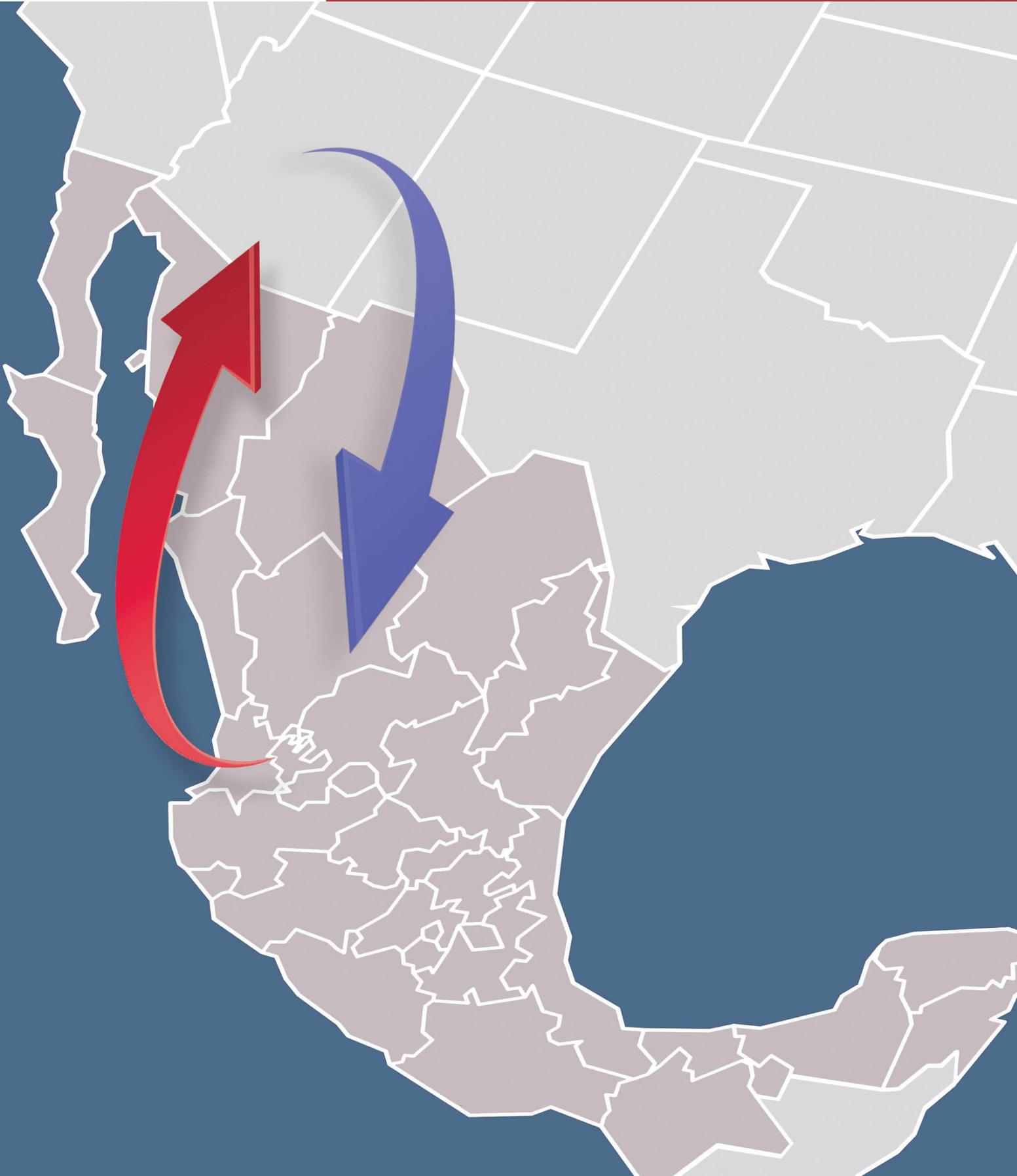


ARIZONA & MEXICO

APRIL 2016



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We thank you for making the commitment to participate in the 108th Arizona Town Hall, to be held at the Casino Del Sol Resort on April 24-27, 2016. You will be discussing and developing consensus with Arizonans and Mexicans on the topic of “Arizona & Mexico.”

An essential element to the success of these consensus-driven discussions is this background report that is provided to all participants before the Town Hall convenes. Morrison Institute at Arizona State University coordinated this informative background material, in partnership with Northern Arizona University, University of Arizona and industry professionals who have lent their time and talent to this effort. Together they have created a unique resource for a full understanding of the topic.

For sharing their wealth of knowledge and professional talents, our thanks go to the report’s authors. Our deepest gratitude also goes to Sapna Gupta, Senior Policy Analyst, Morrison Institute for Public Policy, who marshaled authors, created content and served as editor of the report.

The 108th Town Hall could not occur without the financial assistance of our generous Professional Partners, which (at the time of this printing) include Premier Partner Arizona Public Service (APS); Collaborator Partner Arizona Lottery; and Civic Leader Partners Jennings Strouss & Salmon, and Snell & Wilmer LLP.

When the 108th Town Hall ends, the background report will be combined with the recommendations from the Town Hall into a final report. This final report will be available to the public on the Arizona Town Hall website and will be widely distributed and promoted throughout Arizona. The Town Hall’s report of recommendations and background report will be used as a resource, a discussion guide and an action plan on how best to leverage economic ties and develop partnerships across Arizona and Mexico for the benefit of the region.

Sincerely,

Linda Elliott-Nelson
Board Chair, Arizona Town Hall

ARIZONA & MEXICO

APRIL 2016

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INTRODUCTION

ARIZONA & MEXICO



share a long history of engagement on many levels, including economic, civic, cultural and educational. At the state level, multiple agencies including the Arizona-Mexico Commission, the Arizona Commerce Authority, the Department of Transportation and the Office of Tourism have long worked with their state counterparts in Sonora and at the federal level in Mexico City. More recently, the State of Arizona opened a trade office in Mexico City, a joint effort with the City of Phoenix, City of Tucson and the Maricopa Association of Governments. This official-Level engagement builds on the long history of collaboration between communities and institutions along the 389-mile long border that Arizona shares with Mexico.



Mexico has an increasingly prosperous middle class, an educated workforce, and an economy nearly the same size as that of South Korea. Yet news reports about undocumented migration and violence from Mexico's war on drug traffickers mask the fact that Arizona's economy is deeply interconnected with its southern neighbor. Mexico is the state's largest trade partner with almost \$17 billion worth of goods traded between them. Addressing all of the ties between Arizona and Mexico is beyond the scope of a single report. This background report focuses on topics that underlie the economic and trade relationships between Arizona and Mexico.

In this report, experts examine a wide range of topics, including Mexico's economy and its evolution over the decades, the country's trade footprint and what goods flow through Arizona's ports of entry. The report also covers Mexico's infrastructure, the manufacturing sector near the border, the flow of fresh produce into Arizona and what Mexico's sweeping reform of its energy sector means for the electricity industry. Finally, the report discusses the impact of Mexican tourism on the state's economy, the evolution of Mexico's demographics and cross-border engagement.

TRANSITIONS IN THE MEXICAN ECONOMY

By Justin Dutram and Jennifer Columbus



- ◀ Sustained demographic stability and middle class growth positively impact Mexican productivity.
- ◀ Lower production costs, proximity to markets, and wide-reaching free trade agreements make Mexico attractive to export-oriented manufacturers.
- ◀ Increased trade between Mexico and the U.S. creates jobs and prosperity in both countries.
- ◀ Arizona is well-positioned to increase trade shares with Mexico.

Mexico's economy is the 15th largest in the world¹ and is projected to become the 6th largest by 2050.² Mexico is evolving, and remains an incredibly complex and often contradictory place. Yet as Arizona's single largest trading partner, it requires the state's sustained focus in order to strengthen its economic relationship.

Mexico's rise as an advanced international manufacturing platform has been driven by trade and the country's proximity to the United States and Canada. Since 1994, trade within the North American Free Trade Agreement (NAFTA) community has tripled.³ In the 1960's, Mexico began to develop an export-oriented manufacturing sector, specifically in the six states along Mexico's northern border: Tamaulipas, Nuevo León, Coahuila, Chihuahua, Sonora and Baja California. Lower labor and production costs, and proximity to market, were the initial value propositions Mexico offered companies that looked to move manufacturing facilities offshore.

Over time, geopolitical changes and globalization brought other countries into competition with Mexico for offshore manufacturing business, most notably China and other nations in Asia. In order for Mexico to compete with emerging manufacturing hubs in China and Asia (most notably, the Shenzhen and Guangzhou Special Economic Zones in China), Mexico had to be able to offer more to the world's manufacturers other than low costs and proximity to market. This is only one factor in many that have positively impacted Mexico's manufacturing sector's transition from a low-cost assembly operation, to a more advanced and diversified manufacturing platform -- and it is the driver behind the more recent phenomenon of relocating some manufacturing closer to the U.S. Some companies that bet on China in the early 2000's are now relocating to Mexico, to operate within the NAFTA trading block and to benefit from Mexico's competitive manufacturing environment.

Before addressing specific factors that impacted Mexico's competitive advantage, it is important to consider the demographic changes Mexico experienced over the last 30 years. For example, Mexico's decline in fertility rates had a significant impact on socio-economic progress. In 1980, Mexico's fertility rate was 4.84 children per household, versus 1.84 for the United States; in 2013 fertility rates were 2.27 children per household and 1.87,⁴ respectively, and Mexico's rates were still dropping. In one generation, the fertility rate in Mexico was cut in half: per woman, the average number of births went from approximately 5 to 2, indicating a very significant demographic transition in family size over this period.

¹ <http://databank.worldbank.org/data/download/GDP.pdf>

² <https://www.pwc.com/gx/en/issues/the-economy/assets/world-in-2050-february-2015.pdf>

³ <https://www.fas.org/sgp/crs/row/R42965.pdf>

⁴ https://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&ctype=l&strail=false&bcs=d&nselm=h&met_y=sp_dyn_frft_in&scale_y=lin&ind_y=false&rdim=region&idim=country:MEX&ifdim=region&ind=false

Concurrent with its declining fertility rate, Mexico experienced a significant increase in the size of its middle class. According to the National Institute for Geography and Statistics (INEGI) in 2012, 39.2% of the country's population was considered middle income, accounting for 44 million people; to put this number in perspective, 44 million is 10 million more than Canada's entire population. This comparison translates into a growing internal consumer market, as well as a stable, educated class, and leads to a productivity increase across all economic sectors. Mexico's sizable middle class does not, unfortunately, overshadow serious concerns at the two income distribution extremes: 1.7% of the population is considered higher income, and 59.1% lower income.⁵ Currently almost 60% of Mexico's population still lives at, or near, the poverty level. The main challenges to Mexico's development are poverty, a contrast between urban and rural human development and income inequality. The Organization for Economic Cooperation and Development (OECD) ranks Mexico 34th in member nations; i.e., bottom for income inequality.⁶

The Arizona-Mexico Relationship

David Farca, President, Arizona-Mexico Commission

There are many ways to define the Arizona-Mexico relationship. One is by the numbers, and the numbers are quite staggering. In two-way traffic, more than 46 million people, 17 million cars, and 760,000 trucks crossed the Arizona-Mexico border in 2015. Another definition is our trade volume, which in 2015 reached \$16.8 billion in imports and exports (up almost \$1 billion from 2014). But there are other definitions that are just as important.

Firstly, the Arizona-Mexico region is a unique binational region with rich cultural and historical ties. The Arizona-Mexico Commission has a 56-year history of serving as the principle vehicle promoting Arizona and Sonora cooperation. AMC continues to be a one-of-a-kind institution where the governor of Arizona leads the promotion and strengthening of Arizona's relationship with Mexico.

Secondly, our region is also a gateway for North American trade, with close to \$50 billion worth of trade between the United States and Mexico. The Arizona-Mexico region can also be defined as a growing consumer market. The Central Mexico to Arizona corridor, which includes Mexico City, the states of Mexico, Jalisco, Nayarit, Sinaloa and Sonora, represent some of the fastest growing consumer markets and a regional domestic product of well over \$750 billion.

Finally, our region is globally competitive. By partnering with Sonora we offer the opportunity to tap into advanced Research and Development alongside world class manufacturing, allowing us to compete with regions worldwide. The Arizona-Mexico relationship is complex, dynamic and diverse. Headlines may try to define us, but we are far more than a sound-bite. We are a prosperous region with a rich legacy and strong ties. More importantly, we are a region on the rise, and the best is yet to come.

Demographic stability and middle class growth have positively impacted overall productivity in the Mexican economy. Even amidst global and internal instability, the Mexican economy continues to grow steadily, albeit slowly. According to the World Bank,⁷ Mexico's GDP projected growth is rated at approximately 2.3% for the coming year, and is slated to reach 3.0% by 2017. This rate far outpaces Brazil, where the economy is expected to continue to contract due to the decline in demand for Brazil's natural resources. Mexico, to some extent, has been buffered from the precipitous decline in oil prices due to sustained growth in the manufacturing sector and record levels of remittances (money sent back to Mexico by Mexicans living abroad) yet, lost revenue from state-owned petroleum company PEMEX has impacted public sector budgets. Even the peso's recent devaluation against the U.S. dollar has not seriously impacted growth, as the weaker peso makes Mexico's exports more competitive and mitigates lost revenue

⁵ <http://www.forbes.com.mx/a-cual-clase-social-perteneces-segun-la-se/>

⁶ <http://www.oecd.org/social/inequality.htm>

⁷ <http://www.worldbank.org/en/country/mexico>

from petroleum exports sold in U.S. dollars and converted back to pesos. Notably, the peso devaluation does in fact impact other sectors of the economy, especially consumer buying power and cost of imports. In general, the World Bank now considers Mexico an upper middle income country, with per capita GDP just under \$10,000; per capita GDP is even higher in the State of Sonora, at \$13,300. Additionally, in terms of ease of conducting business (objective measure of business regulation and enforcement), Mexico is currently ranked in the top quintile in the World Bank's Doing Business 2016 report, placing Mexico at 38th out of 189 countries. For comparison, China ranks 84th and Brazil 116th.⁸

Beyond overall economic productivity, some very relevant reasons exist as to why Mexico became a more competitive manufacturing platform. The first is education. Mexico now graduates approximately 100,000 engineers per year according to the OECD,⁹ providing a qualified workforce for manufacturers across all sectors. Secondly, Mexico is more competitive primarily due to comparative labor costs, vis-à-vis China. While labor costs have increased in both Mexico and China over the last 15 years, productivity levels in China have not kept pace with wages, whereas in Mexico productivity levels have done so. Bloomberg Business estimated the difference in wages adjusted for productivity between Mexico and China to be about 29% as of 2015.¹⁰ Thirdly, Mexico is more competitive due to the country's commitment to free trade. NAFTA was the catalyst for the increase in trade, and now Mexico exports over \$1 billion in goods each day, with over 80% of those exports destined for the United States. Beyond NAFTA, Mexico holds free trade agreements with 46 countries that provide preferential access to markets by reducing or eliminating tariffs. Additionally, Mexico is a Trans Pacific Partnership signatory, allowing the country to reach 60% of global GDP with favorable trading conditions,¹¹ and thereby strengthening Mexico's position as a global manufacturing platform.

Free trade advantages are very evident in Mexico's automotive sector, with Mexico being the world's 7th largest producer and 4th largest automobile exporter. Mexico's free trade agreements are a key reason why automakers, such as BMW and Audi, chose to expand into Mexico in order to reduce tariffs on vehicles exported to markets around the world (see Appendix for timeline of new car plants in Mexico).¹² Finally, market proximity provides Mexico with an enormous competitive advantage over producers in Asia. Simplified logistics facilitate just-in-time deliveries and lower transportation costs, both for inputs and outputs, and there is an inherent advantage to being located in or near the same time zone as primary markets and corporate headquarters.

⁸ <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB16-Full-Report.pdf>

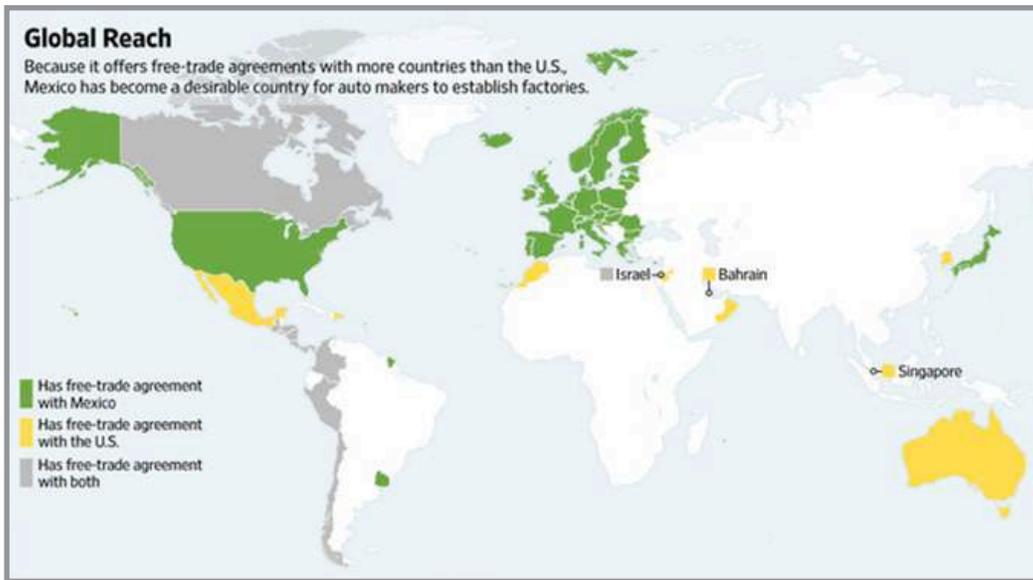
⁹ <http://stats.oecd.org/Index.aspx?DatasetCode=RGRADSTY#>

¹⁰ <http://www.bloomberg.com/bw/articles/2013-06-27/four-reasons-mexico-is-becoming-a-global-manufacturing-power> ¹¹

<http://www.wsj.com/articles/why-auto-makers-are-building-new-factories-in-mexico-not-the-u-s-1426645802>

¹² <https://azmex.eller.arizona.edu/about/fast-facts>

Figure 1: Map of Mexican and other Trade Agreements



Source: Adapted from <http://www.wsj.com/articles/why-auto-makers-are-building-new-factories-in-mexico-not-the-u-s-1426645802>

Figure 2: Map of Mexican States



Source: [https://commons.wikimedia.org/wiki/File%3AMapa_pol%C3%ADtico_de_M%C3%A9xico_a_color_\(nombres_de_estados_y_capitales\).png](https://commons.wikimedia.org/wiki/File%3AMapa_pol%C3%ADtico_de_M%C3%A9xico_a_color_(nombres_de_estados_y_capitales).png)

¹³ <https://azmex.eller.arizona.edu/az-trade/exports-nafta-markets>

¹⁴ <http://www.wired.com/2016/02/startups-can-escape-their-cash-crunch-by-going-to-mexico/>

Table 1: Mexican States and Population

Rank	State	Population 2015	Rank	State	Population 2015
1	México	16,187,608	17	Hidalgo	2,858,359
2	Distrito Federal	8,918,653	18	Sonora	2,850,330
3	Veracruz	8,112,505	19	San Luis Potosí	2,717,820
4	Jalisco	7,844,830	20	Tabasco	2,395,272
5	Puebla	6,168,883	21	Yucatán	2,097,175
6	Guanajuato	5,853,677	22	Querétaro	2,038,372
7	Chiapas	5,217,908	23	Morelos	1,903,811
8	Nuevo León	5,119,504	24	Durango	1,754,754
9	Michoacán	4,584,471	25	Zacatecas	1,579,209
10	Oaxaca	3,967,889	26	Quintana Roo	1,501,562
11	Chihuahua	3,556,574	27	Aguascalientes	1,312,544
12	Guerrero	3,533,251	28	Tlaxcala	1,272,847
13	Tamaulipas	3,441,698	29	Nayarit	1,181,050
14	Baja California	3,315,766	30	Campeche	899,931
15	Sinaloa	2,966,321	31	Baja California Sur	712,029
16	Coahuila	2,954,915	32	Colima	711,235

Increased trade between the United States and Mexico generates new business opportunities and creates wealth and jobs in both countries. For example, as nearshoring fuels Mexico’s manufacturing sector growth, opportunities are created for inputs and services suppliers in the United States and Arizona to capture new markets. Arizona’s manufacturing exports to NAFTA markets grew to \$7.81 billion in 2015, accounting for an impressive 7.32% year-to-year increase from 2014 to 2015.¹³ Still, Arizona is actually only capturing a very small share of the manufacturing export market. Arizona’s total exports to NAFTA markets as a share of all southern U.S. border states combined was 6.43% in 2015 (the vast majority of exports come from Texas at 69.0%¹⁴). Arizona engagement with its traditional Sonora and Sinaloa trading partners can be expanded to other regions of Mexico – Baja California, Chihuahua, Jalisco and Nuevo León for example – where manufacturing has a larger presence. Of indirect benefit to Arizona, Mexican middle class growth creates increased demand for American consumer products -- both through export from the U.S., and in the case of Arizona, through increased retail sales to Mexican visitors. Another area of opportunity for Arizona is the emerging technology innovation sector in Mexico, which is further leveraging Arizona’s robust ecosystem for technology innovation and entrepreneurship -- resulting in joint venture and research collaboration development with emerging tech enterprises in Mexico.

The forces of globalization and a commitment to free trade, coupled with the demographic transition in Mexico have enhanced Mexico’s global position for advanced manufacturing. Additionally, as Mexico’s production sector and higher education system evolve and its capacity for technology innovation grows, new opportunities arise for Arizona businesses to provide inputs and services to the global value chain cutting across the trans-border region. Arizona’s value proposition, from logistics, to research and development, to a strong ecosystem for innovation and entrepreneurship, make it an ideal partner for participating in shared growth opportunities with Mexico. Beyond a revived cyclical interest in Mexico, a sustained dialogue and targeted engagement are critical to capitalizing on these opportunities for both Arizona and Mexico.

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AN OVERVIEW OF ARIZONA'S TRADE WITH MEXICO

By George Hammond

- 
- ◀ Mexico is Arizona's top export market. Exports of goods to Mexico hit \$9.2 billion in 2015. Arizona is the 4th largest exporter to Mexico among U.S. states.
 - ◀ Arizona's exports to Mexico rose 6.3% in 2015. In contrast, U.S. exports to Mexico declined by 1.6%.
 - ◀ On a per capita basis, Arizona exports to Mexico hit \$1,356 in 2015, which ranked the state 2nd in the nation, behind only Texas.
 - ◀ Arizona imports of goods from Mexico hit \$7.6 billion in 2015. The state was the 6th largest importer of goods from Mexico. Arizona is a major market opportunity for Mexican businesses.
 - ◀ One major development during the past year-and-a-half was the 39% appreciation of the U.S. dollar versus the Mexican Peso. This may dampen export growth in the near future.

International trade is a key component of both the Arizona and Mexican economies. Overall, trade reflects our integration into the global marketplace through our purchases from foreigners (imports) and our sales to foreigners (exports). Both imports and exports include transactions for goods and services. Goods include manufactured products, as well as agricultural products and minerals and ores. Services include intangible products, like tourism, medical care, software, and others.

Let's start with a bit of background on Arizona's international trade in goods. Arizona's trade (exports plus imports) in goods with the rest of the world totaled \$42.2 billion in 2015. That ranked the state 23rd in the nation and accounted for 1.1% of U.S. total trade flows in goods. Keep in mind that these data (and much more) are available free online at the Arizona-Mexico Economic Indicators website (azmex.eller.arizona.edu).

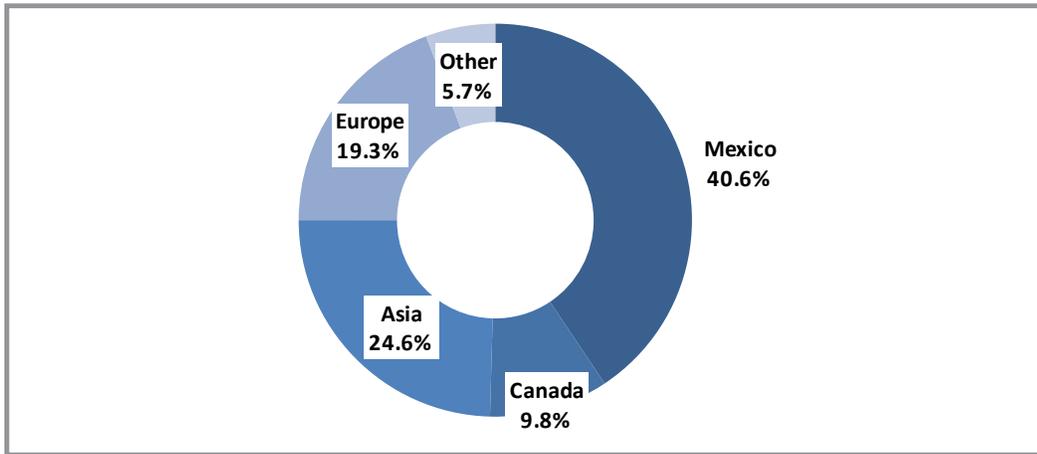
Exports are one dimension of the participation of Arizona and Mexico in the global economy. They get a large amount of attention from decision makers, in part, because exports reflect production and employment within a nation.

In 2015, Arizona's exports of goods to the world hit \$22.6 billion in 2015. That translated into \$3,339 per person in the state, which ranked Arizona 30th in the nation. For the U.S., per capita exports averaged \$4,681.

While exports are one important dimension of international trade, imports also matter. Imports can positively influence state growth when they are part of a supply chain that drives local economic growth. Think of maquiladora activity that boosts production and employment on both sides of the U.S.-Mexico border.

Now let's focus on Arizona's trade in goods with Mexico, which is the second largest export destination for the nation, behind Canada and ahead of China. Mexico is Arizona's number one export destination for goods, accounting for 40.6% of the total value of state exports in 2015. Canada was the next most important destination country at 9.8%. By region, Arizona's largest export destinations in 2014 were North America (Mexico and Canada) at 50.4%, followed by Asia (24.6%), Europe (19.3%), and all other (5.7%), as Exhibit 1 shows.

Exhibit 1: Arizona's Merchandise Export Shares in 2015 by Country and Region

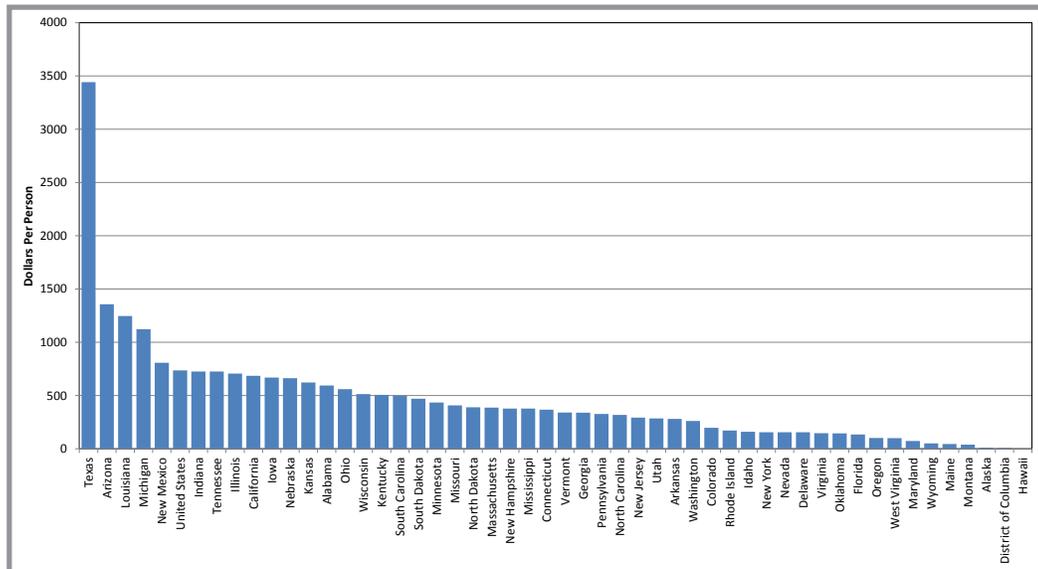


Source: Arizona-Mexico Economic Indicators

In 2015, state exports of goods to Mexico totaled \$9.2 billion, which ranked the state 4th in the nation and accounted for 3.9% of U.S. exports to Mexico. The top five states in terms of the total dollar value of goods exports to Mexico were Texas, California, Michigan, Arizona, and Illinois.

It is important to note that Arizona exports of goods to Mexico were \$1,356 per person in 2015, which ranked the state 2nd in the nation and was nearly double the U.S. average of \$735. As Exhibit 2 shows, Texas ranked first, followed by Arizona, Louisiana, Michigan, and New Mexico.

Exhibit 2: Goods Exports to Mexico Per Person, 2015

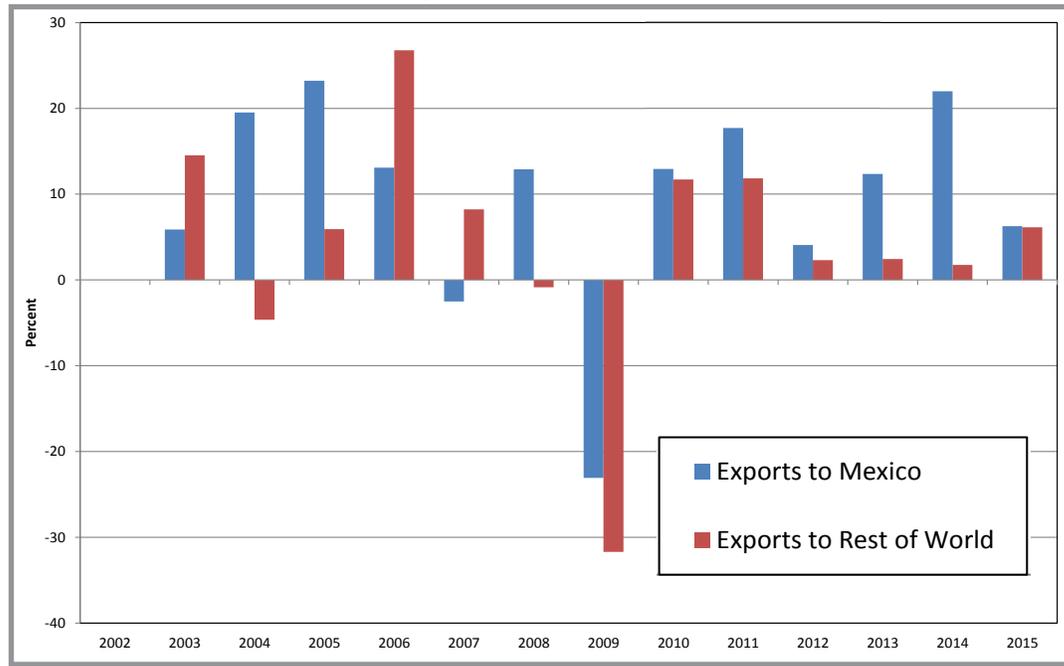


Source: Arizona-Mexico Economic Indicators; Author calculation

Exports of goods have been a bright spot for state growth during the past couple of years. Indeed, Arizona's exports of goods to all countries rose by 6.2% in 2015, which was far better than national performance. U.S. exports of goods declined by 7.2% last year. As Exhibit 3 shows, Arizona's merchandise export growth last year was driven by solid gains in exports to Mexico and to the rest of the world.

Since 2010, Arizona's exports to the world have risen by \$6.8 billion (or 43.5%). Exports to Mexico played a major role in that growth, accounting for 58.9% of the increase.

Exhibit 3: Arizona's Merchandise Export Growth



Source: Arizona-Mexico Economic Indicators

As Exhibit 3 also shows, Arizona's exports of goods declined during 2009, reflecting the impact of the global economic crisis. The crisis impacted export growth because most countries around the world experienced declining income growth (or outright declines in income), which is one key driver of exports. Countries with declining income tend to purchase fewer goods and services, including those bought from abroad, other things the same.

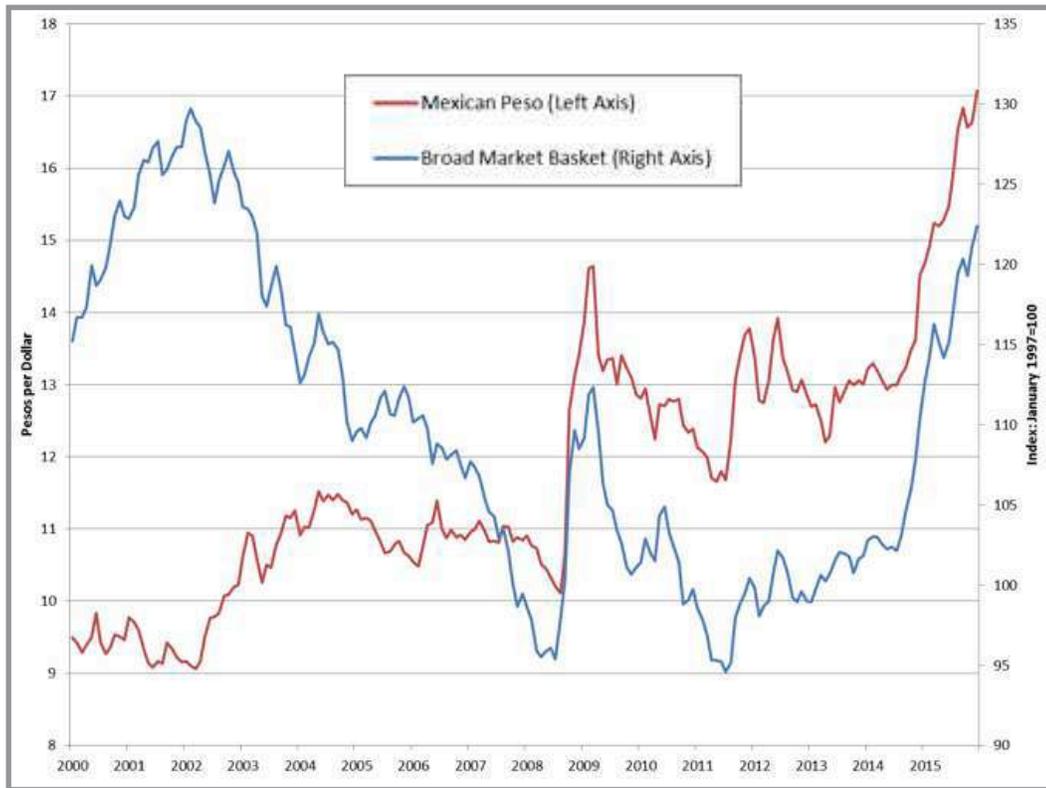
The good news on this front is that the Mexican economy has been expanding lately and it is expected to continue to grow. One important risk to the continued growth, however, is the rapid decline in crude oil prices since mid-2014. In addition, Mexico is also a relatively large economy. According to data from the Organization for Economic Cooperation and Development (OECD) Mexican nominal GDP was U.S. \$2.0 trillion in 2013. That was similar to the GDP of Italy and larger than GDP for South Korea, Spain, and Canada, for example. Of course, U.S. GDP was much larger in 2013, at \$16.7 trillion. The OECD estimates Mexico's population in 2013 at 118.4 million, larger than Germany, France, the U.K., and Italy. U.S. population in 2013 was 316.5 million.

THE POTENTIAL IMPACT OF A STRONG U.S. DOLLAR ON TRADE WITH MEXICO

Another important driver of U.S. and Arizona exports is the value of the U.S. dollar. If the dollar appreciates against most foreign currencies, this will tend to reduce U.S. exports (and increase U.S. imports from abroad), other things the same. The reason is simple: a U.S. dollar appreciation means that one unit of foreign currency buys fewer U.S. dollars. This, in turn, implies reduced purchasing power in the U.S. and lower U.S. exports.

One major development during the past year and a half has been a significant appreciation in the value of the U.S. dollar versus most foreign currencies. As Exhibit 4 shows, the dollar rose by 22.2% from June 2014 to January 2016 against a broad market basket of currencies and is now at its highest level since March 2003. The dollar appreciation has been driven by widening differences in interest rates and economic growth across the globe.

Exhibit 4: Selected U.S. Dollar Exchange Rates



Source: Arizona-Mexico Economic Indicators

The U.S. dollar has also been rising against the Mexican Peso, as Exhibit 4 shows. Indeed, as of January 2016 the dollar has appreciated by 39% against the peso since mid-2014 and is now at an all-time high. The strengthening of the U.S. dollar against the Peso suggests that we will see somewhat slower export growth in the coming year, other things the same.

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TRADE WITH MEXICO THROUGH ARIZONA'S BORDER PORTS OF ENTRY¹

By Tom Rex

- 
- ◀ Of the 47 international crossings for motor vehicles and/or pedestrians present between the United States and Mexico, nine are between Arizona and Sonora. These nine crossings are organized into six ports of entry. In addition, Arizona has two other ports of entry not located along the border: Phoenix and Tucson.
 - ◀ Very large differences are present across Arizona's ports of entry in the volume of commercial and noncommercial traffic crossing the border. Nogales is Arizona's busiest port of entry, particularly for commercial traffic.
 - ◀ In 2014, the total value of exports to Mexico passing through Arizona's ports was \$12.7 billion — 5.3% of the national total. The inflation-adjusted value increased 112% between 2004 and 2014, well above the national rate of 78%.

In addition to the eight railways that cross the United States-Mexico border — one of which is in Arizona, at Nogales — 47 international crossings for motor vehicles and/or pedestrians are present between the United States and Mexico, nine of which are between Arizona and Sonora. The road/pedestrian crossings and rail crossings are organized into 25 U.S. ports of entry located on the United States-Mexico border (see Map 1). Some ports include more than one border crossing; Arizona's nine crossings are organized into six ports. In addition to the six ports of entry located on the border with Mexico, Arizona has two other ports: Phoenix and Tucson, which largely handle traffic by air. Data on border traffic and trade values are reported by port of entry, not by individual crossing.²

A LOOK AT ARIZONA'S POINTS OF ENTRY

Arizona's border crossings and ports of entry are listed in Table 1. Very large differences are present across Arizona's six border ports of entry in the volume of commercial and noncommercial traffic crossing the border. The number of individuals crossing the border is closely tied to the size of the Mexican population living just across the border from each port. The number of trucks and rail cars, and the value of goods carried, depends on the location of the port and the characteristics of the transportation network that leads from the border communities into the interior of each country.

¹ More detail is available from the April 2014 report "Trade Between the United States and México, With a Focus on the Border Area," available at <http://usmexpat.com/>. This is one of a series of reports analyzing the relationship between the United States and México; numerous data files also can be accessed from this website.

² The data come from the U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, http://www.rita.dot.gov/bts/data_and_statistics/databases. Two of its databases are used in this chapter: border crossing/entry data and North American transborder freight data.

Map 1: United States Ports of Entry along the U.S.-Mexico Border



Table 1: Border Crossings and Ports of Entry between Arizona and Sonora

Arizona			Sonora		Lanes*		
Crossing	County	Port of Entry	Crossing	Municipio**	CV	PV	P
San Luis	Yuma	San Luis	San Luis Río Colorado	San Luis Río Colorado	-	9	7
San Luis II	Yuma	San Luis	San Luis Río Colorado 2	San Luis Río Colorado	3	-	-
Lukeville	Pima	Lukeville	Sonoyta	General Plutarco Elías Calles	1	5	-
Sasabe	Pima	Sasabe	Sásabe	Sáric	1 [^]	-	-
Nogales-Mariposa	Santa Cruz	Nogales	Mariposa	Nogales	7	-	-
Nogales-Deconcini	Santa Cruz	Nogales	Nogales	Nogales	-	8	6
Nogales-Morley Gate	Santa Cruz	Nogales	Nogales	Nogales	-	-	4
Naco	Cochise	Naco	Naco	Naco	1	2	-
Douglas	Cochise	Douglas	Agua Prieta	Agua Prieta	2	7	-

Note: the crossings are listed from west to east.

* Maximum number of lanes: CV: commercial vehicles; PV: passenger vehicles; P: pedestrian.

** A municipio is México's equivalent to a U.S. county.

[^] Single lane shared with passenger vehicles.

Sources: U.S. Customs and Border Protection and Wikipedia.

Nogales

Nogales is Arizona's busiest port of entry, particularly for commercial traffic. The high volume of non-commercial traffic is due to Nogales, Sonora being the largest of Sonora's border cities, with a population exceeding 212,000 in 2010. The high volume of commercial traffic is due both to the railway crossing the border and to the presence of freeways leading from the border in each country. In Arizona, Interstate 19 connects to the transcontinental I-10 in Tucson. In Sonora, Route 15 runs south to Hermosillo and on to central Mexico.

San Luis

The San Luis port also has a substantial volume of noncommercial traffic; San Luis Río Colorado, Sonora had a population of more than 158,000 in 2010. However, commercial traffic from central Mexico primarily crosses the border at Nogales or at ports to the east of Nogales, while traffic from the Baja Peninsula predominantly crosses at San Diego or Calexico.

Douglas

Noncommercial traffic through the Douglas port is only about half that of San Luis; the city of Agua Prieta, Sonora had a 2010 population of only about 77,000. The volume of commercial traffic is somewhat higher than at the San Luis port. Neither Douglas nor Agua Prieta, Sonora is connected to a freeway; most of the commercial traffic goes through Nogales to the west or El Paso to the east.

Naco

Naco receives more noncommercial traffic than expected given the small number of local residents (only 6,000 in Naco, Sonora in 2010). It also receives more commercial truck traffic than expected given its location, but the average value of goods per truck is lower than at the large ports.

Lukeville

Lukeville receives somewhat more noncommercial traffic than suggested based on the size of the local population (less than 13,000 in 2010 in Sonoyta, Sonora) since the route to Puerto Peñasco, Sonora (Rocky Point) passes through Lukeville. In contrast, Lukeville receives very little commercial traffic due to its remote location.

Sasabe

Sasabe is Arizona's most-lightly used port of entry. It has almost no commercial traffic and limited non-commercial traffic. Sásabe, Sonora had only 1,000 residents in 2010. This remote location is served by secondary roads in each country.

TRAFFIC THROUGH THE BORDER POINTS OF ENTRY

The data on border traffic are limited to those crossing from Mexico into the United States. Individuals who cross the border into the United States may be Mexicans crossing for such reasons as employment or shopping, or returning Americans. Complete annual data on the volume of traffic by port are available for 1997 through 2014.³ Counts are provided for a number of categories: trucks, loaded truck containers, empty truck containers, trains, loaded rail containers, empty rail containers, train passengers, buses, bus passengers, personal vehicles, personal vehicle passengers, and pedestrians.

The topic of border wait times has received considerable attention, but the data available from the U.S. ports of entry indicate that the wait time for commercial vehicles generally is short — less than one hour.⁴ This is not a significant delay for trucks whose total travel time may be many hours. In contrast, there may be substantial delays in Mexico before commercial vehicles even reach the U.S. border station. As seen in Table 2, the share of commercial truck and train traffic crossing the U.S.-Mexico border in 2014 that passed through Arizona's ports ranged by category from 6-to-9 percent. The state's share of the number of individuals crossing the border was higher at 13 percent.

The Nogales port accounted for 82 percent of the number of commercial trucks crossing the border from Sonora into Arizona in 2014. A very high percentage of the remaining truck traffic into Arizona crossed in Douglas or San Luis. Nogales is not as dominant in terms of the number of individuals crossing the border, but it still accounted for 43 percent of the state's total, compared to 34 percent in San Luis and 17 percent in Douglas.

³ The data are reported monthly, with about a six-month lag.

⁴ At a few border crossings, wait times for passenger vehicles may be longer.

Table 2: Traffic at United States Ports of Entry along the Mexican Border 2014

Port	Number of Individuals*	Number of Trucks	Loaded Truck Containers	Empty Truck Containers	Number of Trains	Loaded Rail Containers	Empty Rail Containers
San Luis	7,824,738	31,968	17,176	12,463	0	0	0
Lukeville	700,878	68	0	0	0	0	0
Sasabe	32,526	0	239	256	0	0	0
Nogales	9,856,050	312,010	256,074	58,334	795	42,802	32,963
Naco	605,764	3,601	3,496	3,112	0	0	0
Douglas	3,846,859	33,104	17,701	13,032	0	0	0
Arizona Total	22,866,815	380,751	294,686	87,197	795	42,802	32,963
U.S. TOTAL, All 25 Ports	173,261,680	5,414,568	3,779,344	1,534,439	10,413	473,866	436,127
Arizona Share (Percent)	13.2	7.0	7.8	5.7	7.6	9.0	7.6

Note: the ports are listed from west to east.

* The number of individuals is the sum of all modes of travel.

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics.

The number of trucks and trains crossing the U.S.-Mexico border increased from 1997 through 2014 by an annual average rate of about 2 percent per year. However, the rate of increase of trucks slowed over this time span; for example, the number of truck crossings rose 3.9 percent per year from 1997 through 2001 but only 1.5 percent per year from 2007 through 2014. The number of trucks crossing into Arizona did not increase as much as for the border as a whole. While the rate of increase through the Nogales port was close to the national total, truck traffic through each of Arizona's other ports dropped. The increase in rail traffic crossing the border into Arizona kept pace with the national total.

In contrast to the increases in commercial traffic, the number of individuals crossing from Mexico into the United States fell in each year from 2000 through 2011. Tightening of U.S. border security beginning in 2001 was a significant cause of the decline; weak economic conditions in the United States and Mexico beginning in 2008 also reduced the number of people crossing. The total decrease from 1999 through 2011 was 48 percent (39 percent at Arizona's ports). As the economy recovered in recent years, the number of individuals crossing the border rose 13 percent between 2011 and 2014 (8 percent at Arizona's ports).

VALUE OF GOODS TRADED WITH MEXICO BY PORT

Geographically, the transborder freight data report the value of traded goods⁵ in two ways:

- 1) By state of origin and destination. Import data by state are not reliable and export data by state also may be inexact.⁶ A very high share of goods that are manufactured, mined, or grown in Arizona and that are exported to Mexico travel through Arizona's ports.
- 2) By port. Import and export data by port are accurate. One-third of the value of goods traveling through Arizona's ports from the United States to Mexico did not originate in Arizona.

Generally, data on the value of trade are available for 2004 through 2014.

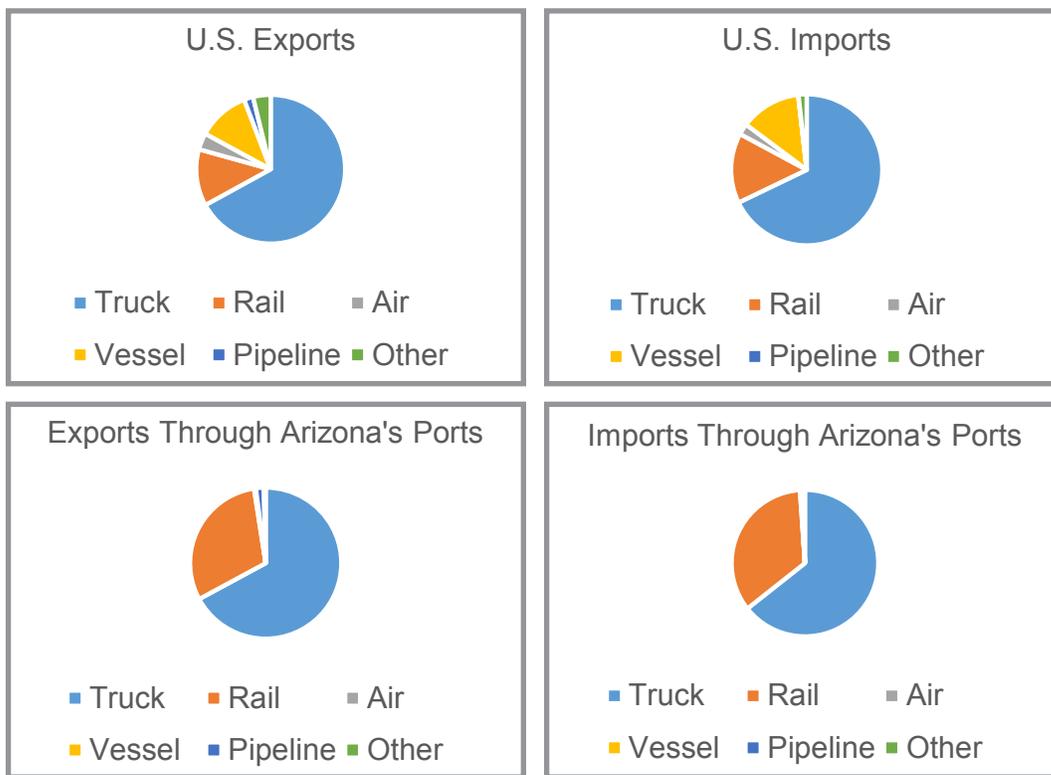
⁵ Data on the trade of services are available only for the nation.

⁶ For imports, the contents of a shipment commonly are destined to more than one state, in which case all of the shipment value is assigned to the state with the greatest aggregate value. If the primary destination is unknown, then the shipment may be assigned to the state of the final consignee or the state in which the shipment entered the United States. In some cases, shipments are sent to a storage or distribution point, which may be recorded as the import state. The direction and size of the error in the value of imports allocated by state varies by commodity. While the overall export data by state are more accurate, when shipments are consolidated, which most often occurs for nonmanufactured goods, the state in which the consolidation occurs is reported as the origin.

The value of goods shipped through the ports not located along the border — Phoenix and Tucson — is far less than the value through the Nogales, Douglas, and San Luis ports. Most of the imports and exports from Phoenix and Tucson travel by air. In 2014, the total value of exports to Mexico passing through Arizona’s eight ports was \$12.7 billion — 5.3 percent of the national total. The inflation-adjusted value increased 112 percent between 2004 and 2014, well above the national rate of 78 percent. Imports from Mexico passing through Arizona’s ports were valued at \$17.9 billion — 6.1 percent of the national total. The inflation-adjusted gain was 61 percent over the 10 years, a little more than the national figure of 55 percent.

Nationally, two-thirds of the value of goods traded with Mexico in 2014 — both imports and exports — were transported by truck. The two other common modes were rail and ship. The shares through Arizona’s ports were about the same as the nation by truck and by pipeline, but the share by rail was much higher than the national share, offset by lower shares in each of the other categories, as seen in Chart 1.

Chart 1: Mode of Transport of Goods Traded between the United States and Mexico in 2014



Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics.

Nogales is Arizona’s dominant port based on the value of trade with Mexico, accounting for 84 percent of exports and 88 percent of imports that passed through Arizona’s eight ports in 2014. Compared to the inflation-adjusted percent changes for the sum of Arizona’s eight ports, the increase in the Nogales port was a little lower for exports but a little higher for imports. Douglas (10 percent of exports and 6 percent of imports) and San Luis (6 percent of exports and 5 percent of imports) are the only other ports with a significant value of traded goods. Douglas experienced a large increase in the inflation-adjusted value of exports between 2004 and 2014, while the increase in the value of imports passing through San Luis was quite small.

Traded goods are grouped into 98 commodity categories; the commodity data by port do not start until 2007. Nationally, just five of these categories — machinery, electrical machinery, mineral fuels, vehicles, and plastics — accounted for 59 percent of the total traded value of exports to Mexico in 2014. Four of the same categories — machinery, electrical machinery, mineral fuels, and vehicles — accounted for 68 percent of the total import value. The plastics category had the highest positive net value of exports less imports, followed by organic chemicals. A very large trade deficit occurred in the vehicles category, with other significant deficits in the electrical machinery, furniture, and mineral fuels categories.

The major commodities traveling through Arizona’s eight ports in 2014 are shown in Table 3. The top five export categories accounted for 66 percent of the value of all exports; the top three import categories accounted for 61 percent of the value of all imports. Most of the negative trade balance was due to only two categories — vehicles and vegetables — while the ores category had a large trade surplus. As seen in Table 3, the inflation-adjusted percent changes between 2007 and 2014 varied widely by commodity.

Table 3: Value of Major Commodities Traded between the United States and Mexico and passing through Arizona’s Ports 2014

Code	Commodity	Value in Thousands				Real Percent Change, 2007-14	
		Exports Plus Imports	Exports	Imports	Exports Less Imports	Exports	Imports
-	TOTAL	\$30,587,014	\$12,686,602	\$17,900,412	-\$5,213,810	60%	14%
87	Vehicles Other Than Railway, and Parts	7,021,088	1,324,943	5,696,146	-4,371,203	22	41
85	Electrical Machinery and Equipment, and Parts	5,991,776	2,741,315	3,250,461	-509,146	34	-17
26	Ores; Slag and Ash	2,446,166	2,366,145	80,021	2,286,124	1,479	-10
84	Machinery and Mechanical Appliances, and Parts	2,102,818	1,031,866	1,070,952	-39,085	-17	-5
7	Edible Vegetables and Certain Roots and Tubers	2,093,304	45,701	2,047,604	-2,001,903	27	13
8	Edible Fruit and Nuts; Peel of Citrus Fruit/Melons	1,282,437	381,451	900,987	-519,536	66	15
39	Plastics and Articles Thereof	968,849	869,169	99,680	769,490	42	-6
90	Instruments: Optical, Measuring, Precision, Etc.	868,867	300,383	568,484	-268,101	61	29
71	Precious Stones and Metals; Pearls	819,182	58,764	760,418	-701,654	1,577	640
74	Copper and Articles Thereof	740,123	136,035	604,089	-468,054	-1	-4
98	Special Classification Provisions	526,469	7,961	518,508	-510,547	-27	-21
73	Articles of Iron or Steel	380,033	356,300	23,733	332,567	74	-41
48	Paper and Paperboard; Articles of Paper Pulp	322,582	310,296	12,286	298,009	20	-61
27	Mineral Fuels; Mineral Oils and Products	316,706	299,733	16,974	282,759	435	-
83	Miscellaneous Articles of Base Metal	305,769	130,594	175,175	-44,582	-1	2
22	Beverages; Spirits and Vinegar	296,068	18,943	277,125	-258,182	21	134
3	Fish, Crustaceans, Other Aquatic Invertebrates	293,971	2,146	291,825	-289,679	640	-17
94	Furniture; Bedding; Lighting Fittings; Etc.	277,269	122,073	155,196	-33,123	382	64
40	Rubber and Articles Thereof	274,104	269,179	4,926	264,253	136	197
61	Apparel and Accessories, Knitted or Crocheted	266,561	85,116	181,444	-96,328	410	31
23	Food Industries Residues; Prepared Animal Feed	236,349	217,823	18,526	199,297	63	18
1	Live Animals	178,404	2,682	175,722	-173,040	42	47
2	Meat and Edible Meat Offal	165,999	132,305	33,694	98,611	12	453
63	Other Textile Articles; Needle Craft Sets; Etc.	165,243	42,816	122,427	-79,611	216	-21
88	Aircraft and Spacecraft, and Parts	144,946	72,740	72,206	535	1,655	5,568
72	Iron and Steel	144,163	139,561	4,602	134,958	-27	6

Sources: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics (unadjusted value) and U.S. Department of Commerce, Bureau of Economic Analysis (U.S. gross domestic product implicit price deflator).

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MEXICAN INFRASTRUCTURE AND THE STATE OF ARIZONA

By Arnold Maltz

- 
- ◀ Major trade corridors between Mexico and the U.S. enter the U.S. at, Nogales/Nogales, El Paso/Ciudad Juarez, and Laredo/Nuevo Laredo.
 - ◀ Nogales is the largest port of entry in Arizona and accounts for approximately 7% of traffic by value for the U.S./Mexico border.
 - ◀ Nogales connects Arizona State Route 189 to Mexico 15, which has moved fresh produce from Sinaloa to U.S. markets for many years.
 - ◀ Upgrades and proper staffing at the Mariposa port of entry are key to maintaining Arizona's competitiveness as a port of entry for goods, particularly fresh produce, from Mexico.
 - ◀ The Arizona and Sonora trade corridor requires good rail connections in order to fully benefit from possible container traffic into the revamped Port of Guaymas in Sonora.

Arizona has long considered its border with Mexico (and the state of Sonora in Mexico) as a potential gateway to economic growth. As discussed in Chapter 11, there is a long history of border cooperation with some cities, e.g. Nogales, even having the same name on both sides of the border.

Currently the north-south traffic flow between Mexico and Arizona is dwarfed by the flow of goods coming from Asia via California and transported to the rest of the U.S. However as Mexico continues to develop its manufacturing and commercial capabilities, Mexican infrastructure improvements could increase Arizona's commercial relationship and opportunities for shared economic growth with its southern neighbor.

CURRENT STATE OF THE INFRASTRUCTURE

As discussed in Chapter 2, Arizona's connection to Mexico for commercial purposes is centered in three major ports of entry (POEs). By far the largest is the Nogales crossing, which consists of the Mariposa POE for commercial and personal vehicles, and the DeConcini POE, which is used by north-south trains, operated on the U. S. side by the Union Pacific Railroad and on the Mexican side by Ferromex (partly owned by the Union Pacific).

Mexico has some 50,000 kilometers of Federal highways and approximately 80,000 kilometers of roads maintained by the individual states. On a national basis, Mexico's ranking on the 2014 World Bank's Logistics Performance Index (LPI) is 50th out of 160 countries. Interestingly, of the 6 components of the LPI Mexico is strongest on "Timeliness" and weakest on Customs efficiency.

As the following map indicates, there are 3 major north-south arteries that connect (more or less directly) to three major crossings between Mexico and the United States-Laredo/Nuevo Laredo, El Paso/Ciudad Juarez, and Nogales, AZ/Nogales, Son. The recent upgrade/completion of the Mazatlán-Durango highway link now completes a relatively high speed east-west link from the center of Mexico's west coast to Matamoros and Nuevo Laredo.

The most important linkage for Arizona is Mexico 15 that runs from Mazatlán in the state of Sinaloa along the east coast of the Gulf of California through the Culiacan (Sinaloa), Ciudad Obregon, Guaymas and Hermosillo to Nogales. Nogales has been a center of importation for fresh produce from Sinaloa for many years, and Mexico 15 is the key connector for that trade.

Two other Mexico Federal roads have some bearing on the Arizona/Mexico trading relationship: Mexico 2/2D begins in Tijuana and goes east to Yuma then southeast before curving back up to Agua Prieta which is across the border from Douglas, Arizona; From Agua Prieta Mexico 2 goes to Ciudad Juarez/El Paso. At various points along Mexico 2 there are connections across the border including Mexicali (where Arizona-based Honeywell Aerospace has significant R&D and manufacturing operations), San Luis, which is the sister/twin city to Yuma, Arizona, and Nogales via an intersection with Mexico 15.

The open question is whether the improved connection from California to Texas on the Mexican side will improve industrial capabilities in Mexico and perhaps have positive effects on the Arizona border communities. So far, anecdotal evidence such as the relocation of Honeywell functions from Phoenix to Mexicali (and Ciudad Juarez) does not support this possibility, but there are efforts from the Arizona communities of Douglas and Yuma to work with their Mexican counterparts and bring more manufacturing to the border.

Figure 1: Mexico's Road Network



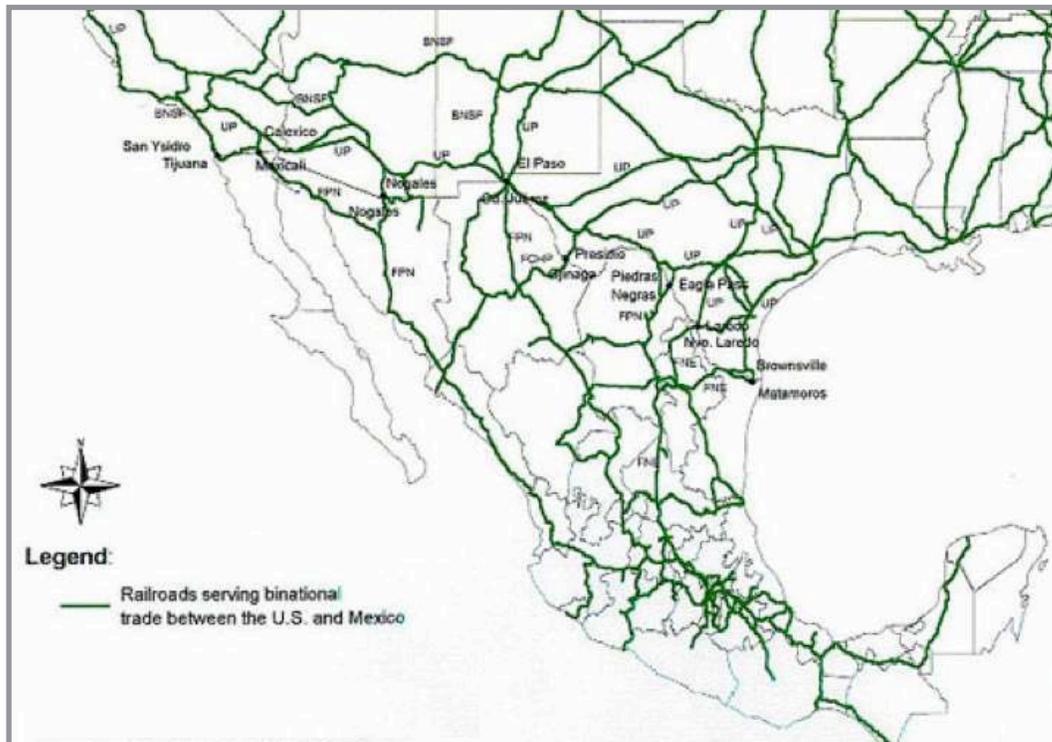
Source: PWC 2014

The other recent development is the completion of the east/west corridor Mexico 40/40D that links Mazatlán to Monterrey and its direct connection to Laredo. As we noted above a significant portion of the trade in Nogales is seasonal fresh vegetables from Sinaloa, which previously benefitted from entering into the high-speed U.S. network as quickly as possible. With the completion of 40/40D Sinaloa's produce may be able to reach Eastern and Midwestern markets as quickly as through Nogales. Thus, the recent upgrading of the Mariposa port in Nogales is crucial to maintaining Arizona competitiveness, as is proper staffing of the Port of Entry. The proposed upgrade to Arizona 189 on the U. S. side and the extension of the proposed I-11 to the border would also be helpful in this regard.

RAIL ISSUES AND THE PORT OF GUAYMAS

As noted above Mexico 15 provides fairly good connections from Sinaloa and Sonora through to Guaymas,⁷ and there are plans to improve travel times by building bypasses around major cities on the way to the border. But if Arizona is to benefit from the possible container traffic into Guaymas (see comments below) good rail connections are mandatory. At present there are reasonably good tracks from close to Guaymas through the Hermosillo area and on into the DeConcini crossing at the border. Other studies have established the capability of this track to handle “double stack” unit trains, and the Ford operations in the Hermosillo area already make extensive use of rail connections to the border. However, the Ferromex site does not list fresh produce (e.g. from Sinaloa) among the agricultural goods it carries.

Figure 2: Mexico Rail Network in 2013



Source: Barton-Aschman & La Empresa, 1997

The most recent Pima County Economic Development Report notes that once funding is secured, significant investments will be made at the Port of Guaymas in two phases. First, dredging will be instituted so that larger bulk ships can call on the port. As bulk commodities are the foundation of the port's operation this should lead to additional business. Then investments will be made in an attempt to attract scheduled container service. Some years ago it was determined that 400 containers per week inbound would be necessary for a shipping line to justify calling on Guaymas. It is still not certain that demand from the state of Sonora and the state of Arizona together is enough to offset the inherent geographic advantages of LA/Long Beach vs. Guaymas as an entry point. The continued increase in main line container vessel size makes this possibility somewhat less likely.

⁷ We should note that the military checkpoint at Benjamin Hill continues to be a periodic bottleneck on Mexico 15 for both private vehicles and commercial trucks.

RELEVANT FURTHER READINGS:

PWC Insights of Transportation and Logistics Sector in Mexico
(<https://www.pwc.com/mx/es/knowledge-center/archivo/2014-09-transportation-and-logistics.pdf>) accessed most recently on January 14, 2016.

Pima County Economic Development 2015-2017
(<http://webcms.pima.gov/cms/One.aspx?pageld=183160>), accessed January 14, 2016.

Mexican Infrastructure Plan 2014-2018
(<http://cdn.presidencia.gob.mx/pni/programa-nacional-de-infraestructura-2014-2018.pdf?v=1>)
accessed most recently January 14, 2016

Lewis, Gail, "ADOT Mexico and Border Strategy" Congressional Briefing November 3, 2015
(https://www.google.com/?gws_rd=ssl#q=ADOT+Mexico+and+Border+Strategy) accessed most recently January 14, 2016.

City of San Luis, "Port Improvement Projects at San Luis/San Luis Colorado," Congressional Border Briefing, November 3, 2015.

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THE MAQUILADORA/IMMEX SECTOR – A KEY DRIVER OF ARIZONA’S MANUFACTURING EXPORTS TO MEXICO

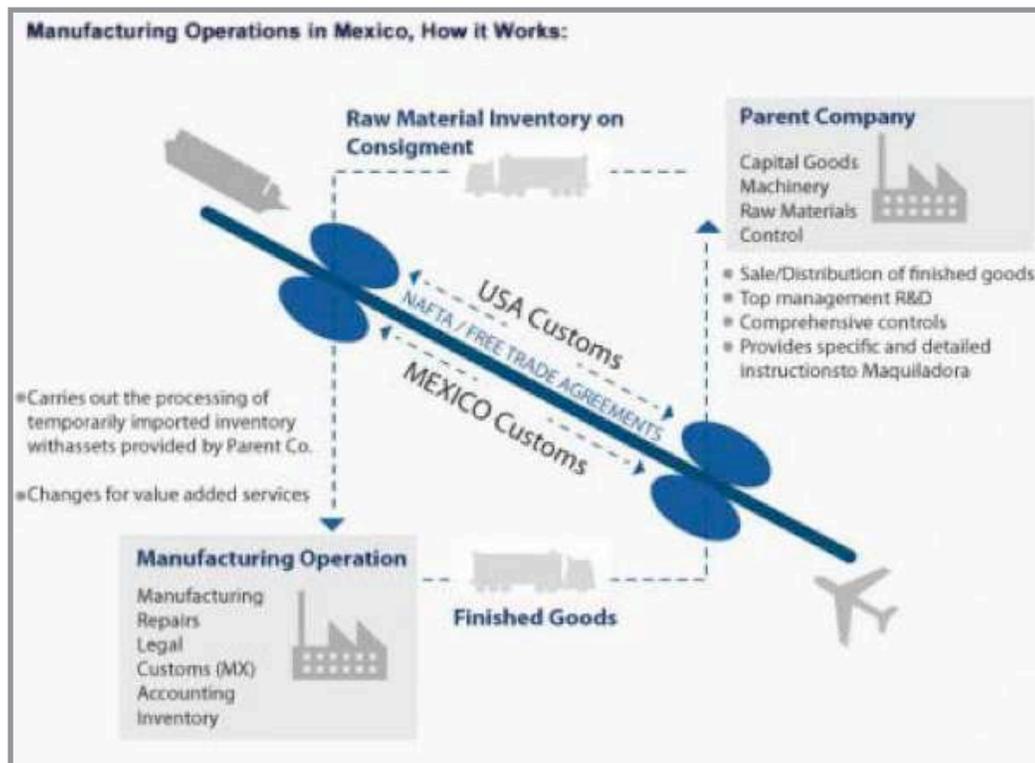
By Vera Pavlakovich-Kochi

- ◀ The Mexican IMMEX sector, which includes maquiladoras, is an important market for Arizona’s exports of goods and services.
- ◀ Arizona’s closest neighbor, Sonora, has about 163,000 employees in the IMMEX sector, of which 70 percent are in manufacturing.
- ◀ The automotive industry centered around Ford Motor Company in Hermosillo became not only one of Sonora’s manufacturing pillars, but also one of Mexico’s leading automotive industry’s production centers.
- ◀ Emerging aerospace sector in the Empalme-Guaymas area strengthens the Arizona-Sonora transborder aerospace industry cluster.
- ◀ There are untapped opportunities for Arizona’s companies to expand trade relationships with the IMMEX sector.

INTRODUCTION

Maquiladoras are Mexican production facilities mostly located along the U.S.-Mexico border. Mexico’s Maquiladora Program was initiated in mid-1960s as an assembly platform for U.S. manufacturing companies within special trade provisions under which U.S.-made components were imported duty-free in Mexico, and after being assembled with less expensive labor, were exported back to the U.S., duty-free (Figure 1).

Figure 1: A Basic Model of Maquiladora -- Parent Company Relationship



Source: Tijuana EDC

Early maquiladoras were limited to the Mexican border zone. Later the Mexican government allowed maquiladoras to be established anywhere in Mexico, while NAFTA gradually eliminated duties on manufacturing products, extending the maquiladora privileges to other exporting companies. Today the majority of maquiladoras are still owned by U.S. companies (“parent” companies), but many are also owned by Mexican national companies, as well as by a host of other companies from Asia and Europe. These parent companies are taking advantage not only of lower production costs in Mexico, but foremost of the proximity to U.S. markets.

Major sectors in the early maquiladora program were electric, electronic and textile industries. In 1990 the Mexican government initiated a parallel program for export promotion, known as PITEEX, which largely benefited the motor vehicle assembly. Subsequently, the automotive industry became one of Mexico’s most important manufacturing sectors. Since 2006, the Maquiladora and PITEEX programs were merged into a single program for the promotion of exports, known as IMMEX (Industria Manufacturera, Maquiladora y de Servicios de Exportación).

IMPORTANCE FOR ARIZONA’S ECONOMY

The economic benefits of the Mexican IMMEX sector to Arizona’s economy are generated through two main venues. First, a number of Arizona’s companies own and operate maquiladoras, mostly in the neighboring state of Sonora. Through a production-sharing relationship, which is based on lower labor costs in Mexico, Arizona-based parent companies stay competitive in national and global markets. Second, the IMMEX sector also provides opportunities to a host of other Arizona-based companies to participate in a supply chain by providing goods and services to operations in Mexico (Figure 2).

Figure 2: Supply Chain Model



Source:teachtools.com 1/20/16

Whereas exports and imports to and from maquiladora/IMMEX sector are not specifically detailed in trade statistics, the connections are obvious when the composition of transborder commodity flows is compared with the sectoral make-up of the IMMEX establishments. On average, about \$6.6 billion worth of manufacturing products heads south to Mexico and another \$10 billion worth from Mexico crosses the Arizona border.¹ This includes both export/import transactions of Arizona-based companies, as well as trade between other U.S. states and Mexico that use Arizona’s border ports of entry.

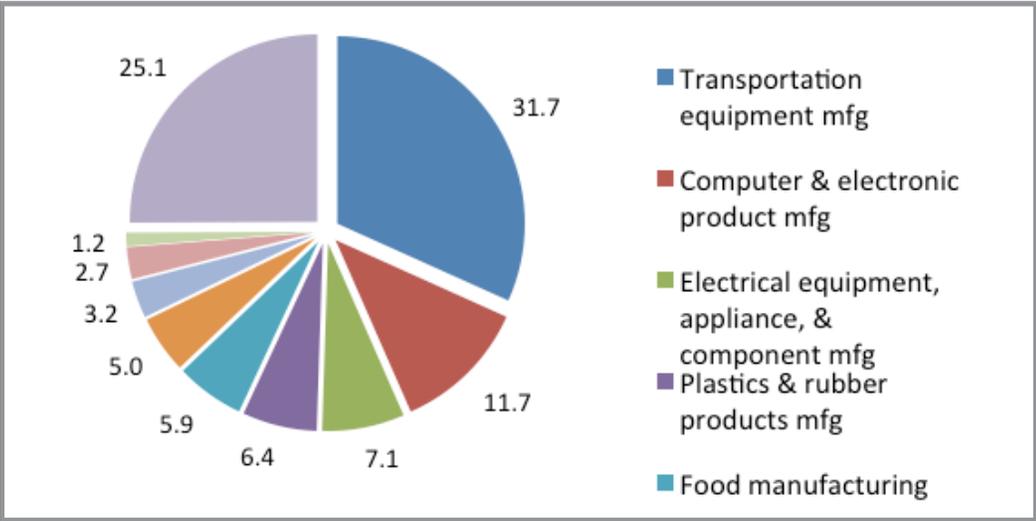
IMMEX ESTABLISHMENTS BY INDUSTRY SECTOR

IMMEX encompasses more than 6,000 establishments and employs close to 2.5 million people in Mexico. Manufacturing establishments account for approximately 82 percent of the total number of establishments and 89 percent of total employment. The non-manufacturing activities, which include agriculture and mining services, account for 18 percent of establishments and 11 percent of the total IMMEX employment. The IMMEX manufacturing plants accounts for more than 60 percent of Mexican manufacturing production.

MANUFACTURING OF TRANSPORTATION EQUIPMENT IS THE LEADER AMONG MANUFACTURING SECTORS

Transportation equipment manufacturing, which includes Mexico’s burgeoning auto industry, is the strongest sector measured by number of employees and revenues. Although this sector accounts only for 16 percent of the number of establishments, it provides close to one third of all IMMEX manufacturing jobs (Figure 3). A full 44 percent of the total IMMEX manufacturing sector revenues are generated by the transportation equipment manufacturing with auto parts and car assembly at its core.

Figure 3: IMMEX Manufacturing Employment by Sector 2014 (%)



Source: INEGI. Estadística Integral del programa de la Industria Manufacturera, maquiladora y de Servicios de Exportación (IMMEX), Feb. 2015. Data are averages January-November 2014. www.inegi.org.mx

¹ Source: AZMEX Indicators <http://azmex.eller.arizona.edu>

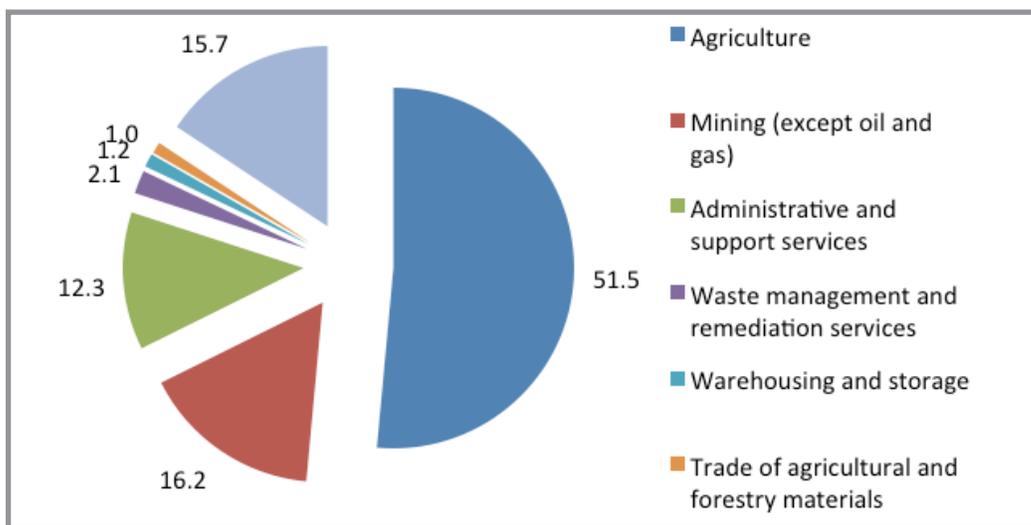
Computer and electronic product manufacturing is in second place with 12 percent of all IMMEX manufacturing jobs, while electrical equipment, appliance and component manufacturing follows in third place with 7 percent. Together, these top three sectors -- transportation equipment manufacturing, computer and electronic product manufacturing, and electrical equipment, appliance and component manufacturing -- account for 51 percent of the IMMEX manufacturing employment, 29 percent of establishments, and 51 of IMMEX-generated revenues.

THE AGRICULTURE SECTOR LEADS THE IMMEX NON-MANUFACTURING EXPORT ACTIVITIES

The non-manufacturing activities in the IMMEX Program include establishments involved in agriculture; mining (except for oil and gas); agriculture and forestry materials; warehousing and storage; administrative and support services; waste management and remediation services, and other export-oriented non-manufacturing activities.

Agriculture-based establishments account for 25 percent of all non-manufacturing establishments, but 51 percent of all IMMEX non-manufacturing sector employees. Administrative and support services include the second largest number of establishments, account for the second-largest revenues, but trail behind the mining sector in number of employees (Figure 4).

Figure 4: IMMEX non-manufacturing employment by sector 2014 (%)



Source: INEGI. Estadística Integral del programa de la Industria Manufacturera, maquiladora y de Servicios de Exportación (IMMEX), Feb. 2015. Data are averages January-November 2014. www.inegi.org.mx

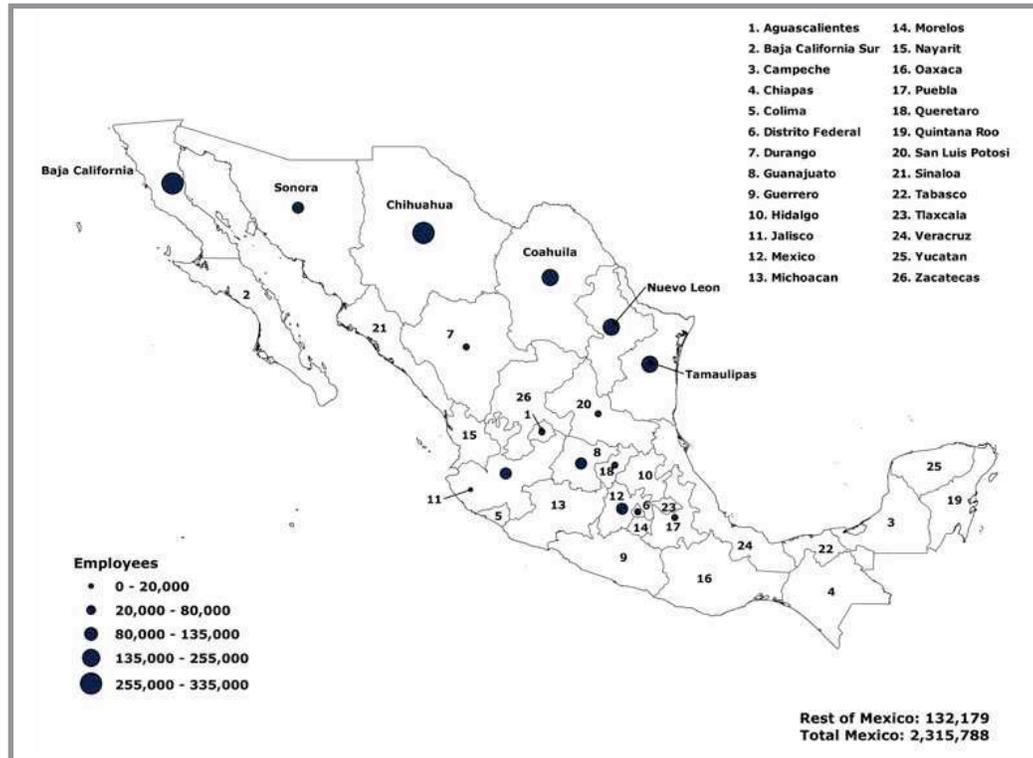
LOCATION OF IMMEX ESTABLISHMENTS BY STATE

The inclusion of the auto industry (formerly within the PITEX Program) and non-manufacturing activities is reflected in the more even distribution throughout Mexico in comparison with the traditional maquiladora sector prior to 2006. Especially interesting is the rise of IMMEX sector in centrally located states such as Guanajuato, Mexico, and Querétaro. However, the six Mexican border states still account for about 60 percent of both the number of IMMEX establishments and number of employees (Figure 5).

Baja California holds the first place with the largest number of establishments (about 18 percent of the total); while Chihuahua is number one with the largest number of IMMEX employees (13 percent of the

total). Sonora's share is about 6 percent for both the number of establishments and the number of IMMEX employees.²

Figure 5: Manufacturing IMMEX employment by state 2015



Source: AZMEX Indicators (<http://azmex.eller.arizona.edu>), based on INEGI

It is interesting to note that the first maquiladora assembly plant was opened in Nogales, Sonora, in 1965. Over the past decades several developments on national and international stages have brought substantial changes to the industry. Here are some of major transformations:

- 1) Increased competition of low-cost labor in China caused some of the older assembly plants to close in Nogales, Sonora, and relocate overseas;
- 2) Increasing utilization of Mexican technical and engineering skills as the sector transforms from simple assembly lines to more complex production processes;
- 3) "New maquiladora model" that utilizes Sonora's skilled workforce causes some Arizona companies to move technical and engineering departments south of the border (reducing those in Arizona), but allowing Arizona's companies to stay globally competitive;
- 4) Emerging aerospace sector in the Empalme-Guaymas area with links to Arizona's aerospace industry creating a core of an Arizona-Sonora trans-border aerospace industry cluster;
- 5) Expanding automotive industry in the Hermosillo region;
- 6) Stronger linkages between maquiladora industry and institutions of higher education in Sonora supported by both federal and state funding with a purpose to better match education and industry needs.

² Source: INEGI. Estadística Integral del Programa de la Industria Manufacturera, Maquiladora y de Servicios de Exportación (IMMEX), February 2015, www.inegi.org.mx

Today Sonora's IMMEX Program employs more than 163,000, of which close to 114,000 persons (or about 70 percent) are employed in manufacturing. About 50,000 people are employed in non-manufacturing sectors.

NOGALES IS STILL SONORA'S MAIN MAQUILADORA LOCATION

Although maquiladoras have spread throughout Sonora, Nogales is still Sonora's main location for maquiladoras. Nogales' maquiladora sector is about 34,000 jobs strong and has more than 80 establishments (Table 1).

Table 1: Manufacturing IMMEX (Maquiladora) in Sonora 2014

Location	Plants Number	Plants %	Employees Number	Employees %
Nogales	84	38.0	33,833	29.9
Hermosillo	48	21.7	26,121	23.1
Rest of Sonora	89	40.4	53,176	47.0
Sonora Total	221	100.0	113,130	100.0

Source: INEGI.

Three industry sectors account for more than 50 percent of all employment: computer and electronic product manufacturing (23.0 percent), apparel manufacturing (15.0 percent), and transportation equipment manufacturing (14.1 percent). When electrical equipment and components manufacturing (13.7 percent), and miscellaneous manufacturing (10.2 percent) are added, these five industry sectors account for 76 percent of the maquiladora sector (Table 2).³ Other sectors include fabricated metal product manufacturing; machinery manufacturing, repair of equipment; plastics and rubber products manufacturing, chemical manufacturing, and paper products manufacturing.

Table 2: Top Maquiladora (IMMEX) Industry in Nogales, Sonora

Industry	Number of Employees
1 Computer & electronic product manufacturing	7,843
2 Apparel manufacturing	5,100
3 Transportation equipment manufacturing	4,802
4 Electrical equipment, appliance & components	4,675
5 Miscellaneous manufacturing	3,463
6 Fabricated metal product manufacturing	2,269
7 Machinery manufacturing	1,699
8 Repair & maintenance	1,565
9 Plastic & rubber products manufacturing	583
10 Chemical manufacturing	565
Other	746

Source: Author based on Index Nogales, Asociacion de Maquiladoras de Sonora, A.C.

Interestingly, the apparel industry, which employs more than 5,000 workers and ranks second in terms of its share of total employment, as noted above, is principally related to manufacturing production of various textile (mostly disposable) garments and other accessories used in hospitals. The third-ranking transportation equipment manufacturing with more than 4,800 workers encompasses manufacturing of various components for the auto industry (from harnesses, wiring components, and cables, to brakes and radios), and a growing production of various key components for the aerospace industry such as turbines.

³ Author, based on the product description provided in Index Nogales, Asociación de Maquiladoras de Sonora, A.C

Several other sectors, such as fabricated metal products, machinery manufacturing, plastic and rubber products, leather and allied products, are among Nogales' more traditional maquiladoras with a longer history in the region. In contrast, administrative and support services, as well as management and technical consulting services developed as a natural outgrowth of the industry's needs

AUTOMOTIVE INDUSTRY IN HERMOSILLO

The Ford company opened its first plant in Hermosillo in 1986, and in less than two decades the automotive industry became not only one of Sonora's manufacturing pillars, but also one of Mexico's leading automotive industry's production centers. About 80 companies established their presence around the Ford plant to supply components and services. Many of them operate as Tier 1, Tier 2 or Tier 3 supplier maquiladoras, including distribution centers. Together, the main plant and locally based (but largely foreign-owned) suppliers employ about 15,000 people.⁴

About \$1.8 billion worth of transportation equipment is exported annually to Mexico through Arizona-Sonora border ports of entry. The dollar value of imported transportation equipment (including cars) shipped north through Arizona-Sonora border ports of entry is \$6.7 billion.⁵ Nogales serves as the main gateway for inputs into Sonora's automotive industry both for southbound shipments of components and northbound shipments of assembled cars.

AEROSPACE INDUSTRY CLUSTER IN THE GUAYMAS-EMPALME AREA

The development of aerospace activity in Sonora is a relatively new phenomenon. It was built on established expertise in manufacturing of cables for aircraft companies like Boeing, precision machining, and electronics manufacturing and assembly. Today the industry encompasses a whole array of composite components for aircraft interiors, aerospace electronics manufacturing, precision machining of airplane components, turbine components, and turbine assembly. The port of Guaymas with nearby town of Empalme is the main location for aerospace companies.⁶

SONORA AND SINALOA LEAD IN MEXICO'S IMMEX NON-MANUFACTURING ACTIVITIES

Whereas in manufacturing activities Sonora trails behind other Mexican border states, in the non-manufacturing activities Arizona's neighboring state holds the top rank (18 percent of Mexico's total). The state of Sinaloa, a major origin of winter fresh produce to the U.S., had over 45,000 employees in the IMMEX non-manufacturing services (17 percent of Mexico's total). Together, these two states accounted currently for more than a third of the IMMEX non-manufacturing employment.

CONCLUSION: TAKING ADVANTAGE OF BORDER LOCATION

Since the inception of the maquiladora model more than 40 years ago, Arizona's companies have had taken advantage of their geographic proximity to Mexico's assembly/production plants, especially those located in the neighboring Sonora.

⁴ Kristian Richardson, U.S. Export Service.

⁵ Annual Report 2015, AZMEX Indicators <http://azmex.eller.arizona.edu>

⁶ Source: The Offshore Group, www.offshoregroup.com

The top five manufacturing exports from Arizona to Mexico suggest a strong maquiladora (IMMEX) connection. Arizona's top manufacturing exports to Mexico are: computer and electronic products; electrical equipment, machinery (excluding electrical); transportation equipment, and primary metal manufacturing.

However, gauging from the dollar value of manufacturing exports coming from other states like Michigan, California and Illinois that use Arizona's border ports as gateway to Mexico, there are certainly untapped opportunities for Arizona companies to expand trade relationships with the IMMEX sector. For example, in 2013, out of total \$10.3 billion worth manufacturing exports shipped annually through Nogales port of entry 34.6 percent originated in Michigan, 7.9 percent in California, and 3 percent in Illinois. Arizona's share was 34.6 percent.⁷ However, by 2015, Arizona remained the top user of its own ports with \$7.7 billion, followed by California with \$1.1 billion. Michigan lost its second place to California, with its exports to Mexico via Arizona ports falling from \$1.4 billion in 2014, to \$801.8 million in 2015. Michigan's prominence in the list is due in part to its connections with the automobile manufacturing industry in Sonora, most notably Ford Company in Hermosillo.⁸

Sonora Leading Binational Initiatives

Dr. M. Yamilett Martínez, Executive Director, Sonora-Arizona Commission

The relationship between Sonora and Arizona, as an international initiative has a long history; it was first proposed and established by Governors Paul Fannin and Alvaro Obregón in 1959, with the name "Arizona-México West Coast Trade Commission and the Committee of Social and Economic Promotion of Sonora-Arizona". Through the years, it has grown to what we now know as the Arizona-Mexico in Arizona and the Sonora-Arizona Commission in Sonora.

Ours is an example of a bilateral relationship with a global reputation, not only because of its longevity, but through its spirit of coordination, it has overcome challenges. We have obtained palpable results such as:

- Sonora-Arizona border master plan to coordinate and plan transport infrastructure.
- Altruistic efforts for the donations of diverse goods and equipment employed in saving the lives of many of Sonora's habitants.
- Creation of the Arizona-Mexico Health Foundation
- Creation of the Sonora-Arizona Education Institute

There are great opportunities for strengthening binational commerce of goods and services for our small and medium businesses. There are many opportunities to stimulate projects in the strategic areas of aerospace, automotive and manufacture sectors, industries where we lead in the global economy.

We are interested in advancing the Sonora-Arizona student resident program as this would be of great benefit to our students; our goal is to foster a bilateral forum of research and innovation. Together, our efforts can continue to succeed and have a regional impact.

⁷ Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Freight Data.

⁸ Source: Alan Hoogasian, "U.S. states use Arizona border ports for exports to Mexico," (forthcoming), Arizona's Economy, <http://ebr.eller.arizona.edu>, based on U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Freight Data

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THE ROLE OF ARIZONA IN THE US-MEXICO TRADE OF FRESH PRODUCE

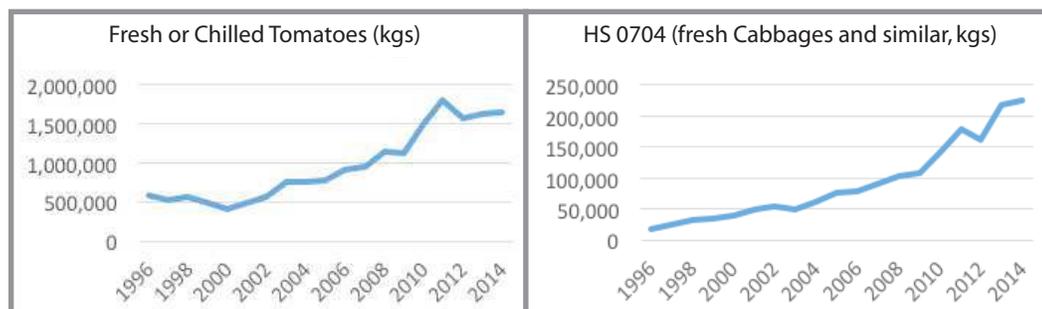
By J. Rene Villalobos, Omar Ahumada and Arnold Maltz

- ◀ Mexico is the main source of winter fresh produce imports to the U.S.
- ◀ Traditionally Nogales Arizona has been the main gateway for winter fresh produce from Mexico.
- ◀ Fresh produce industry is changing to a more vertically integrated enterprise.
- ◀ Changes in industry practices and infrastructure projects in Mexico are affecting the role of Nogales, Arizona in the fresh produce business.

Historically Arizona has played a very important role in the trade of fresh produce between Mexico and the United States, particularly in the flow of winter produce from Mexico. This trade goes back more than 100 years when Mexican farmers, mostly from the state of Sinaloa, looked north to export tomatoes and other fresh produce¹ to the thriving U.S. market.

While the level of fresh produce exports from Mexico to the United States had fluctuations throughout this time, it consistently showed an increasing trend until the implementation of NAFTA when the exports of Mexican fresh fruits and vegetables exploded and displaced some products traditionally coming from Europe and other regions. In order to illustrate this shift we use two products: fresh tomatoes and Cabbages/Cauliflower (HS Code 0704). Figure 1 below shows the total imports to the U.S. of these products.

Figure 1: US Imports of Two Selected Fresh Products



Source: US International Trade Commission, <https://dataweb.usitc.gov>

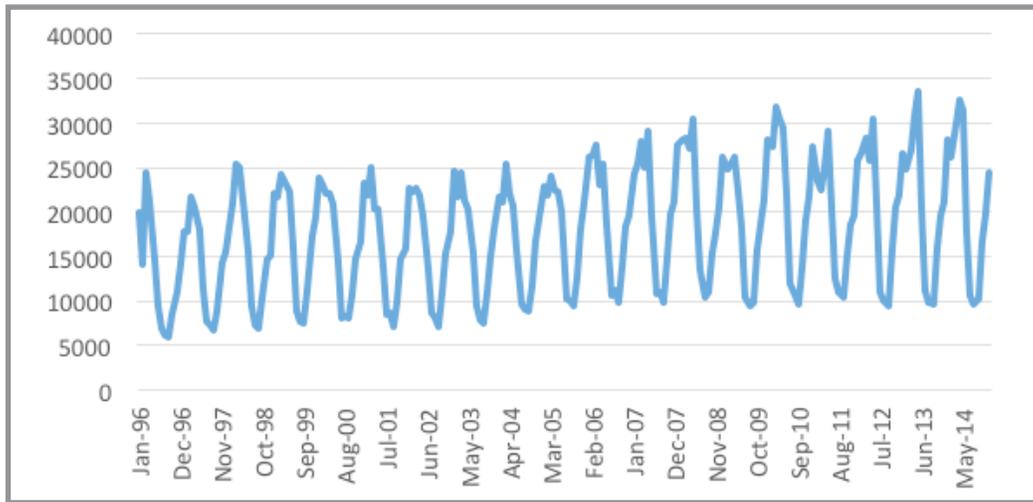
In order to realize the significance of fresh produce imports from Mexico through Nogales, the main point of entry for fresh produce, it is important to take a look at the data of monthly commercial border crossings at Nogales. Figure 2 shows the monthly truck crossings at Nogales. This graph clearly shows the high level of seasonality in the data caused by the crossing of winter season fresh produce coming from Mexico.

One of the deterrents of fresh produce exports from Mexico to the United States has been the underlying logistics and transportation capacity. Originally, given the poor land transportation links between the producing regions in Mexico and the United States, sea transportation was explored as the main means of export. However, this initial experiment failed because the sea shipping industry could not meet the

¹ Frías Sarmiento, Eduardo, "El tomate mexicano y el mercado de Estados Unidos, 1920-1956", *Historia Agraria*, 46, December 2008, pp. 65-90

transportation needs of a highly perishable product. It was then that the farmers looked into using rail transportation, first, and then trucks to take their product to the U.S. market. Since the main transportation routes between the producing regions in Mexico and the U.S. markets passed through Nogales, Arizona, this city became a transportation and commercial hub for the import of fresh Mexican produce.

Figure 2: Monthly Truck Crossings at Nogales



Source: U.S. Department of Transportation, Bureau of Transportation Statistics; http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html)

As a point of interface between the trucking industries of Mexico and the United States, the city of Nogales traditionally has offered different services to the fresh produce industry. These include inspection and sorting, as well as temporary storage, all offered as a trading point in which the US buyers negotiate prices and volumes with the Mexican sellers, and as a source of financing for some Mexican farmers.

Traditionally the Mexican farmers sold their product under Free-on-board (FOB) basis at Nogales. That is, these farmers would take their product to Nogales, Arizona and sell them to the U.S. buyers there. However, as Mexican farmers have become more successful, they have looked for opportunities to advance in the value chain of fresh produce to get additional economic benefits. For instance, as a general rule of thumb for every dollar that the final consumer spends in buying fresh fruits and vegetables the farmer receives less than 20 cents. It is estimated that this amount is significantly less for Mexican farmers since they have to transport their product from the production site, deep in Mexico, to the U.S.-Mexico border.

Mexican farmers have attempted different vertical-integration strategies to capture a higher percentage of the value chain. These include consolidating their product at origin to get economies of scale in terms of transportation and packing costs as well as developing their own marketing labels and opening consolidation and distribution facilities in Nogales, Arizona. However, until recently most of these facilities would still sell their products at Nogales, at the prevailing prices paid there. These prices tend to be significantly less than those prices paid at terminal or intermediate markets. For instance, Table 1 below shows the prices paid at different cities in the US for fresh tomatoes in the year 2009. The differences in the prices of tomatoes between Nogales and the other cities shown in the table cannot be explained solely by the associated logistics costs. In fact, it can be argued that the difference between prices in No-

gales and the wholesale prices paid in other cities may reflect an inefficient market in which there may be opportunities to profit from the price differences.²

Table 1: Wholesale Tomato Prices in Different US Markets 2009

	Dallas	Chicago	New York	Nogales
Wholesale average price (US\$/#)	0.64	0.54	0.57	0.38
Std. Dev.	0.16	0.15	0.15	0.15

Source: U.S. Department of Agriculture; <https://www.marketnews.usda.gov/mnp/fv-home>

As part of the evolution of the Mexican fresh produce industry the Mexican farmers, in particular the most successful ones, have embarked on establishing distribution centers in the US and entering into more long term contracts with the final distribution agents such as supermarket chains. This process is also fueled by changes in strategy at the large retailers such as Walmart and Kroger whereby they seek to acquire fresh fruits and vegetables directly from the farmers if possible. The supply chain of fresh fruits and vegetables is under pressure to change, i.e., from upstream the farmers seek different business models that allow them to capture a higher margin of the supply chain; and from downstream, the large retailers seek to get closer to the farmer to reduce acquisition costs and product waste. Thus, the business models of traditional brokers and wholesalers that rely on knowledge and close connections of markets and logistics operators to move products from the farmers to the final market may no longer be adequate for a flexible market that is based on readily available, real time information.

One of the tenets in logistics is to avoid unnecessary stops and transshipments of any product to minimize the total costs. This is particularly important for perishable products with a short shelf life. This is the case with fresh produce, in which non-value added stops should be avoided at all costs. Nogales has played an indispensable logistics role as a transshipment, processing and distribution node on virtually the only efficient transportation route between the main winter producing regions of fresh vegetables in Mexico and the US market. However, this quasi-logistics monopoly is being threatened by factors such as the full implementation of NAFTA transportation provisions, the change of business models of the fresh fruits and vegetables industry and the development of new logistics infrastructure in Mexico.

It is important to mention that winter fresh produce grown in Mexico is sold in practically the entire United States. The main source of competition for Mexican produce is South Florida. However, the climatic conditions of Florida usually put its product at a disadvantage vs. the fresh produce grown in Mexico, mostly in the state of Sinaloa. For all practical purposes, the reach of the fresh produce grown in Sinaloa is the entire continental US. In theory the center of gravity of the US market is located somewhere around St. Louis, Missouri and the closest route to reach this point from Sinaloa would be through the border of Mexico with the State of Texas. However, although there is a highway connection from Sinaloa to the Texas border, this highway crosses through the Sierra Madre Occidental Mountains. This highway has been historically unreliable because of weather, as well as dangerous and time consuming to cross. Mexican farmers continued to use the traditional highway through Nogales to reach the US market. However, a new highway that connects Sinaloa with Texas was opened about three years ago. This highway cuts the travel time from Sinaloa to Texas considerably. Thus, the logistics monopoly advantage that Nogales, Arizona had over some other border crossings is no longer there, and the dom-

² Flores H. and JR Villalobos, "Using market intelligence for the Opportunistic shipping of Fresh Produce," Int. J. Production Economics, Vol. 142, pp. 89–97, 2013.

inance of Nogales may be threatened unless the city provides additional services that may deter Mexican farmers from leaving Nogales as the gateway of winter fresh produce to the United States.

An illustration of the potential effects of the new market conditions facing Nogales is given by the prices prevailing in the points of entry of Texas and Arizona for tomatoes, in the two years after the opening of the new highway. Table 2 shows that in the year 2012 the prices and volumes of fresh tomatoes at Nogales were significantly higher than those at Laredo. Two years later the prices were significantly lower at Nogales than at Laredo and so were the volumes traded compared with the base year.³

Table 2: Prices and Volumes of Tomatoes at Nogales and Laredo

	2012		2014	
	Nogales	Laredo	Nogales	Laredo
Price(US\$/MT)	1,663.15	1,542.12	1,119.50	1,514.56
Tons	330,475	124,274	256,889	170,794

Source: U.S. Department of Agriculture; <https://www.marketnews.usda.gov/mnp/fv-home>

While the data available is still limited, it supports the hypothesis that the fresh produce industry in Nogales is under pressure from two different fronts: new practices in the underlying supply chains and the emergence of competition fueled by new infrastructure in Mexico. If the fresh produce industry in Nogales wants to not only survive but thrive again it needs to face these challenges through technological and market innovation as well as infrastructure investment.

³ Source: ILPIL working paper by Mason, Ahumada et al., "Large Scale Measures of Nationwide Logistic Efficiency for Fresh Produce: A Case Study in Mexico"

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REGIONAL IMPACT OF FRESH PRODUCE FROM MEXICO

By Vera Pavlakovich-Kochi

- 
- ◀ The fresh produce industry in Nogales, Arizona, incorporates several activities developed around importation of Sinaloa and Sonora grown winter produce: border inspection, custom brokerage, freight forwarding, warehousing, packaging, sale brokerage, distribution, and transportation.
 - ◀ The fresh produce industry supports directly and indirectly more than 4,000 jobs in Santa Cruz County, and accounts for 34 percent of the total County's output.
 - ◀ Although the industry is concentrated in Santa Cruz County, it benefits consumers throughout Arizona and supports Arizona's exports of agricultural machinery, fertilizers, and seeds to Mexico.
 - ◀ The industry faces challenges from new produce-growing regions in Mexico, in addition to investments in highway infrastructure and border ports of entry, which may benefit other border states, most notably Texas.

A LONG HISTORY OF CROSSBORDER TIES

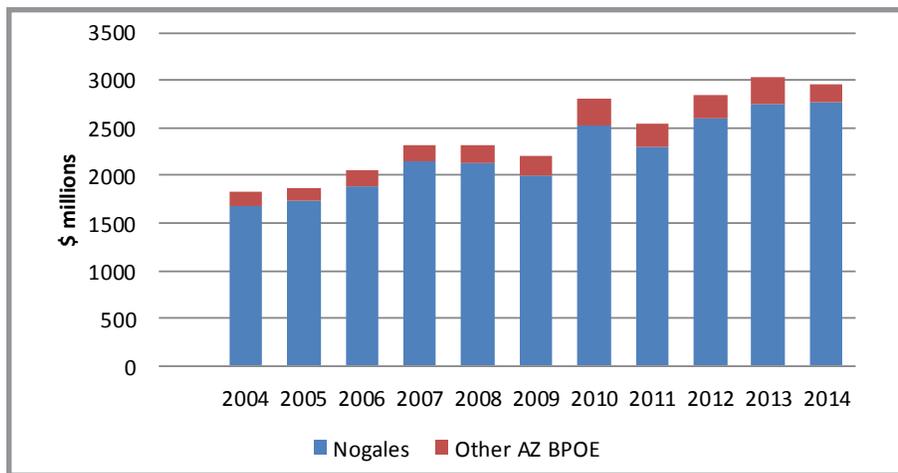
As noted in the previous chapter, Arizona has long been the primary gateway for fresh produce from Mexico to the United States. The importation of fresh produce from the Mexican states of Sonora and Sinaloa through Nogales goes back more than a century. But the industry as we know it today owes its foundations to several factors: growing market demand along the west coast (most notably in California), improvements in truck transportation (including cooling systems), and lower labor costs in combination with mild winters and abundant water supply in Sonora and Sinaloa. For much of its growth into the main gateway for Mexican fresh produce into the U.S., Nogales owes to a combination of favorable geographical location, region-specific familial ties across the border, and historically accumulated expertise in binational shipping and distribution.

The Nogales fresh produce industry is a highly integrated, cross border industry cluster. It is built on intricate cross border relationships involving land owners in Sinaloa and Sonora, suppliers of capital, seeds, fertilizers and machinery in Arizona, and distributors with ties on both sides of the border.

DOLLAR VALUE OF IMPORTED PRODUCE THROUGH ARIZONA

The dollar value of imported fresh produce from Mexico through Arizona was more than \$2.9 billion in 2014, the last complete year for which annual data are available. This is an increase of more than \$1 billion from year 2004, or 38.2 percent more than 10 years ago. Nogales is Arizona's primary point of entry for Mexican fresh produce and Nogales' Mariposa border port facilitates more than 90 percent of those imports. The remaining 7 or 8 percent enters through San Luis, and another 1 to 2 percent through the Douglas port of entry. In 2014, \$2.8 billion worth of fresh produce was imported from Mexico through Nogales, \$140 million through San Luis, and \$41 million through Douglas. Although the smallest in terms of dollar value, imports of fresh produce through Douglas experienced the highest increase in the last 10 years, a full 99 percent increase from 2004 to 2014. During the same period imports through San Luis increased only 3.5 percent. Figure 1 shows total value of imported fresh produce through Arizona's border ports of entry in the last ten years and highlights the domineering share of Nogales.

Figure 1: Imported Fresh Produce from Mexico through Arizona 2004-2014



Source: AZMEX Economic Indicators, <https://azmex.eller.arizona.edu>

WHY IS IMPORTATION OF MEXICAN FRESH PRODUCE IMPORTANT TO ARIZONA'S ECONOMY?

Economists typically emphasize exports as a main force of economic growth, because the sale of products to external markets is how new money is brought into a region where it generates new jobs and new wages through multiplier effects. By the same logic, importation of products generates opposing effects, since the money travels out of a region. What, then, makes the importation of fresh produce from Mexico through Arizona not only different from typical "imports," but moreover, contribute significantly to the economies of Arizona's border counties as well as statewide? A simple answer to this question is that the produce does not just pass through the international border on its way to North American consumers. Instead, an entire industry has developed around inspection, custom brokerage and freight forwarding, warehousing and packaging, sale brokerage, shipping, and logistical distribution to North American markets.

HOW DOES NOGALES' FRESH PRODUCE INDUSTRY GENERATE JOBS AND WAGES IN ARIZONA?

Two studies conducted by The University of Arizona used sophisticated analyses to identify key activities and produced a set of measures to grasp the economic importance of the fresh produce industry for Arizona's jobs and wages. A statewide perspective was taken in the 1997 study, while the more recent study, conducted in 2013, focused on Nogales and Santa Cruz County.¹

The fresh produce "industry," which is concentrated in Arizona's border city of Nogales, consists of several activities that are directly involved with facilitating fresh produce imports from Mexico. These activities are carried out by merchant wholesalers, wholesale agents and brokers, freight forwarders and custom brokers, administrators and laborers in warehousing and storage facilities, and providers of transportation services from the border to warehouses. A number of other activities are closely related to the fresh produce industry, bringing additional money to the County and Arizona. These activities include Custom and Border Protection (CBP) services, collection of truck crossing fees by the Arizona Department

¹ V. Pavlakovich-Kochi and G. D. Thompson, "Fresh Produce and Production-Sharing: Foundations and Opportunities for Nogales and Santa Cruz County," The University of Arizona, 2013, Prepared for Nogales community Development; V. Pavlakovich-Kochi, A.H. Charney, A.C. Vias and A. Weister, "Fresh Produce Industry in Nogales, Arizona: Impacts of a Transborder Production Complex on the Economy of Arizona, An Economic and Revenue Impact Analysis," The University of Arizona, 1997, Prepared for the City of Nogales. Available at <http://ebr.arizona.edu>

of Transportation (ADOT), and sale of diesel fuel for transportation from Nogales' warehouses to final destinations.

ECONOMIC IMPACTS IN SANTA CRUZ COUNTY

In the 2013 study, gross output generated by the fresh produce industry in Santa Cruz County was estimated at \$436.7 million annually. A portion of that money leaks out of the County by way of earnings for people whose primary residence is in other parts of Arizona or other states, as well as through purchases of goods and services that do not exist in the County but need to be acquired elsewhere, such as the interstate transportation services and gasoline. The amount of money that stays in the County, an estimated \$303 million, generates 2,644 jobs and \$146 million in wages. Table 1 shows the key components of Nogales' fresh produce industry and associated direct output, jobs, and wages generated in Santa Cruz County.

Table 1: Direct Economic Contribution of the Fresh Produce Industry in Santa Cruz County

Activity	Gross Output \$ millions	Direct Output* \$ millions	Direct Wages** \$ millions	Direct Jobs \$ millions
Shipping/Distribution/Sale brokerage	272.8	225.9	110.3	1,739
Custom brokerage/Freight forwarding	14.1	14.0	5.7	165
Track transport to warehouses	18.2	16.8	7.2	167
Warehousing and storage	24.8	24.8	12.8	293
Gas stations	100.0	15.0	4.3	209
Truck permits	3.0	3.0	2.6	44
Border inspection (CBP)	3.8	3.8	3.4	27
Total Direct Impact	436.7	303.3	146.3	2,644

*Direct Output is Gross Output minus estimated leakage outside the County.

**Direct Wages are included in Direct Output.

Source: University of Arizona Study 2013, based on survey and IMPLAN Input-Output model

The major source of impact on the County's economy is a combination of shipping, distribution and sale brokerage services, i.e., services that connect production fields in Mexico with markets in the U.S. Through commission fees these services bring about \$226 million annually into the local economy. Warehousing and storage facilities generate about \$25 million annually, while truck transportation from the border to the warehouses and custom brokerage/freight forwarding generate \$17 million and \$14 million, respectively. Sales of fuel and other services at gas stations bring about \$15 million. Salaries of border inspection agents, paid by the federal government, bring close to \$4 million into the local economy, while an additional \$3 million comes from ADOT-collected truck permits.

The overall impact, however, exceeds direct money inflow in the County's economy. A large portion of wages and salaries is spent locally, and thus through both consumer spending and business-to-business transactions, money is re-spent several times. This is what is known as a multiplier effect. By means of an input-output model of Santa Cruz County's economy, about 40 different sectors were identified that benefit directly or indirectly from fresh produce industry. Table 2 lists sectors with sales of at least \$100,000 annually that are associated with fresh produce industry.

Table 2: Local Goods/Services Providers Benefitting from Fresh Produce Industry in Santa Cruz County*

Wholesale trade businesses
Warehousing and storage
Real estate establishments
Couriers and messengers
Business support services
Cable and other subscription programming
Accounting, tax preparation, bookkeeping, and payroll services
Management, scientific, and technical consulting services
Transportation and support activities for transportation
Monetary authorities and depository credit intermediation activities
Nondepository credit intermediation and related activities
Telecommunications
Legal services
Automotive equipment rental and leasing
Lessons of nonfinancial intangible assets
Food services and drinking places
US Postal Service
Newspaper publishers
Transport by truck
Services to buildings and dwellings
Office administrative services
Automotive repair and maintenance, except car washes
State and local government electric utilities
Other state and local government enterprises
Commercial and industrial machinery and equipment repair and maintenance
Other personal services
Securities, commodity contracts, investments, and related activities
Management of companies and enterprises
Commercial and industrial machinery and equipment rental and leasing
Maintenance and repair construction of nonresidential structures
Motion picture and video industries
Independent artists, writers and performers
Other support services
Directory, mailing list, and other publishers
All other miscellaneous professional, scientific, and technical services
Civic, social, professional and similar organizations
Insurance agencies, brokerages, and related activities
Architectural, engineering, and related activities
Radio and television broadcasting
Cut and sew apparel contractors

*With more than \$100,000 annually

Source: University of Arizona Study 2013, based on survey and IMPLAN Input-Output model

Through these business-to-business transactions and consumer spending, additional jobs and wages are generated: on an annual basis this works out to 1,400 jobs, \$44 million in wages, and a total secondary output of \$134 million. Thus, the overall importance of the Nogales fresh produce industry for the Santa Cruz County economy can be summed up as supporting more than 4,000 jobs and contributing \$190 million in wages, while the total output (including wages) amounts to \$438 million (Table 3).

Table 3: Total Economic Impacts of Fresh Produce Industry on Santa Cruz County

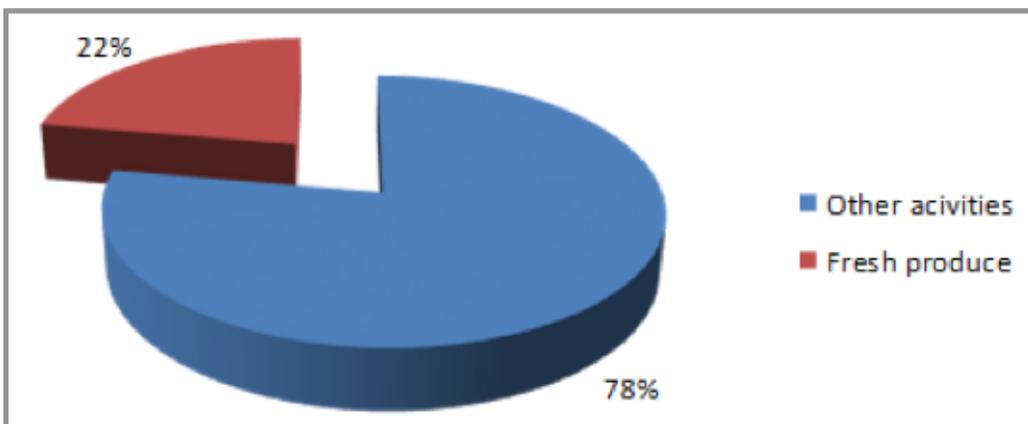
Activity	Output \$ millions	Wages* \$ millions	Jobs \$ millions
Direct impact	303.3	146.4	2,644
Indirect and induced impacts	134.3	43.6	1,376
Total Impacts	437.6	190.0	4,020
Share of Santa Cruz County total	22.3%	33.5%	33.5%

*Wages are included in Output.

Source: University of Arizona Study 2013, based on survey and IMPLAN Input-Output model

Santa Cruz County's dependence on the importation of fresh produce from Mexico is even better grasped when shown as a share of the total County's jobs, wages and output. About 22 percent of all jobs, 25 percent of all wages, and 34 percent of the total County's output are dependent, directly or indirectly, on importation of fresh produce (Figure 2).

Figure 2: Contribution to County's Output



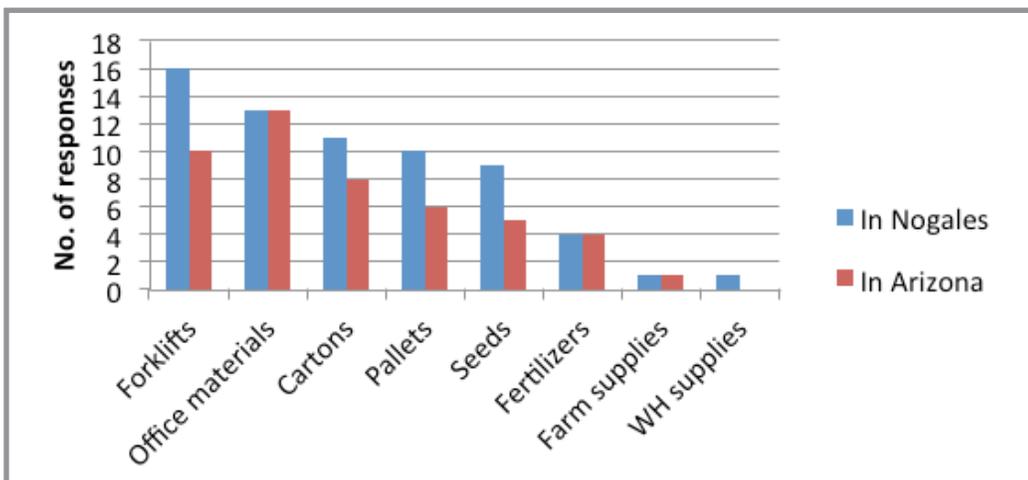
Source: University of Arizona Study 2013, based on survey and IMPLAN Input-Output model

An important part of the overall dollar impact is taxes that accrue to County and State governments. Just from the activities within the Santa Cruz County, the fresh produce industry generates an estimated \$45 million in tax revenues annually.

STATEWIDE ECONOMIC IMPACTS

The fresh produce industry is concentrated in the city of Nogales and the adjacent community of Rio Rico. However, economic impacts are felt throughout Arizona far beyond the boundaries of Santa Cruz County. Consumers throughout Arizona enjoy fresh vegetables and fruits especially in winter months both in terms of wide variety and lower prices. The main economic impacts outside Santa Cruz County, however, are generated from the sale of various machinery and supplies used in the operation of warehouses and storage facilities (Figure 3).

Figure 3: Supply of the Top Inputs to Fresh Produce Industry



Source: University of Arizona study 2013, based online survey of FPAA members, March 2013.

The top seven manufacturing products used by fresh industry include forklifts, office materials, cartons, pallets, seeds, fertilizers, and farm supply. While none of these producers actually exist in Nogales, the supplies are available through wholesale businesses. These supplies are also purchased directly from producers/distributors elsewhere in Arizona.

Arizona's businesses also directly export a number of products used in Mexican growing fields. Although agricultural machinery, fertilizers, and seeds do not top Arizona's exports to Mexico, they are important in the overall trade with Mexico and support many jobs in Arizona, especially in the Phoenix and Tucson metro areas. In addition to tax revenues that are generated with activities in Santa Cruz County, state taxes are generated through business transactions and household spending that take place outside the County in the rest of the State. Additionally, as was found in the 1997 statewide impact study, considerable benefits to Arizona's economy accrue through shopping as a certain portion of earnings from fresh produce in Mexico are spent north of the border in Arizona's stores and restaurants.

TRENDS AND CHALLENGES

The very condition on which the entire industry developed and continues to thrive – comparatively milder winters in Sonora and Sinaloa than in the U.S. southwest – determines one of its innate challenges: seasonality. The production season has been concentrated between October/November and April/May. With the exception of citrus, mangoes, and bananas, the main fresh produce exports such as tomatoes, peppers, cucumbers, squash and beans, are produced in winter months.

This seasonality has consequences for many segments of economics and life, from mere logistics of dealing with increased volume of trucks crossing the border in winter, to high local unemployment in summer months. The heavy truck traffic during winter months exerts pressure on staffing and operation hours at the border ports of entry requiring continued improvements and adjustments to seasonally uneven demands. Additionally, due to the perishable nature of produce, efficiency of inspection procedures at the border is of the utmost importance. The seasonal nature of fresh produce creates additional challenges for Nogales in comparison with other border ports of entry that facilitate more evenly spread truck crossing volumes, such as through Texas.

Many growers/cold storage providers/distributors have adjusted to seasonality by combining winter produce in Mexico with summer production in California. More recently there has been a trend of expansion at Texas border ports of entry to capitalize on both the growing production of fresh produce in central Mexican states and year-round supply. Whereas the majority of fresh produce imported through Nogales travels to Los Angeles, where it is distributed throughout the west coast, about 30 percent is shipped to mid-west and east-coast markets. This is where produce imported through Nogales faces two kinds of competition. For one, some produce, such as tomatoes, compete with Florida's winter harvest. Secondly, with a newly completed highway from Mazatlán in Sinaloa to Durango, the distance between Sinaloa production fields and mid-west/east-coast markets in the U.S. are shorter through Texas border ports of entry than through Arizona ports. Consequently, a certain portion of Sinaloa fresh produce destined for the east coast markets may increasingly be shipped through McAllen/Hidalgo port of entry instead of Nogales.

SUMMARY

The fresh produce industry in Nogales developed as a cross border business model based on a region-specific combination of climate, water, labor availability, and familial ties on both sides of the border. The fresh produce industry in Nogales encompasses several key activities such as border inspection, custom brokerage, freight forwarding, warehousing, packaging, sale brokerage, distribution, and transportation. In addition, fresh produce industry supports at least 80 other sectors in the local economy generating \$438 million annually in Santa Cruz County, or 34 percent of the total output. The industry directly and indirectly supports more than 4,000 jobs and generates \$190 million in wages, accounting for 22 percent of the County's jobs and 25 percent of County's wages. While the activities associated with importation of fresh produce are concentrated in Nogales, the rest of Arizona benefits from it by providing inputs such as forklifts and packaging, and through exports to Mexico of agricultural machinery, fertilizers and seeds.

ABOUT THE AUTHOR

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MEXICO'S POWER SECTOR REFORM

By Michelle Chalmers



- ◀ Mexico's wide-sweeping reforms of its energy sector have introduced competition in its electricity market.
- ◀ Nearly 50% of US natural gas exports are to Mexico, feeding Mexico's growing demand for electricity through natural gas-powered plants.
- ◀ Mexico could become a growth market for border states with excess generating capacity.

ENERGY REFORMS TO SPUR INVESTMENT

Eight months after introducing constitutional amendments to Mexico's oil, gas and electricity sectors, President Peña Nieto on August 11, 2014 signed into law the 21 component parts of his administration's comprehensive energy reform.

At the core of these reforms is the recasting of Mexico's electricity industry into a more market-driven enterprise. By introducing new players and market/regulatory designs, the government is hoping to reduce Mexico's high electric rates and the sense of stagnation that many view has prevented the country from becoming a more competitive economic force. Manufacturing is a case in point. Accounting for almost 70% of Mexico's exports,¹ it has been buoyed by its proximity to the U.S. market, affordable labor costs and a menu of free trade agreements including NAFTA. Yet these advantages have not fully mitigated the effect of rate increases for electricity that continue to be a detriment to the country's economic performance on the international stage. Mexico has the eighth-most-expensive electricity rates in the Organization of Economic Co-Operation and Development (OECD).² This is after taking into account government electricity subsidies that favor agricultural and residential users leaving Mexico's largest businesses with unsubsidized rates that have more than doubled in the past decade.³

The reforms take into account that rate design will not be enough. Although a neighbor and significant trading partner with the U.S., Mexico has not been able to harness the cost savings from the shale gas revolution because much of the country lacks the network of pipelines to transport gas to the regions that need natural gas-fired generation. Investment in pipeline infrastructure will have to precede the construction of natural gas plants. The country will then be able to launch its dual objective of converting fuel oil plants to natural gas and the construction of new combined cycle units.⁴

Renewable energy is also expected to take center stage. The new wholesale electricity market, offering conventional power trading and the opportunity for investors to build and sell renewable energy generation, began operations in January 2016. More than latching on to a worldwide trend of greater sustainability, Mexico has the potential to be one of the

Reducing electricity rates, increasing infrastructural investment and fostering competition are at the core of Mexico's power sector reforms

¹ <http://atlas.media.mit.edu/en/profile/country/mex/>

¹ www.firstmagazine.com/DownloadSpecialReportDetail.5590.ashx

³ www.firstmagazine.com/DownloadSpecialReportDetail.5590.ashx

⁴ www.firstmagazine.com/DownloadSpecialReportDetail.5590.ashx

largest Latin American producers of renewable energy and boasts the largest potential for solar energy in the region, with an annual irradiation of 6 kilowatt hours per square meter.⁵

BACKGROUND

The reforms promise more than token modifications to an industry that has remained unchanged for more than 30 years. Unlike the limited reform of 1992, which opened the door for domestic companies to generate electricity for their own use or for sale to the state-run monopoly Comisión Federal de Electricidad (CFE), these reforms are broader, deeper and more transformative. Key initiatives for the electricity sector include:

Government involvement in power generation has evolved from an operational to a regulatory focus. On the transmission and distribution side, it maintains a focus on both.

- 1) Reducing public sector involvement over the power sector
- 2) Increasing private sector participation
- 3) Reconfiguring CFE's role as a profitable enterprise of the state
- 4) Establishing an independent system operator, CENACE (Centro Nacional de Control de Energía)
- 5) Revising the regulatory framework with CRE (Comisión Reguladora de Energía) to serve as a key regulator
- 6) Promoting sustainability
- 7) Promoting domestic and local supply chains by requiring minimum percentages of national participation⁶

KEY PLAYERS AND ROLES

- 1) CFE's monopoly comes to an end on the wholesale side as private sector independent power producers (IPPs) are allowed to enter and sell to large consumers.
- 2) Although still state-owned, CFE will be transformed into a "productive state company", lose almost all its monopolies and compete against private generators and retailers.
- 3) In its place, CENACE will be responsible for operating the national electric system and the newly created electric wholesale market
- 4) Power generators, retailers and qualified consumers will be able to buy/sell and import/export electricity and ancillary services, as well as transact in financial transmission rights, clean energy and pollution certificates.
- 5) The government, directly or through the CFE and/or subsidiaries, may enter into contracts or partnerships with private parties for the financing, installation, maintenance, managing, operation and expansion of needed infrastructure.
- 6) CFE will continue serving residential customers (termed basic consumers) at regulated tariff rates. Over time, all customers will be able to choose their generation provider.

⁵ <http://www.pillsburylaw.com/publications/mexico-adopts-major-reforms-restructuring-its-electric-power-sector>

⁶ <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/strategy/us-cons-mexico-energy-reform-pandu-05082014.pdf>

- 7) In contrast, qualified consumers – a new concept introduced under the Electric Industry Law - will be able to buy their power from generators or qualified suppliers, including the CFE.
- 8) CFE will continue to participate in other segments of the industry through a series of new operating subsidiaries and affiliates that will be separated from each other and run as independent business units.

Arizona and Mexico: An Important and Strategic Partnership

Ana Luisa Fajer Flores, Director General for North America, Mexico Ministry of Foreign Affairs

- Mexico is Arizona's number one trading partner and the 13th largest economy in the world with a young, talented population that constitutes a thriving domestic market. Every day, 47,800 residents of México visit Arizona and spend \$7.3 million dollars a day.
- Arizona exports \$7.1 billion worth in products to Mexico and more of 100,000 jobs in Arizona depend on the trade with Mexico.
- To continue to work together, improving our border infrastructure is not only key to trade and security, but to the prosperity of our border communities and to the competitiveness of the whole region of North America.
- Arizona shares 389 miles of border with México, through which most of the winter produce currently consumed by the United States and Canada passes.
- But beyond trade, our most valuable asset continues to be our people. Arizona is home to 1.7 people of Mexican origin that contribute importantly to the prosperity of both Arizona and Mexico.
- As we are witnessing the fruits of our collaboration, we are pleased with the publication of this report that provides a valuable insight on the importance of Mexico-Arizona relations

STRUCTURAL TAKEAWAYS

How these roles interact across the grid is set out in the table below.^{7,8} Although much of the country's reform efforts have been aimed at opening the market to competition, the government footprint still looms large and, in some cases, larger than before as it now regulates a wholesale market that did not exist in the pre-reform era. In its current state, the emphasis of reform remains on competitive generation, rather than other aspects of the electricity business.

⁷ <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/strategy/us-cons-mexico-energy-reform-pandu-05082014.pdf>

⁸ http://www.laprensasa.com/309_america-in-english/3539803_residential-electric-rates-going-down-2-pct-in-mexico-in-2016.html

Table 1: Roles and Responsibilities of Mexican Agencies and Ministries

	Generation	Markets	Transmission & Distribution	Customer Service
Ministry of Finance				Set customer rates
CRE	Grant and revoke generation permits		Set transmission rates	
			Permit new T&D	
CENACE		Govern real-time and forward pricing mechanisms		
		Operate the wholesale generation market		
CFE	Build and operate generation facilities		Operate, maintain and grow the grid	Provide outage restoration services
IPPs	Build and operate generation facilities			

NEW ROLES FOR CFE

While its role in the electricity generation markets has become more limited with the reforms, CFE's involvement in the overall energy sector has in fact expanded. Along with its new authority to transact in power trading like other generators, CFE will also engage in:

- 1) Import, export, transport and storage of natural gas, coal any other fuel
- 2) Generation operations split into generation and power trading (including import and export)
- 3) Import, export, transport, storage and trading of natural gas, coal and any other fuel
- 4) All activities, including research and development, related to generation, transmission, distribution and power trading
- 5) Acquisition, possession or shareholding in companies with similar objectives, with similar or compatible with their objectives⁹

⁹ Bloomberg New Energy Finance – CFE's clout and other ongoing tales from the Mexican front (December 2014)

CHALLENGES FOR EXPANDING ENERGY TRANSACTIONS IN MEXICO

Electricity flows between US and Mexico are fairly limited with geographical, political, operational risks and transmission limits all playing a role.

Geography

Unlike Canada, which shares the U.S. border with many U.S. states, Mexico only shares the border with California, Arizona, New Mexico and Texas. Although that imposes a limit as to which states send power to Mexico, it is an opportunity for those that can.

Political Risk

The U.S. power market is comprised largely of a wide variety of private sector players whereas the pre-reform Mexican energy market consisted of government-owned CFE. Post-reform, this dynamic will change but only over time. The mitigant is that the reforms have been fast-tracked, for a reason – Mexico needs lower power rates and infrastructural investment and will be motivated to have transactions under its new energy regime succeed. From the U.S. side, the Department of Energy's recent Quadrennial Energy Review advocated the integration of North American Energy Market, specifically citing Mexico's recent reforms as an opportunity for increased transactions in the energy sector.¹⁰

Operational Risk

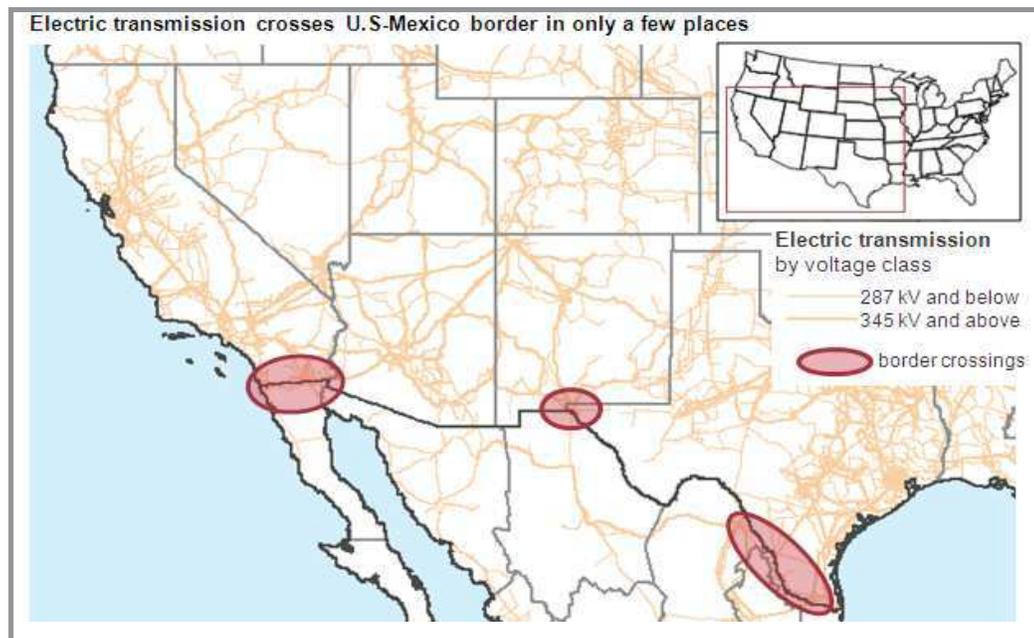
Reliability is the predominant concern in cross-border electricity arrangements. Many Department of Energy authorizations were granted on the condition that counterparties on both sides of the border disconnect themselves from their respective system whenever energy crosses over to avoid potential threats.

Transmission

As seen in the Energy Information Administration map below, cross-border transmission lines are limited – both in number and in scope, with many Presidential Permits imposing a Megawatt limit on the amount of power that can flow between the two nations.

¹⁰ <http://energy.gov/sites/prod/files/2015/08/f25/QR%20Chapter%20VI%20North%20America%20April%202015.pdf>

Map 1: Electricity Transmission Points Along the U.S.-Mexico Border Opportunities



Source: Energy Information Administration

OPPORTUNITIES FOR EXPANDING ENERGY TRANSACTIONS IN MEXICO

Pipelines

U.S. natural gas exports to Mexico account for nearly half of total U.S. natural gas exports, and were approximately 69% of Mexico's natural gas imports in 2014. To meet increasing electricity demand, Mexico is constructing several new natural gas-fired power plants across the country that will need pipelines to import larger amounts of natural gas from the United States.¹¹

Transmission

With growing demand, particularly for natural gas and renewable energy resources, Mexico could become a growth market for neighboring U.S. states with excess generating capacity.

¹¹ <http://www.eia.gov/beta/international/analysis.cfm?iso=MEX>

ABOUT THE AUTHOR

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MEXICAN VISITORS TO ARIZONA: VISITOR CHARACTERISTICS AND ECONOMIC IMPACTS

By Alberta H. Charney, Ph.D. and Alan Hoogasian, M.A., M.S.

- 
- ◀ Every year thousands of Mexican tourists travel to Arizona for business, shopping and to visit family and friends. These visitors spend billions of dollars and support thousands of jobs throughout the state.
 - ◀ Mexican visitors come primarily to shop and visit friends and family. Most are day trip visitors, coming and returning the same day. They come primarily from the state of Sonora and most arrive by vehicle. Spending per party is highest among those who spend the night and the most important trend between the 2001 and 2007-08 surveys was the increase in the portion of Mexican visitors who spend the night in Arizona.
 - ◀ A new proposal to extend the border zone beyond its current 25-75 mile limit, to the entire state of Arizona has gained the support of nine regional planning agencies, including the Maricopa Association of Governments, the Intertribal Council of Arizona, and the City of Nogales.
 - ◀ Using detailed characteristics and spending data from the most recent Mexican Visitor's Survey, combined with more recent information on border crossers, an economic impact analysis was conducted to provide scenarios describing how this extension might affect Arizona's Economy. The estimated potential increase in expenditures with the border expansion is over \$180 million, which has a potential impact of almost 2,200 additional jobs.

Travel and tourism continue to be one of the most important export industries driving Arizona's economy. In 2014, spending by Mexican visitors totaled \$2.5B, ranking it among the state's top five export industries (Table 1). The last major survey¹ of Mexican visitors was in 2007-2008 and some of the characteristics of visitors and expenditures are summarized in this report. Expenditures from the 2007-2008 time period and more recent estimates based on newer border crossing data are presented, along with estimated impacts. Impacts from a proposed border expansion are also presented.

Table 1: Arizona's Top Exports by \$ value in 2014

Category	\$bil
Computer & Electronic Products	5
Transportation Equipment	3.7
Minerals & Ores	2.5
Mexican Visitor Spending	2.5
Machinery (except Electrical)	1.6

Source of trade data: U.S. Census Bureau via USA Trade Online, 3-digit NAICS
Source of Mexican Visitor Spending: Charney and Hoogasian 2015

¹ Pavlakovich-Kochi, Vera and Alberta H. Charney, Mexican Visitors to Arizona: Visitor Characteristics and Economic Impacts, 2007-08, a report prepared for the Arizona Office of Tourism, September 2008, https://ebr.eller.arizona.edu/research/mexican_visitors_to_arizona_2007_08.pdf

MEXICAN VISITORS: PARTY CHARACTERISTICS AND BEHAVIOR FROM THE 2007-08 SURVEY

Visitors, for the purposes of the study, included all types of visitors from Mexico, regardless of reason for visit, choice of accommodation, or length of stay. The 24.04 million estimated visitors in 2007-08 from Mexico came in 13.37 million parties, for an average party size of 1.8, which included 1.47 adults and 0.33 children. Approximately 55 percent of all visitor parties entered by car across the U.S.-Mexico border, almost 45 percent were pedestrians. Less than one percent of Mexican visitor parties to Arizona flew into the state.

Almost 64 percent of Mexican visitor parties cite leisure-related reasons (shopping, vacation, visiting friends/relatives and personal health) as their primary reason for visiting Arizona. The remaining 36 percent of visitor parties cite business-related reasons, such as work, business convention, professional training and business shopping. Shopping, whether for leisure or for business purposes, is the number one reason for visiting. Almost 93 percent of all Mexican visitors cite shopping as a reason for their visit (Table 2).

Table 2: Reason for visit by travel mode (in percent), 2007-08

Leisure reason for visit						
Travel Mode	Health	Vacation	Friends/Relatives	Shopping	Other	All
Motor Vehicle	0.25	0.28	7.16	63.62	0.48	71.79
Pedestrian		0.18	4.1	49.91	0.1	54.29
Air	1.02	2.4	27.59	40.75	1.25	73.01
Total	0.14	0.24	5.81	57.44	0.31	63.94
Business reason for visit						
Travel Mode	Convention	Training	Shopping	Other	All	Bus & Leisure
Motor Vehicle	0.07	0.04	1.17	26.93	28.21	100
Pedestrian	-		0.32	45.39	45.71	100
Air	15.75	6.25	1.15	3.85	27	100
Total	0.05	0.03	0.79	35.19	36.06	100

Source: Pavlakovich-Kochi and Charney, 2008, Table 13.

Eighty-four percent of Mexican visitors are day-trip visitors and 16 percent of all Mexican visitor parties are overnight visitors. Of the 16 percent, approximately 2 percent spend one night, 4 percent spend two nights, 5.5 percent spend three nights and 4 percent spend four or more nights. Among overnight visitors, 61 percent stay in hotels and 39 percent spend the night with family and friends.

Almost 99 percent of Mexican visitor parties come from the neighboring Mexican state of Sonora. Of those, almost 47 percent came from the border city of Nogales, 24 percent from San Luis Rio Colorado and 13 percent Agua Prieta, a little over 1 percent from the capital city of Hermosillo, and the remaining from 20 other cities in Sonora. Non-Sonoran visitors came from Baja California, Sinaloa and the Mexican City metropolitan area (Table 3).

Table 3: Origin of visitors by place of residence

State in Mexico	Percent of visitor parties
Baja California	0.89
Sinaloa	0.1
Sonora	98.91
Other	0.1
Sum	100

City in Mexico	Percent of visitor parties
Agua Prieta	13.37
Caborca	0.15
Cananea	0.93
Cibuta	0.62
Cumpas	0.76
Esqueda	0.18
Guaymas	0.3
Hermosillo	1.32
Imuris	1.56
Magdalena	2.45
Mexicali	0.61
Naco	3.11
Nogales	46.9
Puerto Penasco	0.08
San Luis RC	24.1
Santa Ana	0.76
Sasabe	0.17
Sonoita	1.19
Other	1.44
SUM	100

Source: Pavlakovich-Kochi and Charney, 2008, Table 19.

The most popular shopping destinations in the state were three Arizona Malls: the Arizona Mills Mall in Tempe, the Tucson Mall and Park Mall in Metro Tucson. Among non-mall stores, Wal-Mart was the most popular in every destination county. Casinos in both Tucson and Phoenix were the most popular attraction visited, followed by the Zoos.

HISTORICAL TRENDS – A COMPARISON BETWEEN THE 2001 AND 2007-08 STUDIES

Visitor volume at US-Mexico border ports grew from 22.91 million non-US citizen crossings in 2001 to 24.02 million in 2007-08, a 4.92 percent increase. Air passengers from Mexico arriving in Arizona through Phoenix and Tucson airports increased 33.5 percent, from 15,075 passengers in 2001 to 20,126 in 2007-08.² The overall party size decreased from 2.2 to 1.8, which contributed significantly to the growth in the number of parties. The 4.92 percent increase in volume, combined with the smaller party size, resulted in an increase of 28.37 percent in the number of parties.

² Charney, Alberta H and Vera Pavlakovich-Kochi, The Economic Impact of Mexican Visitors to Arizona, 2001, <https://ebr.eller.arizona.edu/research/MexicanVisitors.pdf>

A contributing factor to both the decrease in party size and the increase in the number of parties was the shift from crossers traveling by car to pedestrian crossers during this period. Pedestrian party sizes are substantially smaller than car-crossers, e.g., car passenger persons per party was 2.0 and pedestrian persons per party was 1.53 in Nogales in 2007-08), so the increase in pedestrian traffic in this period reduced the share of Mexican visitor parties crossing in vehicles from 70.34 percent in 2001 to 55.02 percent in 2007-08. Correspondingly, the share of pedestrian parties increased from 29.58 to 44.88. Air passengers increased from 0.08 percent of all parties to 0.10 percent.

By far the most significant change observed in the behavior of Mexican visitors between 2001 and 2007-08 was the increase in the share of visitor parties that spent the night. The share of visitor parties increased from 4 percent in 2001 to 16 percent in 2007-2008. Since Maricopa County is three hours from the border, almost all visitors to Maricopa spent the night in both studies. Very few parties to the border communities spent the night, so the increase in overnight visitors was attributable to visitors to Pima County, where overnight visitors increased from 15 to 87 percent of visiting parties. Tucson is in the midrange of driving time from the border, allowing both day-trip visitors and overnight visitors.

The increase in the share of visitor parties that chose to spend the night had several effects. First, there was a substantial increase in parties that stayed in hotels (from 2.5 percent of all parties in 2001 to 9.6 percent in 2007-08). Second, once Mexican visitors make the decision to spend the night, their choice of potential destinations is increased. The result was a substantial increase in visitor parties to the Phoenix Metro area from under 140 thousand to over 538 thousand, a 380 percent increase. Third, since overnight visitor parties spend substantially more than day-trip visitor parties, total expenditures substantially increased from \$857 thousand to almost \$2.7 billion. Because of the increase in visitors to Maricopa County, that area had the largest percentage increase in expenditures during the 2001-2007-08 period (Table 4).

Table 4: Expenditures by County, from 1991, 2001, 2007-08 Surveys and 2013 Estimates

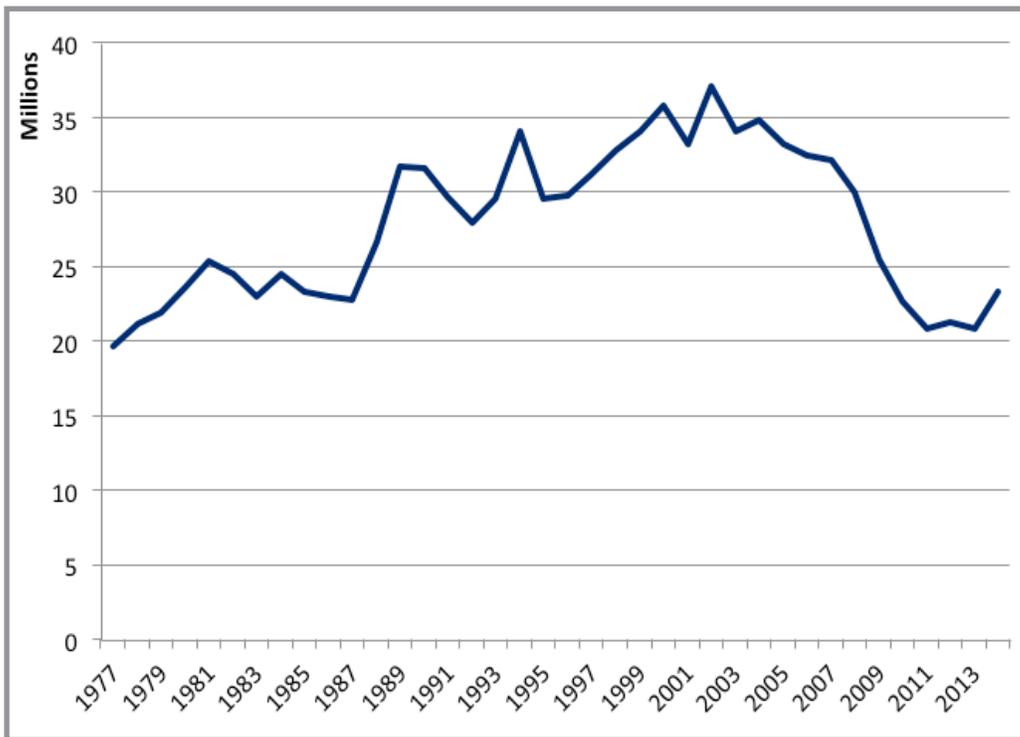
County	Expenditures \$millions							
	1991	%	2001	%	2007-08	%	2013 Est.	%
Cochise	164.3	23.9	96.8	11.3	186.4	6.9	173	7.7
Maricopa	16.4	2.4	36.5	4.3	694.2	25.8	632.4	28.0
Pima	108.5	15.8	289.5	33.8	976.4	36.3	825.4	36.6
Santa Cruz	268.5	39.0	242.5	28.3	491.3	18.3	286	12.7
Yuma	130.6	19.0	191.2	22.3	271	10.1	282.2	12.5
Unallocated		0.0	1	0.1	69.4	2.6	58	2.6
Total	688.3	100.0	857.4	99.9	2688.7	100.0	2257	100.0

Source: Pavlakovich-Kochi and Charney, 2008, Table 42 and Charney and Hoogasian estimates for 2013.

HISTORICAL TRENDS IN CROSSERS, EXPENDITURES, AND GEOGRAPHIC DISTRIBUTION OF EXPENDITURES

Total northbound border crossers since 1977 are shown in Figure 1. There was a steady, although volatile, increase in border crossings from 1977 through 2002, followed by a modest decline during the 2003-2007 time period. Border crossings declined sharply from 2008 through 2011 and appeared to flatten and slightly grow in 2012-2013. This database, from the Custom and Border Patrol, includes all crossers, traveling by foot, by vehicle and by air. Further, it includes both U.S. and non-U.S. citizens. The last obtainable data that separate U.S. citizen crossers from non-U.S. citizen crossers was for 2007-08, the year of the last survey. Since then, the U.S. Department of Homeland Security has not released this disaggregation, yet it is almost certain that this type of data is collected and maintained.

Figure 1: Total Northbound Crossers at US-Mexico Ports of Entry in Arizona, 1977-2014



Source: Pavlakovich-Kochi and Charney, 2008, Table 42 and Charney and Hoogasian estimates for 2013.

Table 4 provides the expenditure estimates, by county, obtained from three surveys³ of Mexican visitors for the years 1991, 2001, and 2007-08. Comparable estimates for 2013 were produced by using visitor travel patterns and expenditure patterns from the 2007-08 study and adjusting them for changes in border crossers by port and allowing per-party expenditures to increase by the growth in Mexico's per capita GDP in \$US.⁴

Since no survey has been conducted since 2007-08, the 2013 estimates implicitly and explicitly assume that Mexican visitors behave exactly as they did in 2007-08. The share of crossers that are U.S. citizens vs.

³ These surveys were conducted by the Economic and Business Research Center (EBRC) of the Eller College of Management, University of Arizona

⁴ The 2013 expenditure estimates were computed in a 2015 study conducted by EBRC for the Maricopa Association of Governments, which estimates of potential economic impacts of expanding the border zone to the entire State of Arizona.

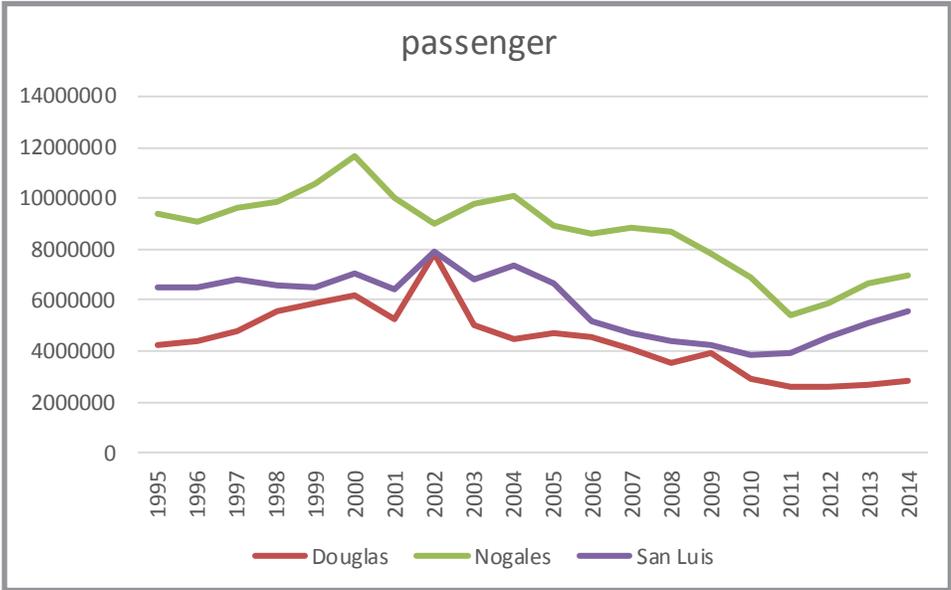
non-U.S. citizens is assumed to be constant over time. Party size, by port and by travel mode, is assumed unchanged. The destinations of crossers, by port and by mode of travel, are unchanged, e.g., the same portions of vehicle crossers at the port of Nogales are assumed to visit/shop in Santa Cruz County, Pima County and Maricopa County in 2013 as in 2007-08. Similarly, their geographical expenditure patterns remain the same as they were in 2007-08. Destinations of pedestrian crossers also remain the same as they were in the 2007-08 study. Only updated data on the number of border crossers, by port and by mode, were available to use to compute a 2013 estimate. Since destination patterns varied across ports and across mode of travel, using updated border crossing data, by port and by mode, results in changes in expenditures by destination-county. The only assumption made regarding expenditures was the use of the growth of Mexico's per capita GDP in \$US to increase per party expenditures for all parties.

The geographic distribution of Mexican visitor expenditures has changed substantially over the years. In the 1991 survey, the largest beneficiaries of Mexican border crossers were the three border counties, with Santa Cruz receiving 39 percent of all expenditures, followed by Cochise County (23.9 percent) and Yuma (19 percent). Since then, there have been dramatic shifts in the geographic distribution of expenditures toward the Tucson and Phoenix metropolitan areas.

Beginning with the 2001 survey, Pima County received the largest share of Mexican visitor expenditures. Expenditures in Pima County almost tripled between 1991 and 2001 and more than tripled between 2001 and 2007-08. Estimated expenditures in Pima County in 2013, which are based on the 2007-08 study, declined because of the fall in border crossings. The expenditure estimates for Maricopa County grew 1800 percent between 2001 and 2007-08 and is associated with the dramatic increase in the percent of visitor parties spending the night in Arizona. The decline in expenditures in Maricopa from 2007-08 to 2013 is again solely due to the decrease in border crossings.

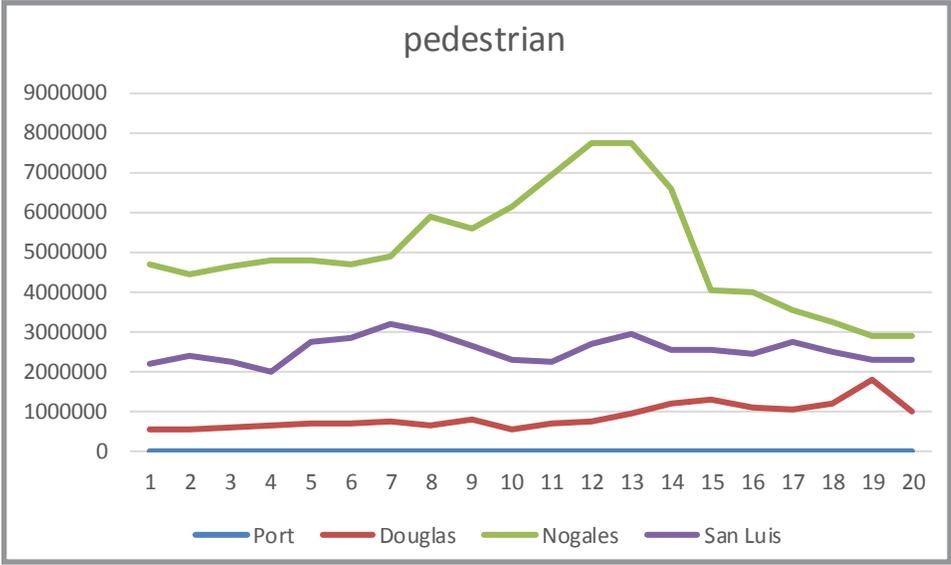
Expenditures in Yuma grew steadily throughout the period from \$130.6 million in 1991 to \$282.2 million in 2013, although its share of total expenditures from 19.0 to 12.5 percent. The year 2001 was a weak year in expenditures for both Cochise and Santa Cruz Counties, because of both the terror attacks on 9/11 and crossing card changes that occurred in that same year that required all crossers to re-apply and get updated cards. Aside from 2001, there was growth in expenditures in both Cochise and Santa Cruz Counties between 1991 and 2007-08. Cochise fell 7 percent between the 2007-08 estimates and the 2013 estimates due to a modest fall in border crossings through the Port of Douglas. Santa Cruz county expenditures, however, fell by 42 percent between the 2007-08 estimates and the 2013 estimates. This decrease was due to the extremely large decline in crossings at the Nogales ports of entry, particularly the dramatic decrease in pedestrian traffic (Figures 2 and 3).

Figure 2: Total Northbound Crossers at Major US-Mexico Ports of Entry



Source: Bureau of Transportation Statistics

Figure 3: Total Northbound Pedestrian Crossers at Major US-Mexico Ports of Entry



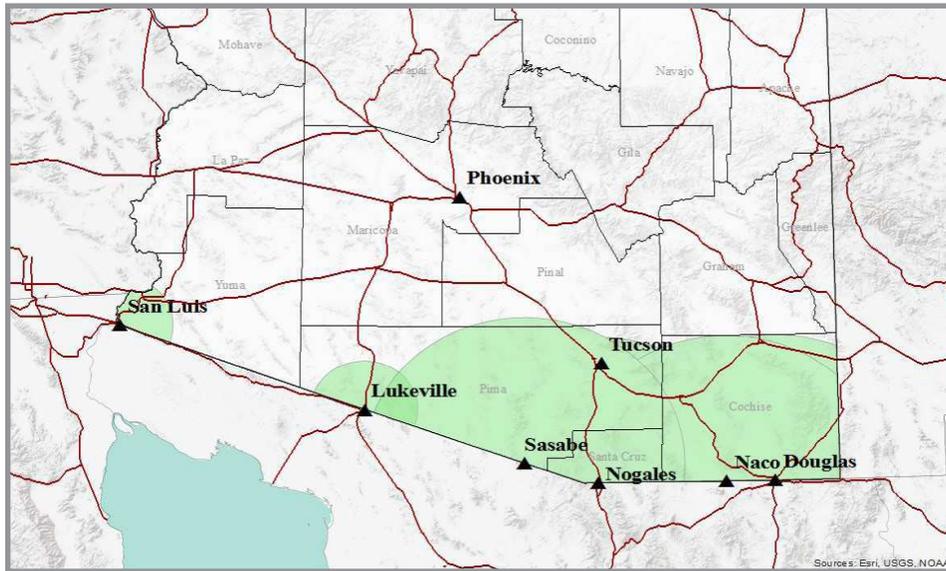
Source: Bureau of Transportation Statistics

THE FUTURE OF MEXICAN VISITOR EXPENDITURES IN ARIZONA

Mexican citizens who frequently cross the border for tourism can apply for Border Crossing Cards (BCC) that allow for unlimited crossings for 10 years, with the crossers required to stay within the 75 mile border zone unless additional paper work is obtained. These cards are only granted to crossers who pass a rigorous application and vetting process and are not considered to be at risk of overstaying. Maricopa Association of Government’s (MAG) Economic Development Committee has made a proposal to expand the coverage of the BCC zone from its current 75 mile limit to the entire state. The proposed change would allow these crossers to travel anywhere in the state. It is believed that this change would send a

positive message to potential visitors, increase total visitors, encourage travel further north in the state and prompt more BCC applications.

Figure 4: Map of Current Border Zone Showing 25 to 75 Mile Border Zone



Source: Charney and Hoogasian, 2015

In a recent study for MAG, Mexican visitor expenditures were projected and potential economic impacts of expanding the border zone in 2016 were estimated.⁵ Projections were based on recent trends in border crossings, by port and by mode. Calculation of potential economic benefits was based on the following three scenarios:

- 1) Scenario 1 increases all crossers by 3 percent, a figure based on observed changes in crossings following Arizona's 1999 border expansion from 25 to 75 miles and New Mexico's recent 2013 border expansion to 55 miles.
- 2) Scenario 2 increases only vehicle passenger crossers by 3 percent
- 3) Scenarios 3a, 3b, and 3c increase in the number of parties traveling to the north by 5 percent, 10 percent and 15 percent, respectively.

The estimated potential increase in expenditures with the border expansion is over \$180 million (sum of Scenario 1 and 3c), which has a potential impact of almost 2,200 additional jobs. When added to the baseline projections and impacts, Mexican visitor expenditures are estimated to be over \$3 billion and provide almost 32,000 jobs.

There are uncertainties that affect the future of Mexican visitors and their expenditures. First is the continued development of retailing on the Mexican side of the border. Walmart, the most commonly visited store of Mexican visitors to Arizona, has built and continues to build stores on the Mexican side of the border. The more developed the retail industry in Mexico becomes, the need to come to Arizona for shopping will be diminished. The health of the Mexican economy and the exchange rate are important determinants of the number of crossers and visitor expenditure levels. The Mexican economy is heavily

⁵ Charney, Alberta H. and Alan Hoogasian, Extending the Border Zone to the Entire State of Arizona: Estimated Expenditures and Economic Impact Simulations, 2013-2016, a report to Maricopa Association of Governments, 2015, https://www.azmag.gov/Documents/EDC_2015-05-11_Extending-the-Border-Zone-to-the-Entire-State-of-Arizona.pdf

dependent on the oil market and the price of crude oil is \$28.4 per barrel, the lowest it has been since 2/2002. The exchange rate, measured as Pesos per U.S. dollar, has been increasing for some time, but in recent months it has surged to an all-time high (18.22 pesos/dollar at the time of this writing).

Figure 5: Oil prices and Mexican Peso/ U.S. Dollar exchange rate



Source: Board of Governors of the Federal Reserve System

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WORKFORCE TRENDS AND ECONOMIC DEVELOPMENT EFFORTS IN THE SOUTHWEST BORDER REGION

By Alex Steenstra, Ph.D., Rosalicia Cordova, D.M., Rakesh Pangasa, Ph.D., and Jeremy Spencer, M.B.A.

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- ◀ Mexico's population growth rates are slowing down and education levels are rising.
 - ◀ The community across Arizona's Southwest Border is relatively populous and prosperous.
 - ◀ Binational collaboration between Mexico and the United States includes emergency response plans, health efforts, economic development, and workforce development.
 - ◀ Educational institutions and economic development agencies from both sides of the border provide opportunities for workforce and economic development.
 - ◀ Northern Arizona University in Yuma promotes regional economic development, cross-border education, and workforce development through collaboration with Mexican universities and incubators across the region through the Business Innovation Accelerator.

Differences in unemployment rates, income levels and education levels together with an underdeveloped workforce separated by a national border provide both challenges and opportunities that are being explored by educational institutions and economic development agencies in the border communities of Arizona and Mexico. This section looks at initiatives to address the challenges in education, economic, and workforce development in the desert Southwest border region.

SLOWER POPULATION GROWTH AND RISING EDUCATION LEVELS IN MEXICO

The following data for Mexico has implications for workforce and economic development in the region. In 2014, the annual population growth rate in Mexico was 1.3% compared to 1.6% in 2007 (see Table 1), continuing a long-term downward trend from 3.15% in 1969. Similarly, birth rates have declined from 45 births per thousand in 1969 to 21 births per thousand in 2006 and 19 births per thousand in 2013. The 25–54 age group is the largest of the population at 40.55%. The next largest is the 0–14 group at 27.59% followed by the 15–24 group at 17.9%, the 55–64 group at 7.9%, and the 65 and older group at 6.7%.

Table 1: Selected Demographic Data for Mexico

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Population Growth Rate (annual %)*	1.5	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.3	NR
Birth Rate (per 1,000 people)*	21	21	21	20	20	20	19	19	NR	NR
Secondary Education Enrollment (Percent of Secondary age population)*	65	66	67	67	67	67	68	NR	NR	NR
Labor Force Participation (percent of population ages 15+)	61	61	61	60	61	60	62	62	62	NR

Source: Board of Governors of the Federal Reserve System

Mexico shows increased participation and completion rates at all levels of education. Enrollment of secondary school aged children in 2012 was 68% compared to 65% in 2006¹. The post-secondary education

¹ <http://data.worldbank.org/indicator/SE.SEC.NENR>

graduation rate in 2012 was 19% compared to 14% in 2000² (see table 2). There was also an increase in the labor force participation rates from 60% in 2006 to 62% in 2014³ (see table 1).

Table 2: Post-Secondary Graduation Rates in Mexico

	2000	2005	2010	2012
Post-Secondary Graduation Rates (Percent of adults ages 25-65)	14	17	18	19

Source: Board of Governors of the Federal Reserve System

In 2014, Mexico reported 53.3%⁴ of the population living at or below the poverty level. The average real wage in Mexico has declined from \$13,765 in 1990 to \$12,952 in 2013.⁵ As discussed in prior chapters, the decline in value of the Mexican Peso makes U.S. goods and services more expensive. The increase in U.S. purchasing power, however, makes Mexican goods and services more affordable.

A RELATIVELY POPULOUS AND PROSPEROUS COMMUNITY ACROSS ARIZONA'S SOUTHWEST BORDER

A relatively high population, low unemployment rates, and an underdeveloped workforce characterize the region, just south of the border. Within 40 miles from the San Luis Arizona border, there are approximately 2 million people with the majority residing in San Luis Rio Colorado, Sonora and Mexicali, Baja California.⁶ Among this population, the unemployment rate consistently hovers around 5.5%⁷ compared to an average of 4.1%⁸ regionally and 4%⁹ nationally. Less than 20%, however, are enrolled in post-secondary education with 23%¹⁰ enrolled in secondary education. The local Mexican labor force meets most of the labor demand of the maquiladora industry. However, many highly skilled and senior management positions are filled with foreign nationals. Over 9% of the population in Mexicali are foreign nationals with 8.4%¹¹ coming from the United States. The region south of the border performs better in the area of employment but also demonstrates a need for workforce development.

BI-NATIONAL EFFORTS

In response to these and other considerations, bi-national efforts for collaboration between Mexico and the United States are evident in several government created organizations and agreements. Classic agreements for bi-national collaboration are the emergency response plans and bi-national health efforts, but most agreements focus on economic development and related issues.

² OECD's "Education at-a-glance" report 2012 found at <http://www.oecd.org/edu/eag.htm>

³ <http://data.worldbank.org/indicator/SL.TLF.CACT.ZS?page=1>

⁴ <http://data.worldbank.org/indicator/SI.POV.NAHC/countries>

⁵ <https://data.oecd.org/earnwage/average-wages.htm>

⁶ Information sociodemografica elaborada por el COESPO-Sonora base a <http://www.inegi.org.mx> and Panorama sociodemografica de Baja California, <http://www.inegi.org.mx>

⁷ Panorama sociodemografica de Baja California, <http://www.inegi.org.mx>

⁸ The average of Baja California 3.6% and Sonora 4.7% as of December 2015, http://www.stps.gob.mx/bp/secciones/conoce/areas_atencion/areas_atencion/web/pdf/perfiles/perfil%20baja%20california.pdf, http://www.stps.gob.mx/bp/secciones/conoce/areas_atencion/areas_atencion/web/pdf/perfiles/perfil%20sonora.pdf

⁹ As of December 2015. <http://www.inegi.org.mx/sistemas/bie/cuadroestadisticos/GeneraCuadro.aspx?s=est&nc=621&c=25447>

¹⁰ Panorama sociodemografica de Baja California, <http://www.inegi.org.mx>

¹¹ COPLADE, con informacion de CONAPO <http://www.copladebc.gob.mx>

Among the many responsibilities of border cities, the department of economic development or its equivalent for each border city of Arizona, California, Baja California, and Sonora oversee cross-border issues such as cross-border educational and workforce initiatives, cross-border work on incubators, and cross-border workforce readiness. These economic development departments of border cities work with other border cities forming associations and coalitions, signing agreements, and collaborating on projects that benefit both entities. These bi-national associations meet regularly to discuss current areas of concern, develop strategies, and implement projects that are beneficial to all communities involved.

The trend is to form bi-national mega regions such as the Arizona-Sonora Binational Megaregion and the Baja-Cali Binational Megaregion. The concept of mega regions refers to natural economic units with similar characteristics regardless of national boundaries.¹² The many associations and government groups forming cross-border units to work together (see Table 3) may grow and become stronger by joining other similar associations.

Government associations and government-created associations dealing with cross-border issues work with private industry to partner on specific projects that promote education and workforce readiness. The University of Arizona Tech Parks together with the private organization Offshore Group formed the Global Advantage Partnership to promote binational economic development.¹³

Table 3: Cross Border Associations

Name	Cities/States/Regions	Web Address
Arizona-Mexico Commission	Phoenix, Arizona	www.azmc.org
Border Trade Alliance	United States, Mexico, Canada	www.thebta.org
US-Mexico Border Mayors Association	Border Cities of Arizona, Sonora, California, Baja California, Texas	Website of the corresponding city
Cuatro Frentes de Desarrollo Económico	Sonora, Arizona, Baja California, California	Website of the corresponding state
Greater Yuma Economic Development Corp.	City of Yuma, City of San Luis, Town of Wellton, Yuma County, State of Sonora	http://www.greateryuma.org/
Department of Community Development	City of Yuma	http://yumaaz.gov/community-development/index.html
Community Development Department	City of San Luis	http://www.cityofsanluis.org/134/Community-Development
Community Development Department	City of Somerton	http://www.cityofsomerton.com/community-development.html
4FrontED	Yuma, San Luis, Somerton, Wellton, San Luis Rio Colorado	http://www.4fronted.org/
Dirección de Turismo y Desarrollo Económico	Ayuntamiento de San Luis Río Colorado, Sonora	http://www.sanluisrc.gob.mx
Imperial-Mexicali Binational Alliance	Imperial Valley, California and Mexicali, Baja California	http://www.imperialctc.org/meetings-&agendas/imperial-mexicali-binational-alliance/
Imperial Valley Economic Development Commission	Imperial Valley, Private organizations	www.ivedc.com
Desarrollo Económico	Ayuntamiento de Mexicali	http://www.mexicali.gob.mx/xxi/pages/Ayuntamiento.php
Comisión de Desarrollo Industrial	Mexicali	http://www.mexicaliindustrial.com/index.html
Community and Economic Development	County of Imperial	http://www.imperialcountyced.com/

¹² Gulden, T. (2007). The rise of the mega region. Retrieved from http://www.creativeclass.com/rfcgdb/articles/Florida,%20Gulden,%20Mellander_Mega-Regions.pdf.

¹³ University of Arizona Tech Parks. (May 1, 2014). Global Advantage Partnership Promotes Arizona-Sonora Region. Retrieved from <https://techparks.arizona.edu/global-advantage-partnership-promotes-arizona-sonora-region>.

Universities, colleges, other educational institutions, and economic development agencies from both sides of the border provide educational opportunities to develop the workforce and support economic development. The three state universities, Arizona State University, Northern Arizona University, and the University of Arizona have a presence in Yuma County, including partnerships with Arizona Western College (AWC) to deliver a variety of four-year degree programs.

We focus below on the efforts of Northern Arizona University. The Yuma Branch Campus of Northern Arizona University (NAU-Yuma) has been a partner with AWC since 1988 and offers a variety of degree programs to meet the needs of the local community as well as the growing demand of the regional workforce. Its mission is to attract and educate students from all backgrounds through innovative programs, learning formats, student services, strong partnerships with community colleges, businesses, economic development agencies, and other stakeholders. The objective is to promote regional economic development and cross-border educational and workforce development initiatives through a twin pronged approach.

One approach focuses on improving and extending educational opportunities in the region, including Yuma County; San Luis Rio Colorado, Sonora; Imperial County, California; and Mexicali, Baja California. The results to date include several collaborative efforts and programs. NAU-Yuma and Centro de Enseñanza Técnica y Superior (CETYS) University are collaborating to develop a pathway for an MBA that includes exchange of students and faculty and joint research. NAU-Yuma and Universidad Autónoma de Baja California (UABC) are partnering to offer educational opportunities in leadership and engineering management. In addition, NAU-Yuma continues to collaborate with educational institutions in Imperial Valley California and San Luis Rio Colorado providing degrees in Business Management and Entrepreneurship to the local and cross-border community, including businesses and organizations in the region, and by offering customized educational opportunities in leadership and management systems. The new NAU-Yuma MBA program focuses on cross-border issues with the first cohort to start in Fall 2016.

WORKFORCE INITIATIVES

The other approach focuses on workforce initiatives, cross-border work on business incubators, and improving operational efficiencies in the region. NAU-Yuma organized the Business Innovation Accelerator as a nucleus for offering services to promote economic development. The Accelerator is working with several agencies and is evolving its infrastructural facilities to meet the needs of the region. Current efforts include creating awareness about the services of the Accelerator and soliciting appropriate business-supported projects for teaching and training students. These activities help improve learning experiences for business students and benefit participating businesses through student-faculty teams in diagnosing opportunities to improve operational and management efficiencies.

The Accelerator participates and integrates activities organized by various economic development agencies such as the Greater Yuma Economic Development Council (GYEDC), Yuma County Chamber of Commerce, AWC Small Business Development Center (SBDC), Somerton Chamber of Commerce, Imperial Valley Economic Development Agency (IVEDA), Imperial-Mexicali Binational Alliance (IMBA), 4FrontED, and the Industrial Development Commission of Mexicali (IDCM). In addition, the Accelerator is strengthening a network with entrepreneurship centers and economic development agencies. As a result of these efforts, the Accelerator is partnering with the City of Yuma to create a business incubator, with the City of San Luis Incubator to promote economic development in San Luis and San Luis Rio Colorado, with

the City of Calexico to create a business incubator,¹⁴ and with the Universidad Autónoma de Baja California (UABC) to explore participation in activities at their incubator. Please see a list of agencies in the appendix.

The stakeholders in the region continue to seek and participate in collaborative agreements and partnerships for purposes of economic development, workforce readiness, and solving cross-border issues. These ongoing efforts will have a significant impact on improving the quality of life in the border communities of Arizona and Mexico in the desert Southwest.

Mexico's Historic Opening Spells Opportunity for Arizona

Andrés Martínez, Editorial Director of Zócalo Public Square, and
Special Advisor to the President, Arizona State University

Adrian Wooldridge, a London-based columnist at *The Economist*, mentioned to me recently that after spending a week in Mexico talking to business and government leaders, he concluded that Mexico is the world's last true believer in globalization. Adrian's stark comment stuck with me as an apt description of how much my native country has changed in the past two decades, and the continuing opportunity it represents for Arizona.

I grew up in a closed Mexico hermetically sealed off from the outside world, a one-party state wedded to an import-substitution economic model and a hyper-nationalist political outlook. In those days, even taking an American candy bar across the border – to say nothing of electronic appliances or other household items – amounted to a high-wire smuggling act. Now Mexico boasts 44 free trade agreements, more than any other country in the world, and those agreements benefit not only Mexican-owned exporters but U.S.-based manufacturers located in Mexico seeking access to the European Union and other markets. Mexico has also opened up key sectors, such as energy and telecom, to foreign investment.

Mexico's commitment to an open engagement with its northern neighbor and the broader global economy remains unshaken despite the recession of the past decade, as an ever-expanding middle class has embraced the notion that Mexico shares its destiny with its northern neighbor. We often take it for granted, but this strong consensus within Mexico for more economic and cultural openness, and the striking lack of anti-Americanism in Mexican public discourse, is a relatively recent development – one that augurs well for a future of shared North American prosperity.

¹⁴ http://www.ivpressonline.com/news/local/northern-arizona-university-yuma-calexico-discuss-possible-mou/article_a6505226-c3ea-11e5-8ed3-8f63d0eb0fdc.html

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TRANSBORDER COMMUNITIES: VEHICLES OF COOPERATION AND INTEGRATION IN THE ARIZONA-SONORA BORDER REGION

By Francisco Lara-Valencia



- ◀ Transborder communities are networks of human relationships that transcend national borders to promote cooperation and mutually beneficial initiatives.
- ◀ Transborder communities are increasingly important and active along the US-Mexico border.
- ◀ The activity of transborder communities contribute to border development through shared governance and joint implementation of regional projects.
- ◀ Economic coordination and integration have been the glue that has cemented many transborder policy communities along the United States-Mexico border for decades.

INTRODUCTION

Transborder communities are a very important resource for the United States and Mexico, but particularly for border states like Arizona and Sonora. The border region between Arizona and Sonora is the site of productive and important transborder communities. These communities are important sources of cross-border cooperation and development in Arizona and Sonora and in the United States-Mexico border region. Transborder communities play an instrumental role in bridging the significant cultural, institutional, and political differences that exist between Mexico and the United States and open the door for numerous opportunities to benefit from the complementarities, interdependencies and socio-historical ties that connect both nations.

WHAT ARE TRANSBORDER COMMUNITIES AND WHY ARE THEY IMPORTANT?

The action of transborder communities is not confined to one side of the international boundary. The border, in a cyclical fashion, has been seen both as a resource and as a barrier to better economic and social opportunity. They are not a new regional phenomenon, but they have become increasingly important and active along the U.S.-Mexico border in recent years. Transborder communities are defined as networks of people or organizations sustaining regular interaction across the international boundary, while pursuing a common project or mutually agreed vision. Familiar examples of transborder communities in our region are the Arizona-Mexico Commission (AMC) and its Mexican counterpart the Comisión Sonora-Arizona (CSA). Another example is the Binational Collaboration for Healthy Communities in the U.S.-Mexico Border Region, a partnership comprising researchers, practitioners, and advocates working together to improve public health on both sides of the Arizona-Sonora border.

The impetus for the formation of these communities comes fundamentally from the same source. First, proximity causes spatial dependency and opportunities for interaction. Second, the border never has been an impermeable boundary. Flows of people, nature, and goods were crisscrossing the border before the ink dried on the treaty that demarcated the present-day border. Third, as interactions grow in intensity and diversity, people of the region progressively converge on a shared vision and identity, pushing local institutions and leaders to gradually embrace ideas of integration and cooperation.

Transborder communities have an active presence in a range of fields, including education and culture, transportation, emergency management, tourism, business promotion, trade, technology, philanthropy, public health, and many others. The influence of transborder communities is particularly significant in the framing of the border development agenda, shared governance, and joint implementation of mutu-

ally beneficial initiatives. In terms of agenda setting, transborder communities help to identify and frame issues of binational concern, creating a common ground for problem-solving action where the interests of different individuals and organizations on both sides of the border converge.

Because their membership is organizationally diverse, issue-driven, and often voluntary, transborder communities are highly adaptable and uniquely positioned to contribute to shared governance. They establish rules and adopt practices that help to deal with the complexities of the United States-Mexico bilateral relation, while overcoming institutional rigidities and securing mutually beneficial outcomes. With time, transborder communities evolve into enablers of change through planning, advocacy, or targeted actions. Joint implementation of transborder actions might take the form of coordinated programs across the border or parallel, simultaneous activities on the respective side of the border of each party involved.

Transborder Communities in Action

Transborder communities are organized in four different ways depending on their goals, membership composition, and organizational configuration: policy networks, communities of practice, communities of knowledge, and citizen networks.

Policy Networks

Economic coordination and integration have been the glue that has cemented many transborder policy communities along the United States-Mexico border for decades. Regional competitiveness, international trade, transportation infrastructure, and investment flows are issues that have grown in prominence recently and have induced the formation of transborder networks of public, private, and sometimes academic actors that join forces to address “policy problems” hampering progress in these areas. These networks allow their members to cooperate and exchange information, expertise and other resources to influence the policy-making process and its outcomes (Rhodes, 2008).

Two good examples of such networks in our region are the Arizona-Mexico Commission and the AriSon Binational Megaregion project. Both engage state and local governments and private sector organizations in long-term regional planning advancing bold conceptions of integration such as binational economic corridors or economic megaregions. In particular, the megaregion perspective makes sense in a space where efforts to attract businesses could be more effective if done jointly because Sonora and Arizona together create a more diverse and larger economy and their human, natural and infrastructural assets complement each other. The AriSon Megaregion, for example, is a concept championed by local leaders on both sides of the border seeking to connect metropolitan areas in Arizona and Sonora and formalize agreements and economic development actions based on cooperation rather than in competition. As is the case with other policy networks, the main challenge for the Arizona-Mexico Commission and the Ari-Son Megaregion Project is the creation of a solid narrative of change and the expansion of their support base regionally and nationally.

Communities of Practice

Within some professional fields, communities of practice develop based on trust over continued, frequent interactions and collaborative, peer-to-peer learning across the border. In the area of border public health, the value of collaborative approaches in addressing infectious diseases and chronic health issues is exemplified by the community health approach represented by the Binational Health Councils (BCH/COBINAS). These councils include local health authorities, non-governmental organizations, social service groups, and professional associations on both sides of the border and illustrate a local and successful model of a transborder community of practice. Currently there are three binational health

councils operating along the Arizona-Sonora border from Yuma-San Luis Rio Colorado to Douglas-Agua Prieta. The United States-Mexico Border Health Commission (USMBHC), public universities, and the health departments of the State of Arizona and the State of Sonora have provided critical support for the operation of these councils for years.

Communities of Knowledge

The *Climate Assessment for the Southwest* (CLIMAS), a regional group of scientists based at the University of Arizona that work in partnership with Sonoran universities (COLSON, UNISON and UNAM) is part of a regionally integrated assessment of climate impact in the Sonoran Desert. This group of experts has identified high socioeconomic and climate related vulnerabilities in the major urban areas of the Arizona-Sonora region (Wilder et al, 2013). They have also found varying institutional capacity, including inaccessibility of appropriate data and climate information, as well as trained personnel to utilize climate knowledge appropriately. The group has concluded that co-generation of climate knowledge to inform water policy and the development of internet-based platforms to facilitate access to information should be expanded on both sides of the border, but with emphasis in Sonora.

Another example is the *Arizona-Sonora Inter-university Consortium* (ASIC), comprised of Arizona State University and three of Sonora's higher education institutions (CIAD, UNISON and COLSON) which seeks to influence and accelerate regional development through the creation of a transborder innovation and knowledge ecosystem that is sustained through collaboration among scientists, policy-makers and entrepreneurs from a variety of fields. In some way, ASIC is an effort initiated two decades ago to develop a long-term plan for an integrated Arizona-Sonora binational region that is able to compete and improve quality of life in a global economy (Wong-González, 2005). These two cases are good illustrations of the types of activities that networks of knowledge-based experts engage in. They work – through academic discourse and research – to articulate cause-and-effect relationships for complex border problems, frame public debates, propose specific policies, or identify salient points for a transborder regional vision.

Citizen Networks

Formal transborder networks have also emerged to link the growing immigrant Latino community in Arizona with their home communities in Mexico. In recent years a number of *Clubes de Oriundos* or Hometown Associations (HTAs) have been created mainly in Tucson and Phoenix. These transborder communities serve multiple functions, including helping newcomers adjust to Arizona as well as providing important social and cultural connections between immigrant communities in the U.S. and their communities of origin in Mexico. Though initially rising as philanthropic enterprises, HTAs have evolved gradually into innovative forms for cross-border networking that are able to stimulate local economic development by channeling remittances, skills, and business knowledge while simultaneously helping to reduce the pressures to emigrate among residents in some rural communities in Mexico (Castles and Miller, 2009). There are currently more than 57 Mexican HTAs registered in 6 cities in the State of Arizona, chiefly associated with rural towns in northwest and central Mexico (IME, 2015). In Phoenix alone, there are 42 of these organizations registered in the Mexican consulate. Increasingly, regional Latino nonprofits such as *Chicanos por la Causa* (CPLC) and the *Concilio Latino de Salud* (CLDS) are taking first steps to establish ties and develop strategic partnerships with Arizona HTAs. As these partnerships develop, the impact of Mexican hometown associations in the larger Arizona's community will also grow.

CONCLUSION

Through cooperation and shared governance, transborder communities are essential for promoting best cross-border outcomes between the two sides of the border. They focus on interdependencies and complementarities and address pressing cross-border issues. The organizations highlighted above are excellent examples of the effectiveness and potential of transborder networks in the field of economic planning, community health, climate change adaptation, and local development. Notwithstanding their limitations, they illustrate a decades-long, sustained trend of strong transborder collaboration in Arizona and Sonora, as well as the tenacity of the social and economic linkages that connect both states.

REFERENCES

- Binational Economic Forum (2014). "Partnering Charter, Formation of an Arizona-Sonora Binational Megaregion," Nogales, Sonora.
- Castles, S. and Mark J. Miller (2009). "The Age of Migration: International Population Movements in the Modern World," 4th. Ed., The Guilford Press, New York.
- Haas, Peter M. (1992). "Introduction: Epistemic Communities and International Policy Coordination", *International Organization*, 46(1), 1–35
- IME. (2015). Directorio de Organizaciones. Instituto de los Mexicanos en el Exterior. Retrieved on January 24, 2016 from <http://www.ime.gob.mx/en/proyectos-en-linea/directorio-de-organizaciones>
- Rhodes, R. (2008). "Policy Network Analysis". In Goodin R., Moran M., Rein M., *The Oxford Handbook of Public Policy*. Oxford, pp. 425–443.
- Wenger, E. and William Snyder (2000). "Communities of practice: the organizational frontier". *Harvard Business Review*, January-February, pp. 139-145.
- Wilder, M, et al. (2013). "Climate Change and the US-Mexico Border Communities". In Assessment of Climate Change in the Southwest United States: A Report for the National Climate Assessment, Edited by G. Garfin et al. 340-384. A Report by the Southwest Climate Alliance, Washington, D.C: Island Press.
- Wong-González, P. (2005). "La Emergencia de Regiones Asociativas Transfronterizas: Cooperación y conflicto en la Región Sonora-Arizona". *Frontera Norte*, 17, 77-106.

ABOUT THE AUTHOR

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APPENDIX

Map of Mexican States

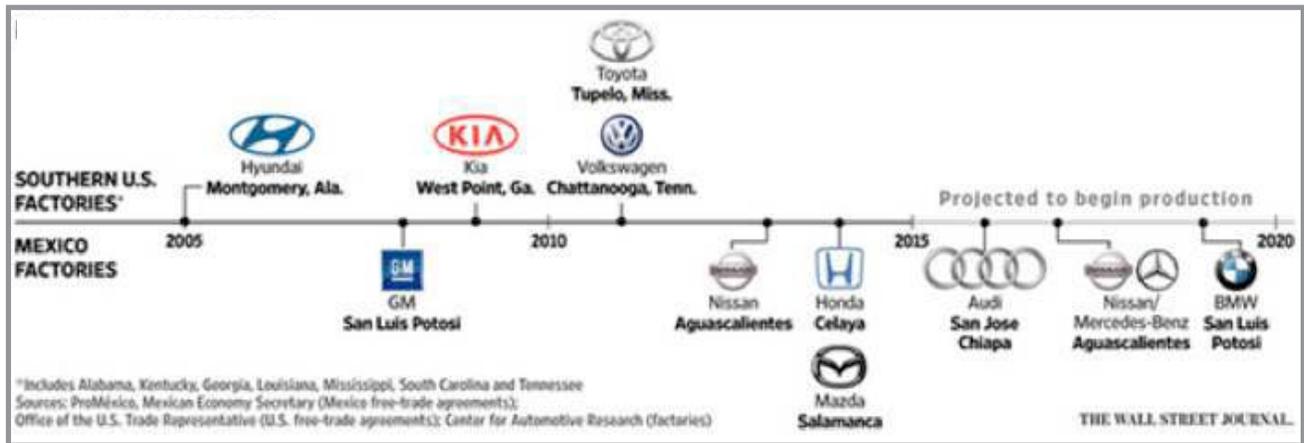


Source: [https://commons.wikimedia.org/wiki/File%3AMapa_pol%C3%ADtico_de_M%C3%A9xico_a_color_\(nombres_de_estados_y_capitales\)](https://commons.wikimedia.org/wiki/File%3AMapa_pol%C3%ADtico_de_M%C3%A9xico_a_color_(nombres_de_estados_y_capitales))

Population of Mexican States

Rank	State	Population 2015	Rank	State	Population 2015
1	México	16,187,608	17	Hidalgo	2,858,359
2	Distrito Federal	8,918,653	18	Sonora	2,850,330
3	Veracruz	8,112,505	19	San Luis Potosí	2,717,820
4	Jalisco	7,844,830	20	Tabasco	2,395,272
5	Puebla	6,168,883	21	Yucatán	2,097,175
6	Guanajuato	5,853,677	22	Querétero	2,038,372
7	Chiapas	5,217,908	23	Morelos	1,903,811
8	Nuevo León	5,119,504	24	Durango	1,754,754
9	Michoacán	4,584,471	25	Zacatecas	1,579,209
10	Oaxaca	3,967,889	26	Quintana Roo	1,501,562
11	Chihuahua	3,556,574	27	Aguascalientes	1,312,544
12	Guerrero	3,533,251	28	Tlaxcala	1,272,847
13	Tamaulipas	3,441,698	29	Nayarit	1,181,050
14	Baja California	3,315,766	30	Campeche	899,931
15	Sinaloa	2,966,321	31	Baja California Sur	712,029
16	Coahuila	2,954,915	32	Colima	711,235

New Car Plants in Mexico, 2005-19



Source: Adapted from <http://www.wsj.com/articles/why-auto-makers-are-building-new-factories-in-mexico-not-the-u-s-1426645802>

Economic Development and Business Agencies

State

[Arizona Commerce Authority](#)
[ASU Research Park](#)
[ASU Skysong](#)
[University of Arizona Tech Parks Arizona](#)
[Arizona-Mexico Commission](#)

Northern Arizona

[Coconino County Economic Development](#)
[Apache County](#)
[La Paz Economic Development Corporation](#)
[Mojave County Economic Development](#)
[Navajo County Economic Development](#)
[The Navajo Nation Economic Development](#)
[Prescott Valley Economic Development Foundation](#)
[Real Corridor](#)
[Verde Valley Regional Economic Development Council](#)

Central Arizona

[Copper Corridor Economic Development Coalition](#)
[Access Arizona](#)
[Greater Phoenix Economic Council](#)
[Maricopa County Economic Development](#)
[Pinal County Economic Development](#)

Southern Arizona

[Cochise County Economic Development - Southeast Arizona Economic Development Group](#)
[Greater Yuma Economic Development Corporation](#)
[Pima County Economic Development](#)
[Southeast Economic Development Corporation](#)
[Tucson Regional Economic Opportunities](#)

Local

Northern Arizona

[Cottonwood Economic Development Council](#)
[Choose Flagstaff](#)
[Lake Havasu Partnership for Economic Development](#)
[Page Economic Development](#)
[Parker Economic Development](#)
[Sedona Economic Development](#)

Central Arizona

[Apache Junction Economic Development](#)
[Avondale Economic Development](#)
[Chandler Economic Development](#)
[Economic Development Group of Eloy](#)
[El Mirage Economic Development](#)
[Fort McDowell Economic Development](#)
[Fountain Hills Economic Development](#)
[Gilbert Economic Development](#)
[Glendale Economic Development](#)
[Goodyear Economic Development](#)
[Litchfield Park Economic Development](#)
[Maricopa Economic Development](#)
[Mesa Economic Development](#)
[Peoria Economic Development](#)
[Phoenix Economic Development](#)
[Queen Creek Economic Development](#)
[Salt River Pima Maricopa Indian Community Economic Development](#)
[Scottsdale Economic Development](#)
[Surprise Economic Development](#)
[Tempe Economic Development](#)
[Tolleson Economic Development](#)
[Youngtown Economic Development](#)

Southern Arizona

[Douglas Economic Development - Southeast Arizona Economic Development Group](#)
[Marana Economic Development](#)
[Oro Valley Economic Development](#)
[Sahuarita Economic Development](#)
[Sierra Vista Economic Development Foundation](#)
[City of Tucson Economic Development](#)
[Tohono O'odham Nation Economic Development](#)

[Gila Bend Chamber of Commerce](#)
[City of Gilbert](#)
[Gilbert Chamber of Commerce](#)
[Glendale Chamber of Commerce](#)
[Globe-Miami Chamber of Commerce](#)
[Graham County Chamber](#)
[Grand Canyon Chamber of Commerce](#)
[Greenlee County Chamber](#)
[Greater Phoenix Chamber of Commerce](#)
[Greater Florence Chamber of Commerce](#)
[Green Valley Sahuarita Chamber of Commerce](#)
[Heber Overgaard Chamber of Commerce](#)
[Holbrook Chamber of Commerce](#)
[Jerome Chamber of Commerce](#)
[Kingman Area Chamber of Commerce](#)
[Lake Havasu Area Chamber of Commerce](#)
[Marana Chamber of Commerce](#)
[Maricopa Chamber of Commerce](#)
[Mesa Chamber of Commerce](#)
[Mohave Valley Chamber of Commerce](#)
[Nogales-Santa Cruz County Chamber of Commerce](#)
[North Phoenix Chamber of Commerce](#)
[Oatman Gold Road Chamber of Commerce](#)
[Page Lake Powell Chamber of Commerce](#)
[Paradise Valley Chamber of Commerce](#)

[Payson Rim Regional Country Chamber of Commerce](#)
[Parker Chamber of Commerce](#)
[Peoria Chamber of Commerce](#)
[Pinetop-Lakeside Chamber of Commerce](#)
[Prescott Valley Chamber of Commerce](#)
[Quartzsite Chamber of Commerce](#)
[Queen Creek Chamber of Commerce](#)
[Sedona Canyon Chamber of Commerce](#)
[Show Low Chamber of Commerce](#)
[Sierra Vista Area Chamber of Commerce](#)
[Snowflake/Taylor Chamber of Commerce](#)
[Sonoita/Eiqin Chamber of Commerce](#)
[South Mountain Laveen Chamber of Commerce](#)
[Southwest Valley Chamber of Commerce](#)

Arizona Chambers of Commerce

State

[American Indian Chamber of Commerce of Arizona](#)
[Arizona Chamber of Commerce](#)
[Arizona Hispanic Chamber of Commerce](#)
[Asian Chamber of Commerce](#)

Regional/Local

[Ahwatukee Foothills Chamber of Commerce](#)
[Ajo Chamber of Commerce](#)
[Alpine Area Chamber of Commerce](#)
[Apache Junction Chamber of Commerce](#)
[Arizona Highway 69 Chamber of Commerce](#)
[Benson/San Pedro Valley Chamber of Commerce](#)
[Bisbee Chamber of Commerce](#)
[Black Canyon City Chamber of Commerce](#)
[Black Chamber of Commerce \(Greater Phoenix\)](#)
[Black Chamber of Commerce \(Tucson/Southern Arizona\)](#)

[Bouse/McMullen Valley Chamber of Commerce \(Arizona Outback\)](#)
[Buckeye Valley Chamber of Commerce](#)
[Bullhead Area Chamber of Commerce](#)
[Camp Verde Chamber of Commerce](#)
[Carefree-Cave Creek, Arizona Chamber of Commerce](#)
[Greater Casa Grande Chamber of Commerce](#)
[Chandler Chamber of Commerce](#)
[Chino Valley Area Chamber of Commerce](#)
[Clarkdale Chamber of Commerce](#)
[Coolidge Chamber of Commerce](#)
[Copper Basin Chamber of Commerce](#)
[Cottonwood Chamber of Commerce](#)
[Eloy Chamber of Commerce](#)
[Greater Flagstaff Chamber of Commerce](#)
[Fountain Hills Chamber of Commerce](#)

[Springerville-Eagar Regional Chamber of Commerce](#)
[Superior Chamber of Commerce](#)
[Surprise Regional Chamber of Commerce](#)
[Tempe Chamber of Commerce](#)
[Tombstone Chamber of Commerce](#)
[Tubac Chamber of Commerce](#)
[Tucson Metropolitan Chamber of Commerce](#)
[Tucson Hispanic Chamber of Commerce](#)
[Tucson Black Chamber of Commerce](#)
[Wickenburg Chamber of Commerce](#)
[Willcox Chamber of Commerce and Agriculture](#)
[Williams-Grand Canyon Chamber of Commerce](#)
[Winslow Chamber of Commerce](#)
[Yuma County Chamber of Commerce](#)
[Yarnell/Peoples Valley Chamber of Commerce](#)

Source: Alex Steensstra, Department of Business Administration, Northern Arizona University



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