from 10.0 percent in 2000, 9.9 percent in 2001, 8.9 percent in 2002, 8.1 percent in 2003, 8.5 percent in 2004, and 8.5 percent in 2005.¹³

Technical and administrative staff

One of the promising trends for the future of the maquiladora sector is the greater use of Mexican high-skilled labor in the design and production processes. However, the data for the entire maquiladora sector show that the percentage of technical and administrative staff has remained fairly stable throughout Mexico border states (and nationally) at around 20 percent of total employees. In 2005, 16,234 technical and administrative personnel were employed in Sonora’s maquiladora sector, an 11.5 percent increase from 1997. However, this represents a 21.7 percent decrease from the peak level in 2000.

With the exception of 2002-2004, the utilization of technical and administrative staff was lower in the Sonora maquiladora sector than for the Mexican border states as a whole.
Productivity

Productivity is measured as the value added per employee. In 2005, productivity in the maquiladora sector was $14,134 per employee in Sonora, and $17,647 per employee in the Mexican border states as a whole. Despite lower productivity, Sonora kept pace with Mexican border states, with a 76.8 percent increase in productivity from 1997 compared to 78.8 percent for all other states.

Inputs of materials and supplies

The maquiladora sector utilizes large amounts of materials and supplies. The overwhelming majority of these inputs are imported, with less than one percent supplied by Mexican (including Sonoran) sources. In 2005, the total value of materials and supplies used in Sonora’s maquiladora plants was $4.9 billion, with national inputs totaling $30.5 million. Although this represented a 12 percent increase from 2004, the rate of growth in national inputs was lower relative to the Mexican border states as a whole. National inputs used by Sonora’s maquiladora sector increased 24.6 percent while inputs for the industry in all Mexican border states increased 33.3 percent between 2001 and 2005.

FOREIGN DIRECT INVESTMENT

Foreign direct investment (FDI) tends to fluctuate from year to year for a variety of reasons.15 With the exception of 2000, when Sonora received a record $416.6 million in foreign investment, the trend in foreign direct investment follows the average for all Mexican border states.

In 2005 Sonora received $186.2 million in FDI, 5.2 percent of all foreign investment in Mexican border states. This was lower than the 7.9 percent in 2004.16

REGIONAL INDUSTRY CLUSTERS

The original concept of transborder cluster development in the Arizona-Sonora Region was proposed in the Strategic Economic Development Vision in the early 1990s. A series of studies showed that the most advanced transborder cluster was agribusiness based on traditional familiar ties, close relationships between growers, distributors and brokers, and a number of business associations, such as the Fresh Produce Association of Americas, located in Nogales, Arizona. In other sectors, such as the hospitality industry, manufacturing and health services, businesses have developed intensive transborder linkages, but formal cluster organizations have not yet been created.

More recently, there has been an increased emphasis on the potential development of complementary sectors that use new technologies and a higher-skilled workforce. This section examines selected industries that are associated with “high-technology” activities. These include, in order of employment size: software and computer services; manufacture of semiconductors and electronic components, aerospace products, precision instruments (including medical and optical), and computer and computer equipment; and pharmaceutical products.

Utilizing data from the Censos Economicos and County Business Patterns, relative changes in employment are analyzed to measure the size and strength of the industries in the Region.

Software and computer services

Labeled as one of the most “dynamic and promising drivers of the Arizona economy,” software and computer services include a wide variety of activities such as data processing, computer systems design, on-line information services, software publishing, as well as the manufacture of magnetic and optical media.

In 2003, employment in the software and computer services industry was 34,529 for the Region, of which Arizona accounted for 95 percent of the total.

Employment in the software and computing services sector increased 22.8 percent from 1999, a rate higher than the U.S.-Mexico border region as a whole (17.6 percent).

Semiconductors and other electronic component manufacturing

The Region’s combined employment in the semi-conductor and electronic component manufacturing industry, a key export commodity, was 28,650, with Sonora accounting for 34 percent of the total. This represented a 27.4 percent decrease from 1999, a fall that mirrored this sector’s widespread decline across the United States and Mexico. Only three border states, Baja California, Chihuahua and Nuevo León gained employment in this sector.

The Region’s relative share of the U.S.-Mexico border states’ semiconductor and electronic component manufacturing industry declined from 13.0 to 12.2 percent.
**Aerospace industry**

In recent years, the aerospace sector has become a target for increased investment in Mexico with more than 70 companies established throughout the country. In the Mexican border states, employment in the aerospace sector increased 45.9 percent between 1999 and 2003, although the total employment of 4,918 was low compared to 138,778 in U.S. border states.

Arizona’s 23,367 aerospace employees accounted for 17.0 percent of the U.S. border states’ aerospace employment in 2003, increasing its share of total U.S. employment from 14.0 in 1999. Sonora’s aerospace industry was practically non-existent.

Arizona’s aerospace industry experienced only a 3.0 percent decline between 1999 and 2003, compared to a fall of 18.6 percent for all U.S. border states.

Given the strength of Arizona’s aerospace industry and the proximity to Sonora’s skilled labor, this sector seems to be promising as a new regional cluster.

**Precision instruments manufacturing**

Precision instruments manufacturing encompasses a wide range of products, including navigational, medical and optical. In 2003, almost 20,000 people were employed in the sector, an increase of 44.4 percent from 1999. Much of this growth was due to increased employment in Sonora, which rose from 600 to 5,100 employees.

As a result of positive growth, the Region’s share of U.S.-Mexico border employment in precision instruments manufacturing rose from 6.1 percent to 8.6 percent.

**Computers and peripheral office manufacturing**

In the Region, employment in this sector declined 70.0 percent between 1999 and 2003, from 7,450 to 2,250 employees. Sonora lost 76.0 percent of its employees in the computer manufacturing sector. As a result, the Region’s share of total U.S.-Mexico border computer manufacturing fell from 6.8 percent to 2.1 percent.

By comparison, declines in computer equipment manufacturing for the U.S.-Mexico border states were smaller (2.2 percent). Texas was the only U.S. border state to experience growth, more than doubling its employment and overtaking the lead position from California.

**Pharmaceutical manufacturing**

Identified as a potential growth industry, an estimated 390 companies manufacture pharmaceutical products in Mexico. However, employment in the Mexican border states, which totaled 2,400 employees in 2003, was small representing four percent of the total sector in all of Mexico.

Combined employment in the Region’s pharmaceutical manufacturing sector was 1,190, of which 95 percent of the employees were in Arizona. The 16.5 percent increase in employment since 1999 was below that of the U.S.-Mexico border states as a whole, which grew 20.4 percent.
Share of NAFTA and global trade

Despite limitations in the collection of export data, the data still provide the most common measure of a region’s competitive edge. This section documents the changes in exports from the Region to Mexico, the United States, Canada and the rest of the world.

In 2005, the Region’s exports to the world (including NAFTA trade) totaled $22.5 billion. This was a 15.6 percent increase from 2004, and represented the highest dollar amount in exports since 1997.

Despite a 24.4 percent increase in global exports from 1997 to 2005, the Region’s growth lagged behind that of total U.S.-Mexico exports which grew 40.1 percent. As a result, the Region’s relative share of total U.S.-Mexico exports fell from 2.3 percent to 2.0 percent in 2005.

More than 60 percent of the Region’s global exports are to NAFTA markets. Mexico is the number one destination for Arizona’s exports, accounting for 32 percent of Arizona’s total exports in 2005, followed by Canada with 11 percent. Sonora’s exports are even more oriented to NAFTA markets, particularly the United States, the destination for over 90 percent of Sonoran exports.

Recovering from the recession in 2002, the Region experienced a steady increase in the absolute value of exports to NAFTA markets. In 2005, the Region exported $13.4 billion worth of goods to Mexico and Canada, a 23.9 percent increase from 2004 and a 56.1 percent increase from 1997. The Region’s share of total NAFTA trade varied between 1.7 percent and 1.6 percent.

Agricultural exports

Although smaller in dollar value than manufacturing exports, agriculture is a strong export sector for the Region.

In 2005, $1.2 billion worth of agricultural products were exported from the Region, a 23.2 percent increase from the previous year and an 88.7 percent increase from 1997. The growth rate of agricultural exports from the Region was substantially greater than for U.S.-Mexico agricultural exports, which grew by only 13.2 percent between 1997 and 2005.

The increase in agricultural exports since 2002 was reflected in an increased percentage share of total U.S.-Mexico agricultural exports in 2005. From 1997 to 2005, the Region’s percentage share of agricultural exports increased from 2.0 percent to 3.3 percent.

Livestock exports from Arizona are relatively negligible in comparison to Sonora, which accounted for 33 percent of all Mexican livestock exports in 2005. Arizona exported less than $1 million worth of livestock in 2005. Sonora experienced a substantial increase in livestock exports from $220 million in 2003 to $350 million...
in 2004, a 59.1 percent increase. While exports fell to $304 million in 2005, it remained substantially higher than in previous years. Since 1997, livestock exports from Sonora increased 80.1 percent. However, total Mexican livestock exports grew 122.7 percent in the same period.

**Manufacturing exports**

While the Region remained competitive in agricultural exports in 2005, manufacturing exports continued to lag behind other regions. In 2005, the Region’s manufacturing exports totaled $19 billion. This represented a 12.8 percent increase from 2004, and a 9.4 percent increase from 1997. In comparison, total U.S.-Mexico manufacturing exports increased 10.7 percent from 2004 and 38.3 percent from 1997. The Region’s share of U.S.-Mexico manufacturing exports declined from 2.4 percent in 1997 to 1.9 percent in 2005.

**Intra-regional trade**

An analysis of transborder freight data between Sonora and Arizona shows a high volume of trade within the Region. Exports to Sonora from Arizona account for 80 percent of the surface trade between Arizona and Mexico. In 2005, $3.6 billion worth of goods were exported from Arizona to Sonora. This was an increase of 26.4 percent from 2004 and was equal to the peak year of 2000.

One notable trend is that Arizona is exporting more to other Mexican border states than in the past. Although of much less value than exports to Sonora, Arizona exports to other Mexican border states have increased at a faster rate in recent years. Arizona exports to other Mexican border states increased 188.3 percent from 1997, compared to an increase of 119.8 percent for exports to Sonora.

Key commodities exported from Arizona to Mexico: electrical machinery and parts; machinery and mechanical appliances; plastics; precision instruments, including optical and medical; paper and paperboard.

Key commodities exported from Sonora to the United States are: motor vehicles, auto parts, electronic products, textile and apparel, medical and surgical instruments, livestock, asparagus and melons.
Role of the Border Ports of Entry in Facilitating NAFTA trade

Region’s share of crossborder commodity flows

The merchandise crossing through Arizona-Sonora border ports of entry reinforces the importance of the Region as a gateway for goods passing between Canada, the United States and Mexico, and its role within the CANAMEX trade corridor. In assessing the Region’s competitiveness vis-à-vis other border states, it is important to recognize that many factors determine which port of entry might be used, such as origin and destination of product, relative costs of transportation, and port efficiency. In this section, two indicators are assessed – the number of commercial trucks passing through the Region’s border ports of entry and the dollar value of commodities shipped.

In 2005, almost $17 billion worth of goods moved through the Region’s border ports of entry. This was an increase of 17.4 percent from 2004 and was the highest value of goods since 2000.

Although the total value of goods crossing through the Arizona-Sonora border ports of entry increased between 2003 and 2005, other border ports experienced greater growth. The dollar value of goods passing through U.S.-Mexico border ports of entry grew 76.6 percent compared to 52.7 percent for the Region. As a result, despite an increase in absolute volume, the Region experienced a relative decline in the share of commodities shipped through all border states, dropping from 8.3 percent in 1997 to 7.1 percent in 2005.

This picture of a relative decline in the share of the total flow of commodities across the U.S.-Mexico border becomes more complex when individual key commodities are examined. The Region experienced relative improvement in certain commodity groups and declined in others.

Agricultural products

Agricultural products are an important sector of Mexican exports. The Region’s ports of entry are a major gateway for these goods, most of which originate in Sinaloa and Sonora and are destined for the United States and Canada. The Region maintained its competitive edge in shipments of agricultural products, accounting for approximately 42 percent of the total value of shipments through all U.S. border ports of entry in 2005.

In 2005, $2 billion worth of agricultural products moved through Arizona-Sonora ports of entry, representing the highest dollar amount since 1997.

In previous years, shipments of agricultural products through the Region’s border ports of entry grew faster than for the U.S.-Mexico border region as a whole. However, between 2004 and 2005, the Region’s agricultural product shipments grew at a slower rate, rising only 2.6 percent compared to a 15.7 percent increase for all U.S.-Mexico border ports of entry.
**Electric and electronic equipment**

Another key commodity is electric and electronic equipment. In 2005, $5.1 billion worth of such equipment was shipped through the Region’s ports of entry, a 19.7 percent increase from 2004. Relative to other border regions, the Region experienced greater growth in shipments than the U.S.-Mexico border region as a whole. Shipments through the Region’s ports of entry grew 73.7 percent, compared to 61.2 percent for the border as a whole.

**Machinery and equipment supplies**

In 2005, $1.8 billion of machinery and equipment supplies moved through the Region’s ports of entry, resulting in the highest value amount since 1997.

Despite an improvement in the Region’s share of machinery and equipment shipments, the relative growth of shipments was slower than for other border ports of entry. Shipments of machinery and equipment rose 117.7 percent for all U.S. border ports of entry from 1997, while shipments increased only 47.7 percent in the Region.

**Plastics products**

Another important commodity group is plastics. In 2005, plastic product shipments totaled $572 million, a 15.1 percent increase from 2004.

After declining between 2000 and 2002, shipments of plastic products through the Region’s ports of entry have steadily increased since 2003. However, the Region lags behind other border ports of entry. While plastic product shipments through U.S. border ports of entry more than doubled from 1997 (127.2 percent), shipments through the Region’s border ports of entry grew only 56.4 percent. As a result, the Region’s share of plastics shipments fell from 7.2 percent to 5.0 percent during this period.

**Truck crossings**

Commercial trucks carry more than 80 percent of all commodities traded between the U.S. and Mexico. In 2005, 346,000 trucks crossed through the Region’s ports of entry, a 7.2 percent increase from 2004.

Between 1997 and 2005, the relative share of commercial trucks crossing through the Region’s ports of entry fell from 9.0 to 7.4 percent. This decline in relation to other border ports of entry was a result of the Region’s lower rate of growth. From 1997, the number of trucks crossing through all U.S.-Mexico border ports of entry rose 26.7 percent compared to 4.1 percent for the Region in 2005.
Knowledge-based economy

A variety of indicators have been used to assess the extent to which a regional economy is moving towards one that is “knowledge-based.” In this section, selected measures are described that reflect (1) investment in research and development (R&D) with particular emphasis in the fields of science and technology, (2) development of a highly skilled workforce through education and training, and (3) building communication networks as a means of disseminating information in the U.S.-Mexico border region.

In selecting these indicators, the challenge was to find data for both Arizona and Sonora. Due to the incompatibility of available data, the choice was made to examine each State separately, and assess their position relative to their respective border neighbors.

Investment in R&D

Patents

Between 1997 and 2004, the average annual number of patents issued per one million residents in Arizona was 312. This was higher than for New Mexico and Texas, but below the level for California (565). Relative to other border states, Arizona’s share of total patents issued remained constant during this period (between 11 and 12 percent). In this respect, the number of patents in Arizona grew at a similar rate to the border states as a whole.

On a national level, the total number of patents issued on an annual basis in Mexico is much smaller. Between 1998 and 2004, 919 patents were issued to inventors from Mexico. Data sources for individual Mexican states count the number of patent applications rather than the number of patents issued. Between 1997 and 2004, the average annual number of patent applications per one million residents in Sonora was two. By comparison, the average annual number of patent applications was 12 for Nuevo León and 4 for Baja California.

The number of patent applications from Sonora grew annually between 1999 and 2002, before declining in 2004. In 2004, the number of patent applications grew but remained below the baseline year of 1997.

Between 1997 and 2004, the relative share of Sonoran patent applications to all Mexican border states varied widely, from 10 percent in 2000 and 2 percent in 2003.

R&D intensity

In measuring the relative position of states with respect to R&D expenditures, the National Science Foundation created the R&D intensity scale, the ratio of total R&D expenditures to GSP.

In 2003, the R&D intensity scale for Arizona was 2.2. This was lower than New Mexico at 2.7 and California at 3.7, but higher than Texas at 1.7.

Highly skilled workforce

An essential factor in a knowledge-based economy is the acquisition and retention of a highly skilled work force, particularly in the areas of science and engineering. The following indicators assess the Region’s position relative to other border states.

In 2004, the percentage of Arizona’s population, aged 25 years and older, with graduate degrees was 9.2 percent. This compared to 10.4 percent in California, 9.9 percent in New Mexico and 8.2 percent in Texas. The number of doctorates in science and engineering awarded per 100,000 Arizona residents, aged 25 years and older was 14, the national average. With respect to other U.S. border states, Arizona lagged behind California (16) and New Mexico (16), but exceeded Texas (12).

The relative share of science and engineering doctorates awarded from Arizona institutions remained constant at approximately 6 percent of the total doctorates awarded in U.S. border states.

While the number of doctorates awarded in science and engineering increased between 2001 and 2004, the number remained below the baseline year of 1997.

Examining the number of computer specialists and engineers working in the state, shows that Arizona is either in second, or more often, third place among U.S. border states. The number of life and physical scientists in Arizona per 10,000 civilian workers was also lower than other border states.

Since 1999, the number of scientists employed in all fields in Arizona increased 19.6 percent, compared to 5.5 percent for the U.S. border states as a whole. However, the relative share of scientists was unchanged between 1999 and 2005.

The data for Mexico is somewhat different. While there is quite extensive data available on science and technology programs in Mexico, it is not published for individual states. The total number of doctorates awarded in all fields was 1,717 in 2004. Since 1997, the number of doctorates in science and technology increased 145 percent to 1,092.24

Another commonly-used measure of investment in a skilled workforce is the number of scholarships awarded to scholars to pursue higher or more specialized degrees. Sonora experienced an increase in the number of awarded scholarships over the past seven years. From the baseline of 1997, the number of scholarships increased 140 percent by 2004. This increase exceeded that of the Mexican border states as a whole (89 percent). As a result, Sonora’s share of scholarships relative to other border states rose from 13 percent in 1997 to 17 percent in 2004.

During the past seven years, the number of SNI members from Sonora almost doubled from 98 to 187, an increase of 91 percent. This rate of growth was consistent with other Mexican border states. The percentage share of members from Sonora remained constant between 1997 and 2004.

> Sistema Nacional de Investigadores (SNI), the prestigious system of nationally recognized researchers in Mexico, was created by a Presidential Agreement in 1984 with the purpose of recognizing individuals for their contribution to scientific knowledge and technology. The awards certify “the quality, productivity, importance and impact of the selected research projects and researchers”.23
Communication networks

A third set of indicators measure the transfer of information and technology to the broader community. Common measures include the use of communication networks, such as wireless phones, computers and the internet.

In 2003, the number of households in Arizona with a computer was 1.3 million, 64.5 percent of all households. Comparable data for other border states show that Arizona was behind California (66.3 percent), but ahead of Texas (59.1 percent) and New Mexico (5.1 percent).

Between 2001 and 2003, the number of Arizona households with computers increased 13 percent, slightly below the growth rate of 16 percent for all U.S. border states.

In 2003, 1.1 million households in Arizona had internet access, representing 55.3 percent. Again, California led with 59.6 percent of households, but only 51.8 percent of households in Texas and 44.8 percent in New Mexico had internet access.

Across all U.S. border states, internet access rose 16 percent compared to 11 percent in Arizona between 2001 and 2003.

In 2005, the number of cellular telephone subscribers per 1,000 residents in Arizona (595) was lower than in California (683) and Texas (631). Overall, the growth of cellular telephone subscribers in Arizona since 1999 matched the overall increase for U.S. border states as a whole, with the number of subscribers more than doubling in the past six years.

Although extensive data on telecommunications networks are collected for Mexico, information for individual Mexican states is limited.

Using 2000 data, the percentage of households with computers in Sonora was 10.0 percent. This compared to 15.6 percent in Baja California, and 14.4 percent in Nuevo León. Only Tamaulipas was significantly lower with 7.9 percent of households having a computer.

Drawing on data from Telmex, the national telephone company in Mexico, 14 people per 1,000 have access to the internet in Sonora. This is equivalent to estimates for Nuevo Leon and Tamaulipas, but significantly lower than Baja California with 24 people per 1,000 having internet access.

In terms of cellular telephones, Sonora had the lowest number of cellular telephones with 248 per 1,000 residents. This compared to 306 telephones per 1,000 residents in Coahuila, and 451 telephones per 1,000 residents in Baja California.
In 2005, 8.4 million residents lived in the Arizona-Sonora Region, accounting for 9.8 percent of the U.S.-Mexico border region population. The combined GSP was $211 billion or 7.5 percent of the entire U.S.-Mexico border region in 2004.

As evidenced by their economic sectors’ contribution to their respective GSP, the economies of Arizona and Sonora are more similar than a decade ago. This is primarily due to a transformation of Sonora’s economy since the 1990s. Both economies are dominated by the services sector while the agriculture and mining sectors have lost their shares.

The maquiladora sector in Sonora represents the backbone of regional economic integration, although other areas such as agribusiness, tourism and health services have developed strong crossborder ties. The maquiladora connection is largely responsible for the high percentage of intra-regional trade in total exports. In 2005, the maquiladora sector in Sonora employed more than 81,514 employees, 8.5 percent of all Mexican border states’ maquiladora employment. The value of total inputs was $4.9 billion, 98 percent of which was imported. The maquiladora sector is also largely responsible for attracting foreign direct investment. In 2005, foreign firms invested a total of $186.2 million in Sonora.

Several high-tech industries have a significant presence in the Region. The Region accounted for 17 percent of total U.S.-Mexico border employment in the aerospace industry, 12.2 percent in semiconductors, 8.6 percent in precision instrument manufacturing, and 6.8 percent in software and computer services.

The Region exported $13.4 billion to NAFTA markets in 2005, 1.6 percent of all NAFTA trade. Total exports to all markets (including NAFTA) were $22.5 billion, representing 2.0 percent of U.S.-Mexico global exports in 2005.

The Region’s six border ports of entry processed close to $17 billion worth of goods in 2005. Mexico border ports of entry. This includes trade between Arizona and Sonora as well as products originating in the United States, Canada and Mexico.

The top four commodities shipped through the Region’s border ports of entry in 2005 were: electric and electronic equipment ($5.1 billion), agricultural products ($2 billion), machinery and equipment supplies ($1.8 billion) and plastics ($0.6 billion).

Commercial trucks carry the majority of merchandise traded between Mexico and the United States. In 2005, 346,000 trucks entered the United States through the Arizona-Sonora border ports of entry. This was 7.4 percent of all commercial trucks entering the United States from Mexico via border ports of entry.

**Short-term improvements in the Region’s relative position:**

**Economic growth**
In general, the Region’s economy has kept pace with the average for all border states. The share of the U.S.-Mexico border states’ GSP kept constant since 2001.

**Maquiladora industry**
The share of employment in the Mexico border states’ maquiladora industry remained the same in 2005 and 2004. This suggests that the previous decline in share from 2002 to 2003 may have been reversed.

**High-tech industries**
In general, the Region followed or exceeded the average trends in high-tech activities for all U.S.-Mexico border states.

The share of employment in the software and computer services industry in 2003 was the same as in 1999, despite an absolute increase in the Region’s employment in that sector.
In aerospace manufacturing, the Region’s employment share increased from 14.0 percent to 17.0 percent in 2003, primarily the result of a greater decline in aerospace manufacturing in other border states.

The share of U.S.-Mexico border states’ precision instruments manufacturing increased from 6.1 in 1999 to 8.6 percent in 2003, a result of strong employment growth, particularly in Sonora.

**Exports**

The Region’s share of global exports increased from 1.9 to 2.0 percent of all U.S.-Mexico global exports. This reflects relatively stronger growth in the Region’s exports compared to the U.S.-Mexico average.

The Region’s share of U.S.-Mexico manufacturing exports of 1.9 percent in 2005 remained unchanged from a year ago. This suggests that exports may have stabilized after two years of deep decline during and immediately after the economic recession of 2001.

The Region’s share of agricultural exports increased from 2.7 to 3.3 percent, reflecting much stronger growth than the average for all border states.

The Region experienced relatively stronger export activity to NAFTA markets than the general trend, as the share of exports to NAFTA markets increased from 1.6 percent in 2004 to 1.7 percent in 2005.

**Crossborder commodity flows**

The Region’s share of all commodities shipped through U.S.-Mexico border ports of entry increased from 6.5 percent in 2004 to 7.1 percent in 2005. This reflects the fact that commodity flow through Region’s border ports of entry grew at a faster rate than the average for all U.S.-Mexico border ports of entry.

Shipment of specific commodities improved as well, suggesting that the Arizona-Sonora border ports of entry remain strong in certain areas of specialization.

The share of all transported electric and electronic products increased from 7.5 percent in 2004 to 8.6 percent in 2005 as a result of stronger growth in commodity flow through the Region’s border ports of entry, compared to all U.S.-Mexico border ports of entry.

The share of machinery and equipment also increased in 2005 to 4.7 percent from 4.0 percent share in 2004, a result of stronger growth through the Region’s border ports of entry.

The share of total truck crossings increased to 7.4 percent in 2005 compared to 7.2 percent in the previous year. The Region’s border ports of entry experienced faster growth in the number of truck crossings.

**Short-term declines in the Region’s relative position:**

**High-tech Industries**

The Region fell behind in two important industries.

The Region’s share of employment in the manufacture of computers and computer peripherals declined 69.8 percent between 1999 and 2003.

The share of employment in the U.S.-Mexico border states’ semiconductor industry declined 27.3 percent between 1999 and 2003.
Exports
As a result of a decline in the dollar value of exports, Sonora’s share of Mexican livestock exports declined from 39.8 percent in 2004 to 32.6 percent in 2005.

Crossborder commodity flows
The share of agricultural product shipments fell from 48.0 percent in 2004 to 42.6 percent in 2005, despite an increase in the total dollar value of agricultural products shipped. This indicates that other border ports of entry experienced faster growth.

The Region’s share of plastic products shipped through all border ports of entry declined slightly from 5.1 percent in 2004 to 5.0 percent in 2005, despite an increase in dollar value. This indicates that shipments through other border ports of entry grew at a faster rate.

Longer-term changes
A longer-term perspective can provide a better understanding of trends in the Region.

The Region’s relative position in 2005 worsened in comparison to 1997 in the following areas:
Employment in the maquiladora sector;
Global exports;
Exports to NAFTA;
Mexican livestock exports;
Total commodity flow through the Region’s border ports of entry;
Trucks crossings through the Region’s border ports of entry;
Machinery shipments through the Region’s border ports of entry;
Plastics shipments through the Region’s border ports of entry.

The Region’s relative position in 2005 improved in comparison to 1997 in the following areas:
GSP, indicating relatively stronger growth of the Region’s economy;
Foreign Direct Investment in Sonora;
Agricultural exports;
Agricultural products shipped through the Region’s border ports of entry;
Electric and electrical products shipped through the Region’s border ports of entry.
Composite Indexes

The Report Card summarizes 36 individual indicators into three composite indexes. Each index measures the Region’s performance on an annual basis and also provides an assessment of longer-term trends (1997-2005). Grades from A to F are assigned as measures of the Region’s improvement in relative position.

The grades assigned for each index highlight how the Region is performing relative to neighboring border regions, and help to identify those areas which require the special attention of both researchers and policy-makers. The indices measure broad economic trends. To capture the complexity of factors, more in-depth analysis needs to be done.

The NAFTA Index measures changes in the Region’s position based on its performance in export activities and facilitation of commodity flows. It is made up of 2 sub-indexes: the Regional Export sub-index and the CANAMEX Leading Industry Commodity Flow (LICF) sub-index. The CANAMEX-LICF sub-index measures changes in the Region’s share of U.S.-Mexico crossborder commodity and traffic flows while the Regional Export sub-index measures changes in the Region’s share of NAFTA and global exports.

Between 2004 and 2005, the Region experienced an increase in both commodity flows (2.3 percent) and exports (1.0 percent) relative to U.S.-Mexico border states as a whole, resulting in an upturn in the NAFTA index.

GRADE for annual performance: B

Although there has been a positive improvement in the Region’s position relative to other border states since 2003, the Region’s overall relative position declined 14.8 percent compared to 1997.

GRADE for long-term performance: F

The Economic Foundation Index measures the Region’s economic position relative to the entire U.S.-Mexico border region. It is based on changes in the Region’s share of GSP in the manufacturing, agriculture and transportation sectors.

Between 2003 and 2004, the Region experienced a 7.4 percent decline in its economic position relative to the whole U.S.-Mexico border. This was due largely to a decrease in the Region’s relative share of manufacturing GSP.

GRADE for annual performance: D-

Since 2002, the Region has experienced a decline in its position relative to the whole U.S.-Mexico border. This reflects the decline in manufacturing share, and the decreasing share in agriculture. The Region’s relative position in 2004 has fallen below that of 1997 by 4.4 percent.

GRADE for long-term performance: D
While the Economic Foundation Index indicates a worsening performance in both the short and long-term, it is important to remember that it measures broad changes in a few selected sectors. As the full report indicates, there are emerging economic industry clusters, such as software and computer services, aerospace and precision instruments where the Region has an advantage. For example, the average change in relative position of these industry clusters of 21.0 percent between 1999 and 2003 deserves an A+ grade for their performance.

The weak long-term performance of the Region does not necessarily mean that the Region is doing poorly, but rather, that neighboring border regions are doing better. This may be due to a number of factors, including geographical location, the types of commodities in demand, and the changing structure of trade which is increasingly directed towards Asia. Understanding the lack of improvement in the Region's position requires further in-depth analysis.

The Regional Economic Integration Index measures the strength of the relationship between Arizona and Sonora through transboundary activities. Indicators include cross-border vehicle and air traffic.

Between 2003 and 2004, the level of interaction increased 9.5 percent, as more people crossed the border for business, tourism, visits or other activities.

GRADE for annual performance: A

Except for a small reduction in 2000, the level of transboundary activity between Arizona and Sonora has shown a strong positive trend, increasing 51.4 percent since 1997.

GRADE for long-term performance: A+

Grading method
Since the objective is to assess the improvement in relative standing (e.g., competitive position), grade assignments are determined as follows:

A+ = an improvement in relative position greater than 10 percent
A  = an improvement in relative position between 5 to 10 percent
B  = an improvement in relative position up to 5 percent
C  = If the relative position is unchanged
D  = a decline in relative position up to 5 percent
D- = a decline in relative position between 5 to 10 percent
F  = a decline in relative position greater than 10 percent

Sources: BEA, BTS, CIAD, INEGI, USITC, WISER.
A primary source for Mexican data is the Instituto Nacional de Estadística, Geografía, e Informática (INEGI). It is comparable to the U.S. Census Bureau and contains a large amount of demographic, social and economic data. INEGI also maintains the Banco de Información Económica (BIE), a database containing economic data such as GSP, trade, industry sectors and employment. The database can be accessed through INEGI’s website, www.inegi.gob.mx, or directly at www.dgcnesyp.inegi.gob.mx.

For U.S. data, the U.S. Department of Commerce (USDOC) and its agencies, the U.S. Census Bureau (USCB), the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS) collect a large amount of demographic, social and economic data. In addition, the Bureau of Transportation Statistics (BTS) in the U.S. Department of Transportation (USDOT) houses numerous databases on border ports of entry, available on-line at www.bts.gov.

**Population**

U.S. Census Bureau (USCB), Population Division, website: www.census.gov.

Secretaría de Gobernación, Consejo Nacional de Población (CONAPO), website: www.conapo.gob.mx.

**Gross State Product**


INEGI, Banco de Información Económica (BIE), website: www.dgcnesyp.inegi.gob.mx.

**Exchange Rates**


**Cross-Border Interactions**

U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics (BTS), Border Crossing data, website: www.bts.gov.

U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics (BTS), T-100 International Market data, website: www.bts.gov.

Data received from Arizona-Mexico Commission staff, website: www.azmco.org.

**Maquiladora Industry**


**Regional Industry Clusters**


**Knowledge-based Indicators**

The U.S. Patent and Trademark Office (USPTO) releases annual data for patents issued and granted in the United States. The National Science Foundation (NSF)’s Division of Science Resources Statistics, publishes annual statistics on science and engineering resources. Employment data were used from the Bureau of Labor Statistics (BLS). Data on the communications infrastructure came from the U.S. Census Bureau (USCB) and the Federal Communications Commission (FCC).

Information regarding patents, scholarships, and Sistema Nacional de Investigadores (SNI) membership in Mexico is reported in the Informe General del Estado de la Ciencia y la Tecnología, published by the Consejo Nacional de Ciencia y Tecnología (CONACYT). CONACYT maintains an information portal, the Sistema Integrado de Información sobre Investigación de la Científica y la Tecnológica (SIICYT).

Data regarding communication infrastructure in Sonora and Mexico came from the publication, La Economía basada en el Conocimiento: las condiciones de los Estados Mexicanos, by Hector R. Peiro, Alfredo M. Ortiz and Rolando F. Bracamontes, published by the Centro de Estudios Estratégicos, Tecnológico de Monterrey (ITESM), 2005.
End Notes


2 Previous reports are available on the internet at www.oepa.arizona.edu.

3 U.S. Census Bureau, 2006.

4 Consejo Nacional de Población, 2006.

5 U.S. Bureau of Economic Analysis, 2006. 1997 is used as the baseline year because this is the first year for which the NAICS industry classification is available. All GSP data have been revised to reflect the use of 1997 NAICS codes. There is no compatibility with data prior to 1997.


7 INEGI 2006.


9 Data are available only for northbound crossings. U.S. Bureau of Transportation Statistics, 2006.

10 INEGI, 2006.


13 Selected parent companies with maquiladoras in Sonora: Avent, Bose, Chamberlain, Daewoo Electronics, Delphi, ITT, Canon de Mexico, Molex, Motorola, TRW. Source: CIAD, Dr. Pablo Wong-Conzalez and Laura Belous, Intern with OEPA, summer 2006.

14 City of Tucson has developed and maintained a *BusinessLinc* program designed to match Arizona businesses with the maquiladora sector in Mexico. http:az.businesslinc.com.

15 Annual Reports (Informes Anuales) published by Banco de Mexico provide yearly assessments of the trends in foreign direct investment, see http://www.banxico.gob.mx.
The higher figure in 2004 may reflect the expansion of the Ford Motor Company in Hermosillo.


The latest data are for 2003, which reflect the first post-recession year and may be lower than more recent data.

As with other manufacturing sectors, the addition or loss of a large firm can have a substantial impact on employment figures.


Usage data at the state level are collected through the Current Population Survey and are available every two years. The most recent data release presents 2001 and 2003 data.