RESOLUTION

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EL PASO:

THAT the Mayor be authorized to send a letter to State Comptroller, Susan Combs, requesting her assistance in evaluating the negative impacts of the excessive wait times at the ports of entry on the economy of El Paso and the State of Texas. And further requesting that she assist in efforts to allocate State funding for the improvement of infrastructure at the ports of entry to enable the more efficient movement of commerce and people across the international border.

PASSED AND APPROVED this _____ day of _____, 2012

CITY OF EL PASO

_____
John F. Cook
Mayor

ATTEST:

_____
Richarda Duffy Momsen
City Clerk

APPROVED AS TO FORM:

Sylvia Borunda Firth
Sylvia Borunda Firth
City Attorney

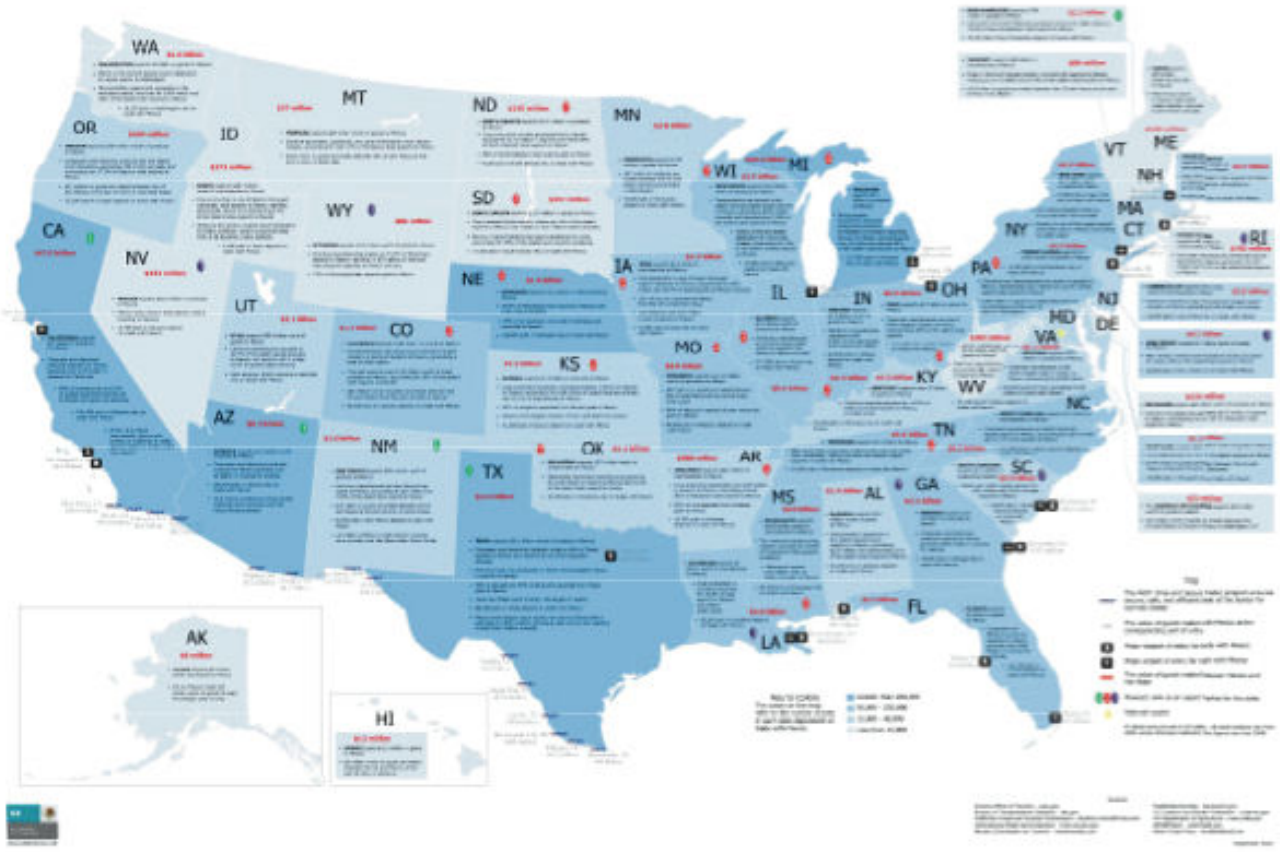
APPROVED AS TO CONTENT:

Jane K. Shang
Jane K. Shang, Deputy City Manager
Mobility Services

CITY CLERK DEPT.
2011 DEC 21 PM 5:05

11-1019-016/PL#95226/Reso/International Bridge Wait Times/SBF

Realizing the Full Value of Crossborder Trade with Mexico



New Policy Institute

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Table of Contents

Executive Summary 2
An Introduction to our Unknown Neighbor, Mexico 4
Mexico's Economy: Packed with Potential 7
Trade with Mexico: An Abundance of Value That Is "Hidden In Plain Sight" for the U.S. 7
U.S. & Mexico's Highly Complementary Economies 11
North America Eats What Mexico Harvests 12
U.S. Mexico Border Management: Building World Class Infrastructure for Competitiveness 13
Much Opportunity, but the Real Work Has Only Just Begun 16

List of Figures

Figure 1: Freight Transportation Networks in Mexico 4
Figure 2: Mexico's Free Trade Agreements 5
Figure 3: Number of Import Procedures by Country 6
Figure 4: Mexico's GDP % Change: 2000-2011 7
Figure 5: U.S. Exports to Mexico: Main Sectors 8
Figure 6: Top U.S States Trading with Mexico 9
Figure 7: Share of Imports to the U.S- Major U.S Commercial Partners 10
Figure 8: Trucks Crossing Into the U.S From Mexico 11
Figure 9: Major U.S Vegetable Imports from Mexico 13
Figure 10: Collapse of San Ysidro Port of Entry Roof 14
Figure 11: Vehicles Waiting to Cross into San Diego from Tijuana, Mexico 15

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Executive Summary

The United States urgently needs a sustained national conversation regarding how to realize greater value in our crossborder trade with Mexico, and the benefits of increasing efficiencies at our shared border. As the export sector assumes more importance and the U.S. economy struggles to create high-quality jobs, our nation needs to discover every dollar of value in our relationship with our nation's number two export market: Mexico.

Trade with Mexico: An Abundance of Value That Is "Hidden In Plain Sight"

Trade is an important tool in policymakers' economic development toolbox. Ever since the enactment of the North American Free Trade Agreement (NAFTA), and given the complementarity of the U.S. and Mexican economies, bilateral trade has grown exponentially, reaching a record high of nearly $400 billion in 2010. Mexico is now the third-ranked commercial partner of the U.S. and the second largest market for U.S. exports. Mexico spent $163 billion on U.S. goods in 2010, and **trade with Mexico sustains six million jobs in the U.S.** This is economic value that for many in the U.S. remains "hidden in plain sight."

To provide a better idea of what this commercial partnership means to our country, U.S. sales to Mexico are larger than all U.S. exports to the BRIC countries (Brazil, Russia, India and China) combined, as well as all combined sales to Great Britain, France, Belgium and the Netherlands. Twenty-two states count Mexico as their No. 1 or No. 2 export market, and it is a top-five market for 14 other states. American consumers and businesses import large quantities of jointly produced products and services from Mexico such as automobiles, produce, and petroleum, just to name a few. Still, for every dollar Mexico makes from exporting to the U.S., it will in turn spend 50 cents on U.S. products or services, which are a considerable benefit to our economy and demonstrates the truly unique quality of this trade or "joint production" relationship.

U.S.-Mexico Border Management: Building the Infrastructure for Future Competitiveness

Sharing a 2,000-mile long border with Mexico needs to be recognized as both a challenge and an opportunity. Though improving, our border's current infrastructure and capacity today reflect the needs of a bygone era. While land ports of entry between the two nations were first envisioned to process the legitimate crossing of people, goods and services across the border, security has taking an overwhelmingly dominant role in recent years, hampering the ability of agencies to efficiently manage border traffic.

With this in mind, in May of 2010 the U.S. and Mexico signed the 21st Century Border Management Joint Declaration. Recognizing the importance of fostering the commercial relationship, both countries have agreed to coordinate efforts to enhance economic competitiveness by expediting lawful trade. The basic idea is that developing a modern and secure border infrastructure will give an added boost to our region's safety and competitiveness in the world.

Much Opportunity, but the Real Work Has Only Just Begun

The poor infrastructure, the inadequate staffing levels and the heavy focus on security that prevails at the U.S. – Mexico border have cost both economies billions of dollars in gross output annually. It is past time for our shared border to begin to meet today's demands, acting as a facilitator and conductor of lawful flows of goods, services and people across our nations so that we may capitalize on the full potential of our partnership. If a billion dollars' worth of trade crosses the U.S.-Mexico border on a daily

basis now while sustaining six million jobs, imagine what could be accomplished with a truly 21st century border.

An Introduction to our Unknown Neighbor, Mexico

It is imperative for the United States to engage in a national conversation regarding the value of economic integration and interdependence, cross-border trade with Mexico, and the cost of inefficiencies at our long and dynamic shared border. As the U.S. economy struggles to create high-quality jobs and the export sector assumes more importance, our nation needs to discover every dollar of value in the relationship with our nation's number two export market: Mexico.

There is no other relationship for the United States that is as dismissed and yet ironically as crucial for our country's well-being as the one with Mexico, a country with a population of over 113 million people. Mexico is much more than a country with which we just happen to share a 2,000 mile long land border. Although it is often unknown to us, it is important to realize that Mexico is one of our most significant commercial partners in the world.

To illustrate Mexico's overall development and the trends in its development, we can look a few examples from its physical infrastructure, its human capital, what it produces and its trade relationships. To begin with, in 2010 Mexico invested an unprecedented five percent of its GDP in infrastructure. With 76 seaports along its 11,000 kilometers of seashore on the Pacific and Atlantic Oceans, 85 airports, 26,700 kilometers of railroad and 366,000 kilometers of road, Mexico is one of the most "interconnected" countries in the entire hemisphere (see Figure 1 below).

Figure 1: Freight Transportation Networks in Mexico

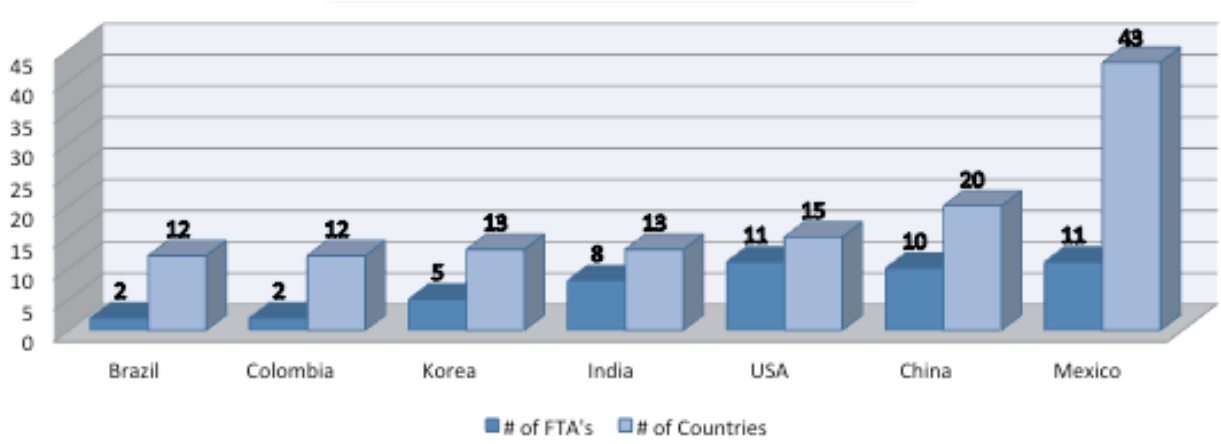


Fuente: SCT

Thanks to its well-established higher education system —which is only second to Chile in Latin America—Mexico graduates more than 90,000 students from engineering and technical schools on an annual basis. Although it is a leading petroleum producer, Mexico gets 20% of its energy from renewable sources. And it's the second-largest producer of silver in the world and the largest producer of the Blackberry smart phone, among many other commodities and products.

Mexico is a member of the Group of 20 (G-20) and of the Organization for Co-operation and Economic Development (OCED). It has the second highest number of Free Trade Agreements (FTAs) in the world (see Figure 2 below), which establish an impressive commercial network that covers 43 countries on three continents. This creates a unique opportunity for international commerce and foreign direct investment since it gives the country and its commercial partners (particularly the United States) strategic access to a potential market of over one billion consumers, which represents close to 60% of the world's GDP.

Figure 2: Mexico's Free Trade Agreements



Source: ProMéxico

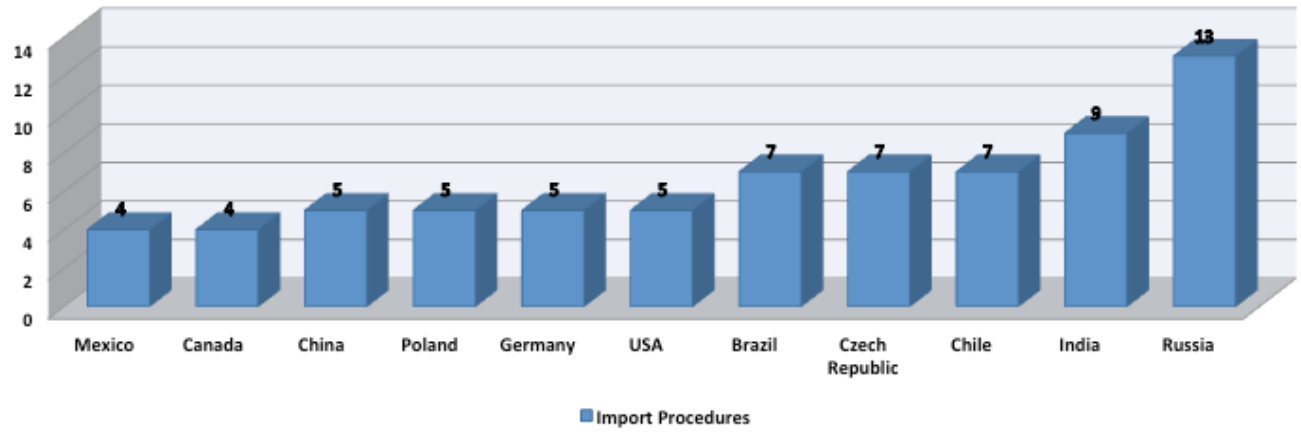
In the last twenty years, Mexico has opened up to the world with great success. In 2011 the World Bank ranked Mexico the easiest place in Latin America to do business and 35th in the world, ahead of such countries as Italy and Spain. Furthermore, the working hours of Mexicans are among the longest in the world, according to a recent report by the OECD. In the Global Competitiveness Report 2011-2012 by the World Economic Forum, Mexico also managed to

improve its competitiveness ranking by 8 places —the largest improvement in competitiveness in Mexico's history.

Furthermore, Goldman Sachs research on the Next 11 Emerging Markets estimates that the Mexican economy will become the world's fifth largest economy by 2050, putting Mexico ahead of the BRICS. And given its rapidly advancing infrastructure, increasing middle class and rapidly declining poverty rates, it is expected to have a higher GDP per capita than all but three European countries by 2050.

A significant part of Mexico's commercial success in the international arena comes in great part from its efforts to do away with bureaucratic, business and trading regulations that hampered its ability to compete in the global market and attract foreign direct investment. Mexico has reduced its import tariffs by an average of 13% to 5% during the last decade. It is currently much easier to sell products into Mexican market, given that only four import procedures are needed for a local or foreign business to buy goods or services outside of Mexico and bring them into the country for value adding or to sell. This puts Mexico in a better position than China, the United States, Brazil and India (see Figure 3 below).

Figure 3: Number of Import Procedures by Country



Source: ProMéxico

Mexico exports more goods and services than all of the other Latin American countries combined; exports account for nearly a third of Mexico's trillion-dollar GDP. Thanks to the North American Free Trade Agreement (NAFTA) and the Mexico's additional bilateral agreements, according to *The Economist*, Mexico trades more than Argentina and Brazil

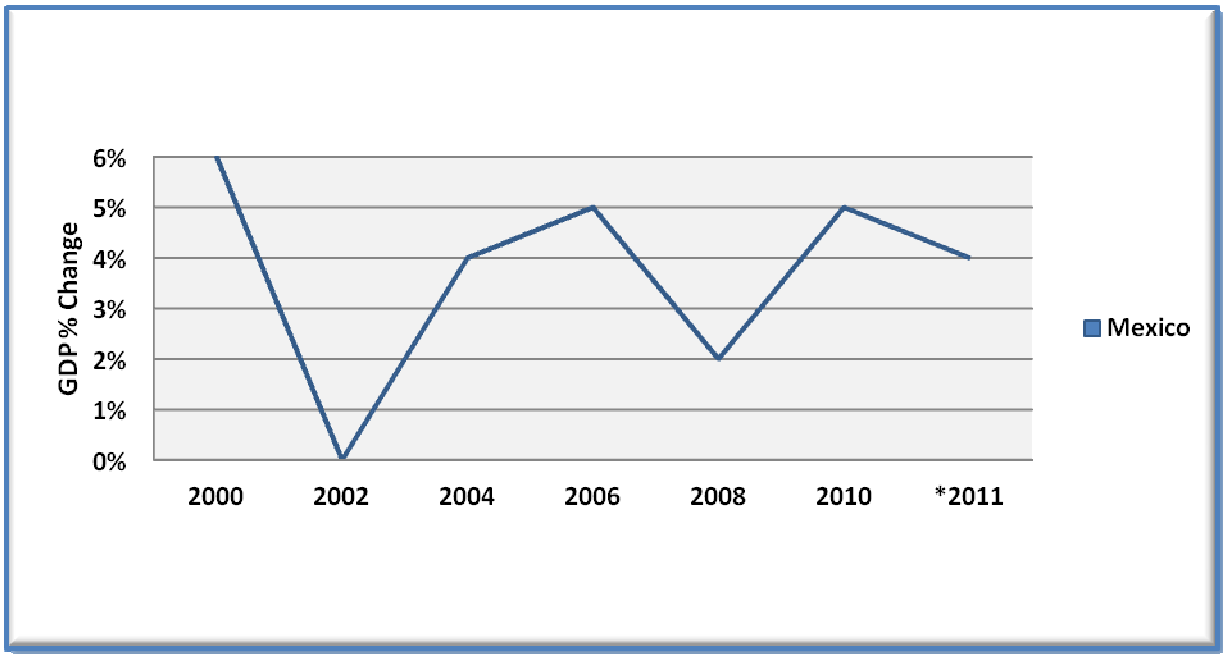
combined, and more per person than China. Over 60% of Mexico's workforce is now employed by the trade and services sector, a 15% increase from twenty years ago.

Mexico's Economy: Packed with Potential

Mexico's people are richer than those of any of the BRICs except Russia. Furthermore, the cost for businesses that operate in Mexico is considerably smaller than other Latin American countries, which creates yet another incentive for multinationals to establish operations in Mexico.

In 2010, the Mexican economy grew by 5.4%, recovering much of the ground it had lost in 2009 due to the recession in the United States. After last year's outstanding recovery, in 2011 Mexico is expected to grow during the next couple of years at around 4% (see Figure 4 below), which is still more than the growth expected for the U.S. and Canada. Furthermore, Mexico's official national unemployment rate is 5.4%, having peaked at 6.4% in 2009. Again, this rate is still far less than what countries such as ours and many other Europeans countries are dealing with today.

Figure 4: Mexico's GDP % Change: 2000-2011



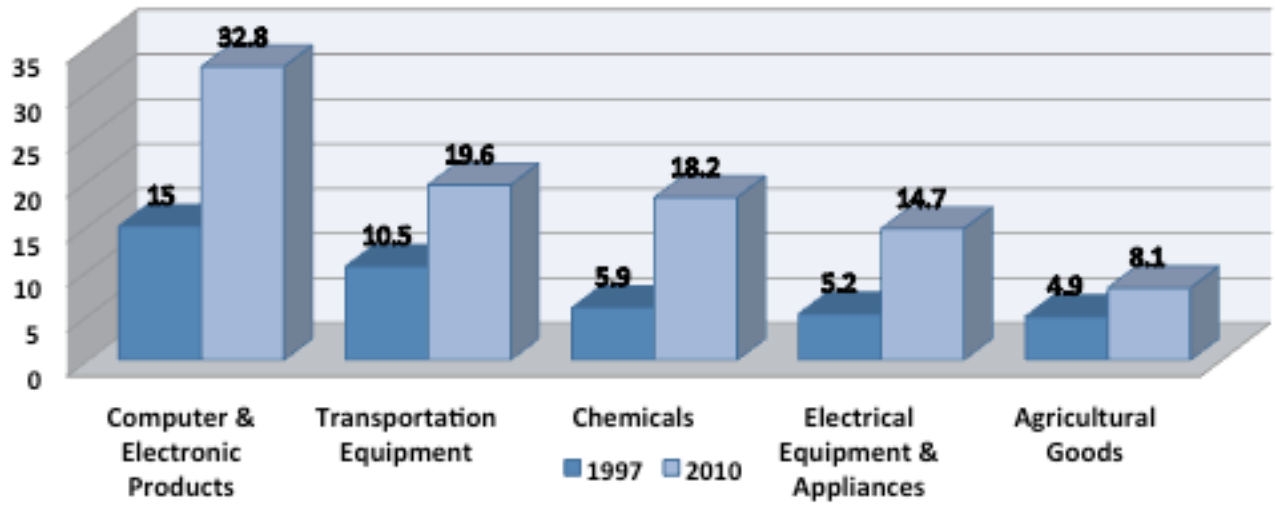
Trade with Mexico: An Abundance of Value That Is "Hidden In Plain Sight" for the U.S.

Although international trade may be a broad, diffuse topic that is not well-understood by the American public at large, it is nevertheless a key component of the U.S. economy. It is no coincidence that the U.S. is simultaneously the world's largest economy and the largest

exporter and importer of goods and services: $2.2 trillion worth of trade move in and out of the U.S. on an annual basis. Furthermore, 60,000 containers enter the U.S. per day from all over the world. According to the U.S. Trade Representative, exports to foreign markets support more than 10.3 million jobs in the U.S., which on average pay 13-18 % more than the national average. Additionally, exports generated half of U.S. economic growth in 2010.

The overall U.S. trading pattern holds true with its next door neighbor to the south. The U.S. and Mexican economies are naturally complementary and interdependent with each other as few others in the world may claim to be. Since the enactment of the North American Free Trade Agreement (NAFTA), bilateral trade has grown exponentially, reaching a record high of nearly $400 billion in 2010. Mexico's GDP growth of 5.4% in 2010 resulted in a $35 billion increase in Mexican purchases from the U.S.. The country has become the U.S.' third-ranked commercial partner and the second most important market for U.S. exports; Mexico spent $163 billion on U.S. goods in 2010. **Trade with Mexico sustains six million jobs in the U.S.** In spite of these impressive numbers, this is economic value that for too many in the U.S. remains "hidden in plain sight."

Figure 5: U.S. Exports to Mexico (billions of U.S. dollars): Main Sectors



Source: Mexico's Secretaría de Economía

To provide an additional perspective toward understanding what this commercial relationship means to our country and the progress it has made since the enactment of NAFTA, exports to Mexico from the U.S. have increased 220%. **U.S. sales to Mexico are larger than all U.S. exports to Brazil, Russia, India and China combined, as well as all combined sales to Great Britain, France, Belgium and the Netherlands.** Along the same lines, twenty-two states count Mexico

as their No. 1 or No. 2 export market and it is a top-five market for 14 other states. Trading with Mexico creates and sustains jobs in our states, including 807,000 jobs in Texas, 249,000 jobs in Nebraska, 13,000 jobs in New Hampshire and 10,000 jobs in Washington, just to name a few examples.

Figure 6: Top U.S. States Trading with Mexico

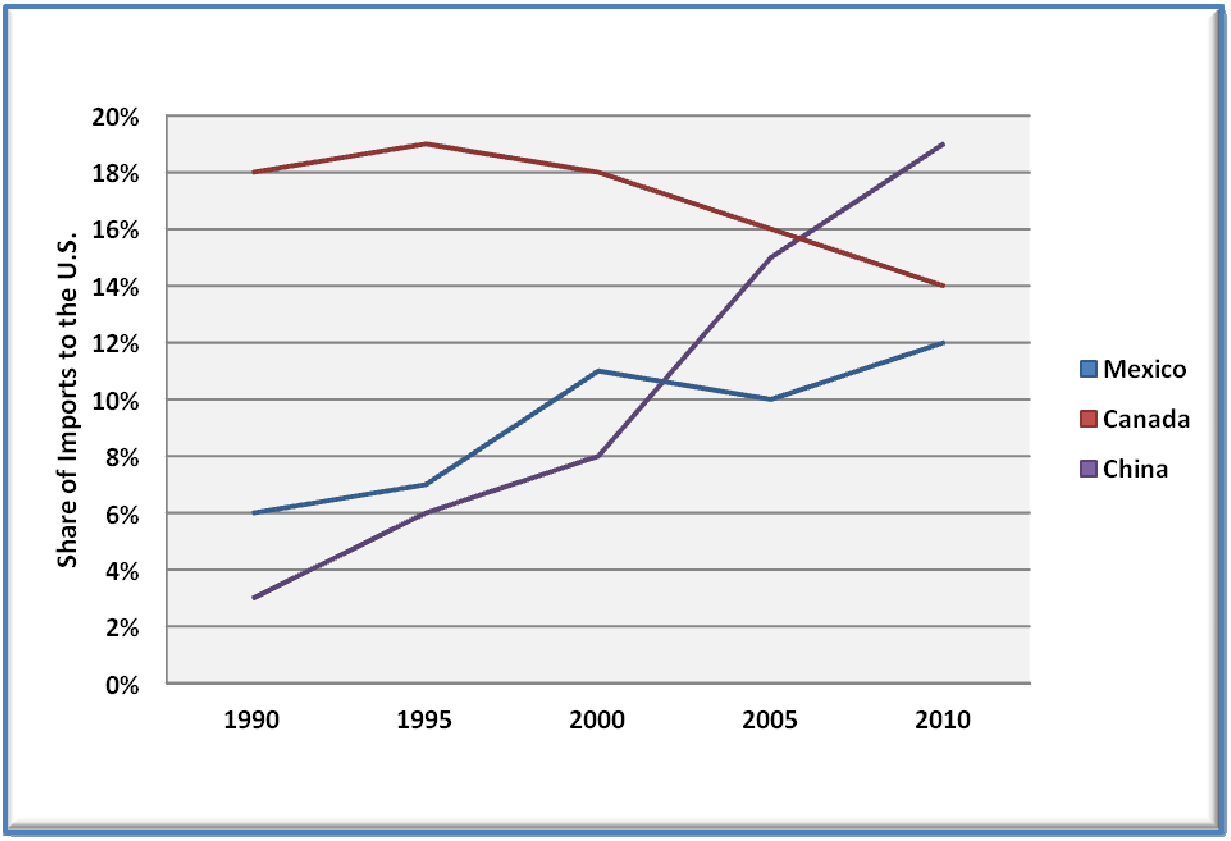
U.S. State	Mexico as Export Market #	Exports Value	Imports Value	Total Trade
Texas	1	$72,370	$78,982	**$151,351**
California	1	$21,002	$32,753	**$53,755**
Michigan	2	$7,428	$28,150	**$35,578**
Illinois	2	$4,267	$8,383	**$12,651**
Arizona	1	$5,055	$5,630	**$10,685**
Ohio	2	$3,500	$5,549	**$9,049**
Tennessee	2	$3,040	$3,666	**$6,706**
Mississippi	2	$1,195	$4,343	**$5,538**
Pennsylvania	2	$2,387	$2,823	**$5,209**
Wisconsin	2	$2,010	$2,910	**$4,920**
Missouri	2	$1,302	$2,540	**$3,843**
Iowa	2	$1,833	$985	**$2,818**
Kansas	2	$1,281	$761	**$2,041**
Nebraska	2	$1,314	$369	**$1,682**
New Hampshire	1	$1,050	$570	**$1,620**
Colorado	2	$590	$644	**$1,233**
Arkansas	2	$544	$584	**$1,128**
Oklahoma	2	$432	$653	**$1,085**
New Mexico	1	$429	$635	**$1,064**
South Dakota	2	$340	$45	**$385**
North Dakota	2	$166	$48	**$214**

Source: NAFTA Trade Office and Mexico's Secretaría de Economíawith Data from U.S. Department of Commerce

On the other hand, Mexican exports to the U.S. provide Americans and import-dependent companies access to affordable and high-quality products and services such as automobiles, produce, and oil, just to name a few. Mexico is our second-ranked supplier of petroleum; interestingly, the U.S. refines most of the oil that Mexico consumes domestically. Still, for every dollar Mexico makes from exporting to the U.S., it will in turn spend 50 cents on U.S. products or services, which is a considerable benefit to our economy out of a real and stable two way trade, especially when compared to 6 cents worth of U.S. goods purchased for every dollar

China spends out of their exports to our country. Furthermore, U.S. inputs account for 64% of the content of every Mexican product sold in the United States.

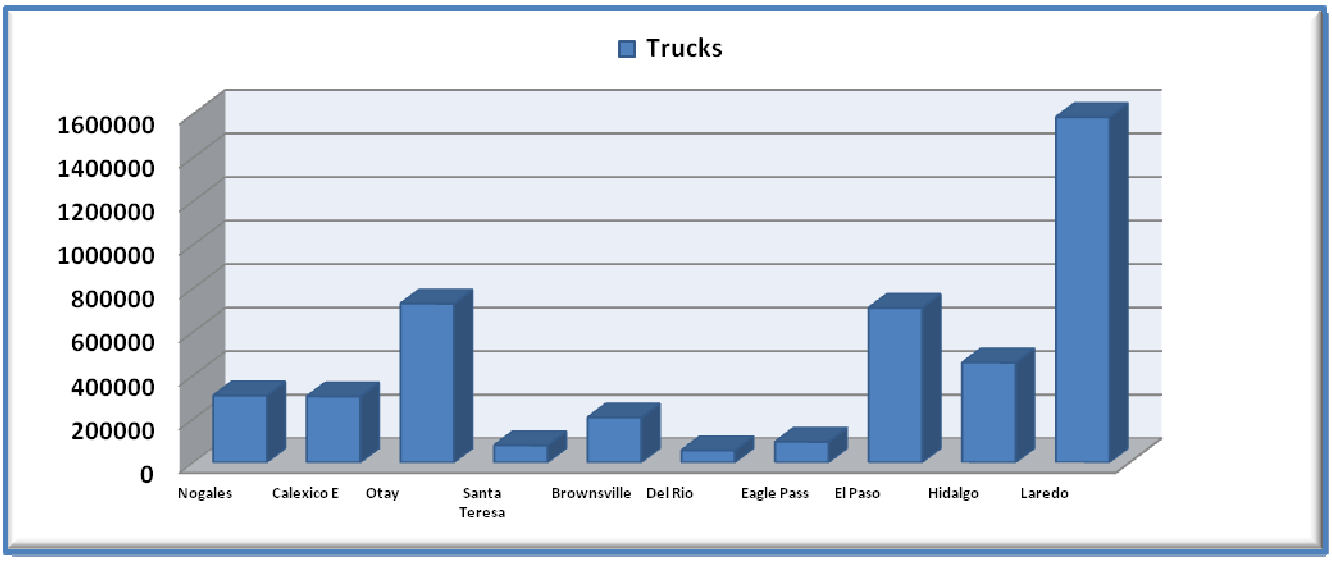
Figure 7: Share of Imports to the U.S. – Major U.S. Commercial Partners



China's relatively low wages—which were the strongest motivation for U.S. and multinational companies to move production to China from Mexico—have risen rapidly in recent months. Today, Mexican manufacturing wages are only 20% higher than in China, which reduces some companies' incentives to move operations to China.

Mexico has leveraged its proximity to the United States stronger than ever, given the high price of crude oil and all other costs associated with global logistics. The resolution in July of a long dispute has allowed Mexican trucks to make deliveries in America. Once in place, the U.S. – Mexico cross-border trucking program is projected to produce savings of up to $675 million annually for binational trading costs, according to the Mexican federal government.

Figure 8: Trucks Crossing into the U.S. From Mexico



Source: U.S. DOT, RITA, Bureau of Transportation Statistics, TransBorder Freight Data.

U.S. & Mexico's Highly Complementary Economies

The close economic ties between the U.S. and Mexico illustrate the dynamics of a 21st century supply chain as inputs cross the border multiple times, accumulating value added to the goods being exported and imported through our shared border.

The automotive, electronics and aeronautic industries, among others, are examples of the highly integrated supply chains between U.S. and Mexican industries that have successfully faced global competition. The North American auto industry has become highly integrated since the original Auto Pact between Detroit and Ontario that began cross-border manufacturing in North America. Today, vehicles made in Mexico have a high U.S. content, while at the same time vehicles manufactured in the U.S. use a large number of Mexican-made auto parts.

Supply chains are critical to businesses' underlying value, growth potential, and economic competitiveness. Unfortunately, supply chains often come to a stop due to border delays, security concerns, and infrastructure constraints. These issues create an environment of uncertainty in the business community, which deters investment, job creation and economic prosperity.

Exports clearly create jobs, but what is less apparent is that **exports rely on imports**. When U.S. firms build and produce things together with firms in Mexico, it is imperative for them to get key components across the border as fast as possible back into their facilities. The sooner they

are in, the sooner they may continue to move along the supply chain until they reach the consumer and create a profit for the U.S. firm and the economy. In a just-in-time business environment, the company relies on an efficient process at the border in order to get numerous key components shipped rapidly from Mexico.

Mexico has increasingly become a strategic supplier to U.S. industry; Mexico's intermediate exports contribute to both intermediate and finished goods in the U.S. Capital goods traded between the U.S. and Mexico also play an important role in increasing regional competitiveness. Last year, $70 billion worth of machinery, tools and equipment were traded bilaterally to produce other goods that were in turn consumed locally or sold to foreign markets as North American-made products.

The highly complementary nature of this trade illustrates the growing importance of incorporating value-added every time a product crosses the border for further processing. The interconnectivity between the supply chains of both countries help U.S. companies remain competitive in the world marketplace by producing goods for worldwide consumption at competitive prices. Mexico's proximity to the U.S. allows production to have a high degree of U.S. content in the final product which in turn helps create and sustain jobs in both countries.

North America Eats What Mexico Harvests

Mexico is among the top ten agricultural producing countries in the world. Moreover, given its geographical proximity to our market and its vast diversity of natural resources, Mexico is the largest foreign supplier of fresh fruits and vegetable to the U.S. and Canada. Key to this accelerated development of commerce under NAFTA is high quality standards, improved production technology, product diversity, and expansion of marketing systems. All of these factors have contributed to substantial growth in the volume and the variety of Mexican counter-seasonal agricultural exports to the U.S. market.

In 2010, Mexico exported more than $4.3 billion in vegetables; the U.S. accounted for 90% of this total, becoming Mexico's largest vegetable export market.

Figure 9: Major U.S. Vegetable Imports from Mexico

Product	Imports (millions)	Share
Tomatoes	$1,487	82.7%
Chili Peppers	$613	66.8%
Cucumbers	$262	74.4%
Other Frozen Vegetables	$248	67.8%
Squash	$234	96.7%
Asparagus	$216	52.7%
Onions	$184	71.6%
Kohlrabi, kale, and brassicas	$120	92.8%
Lettuce	$107	79.5%
Other fresh vegetables	$73	88.5%
Leguminous vegetables	$59	75.9%
Eggplant	$53	82.9%
Mixtures of vegetables	$41	56.7%
Sweet corn	$36	96.3%

Source: NAFTA Trade Office with Data from U.S. Department of Commerce

Additionally and to the benefit of our region's competitiveness, on September 27, 2011 the federal agencies with jurisdiction over consumer products in the United States, Canada, and Mexico issued a joint statement promoting greater cooperation and engagement in ensuring the safety of products made and sold across North America. The three countries agreed to explore further opportunities for collaboration, which will result in quality and safety improvements of all goods produced in the region—especially produce—while at the same time boosting confidence from consumers across the world in these products.

U.S.-Mexico Border Management: Building World Class Infrastructure for Competitiveness

The U.S. and Mexico will be successful at enhancing a prosperous bilateral relationship to the extent that both federal governments and stakeholders are capable of coordinating the development of their border management and infrastructure.

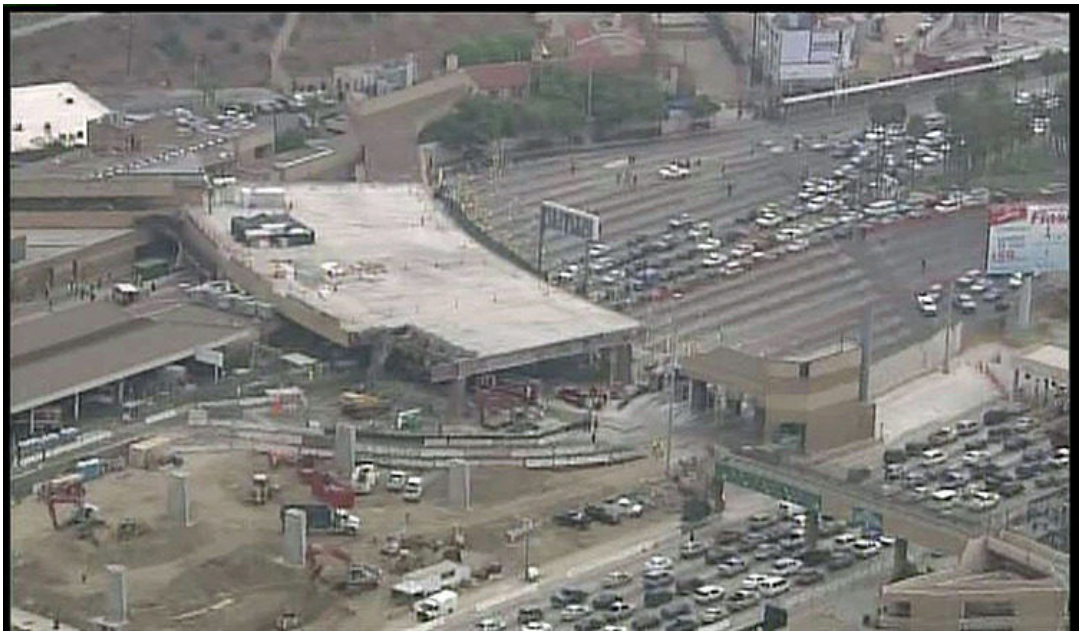
The massive and highly complex U.S. and Mexican economies interact and even create value at our shared border. According to a study conducted by Accenture for the U.S. Department of Commerce, today's level of demand exceeds the physical infrastructure and operating capacity of our ports of entry. Wait times are projected to increase across the five busiest U.S.-Mexico border crossings if volumes continue to grow as expected and if infrastructure and operations remain the same. By 2017, it is estimated that the average wait time will be nearly 100 minutes —an increase of 60%.

"A key component of our global competitiveness is creating a border for the 21st Century…We must develop it and manage it in a holistic fashion and in ways that facilitate the secure, efficient and rapid flow of goods and people and reduce the costs of doing business between our two countries."

—Joint Statement from President Barack Obama and President Felipe Calderón, May 2010

Sharing a 2,000-mile long border needs to be recognized as both a challenge and an opportunity. While land ports of entry between the two nations were first envisioned to process the legitimate crossing of people, goods and services across the border, security has taking a dominant role in recent years, hampering the ability of federal agencies to efficiently manage border traffic. Advances in border infrastructure simply did not happen during the last decade, which is astounding given the greatly expanded post-NAFTA binational commercial relationship. Our border's infrastructure and capacity today reflects the needs of a bygone era. This became evident as never before when on September 14, 2011, the San Ysidro, California port of entry —the busiest land port of entry in the world—had to shut down its 24 north-bound lanes due to the collapse of part of its roof, injuring several people and damaging vehicles trying to cross into the U.S. from Tijuana, Mexico.

Figure 10: Collapse of San Ysidro Port of Entry Roof



Source: San Diego Fox News

According to a report by the San Diego Association of Governments, inadequate infrastructure capacity just at the border crossings between San Diego County and the state of Baja California creates traffic congestion and delays that cost both the U.S. and Mexican economies on average an estimated $7.2 billion in forgone gross output and more than 62,000 jobs on an annual basis. These border delays could cause $86 billion in output losses over the next ten years.

Figure 11: Vehicles Waiting to Cross into San Diego from Tijuana, Mexico



Source: SANDAG

"The border has been a filter to what shouldn't get in, when it can be a facilitator to what should get in."
—Rachel Poynter, U.S. State Department

These delays are significant for a number of reasons, not the least of which is that American firms are constantly attempting to reduce their inventory costs in an attempt to remain competitive. While importing from China to the U.S. may require a company to hold more than 100 days of inventory, if efficiently managed, our proximity to Mexico can provide American firms with a constant and predictable flow of goods that may reduce inventory costs and provide firms the ability to respond rapidly and effectively to sudden market changes. With this fundamental fact in mind, in May of 2010 the U.S. and Mexico signed the 21st Century Border Management Joint Declaration. Recognizing the importance of fostering the commercial relationship, both countries have agreed to coordinate efforts to enhance the economic competitiveness by expediting lawful trade. The idea is that development of modern and secure

border infrastructure will give an added boost to our region's competitiveness in the world and at the same time increase our access to a wider, more affordable and ever improving quality set of goods.

Today more than 75,000 trucks (carrying close to 80 % of our two-way trade) cross our border on a daily basis. That this much traffic is able to cross our congested borders is due in part to important advances in border infrastructure in the last couple of years as new ports of entry have been opened. One important policy development is master planning processes for regional border infrastructure, which have been initiated in conjunction with local border communities and state governments. It is hoped that these regional processes will eventually make the overall binational infrastructure-building process more transparent, more robust and ultimately a better fit for two such powerful economies and next door neighbors.

Much Opportunity, but the Real Work Has Only Just Begun

Total trade between the United States and Mexico has expanded by more than 600% since 1990. Yet we need further commitment and investment in the infrastructure needed to sustain such growth, which is critical for both economies. The question now is whether our current border management system will be able to sustain that growth, and if so, for how much longer. A strong trade/joint production relationship with Mexico can help create high-quality jobs within our borders.

For reasons of geography and history, Mexico's fate is intertwined with that of the United States. And despite the current global economic environment, and transnational organized crime affecting Mexico and the United States, the two countries need to implement a 21st Century border that not only re-invigorates crossborder trade and economic integration but which will also lead to increased safety and quality of life for the residents of both countries.

Both countries need to remain committed to promoting the global competitiveness of our region and to ensuring that the benefits of expanding trade flows keep reaching businesses, workers and consumers on both sides of our shared border. We will be able to accomplish this if leaders can explain the critical nature of our commercial relationships in ways that are more concrete and easier for citizens to understand. It is past time for our shared border to begin to meet tomorrow's demands, acting as a facilitator and conductor of the lawful flows of goods, services and people between our nations, so that we may capitalize on the full potential of our partnership. If a billion dollars' worth of trade crosses the U.S.-Mexico border on a daily basis and sustains six million jobs in the U.S., imagine what could be accomplished with a truly 21st century border.

North American Center for Transborder Studies

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Empirical Evidence Regarding 9/11 Impacts on the Borderplex Economy

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Acknowledgements: Funding support for this research was provided by National Science Foundation Grant SES-0332001, Southwest Center for Environmental Research and Policy Grant W-04-03, El Paso Electric Company, and Wells Fargo Bank of El Paso. Helpful suggestions and comments were provided by Keith Ord, Peg Young, Roberto Tinajero, Brian Kelley, Martha Patricia Barraza, and Cesar Olivas. Econometric research assistance was provided by Marycruz De Leon.

Empirical Evidence Regarding 9/11 Impacts on the Borderplex Economy

Introduction

Because of geographic proximity and close business ties to Mexico, the El Paso metropolitan economy faced a variety of downside risks in the aftermath of the terrorist attacks on 11 September 2001. The primary source behind those risks is increased border crossing times for northbound traffic coming into the United States over the various bridges that link El Paso, Texas and Ciudad Juárez, Chihuahua. Border transit delays potentially affect several segments of the borderplex regional economy principally comprised by these two cities.

A recent survey conducted among of households in Ciudad Juárez indicates that the top reason for residents to embark on shopping trips to El Paso is lower prices. Ranking far below pricing are product quality and variety as the second and third most important reasons for shopping on the north side of the Rio Grande River (Flores, 2005). Longer transit times at the international bridges obviously increase the opportunity cost of shopping in El Paso. They also increase the effective delivery prices of any merchandise purchased due to lower gas mileages and higher travel costs (Di Pasquale and Wheaton, 1996; Janssen, Karamychev, and van Reeven, 2005). Although not examined in this paper, such a scenario would also permit retailers in Ciudad Juárez to increase margins via higher prices that would result from reduced customer flows to El Paso.

Under these circumstances, increases in border transit times may lead to reduced customer traffic from Mexico. Retail sales volumes would possibly decline in response. Transportation activity may also be affected as might in-bond assembly operations in Ciudad Juárez. To investigate these possibilities, elementary statistical analyses are carried out using the borderplex econometric modeling system (Fullerton, 2001). Subsequent sections include a brief review of the literature, data and methodology, empirical results, and conclusions.

Related Studies

Cross-border retail sales represent an important component of commercial sector activity in El Paso. Comprehensive data do not exist for sales in El Paso to residents of Mexico. In part, that is because they potentially fluctuate by very large percentages in response to business cycles, currency market conditions, and bridge delays. However, a range of estimates indicate that these sales may annually exceed $600 million and potentially even approach $1.7 billion (Fullerton, Torres, Barraza, and Amastae, 2003; Flores, 2005; Phillips and Coronado, 2005).

Many of the earlier studies focus on exchange rate impacts on retail sales due to purchasing power losses faced by Mexican consumers (Sprinkle, 1983; Patrick and Renforth, 1996; González Gómez, Deantes del Ángel, and Pérez Sánchez, 1997; Hadjimarcou and Barnes, 1998). Because there have been 9 large-scale devaluations of the peso during the past eighty years (1925, 1934, 1940, 1948, 1954, 1976, 1982, 1986, 1994), this approach has obvious relevance to studies of border economic performance. It was widely assumed in many border settings, in fact, that macroeconomic recessions in Mexico are exclusively triggered by currency market disequilibria.

The emergence of the maquiladora industry following the termination of the bracero program in 1965 naturally led border economic research to examine other issues, as well. One recurring category involves cross-border labor market interactions (Gruben, 1990; Coronado, Fullerton, and Clark, 2004). Another related area involves industrial development and intra-industry trade (Hanson, 1996, 1998, 2001; Fullerton and Tinajero, 2002; Cañas, Pallares, and Torres Ruiz, 2005). These, and a variety of other, studies empirically document increasing levels of economic linkages across the international boundary that separates Mexico and the United States.

Those linkages were disrupted, at least temporarily, by two developments in 2001. The first was the emergence of a business cycle downturn in Mexico that was not accompanied by a maxi-devaluation of the peso (Gilmer, 2002). The second was the temporary closure of the border following the terrorist attacks on 11 September 2001. The initial closures were followed by notably longer transit times from Mexico into Texas at nearly every port of entry. Limited econometric evidence of these disruptions on subsequent air and bridge travel volumes has been documented for El Paso (Fullerton, 2004).

Data and Methodology

Due in part to proximity to an international boundary, several border economy sectors that are likely to have observed statistically significant consequences associated with the aftermath of 9/11. Included among those are retail trade, air transportation, and surface transportation. While the entire border from Brownsville to San Diego has probably observed these changes, material below focuses on the El Paso and Ciudad Juárez portions of the borderplex regional economy. Data employed in the study can be accessed via the Border Region Modeling Project information housed on the University of Texas at El Paso web site (www.utep.edu).

When examining the possible natures of various types of changes on any regional economy, there are a number of methodologies that can yield helpful insights (Sen and Smith, 1995). Ideally, sufficient sample observations will be available to permit estimating the kinds of models that have been employed in analyses of other border economic phenomena such as the North American Free Trade Agreement or real exchange rate fluctuations (Gould, 1998; Gruben, 2001; Campbell and Lapham, 2004). At present, that is not the case for the borderplex economy.

Because degree of freedom constraints limit the types of analyses that can be undertaken for El Paso and Ciudad Juárez, a fairly elementary approach is utilized below. The technique employed involves dummy variables that allow for the possibility of both level effects and slope effects to occur (Pindyck and Rubinfeld, 1998). Assume the following economic relationship exists prior to an event such as 9/11:

(1) $Y_t = b_0 + b_1 * X_t + u_t$, where

Y is a variable whose behavior is functionally dependent on X,
X is a regressor that may or may not be continuous,
u is a random disturbance term, and

t is a discrete time index.

Subsequent to the shock to the system, the relationship shown in Equation (1) may or may not continue to hold. One possibility is that the level of activity drops as a consequence of the shock, but the link between the independent variable and the left-hand-side variable remains in tact. Another possibility is that the relationship between the explanatory variable and the dependent variable changes while the intercept remains the same.

It is also possible that both parameters in Equation (1) will change after the event. Equation (2) presents one specification that allows for both regression coefficients after system structure is altered:

(2) $Y_t = b_0 + b_1*X_t + a_0*DV_t + a_1*DV_t*X_t + v_t$, where

Y is a variable whose behavior is functionally dependent on X,
X is a regressor that may or may not be continuous,
v is a random disturbance term,
DV = 0 prior to the shock,
= 1 after the shock, and
t is a discrete time index.

Versions of the borderplex econometric equations for retail, air transportation, international bridge traffic, and maquiladora equations are estimated using the basic specifications shown in Equations (1) and (2).

The 9/11 terrorist attacks resulted in longer transit times at the international bridges and disrupted air travel patterns as a consequence of new screening and inspection procedures, as well as other changes. To examine what equations exhibit statistically discernible impacts from those outcomes, a combination of t-tests and F-tests are used. The former allow for individual coefficient heterogeneity and the latter allow for simultaneous changes to both constant terms and slope parameters. Those results are summarized in the next section.

Empirical Results

As shown in table 1, none of the intercept or slope coefficient statistics for retail sales in El Paso satisfy the 5-percent t-test significance criterion. In one case, general merchandise, department store, dry goods store sales, the 1-percent F-test significance criterion is satisfied. Slightly more evidence in favor of post-9/11 structural change is reported for northbound international bridge traffic into El Paso.

Taken together, those two sets of results have a potentially interesting interpretation for what has occurred in the borderplex following the terrorist attacks in 2001. Tighter border controls have affected some categories of bridge traffic, especially in terms of reduced passenger vehicle volumes. The absence of strong retail sales effects implies that fewer shopping trips to El Paso are being offset by greater sales volumes once the consumers do arrive.

Limited evidence of lasting post-9/11 impacts on various categories of air traffic through El Paso International Airport is also reported in Table 1. Surprisingly, none of the computed statistics for either of the international air passenger series are significant. For the maquiladora variables, a significant F-statistic is reported for payroll employment, but not for the number of factories in use.

The absence of stronger empirical evidence may be because no borderplex infrastructure was destroyed, only regulatory procedures in how that infrastructure is used were changed. Once businesses and households became accustomed to the new policies, they likely adjusted their respective management practices to take them into account. Recent empirical analysis utilizing borderplex menu prices indicates that business managers in El Paso and Ciudad Juárez respond more quickly to currency market fluctuations that do their counterparts in non-border regions of the world (Blanco-González and Fullerton, 2006). Adjustments to new bridge and air regulations are not hard to envision for such an international setting. For terrorist attacks to have more noticeable effects, however, probably requires more severe disruptions than those observed in El Paso and Ciudad Juárez (Richardson, Gordon, and Moore, 2006).

Conclusion

Because it is traversed by an international boundary, the borderplex regional economy faced several important disruptions subsequent to the terrorist attacks on 11 September 2001. In particular, new regulatory procedures affected usage patterns at the international airport and the international bridges. The ultimate effects of those changes have not previously been examined.

Empirical analysis is carried out using a series of t-tests and F-tests applied to data and equations sued in the borderplex econometric forecasting model. A total of 26 separate variables are employed. Data included in the tests are from the retail, international bridge traffic, airport, and maquiladora sectors of the modeling system.

A fair amount of evidence points to lasting impacts on several bridge and air traffic categories. Relatively little evidence of ongoing disruptions is uncovered for retail sales in El Paso and the in-bond manufacturing sector in Ciudad Juárez. Taken together, these outcomes potentially reflect changes in household inventory management and business sector practices that take into account the new regulatory environment affecting borderplex infrastructure. Whether this is the case for other cities along the border, is an empirical question that remains unanswered at this juncture.

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Table 1
Level and Slope Effect Tests

Dependent Variable	b_0 t-statistic	b_i t-statistic	Joint F-stat.
Hardware Stores	0.036	-1.310	2.041
General Merchandise	1.839	-1.343	10.389**
Food Stores	-0.564	0.557	0.456
Automobiles and Fuel	0.513	-0.463	0.473
Apparel and Accessories	0.445	-1.095	4.811
Furniture and Appliances	0.947	-0.989	2.952
Dining Establishments	-0.218	0.204	0.914
Pharmacies and Other	-0.178	0.194	0.188
Americas Bridge Cars	2.088*	-2.679*	13.636**
Americas Bridge Trucks	0.556	-0.581	0.217
Americas Bridge Pedestrians	1.034	-0.864	2.944
Santa Fe Bridge Cars	0.972	-1.718	1.530
Santa Fe Bridge Pedestrians	-0.315	0.437	1.194
Ysleta Bridge Cars	1.420	-1.605	6.871**
Ysleta Bridge Trucks	-0.238	0.783	1.846
Ysleta Bridge Pedestrians	4.550*	-2.715*	12.182**
In-Bound Air Freight	2.032*	-2.041*	5.216
Out-Bound Air Freight	-0.435	0.279	6.068**
In-Bound Air Mail	-0.602	0.423	6.803**
Out-Bound Air Mail	-0.765	0.511	16.901**
In-Bound Domestic Passengers	-2.106*	2.061*	2.484
In-Bound International Passengers	0.350	0.441	2.835
Out-Bound Domestic Passengers	-0.477	0.596	1.358
Out-Bound International Passengers	-0.596	-0.781	2.870
Maquiladora Employment	-0.582	0.391	24.873**
Maquiladora Plants in Operation	0.259	-0.197	0.180

Notes:
Sample estimation period is 1969-2004, although for some series the first observation is in 1980.
* denotes 5-percent statistical significance.
** denotes 1-percent statistical significance.

The Impact of 9/11 and the U.S. VISIT Program on U.S. Border Retailing

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International Council of Shopping Centers

January 13, 2006
San Antonio, Texas

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Questions

1. Is retailing important to U.S. border communities?
2. Are cross-border shoppers an important part of U.S. border retailing?
3. What impact has 9/11 and the U.S. VISIT program had on U.S. border retailing?
4. What can we expect in the future?

The Impact of 9/11 and the U.S. VISIT Program on U.S. Border Retailing

Methodology

Review and analysis of available data and recent studies.

Q/A

Q. Is retailing important to U.S. border communities?

A. Yes. In U.S. border communities, retailing accounts for the lion's share of total sales, a significant portion of employment, and is an important contributor to local government revenue (via retail sales tax rebates).

Table 1

Texas Border MSA's
Total Sales & Wholesale/Retail Sales
2004 (Billions)

	Brownsville MSA	McAllen MSA	Laredo MSA	El Paso MSA	Border MSA's	Texas
Total Sales	5.9	10.6	4.5	18.6	39.6	1,154.3
W/R Sales	4.3	7.7	3.6	11.7	27.3	636.3
W/R Sales (Pct. of Total)	72.9	72.6	80.0	62.9	68.9	55.1

Source: Texas Comptroller of Public Accounts

Table 2

Texas Border MSA's
Total Employment & Wholesale/Retail Employment
2004 (Thousands)

	Brownsville MSA	McAllen MSA	Laredo MSA	El Paso MSA	Border MSA's	Texas
Total Employment	116.4	184.5	77.6	256.8	635.3	9,478.3
W/R Employment	18.6	33.3	13.5	43.4	108.8	1,546.4
W/R Employment (Pct. of Total)	16.0	18.0	17.4	17.0	17.1	16.3

Source: Texas Workforce Commission

Table 3

Texas Border MSA's Retail Sales Tax Rebates 2004 (Millions)

	Brownsville MSA	McAllen MSA	Laredo MSA	El Paso MSA	Border MSA's
Retail Sales Tax Rebates	25.5	46.1	24.6	51.5	147.7

Source: Texas Comptroller of Public Accounts

Q/A

Q. Are cross-border shoppers an important part of U.S. border retailing?

A. Yes. Cross-border shoppers account for roughly 20 percent of total retail sales in U.S. border communities, ranging from 4.3 percent in El Paso to 41.2 percent in Laredo. Local bridge fees paid by cross-border shoppers constitute an important source of revenue for local government.

Table 4

Texas Border MSA's
Sales to Cross-Border Shoppers
2001 (Percentage)

	Brownsville MSA	McAllen MSA	Laredo MSA	El Paso MSA	Border MSA's
Sales to Cross-Border Shoppers (Percent)	16.0	29.3	41.2	4.3	20.1

Source: Keith Phillips and Roberto Coronado, Dallas Federal Reserve, April 2005

Table 5

Texas Border MSA's
Local Bridge Revenues
2004 (Millions)

	Brownsville MSA	McAllen MSA	Laredo MSA	El Paso MSA	Border MSA's
Local Bridge Revenues	14.2	10.2	33.2	13.4	71.0

Source: Texas Comptroller of Public Accounts

Q/A

Q. What impact has 9/11 and the U.S. VISIT program had on U.S. border retailing?

A. 9/11 had a short lived negative impact on U.S. border retail sales. Border retail sales grew 3.7 percent in 2001. Although northbound pedestrian and vehicle border crossings were down 17.9 percent and 24.4 percent, respectively, between September and November of 2001, they staged a recovery in December of 2001.

Overall, in 2001, northbound pedestrian flows were up 2.4 percent and retail sales in U.S. border communities rose 3.7 percent. Northbound vehicle traffic, however, was down 5.0 percent in 2001, continuing a trend began in 2000.

Table 6

Texas Border MSA's
September 11, 2001 - Border Crossings, Retail Sales
2000 – 2002

Border Crossings (Northbound/Millions)	2000	2001	2002	Percent Change	
				00-01	01-02
Pedestrians	16.5	16.9	17.8	2.4	5.3
Vehicles	30.0	28.5	28.4	(5.0)	(0.4)
Retail Sales (Billions)	16.4	17.0	17.9	3.7	5.3

Source: Texas Center for Border Economic and Enterprise Development, Texas A&M International University; Texas Comptroller of Public Accounts

Q/A

Q. What impact has 9/11 and the U.S. VISIT program had on U.S. border retailing?

U.S. VISIT Program –

1. “Enhance security, facilitate legitimate travel and trade.”

2. The entry phase of U.S. VISIT program has been fully implemented at U.S. airports, seaports, and land ports since December 31, 2005.

3. The exit phase of U.S. VISIT program is still in the design and testing stage. Schedule for full implementation uncertain.

4. U.S. VISIT procedures apply only to those visitors going beyond 25 mile “border zone” that require a I-94 visa.

5. DHS estimates that only 1 in 7 visitors (15 percent) entering the U.S. at a southern border port-of-entry will travel beyond the 25 mile “border zone” and therefore will be subject to U.S. VISIT procedures.

Q/A

Border Community Opposition –

The U.S. VISIT program will have a devastating impact on the border economy , the State of Texas and the U.S. The program “will kill NAFTA” and offers no assurances that it will stop the entry of terrorists.

Q/A

U.S. VISIT Program Impact on Border Retailing –

(Note: How the U.S. VISIT program is implemented, and how cross-border shoppers respond to it, will determine the program's impact on border retailing.)

Impact Studies (ex ante)

1. Perryman Group Study
2. TAMIU Study (1st)
3. TAMIU Study (2nd)

Table 7

Perryman Group Study

Impact of Increase in Delay Time Crossing the Border

(Percent Decline)

	Delay: Increase 1-2 Hour(s)		Delay: Increase 3 or More Hours	
	Output	Employment	Output	Employment
U.S.	-0.3	-0.2	-1.1	-0.9
Texas	-0.2	-0.2	-.06	-0.8
Border	-3.7	-3.1	-14.1	-11.6

Source: "Stalling the Engine of Growth in a Global Economy: The Impact of Implementation of the U.S.-VISIT Program at U.S.-Mexico Border Crossings on Business Activity in U.S., Texas, and Border Region", The Perryman Group, July 2004

Table 8

TAMIU Study

Impact of a Permanent Decline in Border Crossings of 1%, 5%, and 10%*

	Laredo				Border		
Decline in Border Crossings (percent)	1%	5%	10%		1%	5%	10%
Decrease By							
Sales (millions $)	19 (0.5)	95 (2.3)	190 (4.6)		76 (0.2)	380 (1.1)	759 (2.2)
Increase By							
Unemployed	398 (1.5)	1990 (9.6)	3980 (19.2)		1549 (1.5)	7745 (7.6)	15490 (13.9)
Decrease By							
Sales Tax Rebates (thousands $)	133 (05)	665 (2.6)	1330 (5.2)		76 (0.2)	380 (1.1)	759 (2.2)
Decrease By							
Bridge Revenues (thousands $)	324 (1.0)	1622 (5.0)	3240 (10.0)		726 (1.0)	3630 (5.0)	7260 (10.0)

*2002

(percent of total)

Source: **"U.S. VISIT: A Preliminary Impact Assessment on the Border and Texas Economies", Texas Center for Border Economic and Enterprise Development, Texas A&M International University, October 2003**

Q/A

TAMIU Study (2nd) –

40 percent of 800 self-selecting cross-border shoppers in Laredo surveyed in April 2004 and December 2004 said if wait time at the bridge exceeded more than 1 hour, they would reduce their visits to Laredo and expenditures by 30 percent.

Q/A

Impact of U.S. VISIT Program (Entry Phase) on Border Wait Times –

According to Gene Garza, DHS Port Director, Port-of-Laredo, implementation of the U.S. VISIT program has gone smoothly. He cites reduced (not increased) wait times at Laredo's bridges, and reduced time in processing I-94 visas.

Table 9

Wait Time to Cross Bridge
Laredo, Texas – Vehicles Northbound
December 17 – January 10 (2003-04 & 2004-05)

(Minutes)		
	Average	Maximum
2003-2004	24 min	95 min
2004-2005	17 min	50 min
Percent Change	down 29.2%	down 47.4%

Source: Port Director, Laredo Port of Entry, March 2005

Table 10

Wait Time to Process I-94 Visas, Laredo, Texas
December 17 – January 10 (2003-04 & 2004-05)

	Number of Permits	Average Wait Time
2003-2004	66,867	11-12 minutes
2004-2005	68,873	3-4 minutes
Percent Change	+3.0%	67% reduction

Source: Port Director, Laredo Port of Entry, March 2005

Q/A

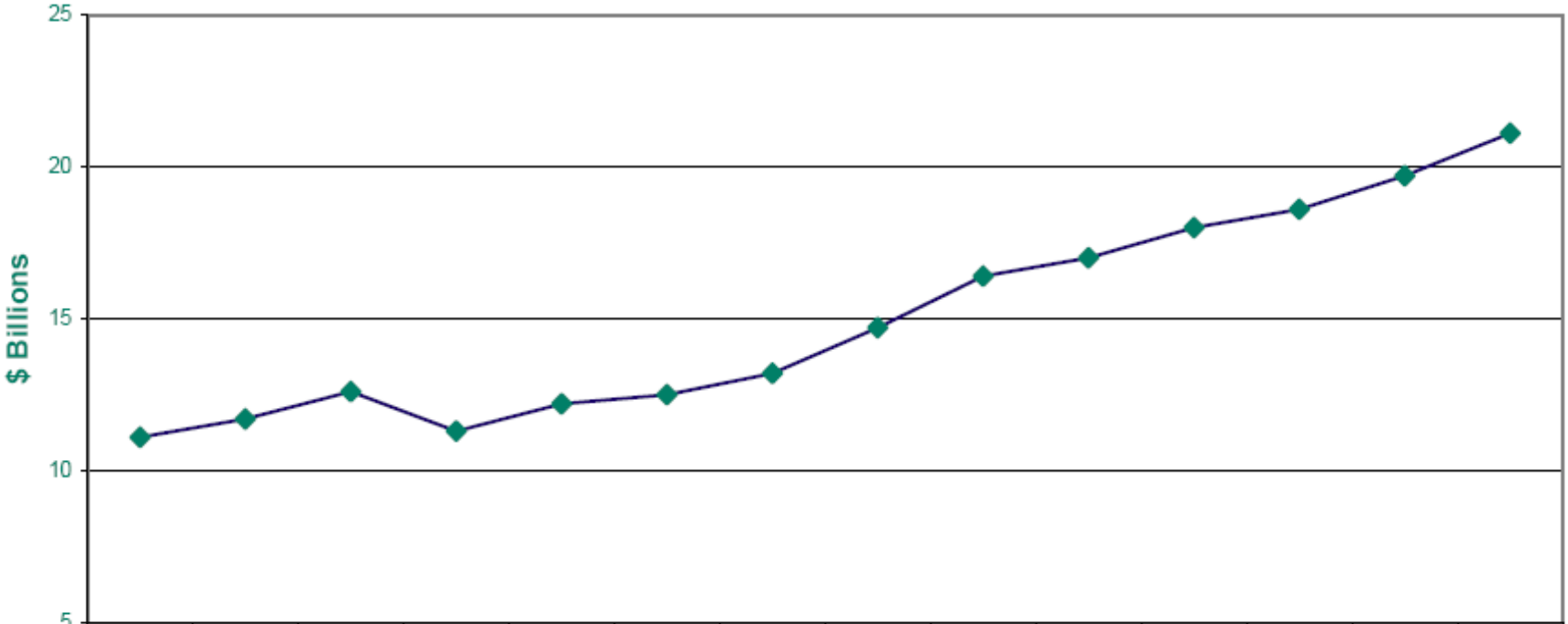
Impact of 9/11 and the U.S. VISIT program on border retailing, tentative conclusion –

Probably have had little impact. Border retail sales continue to grow. Northbound pedestrian and vehicle crossings, however, remain below their previous highs.

Northbound vehicle crossings continue on their gradual decline since reaching a high in 2000. Northbound pedestrian crossings, while dipping in 2002 and 2003, bounced back in 2005.

Chart 1

Texas Border MSA's* - Retail Sales, 1992-2005



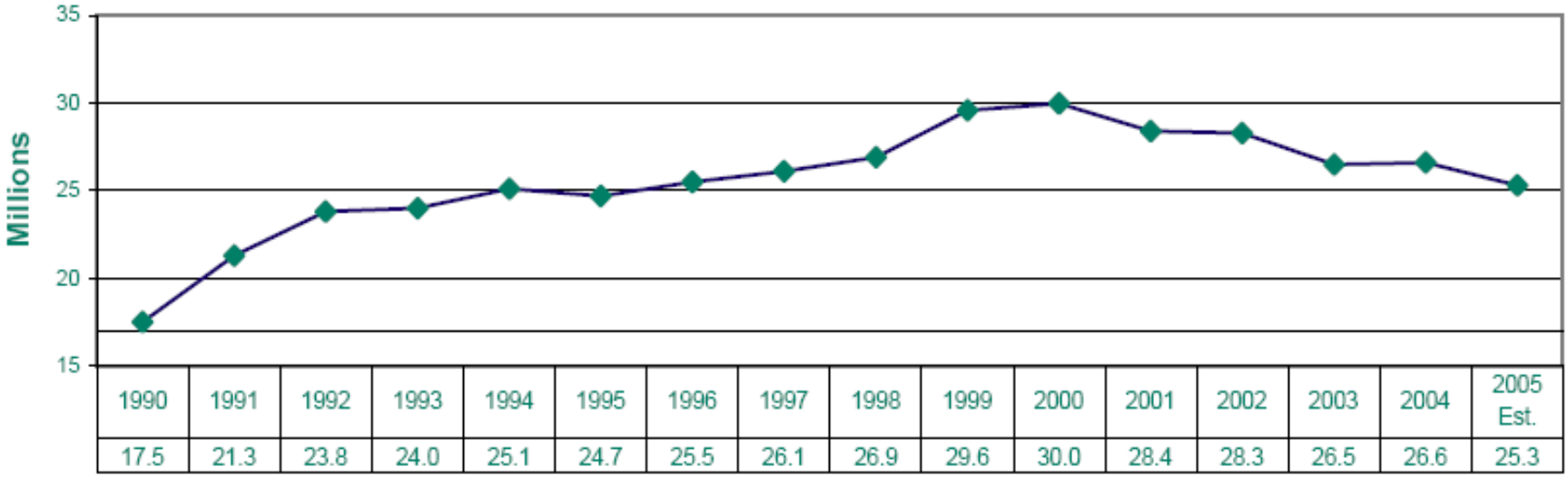
1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 Est.
11.1	11.7	12.6	11.3	12.2	12.5	13.2	14.7	16.4	17.0	18.0	18.6	19.7	21.1

* Brownsville, McAllen, Laredo, El Paso

Source: Texas Comptroller of Public Accounts

Chart 2

Texas Border MSA's* - Vehicle Crossings North, 1990-2005



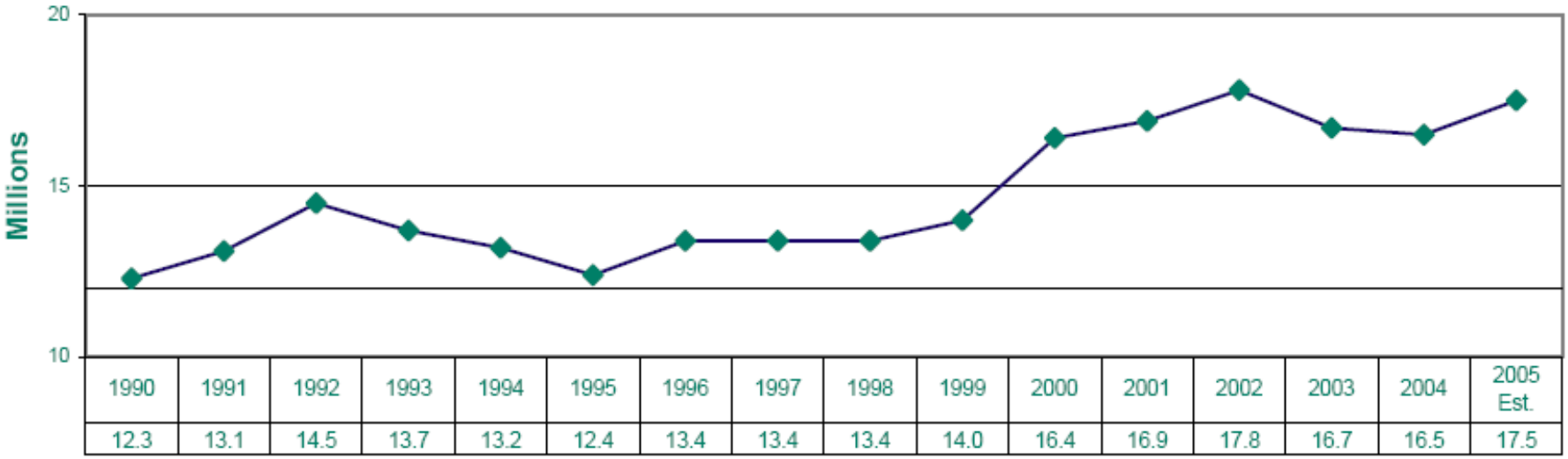
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 Est.
17.5	21.3	23.8	24.0	25.1	24.7	25.5	26.1	26.9	29.6	30.0	28.4	28.3	26.5	26.6	25.3

* Brownsville, McAllen, Laredo, El Paso

Source: Mexico's Oficina de Caminos y Puentes data compiled by the Texas Center at Texas A&M International University

Chart 3

Texas Border MSA's* - Pedestrian Crossings North, 1990-2005



1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 Est.
12.3	13.1	14.5	13.7	13.2	12.4	13.4	13.4	13.4	14.0	16.4	16.9	17.8	16.7	16.5	17.5

* Brownsville, McAllen, Laredo, El Paso

Source: Laredo Bridge System and Mexico's Oficina de Caminos y Puentes data compiled by the Texas Center at Texas A&M International University

Q/A

Q. What can we expect in the future?

A. Retailing in U.S. border communities will continue to grow in the future, driven by strong population growth in the region and continued cross-border shopping.

The implementation of the exit phase of the U.S. VISIT program however, if not handled efficiently like the entry phase, could make crossing the border more time consuming and burdensome, having a negative impact on cross-border shoppers and U.S. border retailing.

Comments?
Questions?

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The Cross-Border Mexican Shopper: A Profile

Suad Ghaddar and Cynthia Brown***

The border area between the U.S. and Mexico is one that has constantly received a tremendous amount of negative publicity due to a plethora of contentious issues, including illegal immigration, drug trafficking and border security concerns, among others. What is neglected in the mayhem, though, is that the border region also offers a positive picture of an economic and social reality that is founded on legal interaction and economic dependence. One aspect of this reality is the cross-border trade at the individual level: Mexican citizens cross to purchase a multitude of products ranging from groceries to furniture, while American citizens mainly target pharmacies, dentists and craft shops. In an attempt to profile Mexican shoppers and to measure the magnitude of their expenditures in the U.S., this review focuses on cross-border Mexican shoppers who comprise a major economic force in the sustenance of communities along the U.S.-Mexico border. While a comprehensive study of this group is needed, analysis of existing regional studies sheds considerable light on the size and impact of these shoppers on the economies of the bordering U.S. states.

To profile cross-border Mexican shoppers, several studies in the border states of Arizona, California and Texas were consulted and analyzed. The first study examined the economic impact of Mexican visitors to the state of Arizona[1]. Three studies were evaluated for information on Mexican shoppers in California[2, 3, 4], and along the Texas border, two reports that looked at Mexican visitors to the Lower Rio Grande Valley[5, 6] were examined.

THE U.S.-MEXICO BORDER

The U.S.-Mexico border region is home to more than 12 million people. Of those, around half are located on the U.S. side in cities that extend from San Diego, California, on the Pacific to Brownsville, Texas on the Gulf of Mexico (Table 11-1 and Figure 11-1). The border region has in recent years experienced population growth rates that exceeded their national averages.

This trend is expected to continue with the Mexican side's population growing by 25% to 47% over the 2000-2010 period; the corresponding population increase for Mexico is expected to be around 11% (CONAPO). Similarly, on the U.S. side, border population is forecasted to increase by 15% to 25% compared to a national average of 10% over the same time period (Demographia).

A high level of interaction between the two sides takes place on a daily basis, as evidenced by the large number of crossings that occur. People cross frequently from side to side in cars or buses and/or on foot. In 2003, the number of northbound crossers amounted to almost 250 million people, the majority of whom, around 80%, crossed in personal vehicles. Estimates from border officials consider that around half of this crossing activity is attributed to Mexican nationals who enter the U.S. using a laser visa[7] or some other form of legal documentation (I-94, resident alien card, etc.). U.S. citizens comprise the other half. The Texas border is the busiest in terms of crossings by passengers

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[1] Charney, A. and Pavlakovich-Kochi, V. *The Economic Impacts of Mexican Visitors to Arizona: 2001*. Economic and Business Research Program, College of Business and Public Administration, University of Arizona, 2002.

[2] Sierra López, O. and Serrano Contreras, S. *Patrones y Hábitos de Consumo en Baja California*. Comercio Exterior, Vol. 52 (No. 8), 2002.

[3] *Who Crosses the Border: A View of the San Diego/Tijuana Metropolitan Region.* San Diego Dialogue, 1994.

[4] Kada, N. and Kiy, R. (eds.). *Blurred Borders: Trans-Boundary Impacts and Solutions in the San Diego-Tijuana Border Region*. International Community Foundation, 2004.

[5] Ghaddar, S., Richardson, C. and Brown, C. *The Economic Impact of Mexican Visitors to the Lower Rio Grande Valley 2003.* Center for Border Economic Studies (CBEST), University of Texas-Pan American, 2004.

[6] Vincent, V., Thompson, W. and Williamson, M. Winter Visitor Study 2002-2003. Center for Tourism Research, College of Business Administration, University of Texas-Pan American, 2003.

[7] A laser visa is a type of visa issued to Mexican citizens allowing them to stay in the U.S. for up to 30 days and to travel within 25 miles of the border (75 miles in the case of Arizona).

Figure 11-1

MAP OF THE U.S. - MEXICO BORDER



Table 11-1

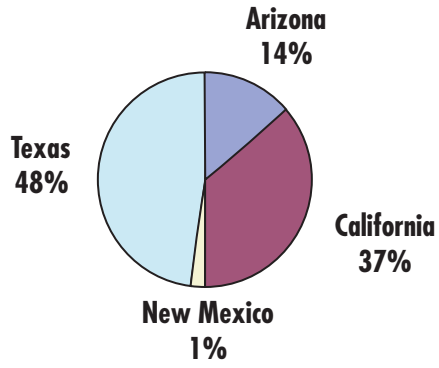
POPULATION OF MAJOR CITIES ALONG THE US-MEXICO BORDER

US City	Population	Mexican Sister City	Population
San Diego, CA	1,223,400	Tijuana, Baja California	1,238,057
Calexico, CA	27,109	Mexicali, Baja California	779,154
Yuma, AZ	77,515	San Luis, Sonora	150,732
Nogales, AZ	20,878	Nogales, Sonora	166,198
El Paso, TX	563,662	Cd. Juarez, Chihuahua	1,255,844
Laredo, TX	176,576	Nuevo Laredo, Tamaulipas	325,494
McAllen, TX	106,414	Reynosa, Tamaulipas	441,567
Brownsville, TX	139,722	Matamoros, Tamaulipas	437,412

Sources: U.S. Census Bureau, Census 2000; Consejo Estatal de Población, 2000.

Figure 11-2

NORTHBOUND CROSSINGS 2003
= 246 MILLION CROSSERS



Source: Bureau of Transportation Statistics

[8]Cross Border Business Associates. Unpublished data.

in private vehicles, buses and on foot. The California border is a close second followed by the Arizona border. Minimal crossing activity takes place along the New Mexico border line. Figure 11-2 depicts the crossings share of each state.

To cater to this activity, malls, shopping plazas and downtown areas in border communities have emerged and, in some cases, remain and thrive mainly thanks to the patronage of Mexican shoppers. Interviews with retailers, hotel owners and business people attest to this fact: border tourist attractions such as South Padre Island in Texas attribute more than half of their activity to Mexican visitors during certain seasons; in South San Diego County, Baja Californians account for 10% to 60% of the sales of area businesses[8]; surveys of Texas border retailers show that sales drop dramatically in response to economic crises in Mexico. Comparison of per capita retail sales and per capita income in select U.S. cities along the border is also evidence to the above; low per capita income levels relative to the national average are accompanied by higher than expected per capita retail sales (Table 11-2). For example, the city of McAllen's per capita income constitutes 70% of the national average while its per capita retail sales are 168% of the national average. Such a high level of retail spending appears to be supported largely by cross-border shoppers. So, who is the typical Mexican visitor crossing to shop in the United States? An understanding of the characteristics of these shoppers is essential for retailers, retail developers and local business leaders, as well as government officials.

A PROFILE OF MEXICAN SHOPPERS

Mexican shoppers display a wide range of characteristics: they stay anywhere from a few hours to several days, they spend little money or considerable sums and their visiting

Table 11-2

PER CAPITA RETAIL SALES AND INCOME OF SELECT BORDER CITIES

	1997 Per Capita Retail Sales Percent of National Average	2000 Per Capita Income Percent of National Average
San Diego, CA	91%	109%
Yuma, AZ	121	78
El Paso, TX	83	67
Del Rio, TX	86	57
Laredo, TX	97	51
McAllen, TX	168	69
Brownsville, TX	75	45

Sources: Geospatial and Statistical Data Center, University of Virginia Library; U.S. Census Bureau Census 2000

frequency can range from once a year up to once a day. One distinguishing feature, though, is the mode of travel. Pedestrians appear to have a distinct profile from those who enter in their private vehicles. Airplane travelers[9] also seem to be different from the above two groups. Location is another feature that might impact crossing and spending characteristics. Thus, in our attempt to profile this group we take into account the mode of travel as well as location.

General Characteristics of Mexican Shoppers

Shopping is the primary reason to cross into the U.S. for more than two-thirds of Mexican citizens. Other reasons are social in nature, like visiting family and friends, or are work-related. Around three-quarters of crossers enter in their private vehicles since a car allows them freedom of movement between different shopping locations in the U.S. as well as enough room to handle the volume of their purchases. Pedestrians constitute 20% to 25% of crossers with the remaining few (about 2%) crossing by bus. Those who cross into California seem to visit more frequently than those who cross into Texas, with around half of California visitors crossing daily or on a weekly basis compared to 16% for Texas visitors[10]. Pedestrians generally cross more frequently than those using other modes of travel. Regarding the length of their stay[11], almost all Mexican shoppers to Arizona enter and leave the U.S. the same day. Though the majority of Texas visitors are day trip visitors as well, a considerable portion (36% to 40%) stay overnight usually for up to seven nights. Pedestrians, along with bus crossers, are predominantly day visitors, while around 43% of those who enter in their personal vehicles tend to stay overnight. One possible reason why visitors to Texas stay longer is that these visitors are more likely to have traveled from farther south. Visitors to Arizona border towns are primarily from sister cities right across the border. About a third of visitors to Texas, on the other hand, come from cities farther from the border, such as Monterrey[12]. Another variable increasing the likelihood of longer trips in Texas is the proximity of vacation destinations such as South Padre Island to the border.

Expenditures of Mexican Shoppers

Mexican shoppers spend their money on a variety of items. Given that shopping is the primary reason for crossing into the U.S., it comes as no surprise that clothing items constitute more than 40% of total expenditures. Groceries are another important category along with food-related expenses such as dining at area restaurants (20% to 35%). Texas visitors also spend a considerable portion on lodging (around 8%) given their proclivity to stay over night. Figure 11-3, 11-4, and 11-5 provide a breakdown of Mexican shoppers' expenditures in Arizona, California and Texas, respectively.

Expenditures per trip vary mainly by mode of travel and range from around $30 for pedestrians to over $1,000 for air travelers[13], with car travelers spending an average $100-

[9] Airplane travelers are those who either enter the U.S. through the airport of an American border city, or those who travel by air from the interior of Mexico to a Mexican border city and then enter the U.S. through a land port. These shoppers constituted a small fraction of collected surveys (10.6% of the Arizona study and 1.4% of CBEST's study).

[10] No data are available to evaluate Arizona visitors' frequency of crossing.

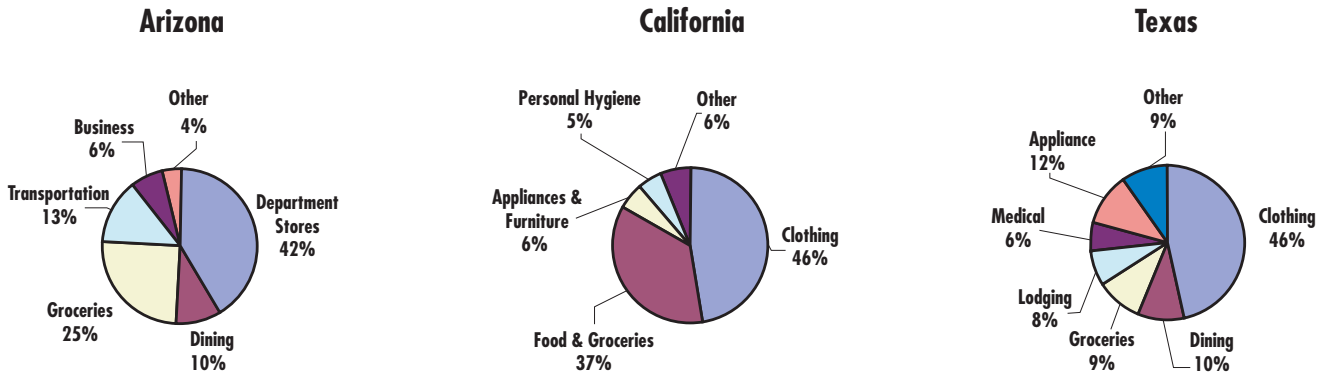
[11] No data are available to evaluate California visitors' length of stay. However, given the higher crossing frequency of this group, it might be concluded that California visitors tend to stay for shorter periods of time relative to Texas visitors.

[12] Monterrey is the industrial capital of northern Mexico with a population exceeding 1.5 million. It is less than 150 miles from the cities of McAllen and Laredo on the Texas border.

[13] According to the 2003 Shopping and Tourism Report produced by the U.S. Department of Commerce's Office of Travel and Tourism Industries (OTTI) and Taubman Centers Inc., Mexican shoppers who enter the United States by air, spent $134 per person per day for an average expenditure of $1,144 per visitor per trip.

Figure 11-3

EXPENDITURES BY CATEGORY



Source: CBEST's analysis of Mexican visitors' studies.

Table 11-3

ESTIMATED EXPENDITURES OF MEXICAN SHOPPERS

	Average Expenditures per Party per Trip	Estimated Regional Expenditures*
Arizona	$92	$950 million
Pedestrians	*$39*	
Car	*$99*	
Airplane	*$1,317*	
San Diego, California	NA	$1.6 - 3 billion
Texas	$152	$3 - 3.5 billion
Pedestrians	*$20*	
Car	*$182*	
Bus	*$80*	
Airplane	*$2,038*	

*Estimated regional expenditures are for the years 2001 for Arizona, 2001-2002 for California, and 2003 for Texas.
Source: CBEST's analysis of Mexican visitors' studies.

Table 11-4

MEXICAN SHOPPERS' SPENDING AS A PERCENT OF TAXABLE SALES

	Estimates
Arizona	
Cochise County	5.9%
Pima County	3.8%
Santa Cruz County	47.3%
Yuma County	12.4%
San Diego, California	7.0%
Texas	
Cameron County	16.6%
El Paso County	12.7%
Hidalgo County	10.1%
Webb County	19.4%

Source: CBEST's analysis of Mexican visitors' studies.

$200 per trip and bus travelers spending around $80 per visit. To arrive at annual expenditures of Mexican shoppers, survey estimates of per-visit expenditures are projected on crossing statistics. These projections are then synthesized with findings from other studies along with the educated guesses of economists and local business leaders. For Arizona, it is estimated that Mexican shoppers spend around $1 billion a year. In California, these expenditures range from $1.6 to $3 billion and they exceed $3 annually billion in Texas (Table 11-3). These amounts make an important contribution to local economies. This contribution varies considerably depending on the county's location and economy size. For example, Mexican visitors' expenditures as a percentage of taxable sales amount to 7% in San Diego, while the same figure jumps to almost 50% in Santa Cruz County in Arizona (Table 11-4).

Shopping Traits of Mexican Shoppers

An assessment of the shopping traits of Mexican visitors to the South Texas border region revealed that they exhibited a very high level of brand loyalty, were very price- and quality-conscious, and had especially favorable views of U.S. products in terms of their technological advancement, price competitiveness, high quality and variety of choices (Vincent et al., 2003). Similar findings were reported for Mexican shoppers from Baja California who pointed to prices, variety and quality as their main reasons for shopping in the U.S. (Sierra López and Serrano Contreras, 2002; San Diego Dialogue, 1994).

HOW TO BETTER CATER TO CROSS-BORDER MEXICAN SHOPPERS?

A better understanding of the characteristics of cross-border Mexican shoppers is the first step in helping retailers and border businesses better capture this market segment. Toward this end, an in-depth comprehensive study should be conducted at main locations along the U.S.-Mexico border. While few studies exist at the regional level, consistent research and data collection methodology are essential to more reliably evaluate the impact of Mexican shoppers on U.S. border communities.

Other efforts should be directed at enhancing the quality of the crossing experience through investment in border infrastructure. This can help facilitate the growth of cross-border trade at both the individual and commercial levels by decreasing long wait times and, consequently, increasing the volume and frequency of crossings[14].

Border initiatives are another issue requiring attention from local communities. Given the highly political nature of border-related issues, the area is bound to be host to a constant influx of border initiatives from the U.S. and Mexican governments. In many instances, such initiatives can be misunderstood at the local level. Given the serious economic ramifications of misconceptions surrounding governmental programs on cross-border trade, it is imperative that the Mexican public in border areas be properly informed on border initiatives. While the federal government may be responsible for education campaigns, local governments, city officials and businesses on the U.S. side should also engage in such campaigns and should coordinate with their counterparts on the Mexican side.

Mexican shoppers are an important element in the retail industry along the U.S.-Mexico border. Such a role is bound to increase in importance given the population growth rates along the border as well as the positive outlook for the Mexican economy over the next five years.

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For more information on CBEST, please visit www.c-best.org

[14]The CBEST study points to an hour as the maximum amount of wait time for more than half of the respondents, with excessive wait times resulting in less frequent visits for around 70% of visitors.

Economic Role of the El Paso Border Crossings

Technical Memorandum

prepared for

Texas Department of Transportation

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February 2011

Table of Contents

Executive Summary **1**

1.0 Introduction **3**

2.0 Regional Economic Profile **4**

3.0 Border Dependent Businesses **11**
3.1 Manufacturing 11
3.2 Retail Services 13
3.3 Transportation and Warehousing 14
3.4 Financial, Real Estate, and Professional Services 16
3.5 Federal Government 17

4.0 Economic Impact of Border Crossings **19**
4.1 Methodology 19
4.2 Results 20

List of Tables

Table ES.1 Summary of Total Economic Impacts of ther Border 2
Table 2.1 Top 10 States Trading with Mexico, All Modes of Transportation *By Value, 2008* 4
Table 2.2 Top Five Ports By Percent Share of U.S.-Mexico Trade by Value *Millions of U.S. Dollars* 5
Table 2.3 Median Earnings For Selected Service Sector Occupations in El Paso MSA *2008* 7
Table 2.4 Average Wage of Selected Sectors *2007* 8
Table 3.1 Location Quotients of El Paso Employment in Selected Sectors 12
Table 3.2 Input Demand and Supply Relationship Between Ciudad Juárez Maquiladora and El Paso Suppliers 13
Table 3.3 Sales Tax in Texas and El Paso 14
Table 4.1 Direct Impact of Border Dependent Sectors 20
Table 4.2 Total Economic Impact of a Reduction in Border Dependent Acitivites 20
Table 4.3 Summary of Total Economic Impact of a Reduction in Border Dependent Business- State of Chihuahua, MX 21
Table 4.4 Summary of Total Economic Impact of a Reduction in Border Dependent Business – El Paso, TX 21
Table 4.5 Summarry of Total Economic Impact of a Reduction in Border Dependent Business- Dona Ana County, NM 22

List of Figures

Figure 2.1 El Paso Regional GDP Distribution *2007* 5
Figure 2.2 2008 Gross Regional Product Ciudad Juárez 6
Figure 2.3 Employment and U.S. IP Index 9
Figure 3.1 Government Jobs as Share of Employment 16
Figure 3.2 Transportation and Warehousing Services Growth Rates 17
Figure 3.3 Growth of Financial, Real Estate, and Professional Services 18

Executive Summary

Understanding the economic importance of the U.S.-Mexico border to the El Paso region is important in honing policy decisions to improve cross-border mobility, promote economic development, and enhance regional quality of life. This report, the first in a series of economic analysis reports conducted as part of the El Paso Port of Entry Operations Plan, documents the economic significance of the region's existing border crossings and analyzes the total economic impact of a reduction in border dependent business activity. Key findings are presented below.

- The region's manufacturing, service, and retail sectors are closely linked and contribute significantly to the economic vitality. Juarez-based maquiladora factories demand distribution facilities, administrative offices and legal, accounting, and financial services. In addition, hotels and restaurants cater to off-site maquiladora management and other visitors. This linkage stimulates a broad range of employment sectors and provides employment for area residents.
- For the 10 largest maquiladora industries in Juárez, almost all of the top twenty suppliers are located in El Paso. Businesses on both sides of the border depend on the crossings to efficiently link these firms.
- Per capita retail sales tax income in El Paso is five times higher than the state average, due in large part to Mexican nationals crossing the border into El Paso to shop.
- Border dependent businesses account for nearly 115,000 direct jobs in El Paso County, 559,000 direct jobs in Chihuahua, and 19,000 direct jobs in Dona Ana County.
- The transportation and warehousing sector in El Paso is resilient, growing even in the midst of national and global economic recessions in the early 2000s and today. Between 2001 and 2008, employment in transportation and warehousing sector averaged nearly 17,000 and total output was estimated to be $6.7 billion, almost all of which is dependent on the region's border crossings.
- Decreases in employment at border dependent business- regardless of the cause- would have devastating effects on the regional economy. A 50 percent decrease in direct employment at border dependent businesses would result in a total loss of nearly 450,000 jobs for the bi-national region. An 80 percent decline in direct employment at border dependent businesses would result in a total loss of nearly 808,000 jobs (see Table E1). This includes direct, indirect and induced jobs.

Table E1: Total Employment Impact of Losing Border Dependent Businesses

	50% Decrease in Border Dependent Business Employment		80% Decrease in Border Dependent Business Employment	
Region	**Direct**	**Total**	**Direct**	**Total**
El Paso	57,331	83,100	91,729	137,955
Dona Ana	9,352	12,135	14,963	20,710
Chihuahua	279,340	392,807	446,943	649,120
Total	356,022	448,042	553,636	807,970

Source: Cambridge Systematics analysis using REMI model

1.0 Introduction

The objective of the El Paso Regional Ports of Entry (POE) Operations Plan (POE Plan) is to review all existing ports of entry within the El Paso region, assess the current efficiency of the ports, and make recommendations to improve cross-border mobility in the region. These recommendations will lead to formal adoption of POE Operations Plan for the border region. The Plan will include prioritized recommendations for infrastructure, operational, and institutional improvements, to be phased in over the short-term (less than 5 years), medium-term (5 to 10 years), and long-term (more than 10 years).

To attain the above objective, it is critical to understand the economic importance of efficient and safe border crossings to economic vitality of the bi-national region. Our overall economic analysis approach consists of three components:

- Economic role of the existing border crossings;
- Economic impact of border crossing delay; and
- Economic benefits of alternative improvement scenarios.

This technical memorandum is the first in the series – the economic role of the border – and it provides information on the border's impact on businesses and related jobs in the region.

It is important to note that this report is intended to provide readers with an understanding of broad economic impact of cross-border movements of people and goods in the El Paso/Juárez region. Subsequent reports will support other tasks by providing detailed estimates of economic impact of border wait time on the region and describing economic benefits of potential project, policy, and management scenarios. Our overall economic analysis approach is closely linked to the operational model being developed and applied as part of the Plan, which is designed to provide more detailed estimates of POE operational characteristics such as automobile/truck volumes and border wait times. The data and information included within this technical memorandum will be used as a reference during model development, calibration, and application.

The following sections provide an overview of the El Paso/Juárez regional economy, a description of the "border-dependent" businesses in the region, and a summary of the overall economic impact of these businesses.

2.0 Regional Economic Overview

Texas leads all U.S. states in trade with Mexico with over $130 billion in goods and services exchanged in 2008. This represents three times more trade than California, which ranks number two in trade with Mexico. A major reason for the significantly higher volumes of trade is the maquiladora industry which is concentrated at the Texas border, in particular in the El Paso-Ciudad Juárez region.

Table 2.1 Top 10 States Trading with Mexico, All Modes of Transportation
By Value, 2008

Rank	State	Total All Modes
1	Texas	$130.8
2	California	$54.3
3	Michigan	$30.2
4	Louisiana	$12.9
5	Illinois	$11.6
6	Arizona	$11.2
7	Ohio	$8.6
8	Mississippi	$6.6
9	North Carolina	$6.5
10	Tennessee	$6.1

Source: U.S. Department of Transportation TransBorder Freight Data. Figures in billions U.S.$.

As noted in the Commodity Flow and Socioeconomic Profile and depicted in Table 2.1, El Paso is the second busiest land port in the U.S. by value representing 17 percent of total trade between the U.S. and Mexico by surface modes in 2008. El Paso is followed by ports at Otay Mesa-San Diego, California, the Hidalgo-Pharr-McAllen region in Texas, and Nogales, Arizona. El Paso's share of U.S. trade with Mexico, by value, has declined steadily since 2000. Laredo also has lost share over the past 10 years, while Otay Mesa has increased moderately. However, from 2008 to 2009, all ports experienced significant declines due to the global economic downturn.

Table 2.2 Top Five Ports By Percent Share of U.S.-Mexico Trade by Value
Millions of U.S. Dollars

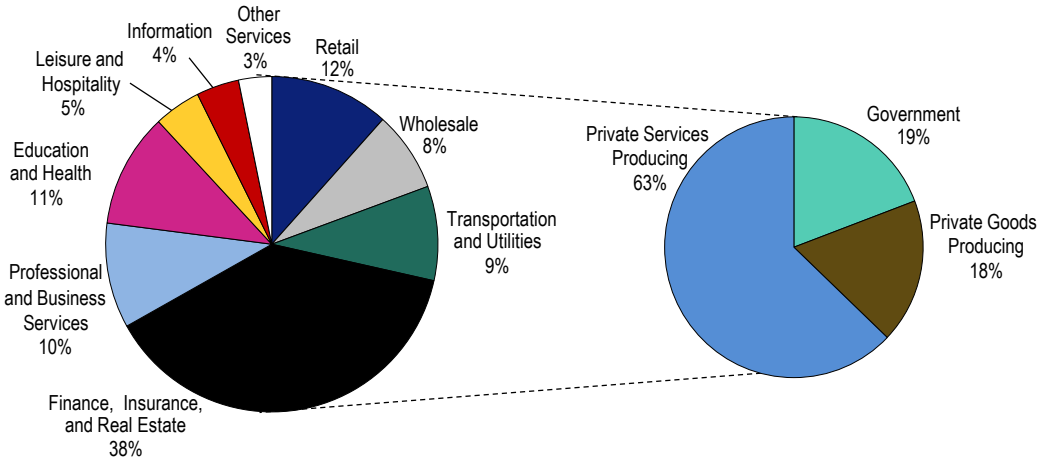
Port	2001	2002	2003	2004	2005	2006	2007	2008
Laredo, Texas	41.2%	41.1%	40.5%	41.0%	40.2%	39.4%	39.7%	40.8%
El Paso, Texas	18.8%	19.3%	19.8%	19.5%	18.5%	17.7%	17.6%	16.9%
Otay Mesa, California	10.0%	10.6%	10.1%	10.2%	10.5%	10.8%	11.0%	11.2%
Hildalgo, Texas	6.4%	6.6%	7.4%	7.3%	7.8%	7.6%	7.9%	7.8%
Nogales, Arizona	6.5%	5.6%	5.3%	5.5%	6.0%	7.2%	6.5%	6.7%

Source: U.S. Department of Transportation TransBorder Freight Data.

Gross Regional Product

Gross regional product (GRP) is one of several measures of the size of a region's economy. GRP is defined as the market value of all final goods and services produced within a region in a given period of time. Figure 2.1 displays of the composition of the El Paso's GRP in 2007. Service-oriented business output represents nearly two-thirds of the El Paso GRP. The service sectors in El Paso are dominated by the financial and real estate sectors, which contributed over a third of the regional GRP. Manufacturing was responsible for $2.5 billion in El Paso economic output, or approximately 18 percent of El Paso's GRP and government services account for about 19 percent of GRP.

Figure 2.1 El Paso Regional GDP Distribution
2007



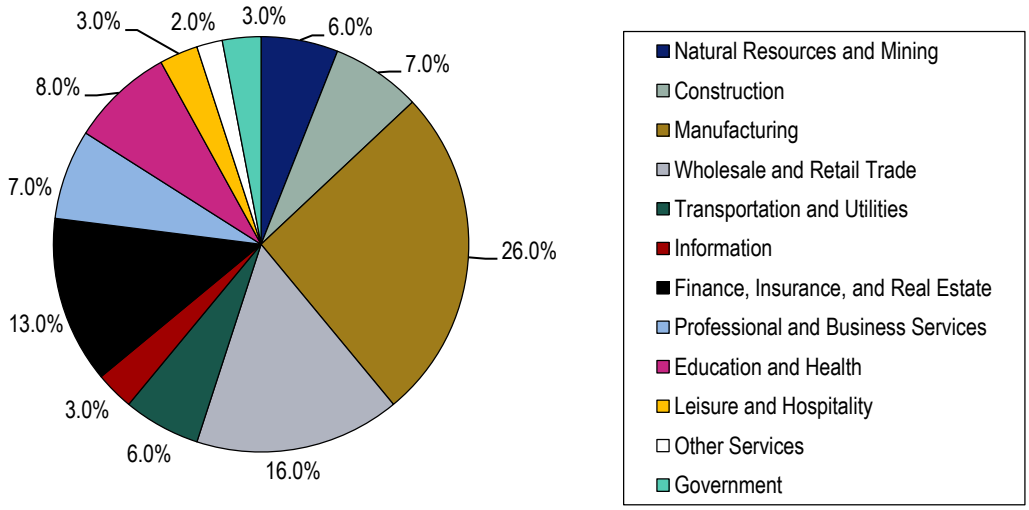
Source: U.S. Bureau of Economic Analysis.

Note: GDP data available through 2007 only. The difference between 2007 and 2008, the year used for analysis in this analysis, is not expected to impact the conclusions in this report.

Figure 2.2 displays GRP data for Ciudad Juárez. GRP in Ciudad Juárez is dependent on service-providing industries. However, manufacturing, natural

resources, and construction (goods-producing industries) have a much larger share than in El Paso. As noted in the draft Commodity Flow and Socioeconomic Profile, maquiladora activity has moved toward service-oriented activities in recent years, including back-office functions such as coupon sorting.

Figure 2.2 2008 Gross Regional Product Ciudad Juárez



Source: University of Texas at El Paso.

Comparison of Employment and GRP: El Paso and Cuidad Juarez

Comparisons of key industries by GRP and by employment show that some industries, such as retail and hospitality (food services), employ relatively high number of people with comparatively lower economic output. This may suggest two trends common with shifts to services. One, the area attracted high-skill, high-income positions in finance, real estate and technical manufacturing fields. Two, service jobs (retail, food services, health care) related to direct consumer services created high numbers of low-skill, low-income jobs that also boost the economy and maintain customer bases. This is reflected in median earnings for selected service occupations, which are displayed in Table 2.3. Some positions related to retail, healthcare, and transportation have low annual earnings. However, the management and administration occupations, another large sector in the El Paso region, show strong median earnings.

Table 2.3 Median Earnings For Selected Service Sector Occupations in El Paso MSA
2008

Service Occupations	Average Wage
Building Cleaning and Maintenance	$10,874
Construction, Maintenance, Repair	$20,820
Fire Fighting and Prevention, Other Protective Service	$21,301
Food Preparation and Serving	$9,605
Healthcare Practitioner and Technical Occupations	$50,294
Healthcare Support Occupations	$16,329
Law Enforcement	$55,795
Management, Business, and Financial Occupations:	$43,582
Personal Care and Services	$10,999
Professional and Related Occupations:	$40,213
Sales and Office	$17,506
Transportation and Material Moving	$22,340

Source: U.S. Census Bureau; all figures in 2008 inflation-adjusted dollars for civilian population aged 16 and over.

Manufacturing jobs in El Paso tend to be high-paying jobs (see Table 2.4). Even though the employment numbers in this sector have declined, the remaining industries employ high-skilled workers with greater earnings than occupations in areas such as apparel production. Manufacturing jobs in El Paso pay on average $41,000-$86,000. This compares favorably to the average wage per job of $33,310 reported by the Bureau of Economic Analysis (BEA).

Table 2.4 Average Wage of Selected Sectors
2007

High-Paying and Technological/Technical Jobs	Average Wage
Valve and Fittings (Except Plumbing)	$86,000
Scientific R&D Services	$57,000
Semiconductor and Related Device Manufacturing	$44,000
Printed Circuit Assembly Manufacturing	$68,000
Copper Rolling, Drawing, Extruding, and Alloy	$51,000
Motor and Generator Manufacturing	$73,000
Surgical and Medical Instrument	$71,000
Software Publishers	$74,000
Synthetic Dye and Pigment Manufacturing	$47,000
Architectural and Engineering-Related Services	$46,000
Wiring Device Manufacturing	$41,000

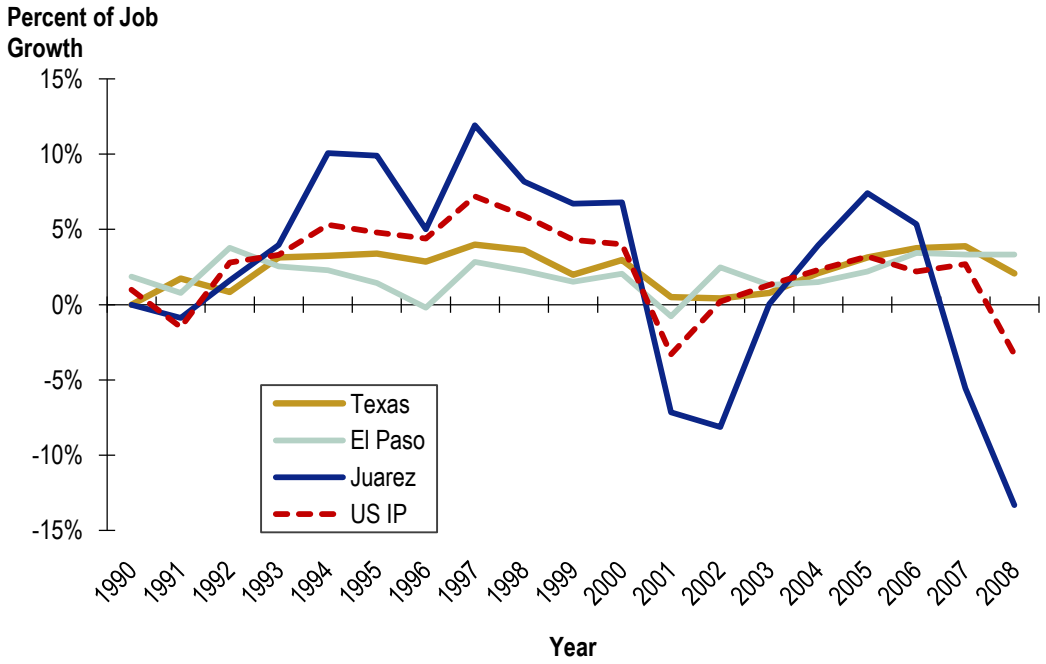
Source: University of Texas at El Paso, *Cuidad Juárez Manufacturing and El Paso Industry Linkages*, 2008.

Economic development in El Paso has been heavily influenced by activities at the border. Prior to Mexico joining the General Agreement on Tariffs and Trade (GATT) in 1986, job growth in El Paso lagged that of the State as a whole. Following GATT, job growth in El Paso accelerated and outpaced the State two years later. In 1994, the North American Free Trade Agreement (NAFTA) gave a boost to job growth in Mexico, although the rate of growth declined slightly in El Paso due to general economic decline experienced in the U.S. during the late 1990s and early 2000s. Job growth accelerated in 2003 and continued until the current economic recession started in 2008.

Changes in employment have been more stark in Juárez than in El Paso, as manufacturing jobs react more strongly to changes in economic and industry production cycles. Figure 2.4 shows the relationship between the industrial production (IP) index[1] and regional employment. While Juárez sees volatile changes in jobs, employment in El Paso generally tracks the IP Index. One exception appears to be a recent decline of the IP Index as El Paso's employment growth leveled out at approximately four percent. At the same time, Juárez experienced a decline of over 10 percent. These changes also affected Texas employment growth, which has performed slightly better in terms of job growth than El Paso, and exhibited steady growth until the 2008 economic decline.

[1] The IP index is released monthly by the Federal Reserve Board and measures the relative amount of output from the manufacturing, mining, electric and gas industries.

Figure 2.2 Employment and U.S. IP Index



Source: U.S. BEA, U.S. Federal Reserve (IP Index Total Industry, seasonally adjusted, year-over-year).

To summarize, job and industry growth in El Paso is underpinned by:

- Growing local facilities and firms such as Fort Bliss Army Base, Texas Tech Medical School, Tenet Healthcare, University of Texas at El Paso, and local services to meet consumer demand.
- Companies operating twin plants in Juárez, which often require transportation and customs services from firms based in El Paso.
- Maquiladora operators, who often use distribution facilities, administrative offices and temporary employment services located in El Paso. This stimulates the industrial real estate sector and provides employment for area residents.
- Maquiladora suppliers located or expanding in El Paso to be close to their customers across the border, which stimulates domestic manufacturing and provides high-skill, high-wage jobs to residents of El Paso.
- The need for legal, accounting, and financial services for the maquiladora industry, which are often provided in El Paso.

- Hotels, car rental agencies, and restaurants in El Paso that serve business travelers visiting the maquiladoras.[2]
- A large government sector that supports border crossing, security, and the Fort Bliss Army Base.

[2] Vargas, L. (2001), *Maquiladoras: Impact on Texas Border Cities*. Federal Reserve Bank of Dallas.

3.0 Border Dependent Businesses

Location quotient (LQ) analysis was employed to estimate the concentration of the dominant sectors in El Paso and to identify border dependent industries. LQ is a measure the concentration of an industry in a local economy relative to the national concentration of that industrial sector. In general, sectors with LQ greater than 1.0 have an advantage compared to the U.S. and is typically either exporting goods and services or responding to significantly higher local demand. If the LQ is less than 1.0, it means the local economy may have a comparative disadvantage in that sector compared to the U.S., and it is a net importer of goods and services.

In the El Paso region, the comparative advantage is often the system of border crossings, which creates exceptional export opportunities as well as unusually high demand for certain goods and services. We classify industries having location quotients greater than 1.0 and engaging in or supporting significant cross border activities as "border dependent."

Based on the LQ displayed in Table 3.1, manufacturing, retail, and transportation and warehousing sectors were identified as dominant sectors in El Paso's economy and primary border dependent industries. Other sectors such as real estate, financial, and professional services were also identified as border dependent because a large part of their activities is in support of industries that are directly engaged in border crossing activities.

Table 3.1 Location Quotients of El Paso Employment in Selected Sectors

Industry Sector	2001	2007
Retail and Wholesale	1.6	1.7
Government	1.5	1.6
Federal	1.6	1.8
Military	2.9	3.8
State/Local Government	1.4	1.3
Transportation and Warehousing	1.3	1.5
Manufacturing	1.1	0.8

Source: U.S. Bureau of Economic Analysis. Analysis by Cambridge Systematics, Inc.

3.1 MANUFACTURING

The expansion of U.S.-Mexico trade has attracted various manufacturers to El Paso to take advantage of the proximity to their markets, particularly the maquiladoras in Ciudad Juárez. This has contributed significantly to the region's economic growth over the last decade. However, the LQs for manufacturing in 2000 and 2007 (see Table 3.1) indicate that the manufacturing sector in the region is mature and its future performance will be less dependent on continued attraction of manufacturers and more dependent on the health of broader national and global economies. For instance, the decline in concentration of manufacturing sector in El Paso from 2000 to 2007 (LQs declining from 1.0 to 0.8) may be attributed to the sharp response of the manufacturing sector in Cuidad Juarez to the off-shoring of manufacturing activities to Asia. The decline in Cuidad Juarez's economy led to a decline in demand for input material from El Paso. However, the narrowing wage gap between Chinese and Mexican laborers, combined with other international trade and transportation trends, may cause this trend to reverse in the mid- to long-term.[3]

Table 3.2 shows that most of the inputs demanded by the maquiladoras are supplied from El Paso. Of the top 20 suppliers of inputs material to each of the 10 most significant maquiladoras industries, 14 to 18 of them are located in El Paso. This confirms the integration of the manufacturing sector in El Paso and the maquiladoras in Ciudad Juárez. Therefore, expansions of maquila operations in Cuidad Juárez will result in the expansion of the manufacturing sector in El Paso and vice versa, hence the dependency of the manufacturing sector on the border.

[3] While Mexican workers made double the wages of their Chinese counterparts in 2003, today that gap has shrunk to only 15 percent.

Table 3.2 Input Demand and Supply Relationship Between Ciudad Juárez Maquiladora and El Paso Suppliers[a]

Juárez Demand for Inputs	Supply of Inputs to Juárez from El Paso	Top Two Supplies
Motor Vehicle Parts Manufacturing	17 of the top 20 suppliers operate in El Paso	Motor vehicle parts; iron and steel mills and ferroalloy
Semiconductor and Other Electric Parts Manufacturing	17 of the top 20 suppliers operate in El Paso	Semiconductor and related device, printed circuit (electronic) assembly
Electrical Equipment Manufacturing	16 of the top 20 suppliers operate in El Paso	Relay and industrial control, iron and steel mills and ferroalloy
Medical Equipment and Supplies Manufacturing	15 of the top 20 suppliers operate in El Paso	Surgical and medical instrument, surgical appliance and supplies, and advertising and related services
Communications Equipment Manufacturing	17 of the top 20 suppliers operate in El Paso	Broadcast and wireless communication equipment, semiconductor and related services, software publishers
Printing Ink Manufacturing	14 of the top 20 suppliers operate in El Paso	Synthetic dye and pigment, paint and coating manufacturing
Navigational, Measuring, Electromedical, and Control Instruments	16 of the top 20 suppliers operate in El Paso	Software publishers, scientific R&D services
Audio and Video Equipment Manufacturing	18 of the top 20 suppliers operate in El Paso	Electron tube manufacturing, printed circuit (electronic) assembly manufacturing
Plastics and Product Manufacturing	15 of the top 20 suppliers operate in El Paso	Plastics material and resin manufacturing, plastics packaging materials, and unlaminated film and sheet
Household Appliances Manufacturing	18 of the top 20 suppliers operate in El Paso	Plastics packaging materials and unlaminated film and sheet, other plastics product manufacturing

Source: C. Juárez Manufacturing and El Paso Industry Linkages.

[a] Cuidad Juárez Manufacturing and El Paso Industry Linkages, Institute for Policy and Economic Development.

3.2 RETAIL SERVICES

Retail sales provide a strong tax base for a region and can often be exported to nonresidents. Because retail sales data were not available, we used per capita sales tax as a proxy. Per capita sales tax is highly correlated with retail sales in Texas, since ad-valorem is the mode of sales tax collections.

As seen in Table 3.3, per capita sales tax income in El Paso exceeded that of Texas as a whole and grew between 2001 and 2008. Although El Paso's personal income rates were lower than Texas overall, per capita sales tax is about five times the state average and the border is a primary reason. The retail sector is

more highly concentrated in the El Paso region than in other parts of the State as measured using the location quotient. It is estimated that El Paso's retail activity is approximately 60 percent and 70 percent greater than in Texas overall in 2001 and 2007, respectively. Regional retail activity is bolstered primarily by sales to shoppers from Mexico, and by visiting professionals on work trips to the area.

Table 3.3 Sales Tax in Texas and El Paso

	Texas			El Paso		
Year	Sales Tax ($Million)	Population (Million)	Per Capita Sales Tax	Sales Tax ($Million)	Population (Million)	Per Capita Sales Tax
2001	27,230	21	1,277	4,230	0.68	6,177
2002	26,276	22	1,209	4,370	0.69	6,345
2003	26,127	22	1,185	4,500	0.69	6,478
2004	27,913	22	1,245	4,700	0.70	6,691
2005	29,838	23	1,307	5,100	0.71	7,196
2006	33,544	23	1,432	5,500	0.72	7,631
2007	36,956	24	1,554	5,800	0.73	7,969
2008	41,358	24	1,702	5,900	0.74	7,901

Source: State of Texas Annual Cash Budget, Cambridge Systematics, Inc. analysis, UTEP.

3.3 TRANSPORTATION AND WAREHOUSING

Due to the presence of the maquila industry, truck operations are of particular importance to the El Paso borderplex. Truck fleets in the El Paso region generally fall into one of two operational categories, described below:

- **Drayage trucks** provide short-haul transportation of goods (usually in intermodal containers) across the border, for example between a maquiladora in Mexico and truck terminals in the U.S.
- **Long-haul** trucks are over-the-road haulers that transport goods to their final destination, usually on a contract basis. A long-haul truck may pick up a container dropped off by a drayage operator and transport it to a consignee.

Operations

Within each category, some trucks are owner-operated, others are company owned, and still others are offered for hire by third-party logistics firms. Regardless of ownership, the operational characteristics of trucks in the borderplex have important implications for port of entry operations.

When NAFTA went into effect in 1994, one of its key provisions was the establishment of a 25-mile commercial zone along the U.S.-Mexico border by

1995. Mexican trucks are permitted to operate within this zone to facilitate efficient cross-border freight movement, while U.S. trucks are afforded the same ability to operate on the Mexican side.[4]

The effect of this is that cross-border truck moves between Juárez and El Paso are typically accomplished using drayage operators. Long-haul moves from Mexico's interior may involve up to three trucks – a Mexican long-haul truck to bring a load to the border, a Mexican drayage truck to haul it across, and finally a U.S. truck to pick it up for final delivery. Maquiladora operators, meanwhile, require constant back-and-forth deliveries across the border for supplies and finished product.

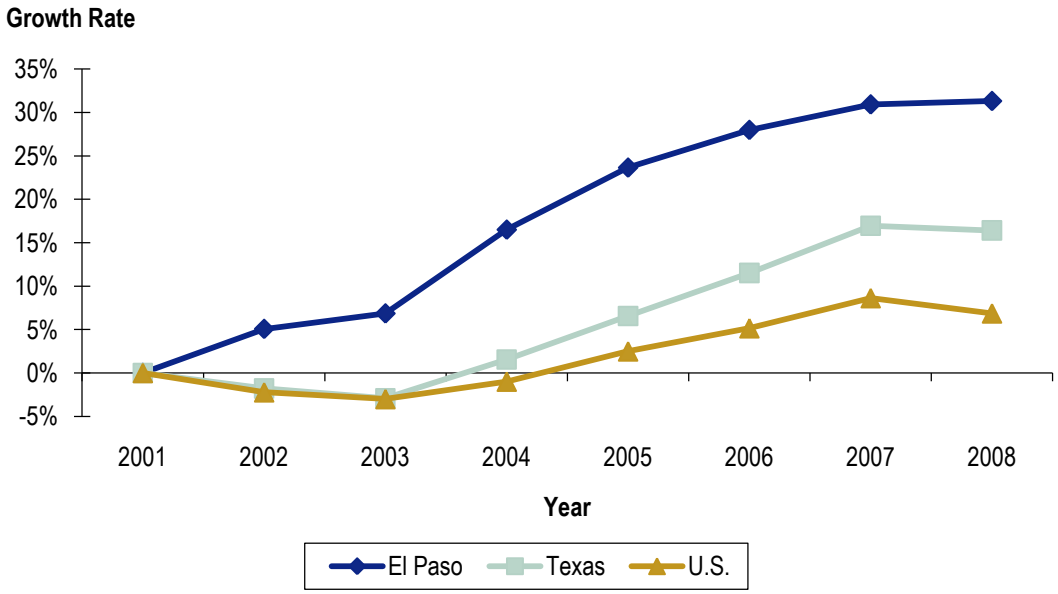
Economic Effects

The transportation and warehousing sector in El Paso has benefitted enormously from cross-border trade. From Table 3.1, the location quotient for the transportation and warehousing sector was 1.3 in 2001 and 1.5 in 2007. This means the El Paso has a significantly higher demand in this sector compared to the U.S. Its high concentration stems from its unique location as a border city with Cuidad Juárez.

The transportation and warehousing sector in El Paso is resilient. As shown in Figure 3.1, El Paso posted strong growth at 6.8 percent between 2001 and 2003 while Texas and the U.S. both declined by approximately 3.0 percent each. Additionally, in the midst of the current recession, El Paso grew 0.4 percent between 2007 and 2008 while Texas and the U.S. declined 0.5 percent and 1.8 percent respectively. Between 2001 and 2008, employment in transportation and warehousing sector averaged 16,714 and total output was estimated to be $6.73 billion, almost all of which is dependent on the border crossing.

[4] NAFTA called for access to all U.S. states for Mexican trucks by 2000, but this was never implemented due to opposition from organizations in the U.S. A pilot program involving 100 Mexican trucks was established, but funding for the program was cut in early 2009, leading Mexico to add tariffs to some U.S. exports. As of January 2011 the USDOT is assisting efforts to restart negotiations with Mexico. For more information see comments by USDOT Secretary Ray LaHood at the CMC3 2001 Jump Start Conference: http://www.dot.gov/affairs/2011/lahood01182011.html, accessed February 4, 2011.

Figure 3.1 Transportation and Warehousing Services Growth Rates



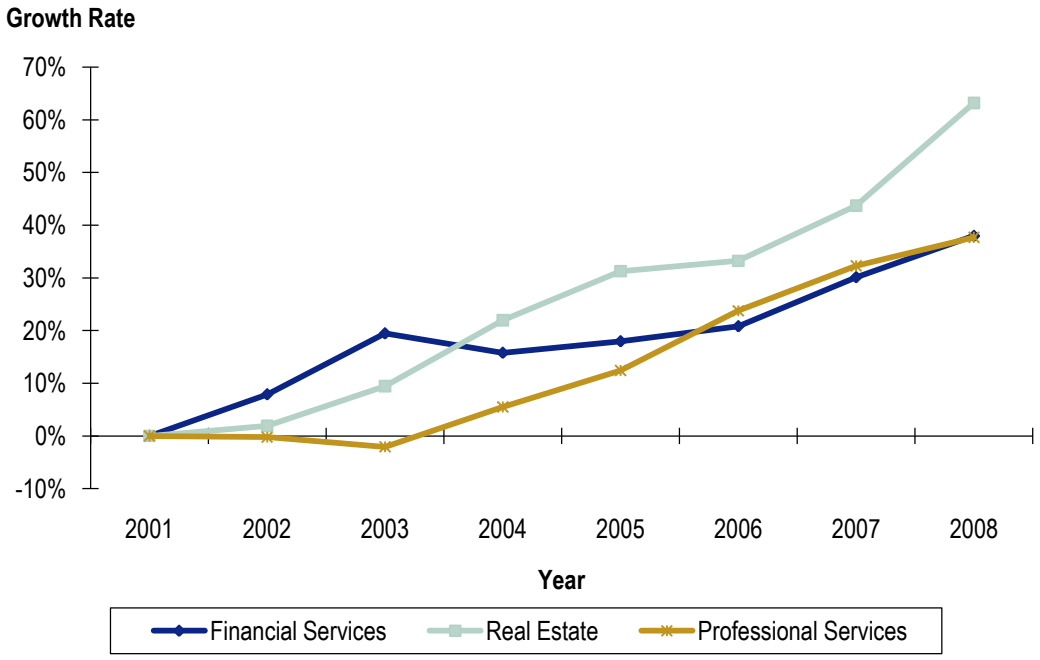
Source: U.S. Bureau of Economic Analysis, Cambridge Systematics, Inc. analysis.

3.4 FINANCIAL, REAL ESTATE, AND PROFESSIONAL SERVICES

The financial, real estate, and professional services sectors together accounted for 19 percent of El Paso's regional employment in 2008, with 42,277 jobs, up from approximately 29,000 in 2001. Over the same period, the sectors combined contributed $1.17 billion to El Paso's economy.

Between 2001 and 2008, the real estate sector grew over 60 percent followed by 37 percent growth in financial and professional services. The growth in these sectors was primarily due to the expansion of the maquiladora industry in Juárez. These services are vertically integrated with maquila operations. As the maquila operations expand, so does the demand for financial and real estate services. Financial services include subsectors such as insurance, taxes, management consulting (accountants, financial advisors, human resources, marketing), and legal services. The growth of the real estate sector is a direct response to the growing demand for industrial facilities and land as well as office and retail space for businesses supporting the maquiladora industry.

Figure 3.2 Growth of Financial, Real Estate, and Professional Services



Source: U.S. Bureau of Economic Analysis, Cambridge Systematics, Inc. analysis.

3.5 FEDERAL GOVERNMENT SERVICES

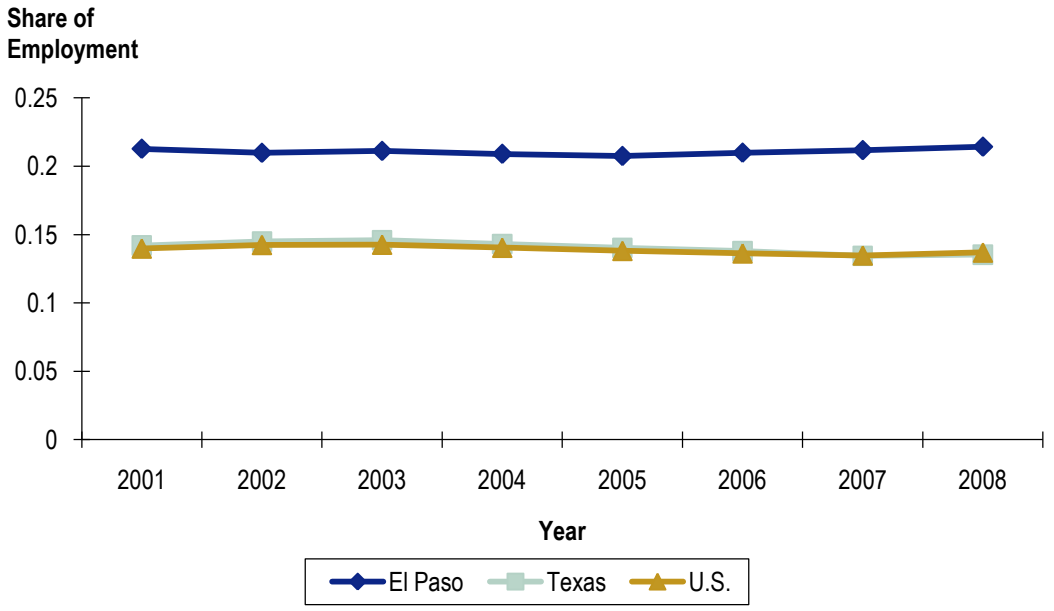
The U.S. government contributes to the regional economy through the operation of a number of law enforcement and military installations. The U.S. Customs Services, the Immigration and Naturalization Service and various Federal law enforcement agencies are directly related to border activity, ensuring the safe and efficient operation of international trade and travel. El Paso also is home to Fort Bliss, the second largest military installation in the U.S., which had an estimated employment of over 18,500 in 2008, growing from 11,740 in 2001.[5] Fort Bliss houses the U.S. Army Air Defense Artillery School, the William Beaumont Army Medical Center, The U.S. Army Sergeants Major Academy and the Joint Task Force North. The U.S. Senate approved over $1.5 billion in funding to expand the base by 20,000 soldiers and their families by 2011.

These institutions explain the high concentration of government services in El Paso. The location quotient for government jobs is 1.6 in 2007, marginally up from 1.5 in 2001. This means that government jobs accounts for a greater share of jobs in El Paso than the U.S. average, as shown in Figure 3.3. The location

[5] Bureau of Economic Analysis.

quotients for Federal governments and military for 2007 are 1.8 and 3.8 respectively.

Figure 3.3 Government Jobs as Share of Employment



Source: U.S. Bureau of Economic Analysis, Cambridge Systematics, Inc. analysis.

While the majority of Federal government jobs are associated with Fort Bliss, a significant number is directly attributable to the border crossing, thus making them border dependent.

4.0 Economic Impact of Border Crossings

The total economic impact of border dependent businesses is the sum of the direct, indirect and induced impacts, defined as follows:

- **Direct impacts** are the initial, immediate output, employment and income effects of the border dependent businesses.
- **Indirect impacts** are the incremental business sales and associated income and employment effects arising from the purchase of input materials (supplies, materials, equipment, and services) by border dependent businesses.
- **Induced impacts** are incremental business sales and associated income and employment effects resulting from household spending and re-spending on goods and services as a result of the direct and indirect impacts.

Generally, changes in employment or final demand associated with a business or industrial sector are the basis for modeling direct economic impact. For this analysis, the direct impacts are reductions in direct employment by border dependent businesses. The economic model used in the analysis is a customized model developed by Regional Economic Modeling Inc. (REMI). This economic simulation estimated indirect and induced impacts, resulting in total economic impact. The total impact is measured as changes in employment, output or gross regional product (GRP), value added, and personal income.

4.1 METHODOLOGY

The purpose of the analysis is to establish the total economic significance of the border ports of entry in the El Paso region. To accomplish this, we conducted a simulation of the economic impact of a reduction in employment by border dependent industries. A reduction in employment in these industries could result from several scenarios including, the closing of ports of entry, increased cost of border crossings as result of increased congestion or tolls, or increased safety and security concerns.

Table 4.1 displays the total direct employment impact for border dependent industries which totals over 690,000 jobs. For this analysis, two scenarios were analyzed. The first assumed a 50 percent reduction in employment (or 346,000 jobs) in border dependent businesses and the second assumed an 80 percent reduction (or 553,600 jobs). For each scenario, the reduction was applied evenly across each of the border dependent industry sector. For example, the 50 percent scenario assumed a 50 percent employment reduction in manufacturing,

transportation and warehousing, retail services and finance and real estate. The economic impact analysis of these direct employment reductions was conducted utilizing the 42 sector multi-region U.S.-Mexico REMI Model.

Table 4.1 Direct Employment and Output of Border Dependent Sectors, 2008

Sector	El Paso	Chihuahua	Dona Ana	Total
Manufacturing[6]	14,576	302,863	1,961	**319,400**
Retail & Wholesale Trades	58,400	177,210	10.833	**246,443**
Financial Services	27,244	7,213	4,899	**39,356**
Transportation & Warehousing	14,441	71,393	1,011	**86,845**
Total	114,661	558,679	18,677	**692,017**

Source: REMI

4.2 RESULTS

Reductions in border dependent economic activity would have significant impacts on the regional economy. A 50 percent reduction in direct employment in border dependent sectors would result in a loss of nearly 450,000 jobs in the bi-national region. An 80 percent reduction in direct employment would lead to a loss of nearly 808,000 jobs. The distribution of employment impact by locality is presented in Table 4.2.

Table 4.2 Job Loss Arising from Reductions in Border Dependent Activity

	50% Employment Reduction in Border Dependent Sectors		80% Employment Reduction in Border Dependent Sectors	
Region	**Direct Jobs**	**Total Jobs**	**Direct Jobs**	**Total Jobs**
El Paso	57,331	83,100	91,729	137,955
Dona Ana	9,352	12,135	14,963	20,710
Chihuahua	279,340	392,807	446,943	649,120
Total	356,022	448,042	553,636	807,970

Source: Cambridge Systematics, Inc analysis using REMI

[6] This refers to only border dependent manufacturing subsectors.

The State of Chihuahua stands to sustain the greatest loss if border dependent activities subside in the region as shown in Table 4.3. An average of 521,000 jobs or 39 percent of total employment could be at stake. These activities translated into 32.0 percent to 52.7 percent of GRP.

Table 4.3 Summary of Total Economic Impacts of Reduction in Border Dependent Business – State of Chihuahua, MX[1]

	Total Impact	
Economic Variables	**Number Lost**	**Percent Lost**
Employment (Thousands)	393 – 649	29.0 -48.0%
Gross Regional Product (Billion U.S.$)	$13 – 21.4	32 – 52.7%
Personal Income (Billion U.S.$)	$7.15 – 11.7	23.2 – 38%

1. Results based on assumed reductions in direct employment in border dependent sectors equal to 50% and 80%, respectively.

Source: Cambridge Systematics, Inc analysis using REMI.

The total economic impact of a 50 to 80 percent contraction in border dependent sectors in El Paso is displayed in Table 4.4. The impacts are estimated to range from 83,000 to 138,000 jobs, representing 22.3 to 37.0 percent of El Paso's total employment, 24 to 39 percent of GRP and 13 to 21 percent of personal income.

Table 4.4 Summary of Total Economic Impacts of Reduction in Border Dependent Business – El Paso, TX[1]

	Total Impact	
Economic Variables	**Number**	**Percent**
Employment (Thousands)	83.1 – 138	22.3-37%
Gross Regional Product (Billion U.S.$)	$4.6 – 7.57	23.8-39%
Personal Income (Billion U.S.$)	$2.55 – 4.18	12.9 – 21.2%

1. Results based on assumed reductions in direct employment in border dependent sectors equal to 50% and 80%, respectively.

Source: Cambridge Systematics, Inc. analysis using REMI.

Although Dona Ana County, NM would be the least impacted by declining border activities, the impacts are still significant. As shown in Table 4.5, a 50 to 80 percent decline in border dependent employment would have a total impact of 12,000 to nearly 21,000 jobs, representing up to 22 percent of County's total employment and 11 percent of the GRP and personal income.

Table 4.5 Summary of Total Economic Impacts of Reduction in Border Dependent Business– Dona Ana County, NM[1]

	Total Impact	
	Number	**Percent**
Employment (Thousands)	12.1 – 20.7	13.1 – 22.3%
Gross Regional Product (Billion U.S.$)	$0.7 – 1.2	16.23 – 27.4%
Personal Income (Billion U.S.$)	$0.34 – 0.56	6.5 – 11.0%

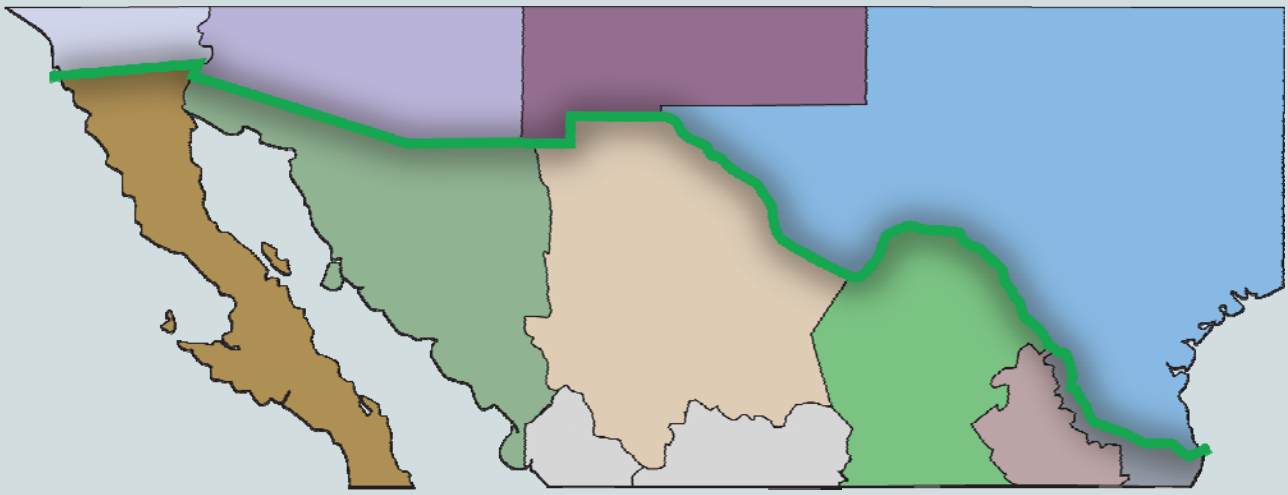
1. Results based on assumed reductions in direct employment in border dependent sectors equal to 50% and 80%, respectively.

Source: Cambridge Systematics, Inc. analysis using REMI.

DRAFT

IMPROVING ECONOMIC OUTCOMES BY REDUCING BORDER DELAYS

FACILITATING THE VITAL FLOW OF COMMERCIAL TRAFFIC ACROSS THE U.S.-MEXICO BORDER



DRAFT

March 2008

TABLE OF CONTENTS

Section	Description	Page
1	Executive Summary	3
2	Border Crossing System Delays	7
3	Economic Impacts	8
4	High-Level Options	10
5	Port of Entry Analysis	14
6	Conclusions	29

This study, commissioned by the Department of Commerce's International Trade Administration, was conducted by Accenture in association with HDR Decision Economics and Crossborder Group Inc. The study approach was conducted under the requirements of the International Trade Administration and limited by constraints of the Paperwork Reduction Act. The options and estimates contained in this report result from an approach that focused on commercial impacts, and do not necessarily reflect the direct perspectives of a complete cross-section of government entities or other stakeholders.

Acknowledgement of Accenture, HDR Decision Economics, and Crossborder Group Inc., does not constitute the International Trade Administration's endorsement of any company's views, products, or services. The options presented in this report do not represent the policies, funding priorities, or project plans of the United States Government.

1 Executive Summary

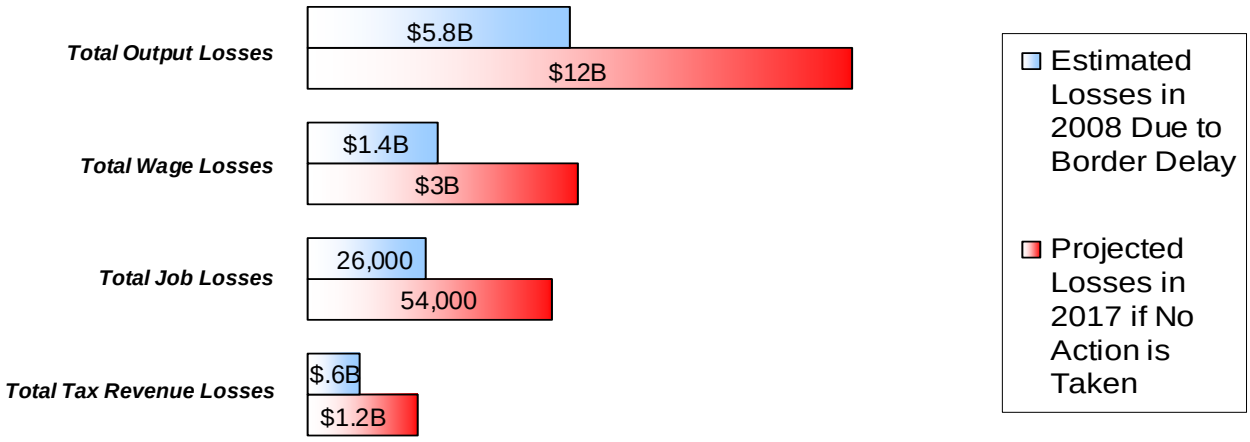
Increasing international traffic and strained border capacity have resulted in border delays that could cause $86 billion in output losses over the next ten years.

Essential Trading Partner Trade with Mexico is important to the United States' (U.S.) economic vitality. U.S. manufacturers and consumers depend on ready access to Mexican goods. U.S. exporters serve the Mexican market and profit from foreign sales. Border region businesses in Arizona, California, New Mexico, and Texas tie their livelihoods to trade and create jobs for American workers. Mexico is America's third largest trading partner behind only Canada and China.

U.S.-Mexico trade totals approximately $340 billion, a nearly fourfold increase in trade since the enactment of the North American Free Trade Agreement (NAFTA). Every day more than 13,000 trucks bring over $550 million worth of goods into the U.S. from Mexico. Over 80% of Mexican imports enter via truck through the five busiest southern border ports of entry (POEs) of Laredo, TX, El Paso, TX, Otay Mesa, CA, Hidalgo, TX, and Nogales, AZ. U.S. exports to Mexico total $136 billion, with $93 billion crossing via commercial truck. This represents a 150% increase in export value since the enactment of NAFTA.

A Creeping Economic Threat America's ports are charged to facilitate growing trade while safeguarding national security. However, increases and changes to global trade have outpaced the ports' capacity to accommodate them – resulting in congestion and delays.

Projected Losses to U.S. Economy in 2017
Due to Increasing Border Wait Times



$116 million per minute and 26,000 jobs Today, border wait times at the five busiest southern border POEs average over one hour, which result in an average economic output loss of $116 million per minute of delay. In 2008, these delays cost the U.S. economy nearly 26,000 jobs and $6 billion in output, $1.4 billion in wages, and $600 million in tax revenue *annually*. By 2017, average wait times could increase to nearly 100 minutes, costing U.S. more than 54,000 jobs and $12 billion in output, $3 billion in wages, and $1.2 billion in tax revenue *annually*. The *cumulative* loss in output due to border delays over the next ten years is estimated to be $86 billion.

State and Manufacturing Impacts Border state economies are also injured by border delays. Texas alone loses 8,500 jobs and $1.7 billion in output and $490 million in wages *annually* due to delays at the in-state ports of Laredo, El Paso, and Hidalgo. The *cumulative* state economic losses in output due to in-state border delays over the next ten years are estimated to be $26 billion in Texas, $4.5 billion in California, and $2 billion in Arizona. Further, industries that rely on importing and exporting are harmed by border delays. Losses to the Machinery and Equipment industry account for approximately 45% of national economic losses.

Economic losses due to border delays are projected to double by 2017.

Improving Economic Outcomes The annual economic impact of wait times will more than double by 2017 if delays grow as projected and if infrastructure and operations remained the same. Actions are being taken or planned to improve the situation, but many are constrained by available budget.

Congestion and delays may result within the U.S.-Mexico border crossing system because:

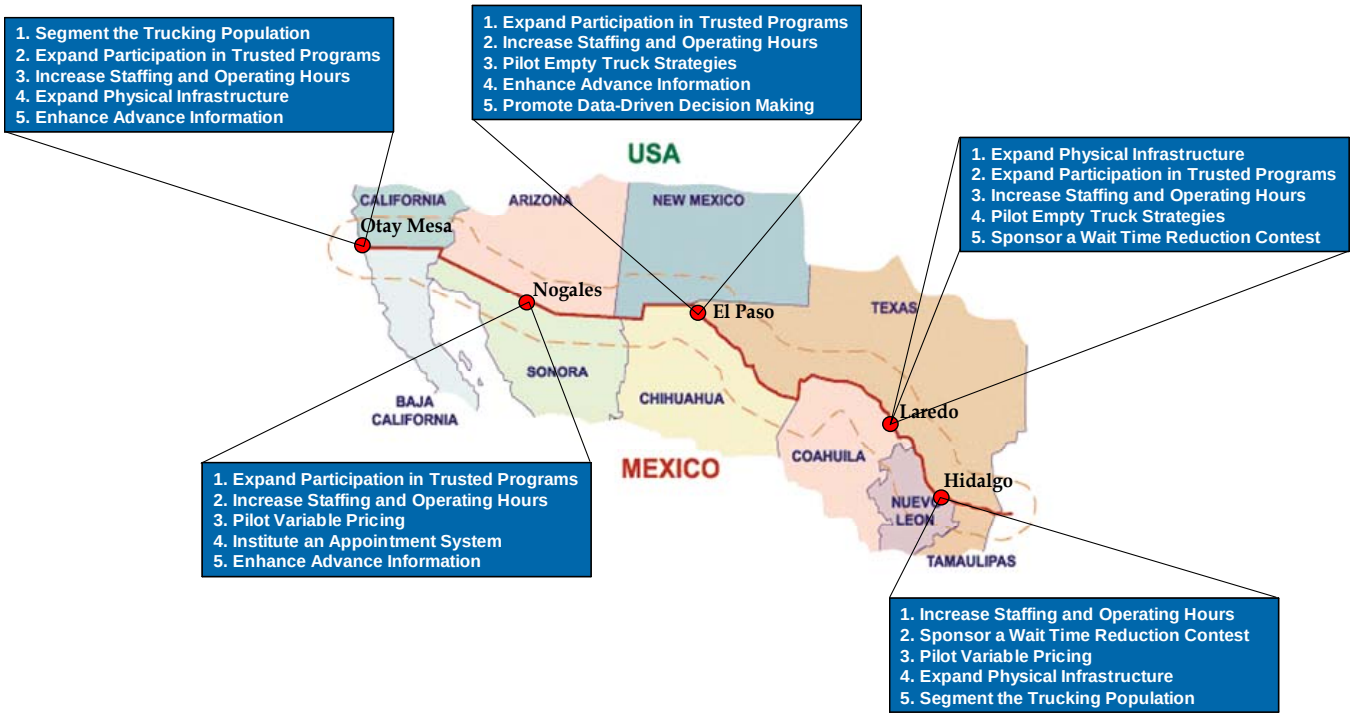
- Today's level of demand exceeds the physical infrastructure and operating capacity.
- The demand for border crossings is not optimally disbursed across available capacity to minimize congestion.
- The rate of throughput of the international border crossing system is insufficient.

To reverse negative economic trends and combat these causes of delay, a comprehensive set of options can be explored *on both sides of the border among Federal, state, and local agencies* to reduce border wait times. These options respect CBP's vital security requirements. They are designed to allow CBP the same or greater opportunity to conduct security screening while facilitating trade – two imperative components to strengthening national and economic security.

1. Optimize Use of Capacity
Objective: Achieve an optimal dispersion of demand across available capacity by promoting efficient border crossing decisions.
1.1 Institute an Appointment System: Retain a percentage of capacity for e-scheduled appointments and pilot border crossing-specific use permits.
1.2 Pilot Variable Pricing: Pilot adjustments to infrastructure-use tolls and other fees through congestion pricing (mandatory fees based on traffic volumes) and value pricing (voluntary fees based on demand for time-sensitive, expedited crossings).
1.3 Promote Data-Driven Decision Making: Provide real-time, mobile alerts on congestion conditions and lane openings to enable efficient decisions on time and route choices by importers and to enable rapid responses by government agencies.
1.4 Pilot Empty Truck Strategies: Limit empty trucks to off-peak hours and collect an empty truck fee to optimize available capacity for loaded trucks, where possible.
2. Improve Throughput
Objective: Increase the rate of movement and pace of verifications across the end-to-end border crossing system.
2.1 Segment the Trucking Population: Divide the population of incoming conveyances to facilitate the efficient crossing of low-risk shipments, focus on high-risk shipments, and transition lane types to accommodate demand.
2.2 Expand Participation in Trusted Programs: Grow enrollment in trusted importer programs and provide improved access to dedicated lanes.
2.3 Enhance Advance Information: Integrate advance information across the importing process and investigate a bi-national superbooth concept.
2.4 Sponsor a Wait Time Reduction Contest: Organize a performance measure-based contest for owners, operators, and administrators of border crossing infrastructure to reduce system-wide wait times.
3. Expand Capacity
Objective: Enlarge physical infrastructure and increase operating capacity.
3.1 Expand Physical Infrastructure: Widen bridges and U.S. and Mexican access roads, expand primary and secondary facilities, and lengthen dedicated cargo and FAST lanes.
3.2 Increase Staffing and Operating Hours: Add shifts to existing operating hours and extend operating hours on both sides of the border.

A coordinated effort of stakeholders is needed to reduce border wait times and increase American economic gains from trade.

Improving Ports of Entry Stakeholders, both public and private, Federal, state, and local, and in the U.S. and Mexico, must evaluate options and turn them into results. To jump-start improvement, options are tailored and aligned to POEs. These options may generate $7.5B and 34,000 jobs over the next ten years by reducing border wait times. Action to improve border crossings can begin immediately.

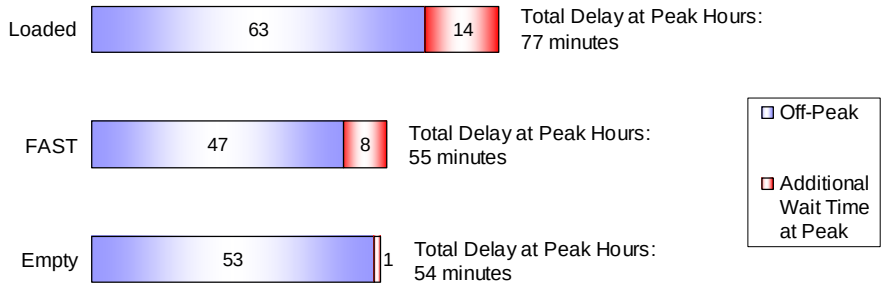

1. Segment the Trucking Population
2. Expand Participation in Trusted Programs
3. Increase Staffing and Operating Hours
4. Expand Physical Infrastructure
5. Enhance Advance Information
1. Expand Participation in Trusted Programs
2. Increase Staffing and Operating Hours
3. Pilot Empty Truck Strategies
4. Enhance Advance Information
5. Promote Data-Driven Decision Making
1. Expand Physical Infrastructure
2. Expand Participation in Trusted Programs
3. Increase Staffing and Operating Hours
4. Pilot Empty Truck Strategies
5. Sponsor a Wait Time Reduction Contest
USA
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
Otay Mesa
Nogales
El Paso
Laredo
SONORA
CHIHUAHUA
BAJA CALIFORNIA
COAHUILA
MEXICO
Hidalgo
NUEVO LEON
TAMAULIPAS
1. Expand Participation in Trusted Programs
2. Increase Staffing and Operating Hours
3. Pilot Variable Pricing
4. Institute an Appointment System
5. Enhance Advance Information
1. Increase Staffing and Operating Hours
2. Sponsor a Wait Time Reduction Contest
3. Pilot Variable Pricing
4. Expand Physical Infrastructure
5. Segment the Trucking Population

2 Border Crossing System Delays

The complex international trade process reaches its climax at our nation's POEs, requiring the highly coordinated effort of a diverse set of public and private sector stakeholders. Therefore, it is important to view delays in that context and use a measure of total wait time that captures the border crossing system as a whole. Total wait time is defined as the time elapsed *from entering* the line in Mexico leading to Mexican export inspection *through exit* from U.S. inspection facilities, including any U.S. state-conducted inspections. Importantly, this definition of border crossing wait time captures the fact that processing time at U.S. primary is not the driver of wait time; instead, delays are due several factors, including many outside U.S. federal control. This represents an expansion of traditional wait time metrics and raises the focus from a processing time level to a more comprehensive system view. The importing community has long sought a well-constructed wait time metric. This construction, or one similar, is proposed as the national standard to account for system-wide border crossing wait time.

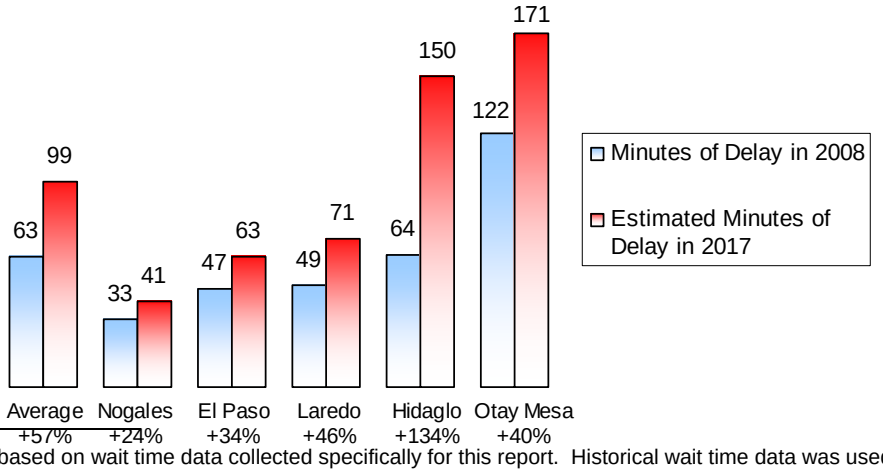
The average delay experienced by trucks crossing the U.S.-Mexico border is 63 minutes[1]. Otay Mesa has the longest delays of the top five busiest southern border POEs, reaching over two hours. In contrast, Nogales has delays of approximately half the national average[2]. Peaks in wait time, consistent across POEs, occur during the morning rush hour between 8am and 11am. Wait times for loaded trucks at peak times average 77 minutes. Both FAST trucks and empty trucks average approximately 55 minutes during peak times, but FAST trucks wait less during off-peak periods. At each of the five largest southern border POEs, FAST trucks experience less wait time on average than non-FAST loaded trucks.

Wait Times at Peak and Off-Peak Hours



Wait time is projected to increase across the five busiest U.S.-Mexico border crossing systems if volumes continue to grow as expected and if infrastructure and operations remain the same. By 2017, it is estimated that the average wait time will be nearly 100 minutes – an increase of 60%. Delays at Hidalgo are estimated to more than double due to its very rapid commercial growth. *Note:* The potential positive wait time impacts of planned and underway improvements are not included in these projections.

Projected Growth in Wait Times from 2008 to 2017



[1] Wait time estimates are based on wait time data collected specifically for this report. Historical wait time data was used to annualize and extrapolate the observed wait times.

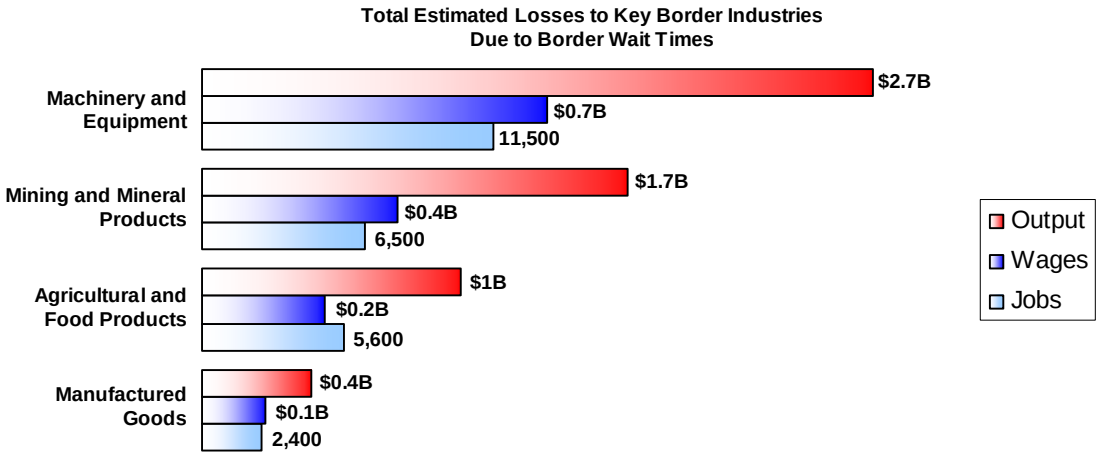
[2] The wait time construction in Nogales does not include Mexican export processing time due to its distance from U.S. primary.

Economic Impacts

Border delays result in losses to output, wages, jobs, and tax revenue due to decreases in spending by companies, suppliers, and consumers. Due to congestion, delays, and wait time uncertainty:

- U.S. and Mexican firms require increased inventory levels, additional trucks, and additional drivers.
- U.S. and Mexican exporters experience higher transportation costs and less export volume.
- U.S. consumers pay higher prices for Mexican goods and reduced consumer choice.
- The productivity of firms is compromised, especially in time-sensitive industries (e.g., automotive, agriculture).
- The border region's ability to attract and maintain investments is hindered.

The economic impact due to border wait times at the five largest southern land border POEs is considerable. Total losses to the national economy are 26,000 jobs and $5.8 billion in output, $1.4 billion in wages, and $600 million in tax revenue *annually*. The *cumulative* economic output loss over the next ten years (sum of projected annual losses due to current border delays at the five largest U.S.-Mexico POEs) is $86 billion. Industries that rely on regular and predictable importing and exporting are harmed by border delays. Losses to the Machinery and Equipment industry account for approximately 45% of national economic losses.



Since U.S.-Mexico trade is deeply integrated with the fabric of U.S. border-states, state economies also experience losses due to border delays. Combined estimated output losses to Texas, California, and Arizona due wait times at their in-state POEs total 11,000 jobs and $2.2 billion in output and $630 million in wages *annually*.


California
$325 million in output
$90 million in wages
1,700 jobs
Arizona
$150 million in output
$50 million in wages
780 jobs
Texas
$1.7 billion in output
$490 million in wages
8,500 jobs
USA
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
SONORA
CHIHUAHUA
BAJA CALIFORNIA
COAHUILA
MEXICO
NUEVO LEON
TAMAULIPAS

3 High-Level Options

Border delays have a considerable negative impact on the U.S. national economy, border-state economies, and key industries. In the absence of mitigating action, the expected growth in international trade and continuance of necessary security measures may lead to further increases in border wait times. To halt negative economic trends and reduce delays, the evaluation of potential improvement options is needed. Many of these options reflect important initiatives already planned or underway by CBP, GSA, and other federal, state, and local stakeholders.

The following options are a guide to improvement possibilities and are used to estimate returns on investments by port. These options are not intended to be policy recommendations. As shown in Section 5, positive estimated returns on investments provide evidence that these options have potential, but additional analysis is required to assess long-term feasibility.

3.1 Option 1: Optimize Use of Capacity

Proactive demand management could reduce wait times by focusing on achieving an optimal dispersion of demand across available capacity and promoting efficient border crossing decisions. A barrier to implementation is the flexibility of stakeholder business practices; collaboration and pilots are required to test feasibility.

3.1.1 Option 1.1: Institute an Appointment System

Reliability and predictability are of principal importance to those involved in importing and transportation. Appointments for service are an effective mechanism for reducing unpredictability and managing demand. An importer, broker, or transportation company could electronically schedule border crossings, free of charge, and receive a window of time within which trucks may cross. Non-scheduled crossings would wait in the standard queue. CBP and Aduanas (Mexican Customs) could best allocate available capacity and inspection resources. Adequate infrastructure is needed to allow trucks with appointments to access dedicated capacity.

A second solution for managing demand through appointments is to develop POE- and border crossing-specific use permits, pursuant to legal feasibility. Each POE or border crossing (e.g., bridges) could distribute licenses that authorize its use. Licenses could act as all day appointments and licensed trucks would be granted a defined percentage of daily border crossing capacity.

3.1.2 Option 1.2: Pilot Variable Pricing

Demand for capacity can be managed in the border crossing environment through two forms of variable pricing – congestion pricing and value pricing. Real-time congestion pricing is a strategy that varies the total cost associated with border crossings depending on traffic levels. With appropriate adjustments to tolls and fees, traffic congestion can be dissipated over time and available physical capacity.

A second form of variable pricing is value pricing. Value pricing adjusts the cost associated with border crossing depending on the urgency, or other measure of importance, of each shipment. Many shipments are time sensitive due to just-in-time inventory practices or perishability. Importers may determine that it is in their best interest to expedite shipping and may choose to pay additional tolls or fees based on their demand for time-sensitive crossings. An example is agriculture shippers who place a premium on rapid access to the U.S. market.

3.1.3 Option 1.3: Promote Data-Driven Decision Making

To best manage the use of available infrastructure, the provision of wait time and lane opening information is needed. This option builds on CBP's existing web-based reporting of open lanes and current wait times, as well as border crossing operators' traffic cameras that provide web-based, video feeds of congestion conditions. Alerts on congestion within the border crossing transportation system could be provided to users of the crossing infrastructure, such as brokers and shippers, to help make efficient decisions. Information should be provided by methods that enable alternate route selection prior to trucks being committed to a road. Importers can then vary

route, timing, and POE choices. This information may be provided through several channels, including websites, mobile phones, variable signage on approaching roadways, or the radio. A key benefit of using this information would be a reduction in excess plan time by importing entities. This strategy would benefit from a public-private partnership that enables a quasi-private organization to provide border crossing congestion and border wait time data to subscribers via electronic and other communication channels.

3.1.4 Option 1.4: Pilot Empty Truck Strategies

Empty trucks and bobtails consume capacity available to loaded trucks, are a less efficient use of the border crossing infrastructure, and slow travel for value-laden trucks and FAST trucks. For POEs with a high percentage of empty truck volume, border crossing capacity can be optimized by limiting access to only loaded trucks during peak hours. This option must be considered in the context of the current truck drayage system. Another mechanism is to charge an empty truck fee. Both options could encourage trucks to be value-added in both directions as they cross the border. The existing tolling infrastructure could be used to collect the empty truck fee. An exemption from fees or peak hour restrictions could be made to participants in trusted programs.

3.2 Option 2: Improve Throughput

Improving throughput can reduce border wait times by increasing the rate of movement and pace of verifications through the border crossing system.

3.2.1 Option 2.1: Segment the Trucking Population

Mingled and diverse traffic types at the border produce traffic conflict and congestion that impedes efficient crossings. With proper segmentation of commercial trucks, CBP and other agencies can efficiently deploy differentiated services to increase throughput for low-risk and compliant shipments. Separate and dedicated lanes provide the best method to push segmentation further back into the approach process. This option must be considered in the context of physical limitations. To improve throughput via segmentation, U.S. border authorities should be able to quickly transition lane types and processing modes to accommodate the highest demand segments at any given time. Each lane and inspection booth could process all segments of anticipated demand. For example, if empty truck lanes are expected to be underutilized during peak hours, those lanes should be converted to handle FAST or loaded trucks.

3.2.2 Option 2.2: Expand Participation in Trusted Programs

Trusted, low-risk, and known approaching trucks can move easily and quickly across the border, enabling further screening and compliance verifications of high-risk and unknown trucks. CBP has increased private sector enrollment in voluntary trusted importer programs (such as FAST, Importer and Broker Self Assessments, Customs-Trade Partnership Against Terrorism, and Nationally Managed Accounts) and continued outreach and marketing will be beneficial. There could also be tiers of benefits offered between programs to attract small, medium, and large companies. Readily accessible, dedicated lanes for members of trusted programs are critical to providing program wait time benefits. Additionally, important new programs to pilot on the southern border are a low-risk agriculture importer program and a program for maquiladoras making multiple crossings per day.

3.2.3 Option 2.3: Enhance Advance Information

Over the past few years, CBP has expanded its capability to collect advance information on passengers and cargo that intends to gain admittance into the U.S., including initial deployments of the Automated Commercial Environment. These successes can be built upon to continue to accrue benefits. Information and risk analysis could benefit from a full lifecycle view of cargo, providing credentialed records as the cargo moves through the importing chain. Data may be integrated across each component of the importing process, including importers, brokers, shippers, manufacturers, transport companies, and truck drivers. Better targeting of threats and high-risk cargo will be enabled.

At the land border, the superbooth concept currently in operation in Nogales could be expanded. An enhanced processing center could be piloted that integrates Mexican export, U.S. security, trade, and safety, and state inspections. Shared inspection and concurrent processing practices could improve throughput. This could reduce congestion during approach to the U.S. border by routing fully validated trucks past U.S.-based inspection facilities. This concept should be implemented in combination with secure corridors to close security vulnerabilities and with the International Trade Data System to integrate advance information across public and private sector stakeholders. Improvements to Mexican export processing, including closing security vulnerabilities and improving personnel skill sets may be required to ensure security while facilitating trade.

3.2.4 Option 2.4: Sponsor a Wait Time Reduction Contest

An innovative mechanism to improve system-wide throughput is to sponsor a performance measure-based wait time contest. The contest can include private firms that own and operate the border crossing infrastructure and the agencies that regulate it. The contest could involve federal agencies united as a sponsoring umbrella organization to provide incentives for the successful implementation of wait time reduction solutions. This technique would be best employed at POEs with privately-owned transportation infrastructure and with multiple border crossings. It is important to note that improvement options made via the contest would be subject to the laws and procedures of proper security inspections. No changes to CBP's or other border agencies' security or operational protocols would be initiated by stakeholders of this contest.

3.3 Option 3: Expand Capacity

Expanding capacity can reduce wait times by enlarging physical infrastructure and increasing staff and operating hours to improve the ability to process growing traffic volumes. There are many infrastructure projects planned or underway.

3.3.1 Option 3.1: Expand Physical Infrastructure

An expansion of physical border crossing infrastructure is needed to reduce wait time. Expansion options, depending on port-specific needs and available space, include:

- Improving Mexican and U.S. local access roads and highways.
- Widening the approach to Mexican export facilities and widening border crossings such as bridges.
- Constructing new lanes leading to U.S. primary and expanding the number of primary booths.
- Lengthening dedicated cargo and FAST lanes.
- Enlarging and redesigning secondary inspection facilities to accommodate advanced security technologies (e.g., radiation portal monitors, gamma-ray imaging).

Bilateral effort is required to improve infrastructure on both sides of the border. Several infrastructure expansion projects are planned and underway. It is also important to consider the type of capacity needed. The capacity needed at each POE will vary based on the types of incoming trucks, such as FAST, empty, or agricultural. For those POEs with high percentages of FAST trucks, it is recommended to provide longer and additional dedicated lanes to deliver wait time benefits to enrolled members. An additional strategy is to designate "trade-only" transportation corridors that lead to expanded commercial-only POEs. These newly designated cargo-only ports could be limited to low-risk importers and trucks (e.g., FAST, C-TPAT, or other pre-cleared trucks) either full time or during known periods of peak demand.

3.3.2 Option 3.2: Increase Staffing and Operating Hours

Adding shifts to existing operating hours is a critical option. Full staffing of available capacity can help minimize border wait times during peak operating hours. Further, widened operating hours would allow more opportunities throughout the day for trucks to cross the border. Positive results from the provision of widened operating hours will only occur if all stakeholders better align their schedules, especially brokers, transporters, and warehousing companies.

To enable better management of operating capacity during peaks in demand, an expanded temporary detail program could help to rapidly respond to staffing needs. For example, CBP Officers from off-season ports could be detailed to other ports experiencing peaks in seasonal demand. A further mechanism to increase capacity through staffing is to staff tandem primary inspection booths in anticipation of peaks, where physically feasible. Tandem primary booths are designed with two primary windows for two CBP Officers to clear two trucks concurrently.

4 Port of Entry Analysis

The five busiest southern land border POEs experience congestion and border delays that negatively impact national and state economies. Businesses, workers, and governments experience decreases in sales, wages, jobs, and tax revenues. To halt these losses, specific strategies are needed at each POE.

4.1 Laredo Port of Entry

Laredo is the busiest POE on the southern land border by volume and value. Border wait times average 49 minutes. Total national economic losses due to delays at the Laredo POE are $2.8 billion and 12,500 jobs. Strategies to reduce wait times are projected to result in a $4.4 billion economic benefit to the U.S. over the next ten years.

4.1.1 Port Profile

Laredo, TX is the largest land POE on the U.S.-Mexico border by commercial freight value. Over one-third of U.S. southern land border imports pass through Laredo. Over the past twelve years, total cargo value imported through Laredo by truck increased by 335% and total volume increased 103%. U.S. exports to Mexico more than doubled in value over the past twelve years, currently totaling $35 billion. Laredo has two commercial crossing points approximately 20 miles apart: the World Trade Bridge (WTB) and the Colombia Solidarity International Bridge (CSIB). The WTB is closer to the city of Laredo and has eight primary inspection booths, all of which are used for commercial trucks. The WTB implemented the FAST program in 2005. A seven primary lane expansion project will be completed within two years. The CSIB has 12 primary inspection booths, four for passenger vehicles and eight for commercial trucks, and implemented the FAST program in November 2007. Although both commercial border crossing points have similar capacities, there is a significant disparity in their use. Over the past two and a half years, over 75% of Laredo commercial traffic volume used the WTB. This is due to political and broker licensing factors in Mexico and to the geographic and infrastructure advantages of the WTB.

World Trade Bridge - Map



The commercial traffic route is shown in Green

Colombia Solidarity International Bridge - Map



The commercial traffic route is shown in Green

4.1.2 Summary of Findings

Wait Times – Laredo's border wait time averages 49 minutes. WTB wait time averages 55 minutes and CSIB wait time averages 40 minutes. Wait times are highest from 8:00am to 11:00am and decrease steadily throughout the day. FAST trucks wait 39 minutes compared to 51 minutes for non-FAST loaded trucks.

Economic Impact – The economic impacts to the U.S. due to border delays at Laredo account for approximately half of the total national economic impact. Total losses to the U.S. economy due to border delays at Laredo are estimated to be almost $2.8 billion in output, $700 million in wages, $300 million in tax revenues, and 12,500 jobs. Economic losses are projected to increase to over $5.7 billion in output, $1.4 billion in wages, $600 million in tax revenues and over 25,600 jobs by 2017.

4.1.3 Laredo Options

A decrease in border wait times at the Laredo POE may be achieved through the following tailored strategies:

Laredo - Options, Strategies, and Implementation Targets

Laredo Problem Areas	Options	Strategies	Target Start	Target End
1. Congestion due to inadequate number of primary inspection booths at WTB.	▪ Expand Physical Infrastructure (3.1)	▪ Complete addition of seven primary inspection lanes and booths.	2009	2011
	▪ Increase Staffing and Operating Hours (3.2)	▪ Extend morning operating hours and coordinate with private sector to use additional hours to reduce morning demand peaks.	2009	Ongoing
2. Capacity of CSIB is underutilized relative to WTB.	▪ Expand Physical Infrastructure (3.1)	▪ Improve infrastructure around CSIB, specifically by expanding Mexican roadways and linking CSIB's exit roads more directly to major Texas highways.	2013	2020
	▪ Sponsor a Wait Time Reduction Contest (2.4)	▪ Establish a contest with incentives to improve system-wide cooperation and reduce border wait times.	2009	2010
		▪ Develop a public-private partnership to facilitate contest achievement. ▪ Prime candidate for wait time reduction contest due to the existence of multiple crossings within the POE and nearby alternatives (e.g., Eagle Pass).	2009	2010
3. Limited management of the large population segments that regularly import through Laredo.	▪ Expand Participation in Trusted Programs (2.2)	▪ Perform marketing and outreach to increase enrollment in voluntary trusted programs, given Laredo's massive volume and relatively lower FAST wait times. Target large, mid-size, and *maquiladora* importers who regularly import through Laredo.	2009	Ongoing
		▪ Install jersey barriers and lengthen dedicated lanes for trusted trucks to establish earlier segmentation during approach.	2010	2015
4. High volume of empty trucks absorbs capacity.	▪ Pilot Empty Truck Strategies (1.4)	▪ Pilot an empty truck fee program to encourage value-added border crossings.	2010	2011

These strategies are projected to result in a $4.4 billion economic benefit over the next ten years due to reductions in border delays. The total implementation cost estimate ranges from $155 million to $460 million. The largest benefit is expected to result from expanded participation in trusted programs such as FAST. This strategy is estimated to lower wait times by approximately 10 to 13 minutes and to reduce output losses by $2.6 billion (*over 20 years* due to infrastructure considerations for this strategy at Laredo).

Laredo - Cost Benefit Analysis

Options	Estimated Cost	Estimated Wait Time Impact (% and mins)	NPV Timeframe[3]	NPV (in $millions)[4]
Expand Participation in Trusted Programs (2.2)	High ($51M – $100M)	20% - 27% (10 - 13min)	20 years	**$2,643**
Expand Physical Infrastructure (3.1)	Very High ($101M - $300M)	15% - 20% (7 - 10min)	20 years	**$1,770**
Increase Staffing and Operating Hours (3.2)	Low ($1M – $20M)	17% - 23% (8 - 11min)	10 years	**$817**
Pilot Empty Truck Strategies (1.4)	Low ($1M – $20M)	15% - 20% (7 - 10min)	10 years	**$733**
Sponsor a Wait Time Reduction Contest (2.4)	Low ($1M – $20M)	14% - 18% (7 - 9min)	10 years	**$653**

[3] NPV is calculated over either a 10 year or 20 year timeframe, depending on the projected time period of benefits realization.
[4] NPV is defined as the present value of an option's future wait time reduction benefit, as translated into economic benefit, minus the initial implementation cost

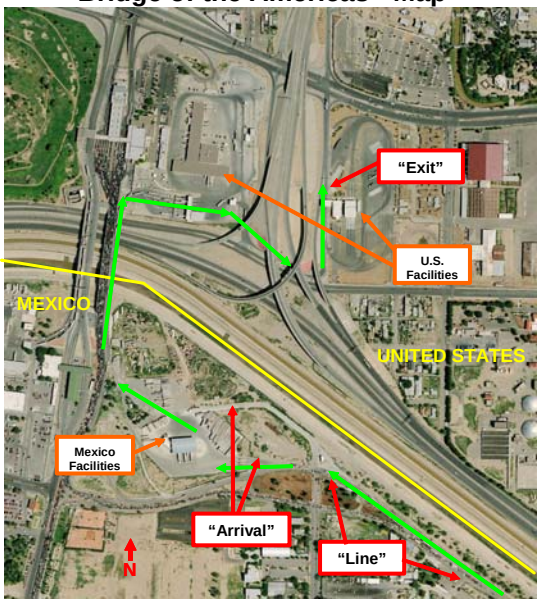
4.2 El Paso Port of Entry

El Paso is the second busiest southern land border POE. Border wait times average 47 minutes. Total national economic losses due to delays at the El Paso POE are $1.5 billion and 6,700 jobs. Strategies to reduce wait times are projected to result in a $1.5 billion economic benefit over the next ten years.

4.2.1 Port Profile

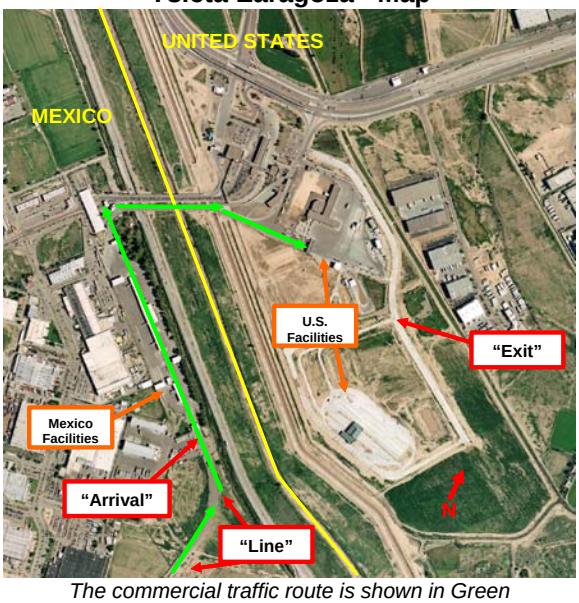
The El Paso POE is the second largest southern land border port by value. Over the past twelve years, the total trade value imported through El Paso has increased by 100%, from $12 billion to $24 billion per year, and volume has increased 22%. Exports to Mexico through El Paso total $18 billion, doubling since 1996. El Paso has two commercial crossing points approximately ten miles apart: the Bridge of the Americas (BOTA) and the Ysleta-Zaragoza bridge. The BOTA has a total of 20 primary inspection booths, six of which are used for commercial trucks and 14 are used for passenger vehicles. Ysleta-Zaragoza has a total of 19 primary inspection booths; six of which are allocated for commercial trucks and 13 are assigned to passenger vehicles. Commercial traffic flow shifts from BOTA to Ysleta-Zaragoza in the evenings because BOTA closes at 6pm. Both crossings process passenger vehicles 24 hours a day, seven days a week.

Bridge of the Americas - Map



The commercial traffic route is shown in Green

Ysleta-Zaragoza - Map



The commercial traffic route is shown in Green

4.2.2 Summary of Findings

Wait Times – El Paso's border wait time averages 47 minutes. BOTA wait time is 48 minutes and Ysleta-Zaragoza wait time is 46 minutes. Wait times are high in the morning from 8:00am to 9:00am with an additional peak at mid-day from 1:00pm to 2:00pm. FAST trucks wait on average 32 minutes, while non-FAST loaded and empty trucks average 53 and 46 minutes, respectively.

Economic Impact – Total losses to the U.S. economy due to border delays at El Paso are estimated to be almost $1.5 billion in output, $400 million in wages, $200 million in tax revenues, and 6,700 jobs. Economic losses are projected to increase to over $2.6 billion in output, $600 million in wages, $300 million in tax revenues and 11,500 jobs by 2017.

4.2.3 El Paso Options

A decrease in border wait times at the El Paso POE may be achieved through the following tailored strategies:

El Paso - Options, Strategies, and Implementation Targets

El Paso Problem Areas	Options	Strategies	Target Start	Target End
1. Limited operating hours at BOTA compared to other border crossings causes congestion during open hours and shifts evening demand to Ysleta-Zaragoza.	▪ Increase Staffing and Operating Hours (3.2)	▪ Widen operating hours at BOTA, specifically in the evening and in spring and summer months, and staff all primary booths during BOTA demand peaks.	2009	Ongoing
		▪ Build and operate tandem primary booths to clear multiple trucks concurrently during peaks in demand, pursuant to physical feasibility.	2010	Ongoing
		▪ Pilot an empty truck fee program for trucks not enrolled in trusted programs that make multiple daily trips across the border.	2011	2013
2. Limited management of the large commercial population segments that regularly import through El Paso.	▪ Expand Participation in Trusted Programs (2.2)	▪ Perform outreach and marketing to increase enrollment in trusted programs, given El Paso's massive volume and relatively lower FAST wait times. Market El Paso's large differential between FAST wait times and empty or loaded wait times as a major benefit to increase participation.	2009	Ongoing
	▪ Enhance Advance Information (2.3)	▪ Integrate expanded advance information across the importing process (e.g., manufacturer through consignee) to improve targeting and enable data-driven decision making (2.3) and Intelligent Transportation Systems	2011	Ongoing
3. Limited distribution of traffic across physical capacity.	▪ Promote Data-Driven Decision Making (1.3)	▪ Develop capability to transition lanes to accommodate passenger or commercial, northbound or southbound, and empty vehicles as demand requires.	2012	2014
		▪ Develop a public-private partnership to provide real-time congestion and lane opening information to subscribers. ▪ Prime candidate for promoting data-driven decision making due to the clustering of four border crossings, close to major highways, in the same Mexican state.	2011	2012
4. High volume of empty trucks absorbs physical and processing capacity; El Paso serves the highest volume of empty trucks of the five busiest POEs.	▪ Pilot Empty Truck Strategies (1.4)	▪ Pilot a dedicated empty truck lane at Ysleta-Zaragoza with Non-Intrusive Inspection technology.	2011	2013

These strategies are projected to result in a $1.5 billion economic benefit over the next ten years due to reductions in border delays. The total implementation cost estimate ranges from $65 million to $190 million. The largest benefit is expected to result from expanded participation in trusted programs such as FAST. This strategy is estimated to lower wait times by approximately 9 to 13 minutes and to reduce output losses by $454 million.

El Paso - Cost Benefit Analysis

Options	Estimated Cost	Estimated Wait Time Impact (% and mins)	NPV Timeframe	NPV (in $millions)[5]
Expand Participation in Trusted Programs (2.2)	Low ($1M – $20M)	20% - 27% (9- 13min)	10 years	**$454**
Increase Staffing and Operating Hours (3.2)	Low ($1M – $20M)	17% - 23% (8 - 11min)	10 years	**$388**
Pilot Empty Truck Strategies (1.4)	Medium ($21M – $50M)	15% - 21% (7 - 10min)	10 years	**$324**
Enhance Advance Information (2.3)	Medium ($21M – $50M)	13% - 17% (6 - 8min)	10 years	**$257**
Promote Data-Driven Decision Making (1.3)	Medium ($21M – $50M)	5% - 6% (2 - 3min)	10 years	**$74**

[5] NPV is defined as the present value of an option's future wait time reduction benefit, as translated into economic benefit, minus the initial implementation cost

4.3 Otay Mesa Port of Entry

Otay Mesa has the highest wait times of the five busiest southern land border POEs. Border wait times average 122 minutes and remain higher than all other POEs throughout the day. Total national economic losses due to delays at the Otay Mesa POE are $600 million and 2,700 jobs. Strategies to reduce wait times are projected to result in a $430 million economic benefit over the next ten years.

4.3.1 Port Profile

The Otay Mesa POE is in San Diego, California. Over the past ten years, the total value of goods imported through Otay Mesa has increased by 162%, from $7 billion to $18 billion, and volume has increased 30%. From 1997 to 2007, the value of U.S. exports to Mexico rose to $10 billion from $5 billion. Otay Mesa has a total of 22 primary inspection booths, 12 for passenger vehicles and ten for commercial trucks. Of these cargo inspection booths, one is dedicated to empty vehicles. In October 2004, Otay Mesa was the first California POE to implement the FAST program.

Otay Mesa – Port of Entry Map



The commercial traffic route is shown in Green

4.3.2 Summary of Findings

Wait Times – Otay Mesa's border wait time averages 122 minutes, the highest of the five busiest southern land border POEs. Wait times are higher than the other four POEs throughout all operating hours. FAST trucks wait approximately 96 minutes, compared to 134 minutes for non-FAST loaded trucks and 119 minutes for empty trucks.

Economic Impact – Total losses to the U.S. economy due to border delays at Otay Mesa are estimated to be almost $600 million in output, $100 million in wages, $60 million in tax revenues, and 2,700 jobs. Economic losses are projected to increase to $1.1 billion in output, $300 million in wages, $100 million in tax revenues and 5,000 jobs by 2017.

4.3.3 Otay Mesa Options

A decrease in border wait times at the Otay Mesa POE may be achieved through the following tailored strategies:

Otay Mesa - Options, Strategies, and Implementation Targets

Otay Mesa Problem Areas	Options	Strategies	Target Start	Target End
1. Congestion throughout all hours of operation.	▪ Expand Physical Infrastructure (3.1)	▪ Expand the roadway infrastructure leading to Otay Mesa on the Mexican side and widen the two mile stretch between U.S. and Mexico inspection points. ▪ Build Otay Mesa East *(not included in cost estimates).*	2013	2020
2. Limited hours of operations restrict the use of available capacity.	▪ Increase Staffing and Operating Hours (3.2)	▪ Widen operating hours and staff all primary booths during demand peaks (e.g., summer).	2009	Ongoing
		▪ Optimize staffing by time of year – adding CBP Officers in late fall / holiday season and Agriculture Specialists in spring season.	2009	Ongoing
3. Lack of segmentation of passenger and commercial vehicles on approaching roadways.	▪ Segment the Trucking Population (2.1)	▪ Lengthen dedicated lanes for passenger, commercial, and trusted trucks to establish earlier segmentation and reduce weaving on roadways leading to U.S. primary inspection.	2011	2014
		▪ Develop capability to rapidly transition lane types as demand requires.	2012	2014
	▪ Expand Participation in Trusted Programs (2.2)	▪ Market Otay Mesa's relatively lower FAST wait times to increase enrollment in trusted programs.	2009	Ongoing
	▪ Enhance Advance Information (2.3)	▪ Pilot superbooth concept for commercial trucks on Mexican side of the border to eliminate bottleneck on the two mile stretch between CBP and Mexican Customs. ▪ This option is pursuant to political and physical feasibility.	2013	2015
		▪ Establish a secure corridor to route compliant trucks around U.S. primary once cleared by the superbooth.	2014	2020

These strategies are projected to result in a $430 million economic benefit over the next ten years due to reductions in border delays. The total implementation cost estimate ranges from $255 million to $740 million. The largest benefit is expected to result from segmenting the trucking population. This strategy is estimated to lower wait times by up to 20 minutes and to reduce output losses by $168 million (*over 20 years* due to infrastructure considerations for this strategy in Otay Mesa).

Otay Mesa - Cost Benefit Analysis

Options	Estimated Cost	Estimated Wait Time Impact (% and mins)	NPV Timeframe[6]	NPV (in $millions)[7]
Segment the Trucking Population (2.1)	High ($51M – $100M)	12% - 16% (14 - 19min)	20 years	**$168**
Expand Participation in Trusted Programs (2.2)	Low ($1M – $20M)	20% - 27% (24 - 32min)	10 years	**$143**
Increase Staffing and Operating Hours (3.2)	Low ($1M – $20M)	17% - 23% (21 -2 8min)	10 years	**$121**
Expand Physical Infrastructure (3.1)	Very High ($101M - $300M)	15% - 20% (18 - 24min)	20 years	**$101**
Enhance Advance Information (2.3)	Very High ($101M - $300M)	123% - 17% (16 - 20min)	20 years	**$60**

[6] NPV is calculated over either a 10 year or 20 year timeframe, depending on the projected time period of benefits realization.
[7] NPV is defined as the present value of an option's future wait time reduction benefit, as translated into economic benefit, minus the initial implementation cost

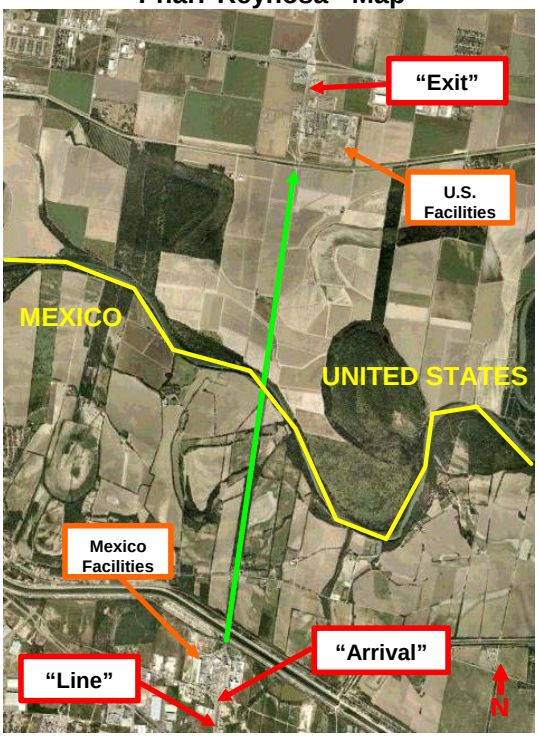
4.4 Hidalgo / Pharr Port of Entry

Hidalgo is one of the fastest growing POEs on the southern border. Total national economic losses due to delays at the Hidalgo POE are $600 million and 2,700 jobs. Strategies to reduce wait times are projected to result in a $950 million economic benefit over the next ten years.

4.4.1 Port Profile

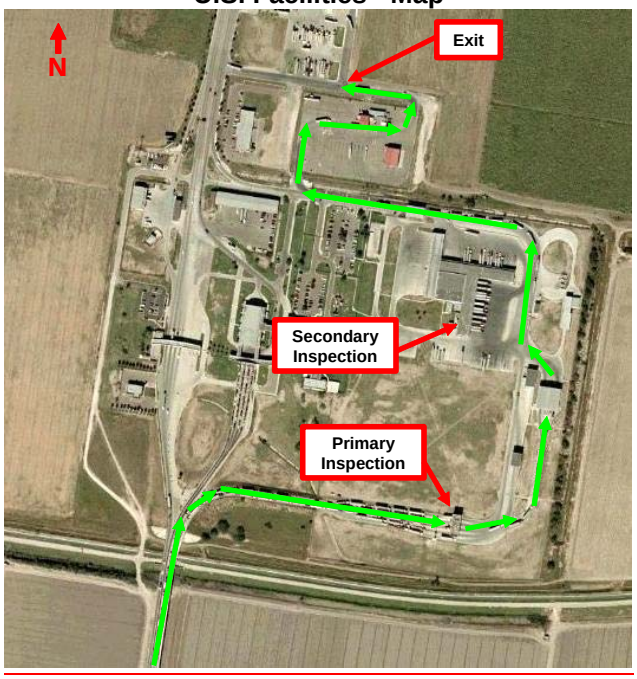
Hidalgo / Pharr, TX is one of the fastest growing ports in terms of commercial traffic volume and trade value of all the POEs on the U.S.-Mexican border. Over the past twelve years, total import value has increased 277%, from $3 billion to $12 billion and volume has increased 158%. This is the largest percent increase of the five busiest U.S.-Mexican border POEs. Exports to Mexico have grown to $9 billion, increasing 350% since 1995. The Hidalgo / Pharr POE has one commercial crossing point that processes northbound cargo, the Pharr-Reynosa International Bridge on the Rise. The Pharr bridge has nine primary inspection booths, five for commercial trucks and four for passenger vehicles. The FAST program was implemented at the Pharr bridge in 2005.

Pharr-Reynosa - Map



The commercial traffic route is shown in Green

U.S. Facilities - Map



The commercial traffic route is shown in Green

4.4.2 Summary of Findings

Wait Times – Pharr's wait time averages 64 minutes. Wait times are highest between 8:00am and 10:00am and remain relatively consistent throughout the day. FAST trucks have shorter wait times (65 minutes) than non-FAST loaded trucks (75 minutes), while empty trucks experience the least wait time (46 minutes). Average weekend wait times are higher than weekday wait times – 91 minutes compared to 59 minutes.

Economic Impact – Total losses to the U.S. economy due to border delays at Pharr are estimated to be almost $600 million in output, $100 million in wages, $60 million in tax revenues, and 2,700 jobs. Economic losses are projected to increase significantly to $2.5 billion in output, $600 million in wages, $300 million in tax revenues and 11,500 jobs by 2017.

4.4.3 Hidalgo / Pharr Options

A decrease in border wait times at the Hidalgo / Pharr POE may be achieved through the following tailored strategies:

Hidalgo / Pharr - Options, Strategies, and Implementation Targets

Hidalgo / Pharr Problem Areas	Options	Strategies	Target Start	Target End
1. Rapid increases in commercial volume have outgrown current capacity.	▪ Expand Physical Infrastructure (3.1)	▪ Increase the number of primary inspection booths.	2012	2014
		▪ Begin planning other infrastructure expansion projects to address Pharr's fast growth and provide lead time for project approval. ▪ Forecast the timing at which the threshold for use of the Anzalduas bridge will be reached.	2009	2011
2. Lack of segmentation of passenger and commercial vehicles and pedestrians on the Pharr-Reynosa Bridge.	▪ Segment the Trucking Population (2.1)	▪ Establish segmentation prior to the bridge to eliminate the bottleneck and reduce weaving on roadway leading to U.S. primary inspection. ▪ Establish permanent FAST segmentation on the bridge.	2010	2011
		▪ Develop capability to rapidly transition lanes between passenger and commercial as demand requires.	2012	2014
3. Limited distribution of traffic across physical capacity and days of the week.	▪ Increase Staffing and Operating Hours (3.2)	▪ Widen weekend operating hours and staff additional primary booths to reduce peaks in weekend commercial demand.	2009	Ongoing
	▪ Sponsor a Wait Time Reduction Contest (2.4)	▪ Establish a contest with incentives for improving system-wide cooperation and reducing border wait times.	2009	2010
		▪ Develop a public-private partnership to facilitate contest achievement. ▪ Prime candidate for a wait time reduction contest due to the existence of multiple crossings within the POE.	2009	2010
	▪ Pilot Variable Pricing (1.2)	▪ Pilot congestion pricing to encourage border crossings during the week.	2012	2014

These strategies are projected to result in a $970 million economic benefit over the next ten years due to reductions in border delays. The total implementation cost estimate ranges from $125 million to $290 million. The largest benefit is expected to result from increasing staffing and operating hours. This strategy is estimated to lower wait times by 11 to 15 minutes and to reduce output losses by $275 million.

Hidalgo / Pharr - Cost Benefit Analysis

Options	Estimated Cost	Estimated Wait Time Impact (% and mins)	NPV Timeframe[8]	NPV (in $millions) [9]
Increase Staffing and Operating Hours (3.2)	Low ($1M – $20M)	17% - 23% (11 - 15min)	10 years	**$275**
Sponsor a Wait Time Reduction Contest (2.4)	Low ($1M – $20M)	14% - 18% (9 – 12min)	10 years	**$218**
Pilot Variable Pricing (1.2)	Medium ($21M – $50M)	13% - 18% (9 - 11min)	10 years	**$188**
Expand Physical Infrastructure (3.1)	High ($51M – $100M)	15% - 20% (10 - 13min)	10 years	**$159**
Segment the Trucking Population (2.1)	High ($51M – $100M)	12% - 16% (8 - 10min)	10 years	**$126**

[8] NPV is calculated over either a 10 year or 20 year timeframe, depending on the projected time period of benefits realization.
[9] NPV is defined as the present value of an option's future wait time reduction benefit, as translated into economic benefit, minus the initial implementation cost

4.5 Nogales Port of Entry

Nogales is a fast growing POE that processes almost 50% of U.S. southern border imports of agriculture. Total national economic losses due to delays at the Nogales POE are $335 million and 1,500 jobs. Strategies to reduce wait times are projected to result in a $245 million economic benefit over the next ten years.

4.5.1 Port Profile

The Nogales-Mariposa crossing point is the commercial crossing for the POE at Nogales, AZ. Over the past twelve years the total value of cargo imported through Nogales has grown 166%, from $3 billion to $8 billion per year, and volume has increased 41%. Exports to Mexico total $5 billion, up from $2 billion in 1995. The Nogales-Mariposa crossing was recently expanded and implemented FAST in August 2006. The facility now has nine primary inspection booths, four for passenger vehicles and five for commercial trucks. Of these cargo inspection booths, one is allocated for FAST, three are for loaded trucks, and one is for oversized vehicles. Nogales is a significant POE for fruit and vegetable imports from Mexico. As a result, the POE consistently experiences peaks during the winter and spring seasons. Improvement plans, including infrastructure expansions, are being developed to respond to seasonal peaks.

Nogales – Port of Entry Map



The commercial traffic route is shown in Green

4.5.2 Summary of Findings

Wait Times – Nogales' annualized border wait time averages 33 minutes. Peak hours are 10:00am through 1:00pm. Trucks with drivers enrolled in the FAST program experience significantly shorter border wait times than loaded commercial trucks, waiting on average approximately half the time (20 minutes) of non-FAST trucks (40 minutes). Empty trucks experience delays of 27 minutes. *Note:* Estimates of Nogales wait times do not include Mexican export processing due to its location in interior Mexico.

Economic Impact – Total losses to the U.S. economy due to border delays at Hidalgo are estimated to be almost $340 million in output, $80 million in wages, $30 million in tax revenues, and 1,500 jobs. Economic losses are projected to increase to $500 billion in output, $130 million in wages, $50 million in tax revenues and 2,300 jobs by 2017.

4.5.3 Nogales Options

A decrease in border wait times at the Nogales POE may be achieved through the following tailored strategies:

Nogales - Options, Strategies, and Implementation Targets

Nogales Problem Areas	Options	Strategies	Target Start	Target End
1. Peaks in demand by time of day and time of year (agriculture season).	▪ Increase Staffing and Operating Hours (3.2)	▪ Widen operating hours and staff all primary booths at peak times of year for commercial crossings.	2009	Ongoing
		▪ Build and operate tandem primary booths to clear multiple trucks concurrently during peaks in demand, where physically feasible.	2010	Ongoing
	▪ Institute an Appointment System (1.1)	▪ Disburse demand throughout POE operating hours by using e-appointments.	2010	2012
2. Clearing agriculture-laden trucks requires special processing and additional inspections.	▪ Segment the Trucking Population (2.1)	▪ Dedicate lanes to agriculture-laden trucks.	2010	2010
		▪ Develop capability to rapidly transition lanes between passenger and commercial as demand requires.	2011	2013
	▪ Expand Participation in Trusted Programs (2.2)	▪ Develop a trusted, low-risk agriculture importer program; enrollees would retain "all day appointments."	2009	2010
	▪ Enhance Advance Information (2.3)	▪ Expand pre-inspection of agriculture at the point of origin.	2011	Ongoing
		▪ Enhance existing Nogales superbooth with integrated and expanded advance information across the importing process (e.g., manufacturer through consignee).	2010	2011
		▪ Involve USDA and FDA in superbooth.	2010	2012
		▪ Develop electronic submission and review of agriculture permits / visas.	2011	2012
	▪ Pilot Variable Pricing (1.2)	▪ Pilot value-based pricing to expedite time-sensitive cargo (such as agriculture) across the border by providing access to dedicated capacity.	2013	2015

These strategies are projected to result in a $250 million economic benefit over the next ten years due to reductions in border delays. The total implementation cost estimate ranges from $75 million to $210 million. The largest benefit is expected to result from expanding participation in trusted programs. This strategy is estimated to lower wait times by 7 to 9 minutes and to reduce output losses by nearly $90 million.

Nogales - Cost Benefit Analysis

Options	Estimated Cost	Estimated Wait Time Impact (% and mins)	NPV Timeframe[10]	NPV (in $millions) [11]
Expand Participation in Trusted Programs (2.2)	Low ($1M – $20M)	20% - 27% (7 - 9min)	10 years	**$87**
Increase Staffing and Operating Hours (3.2)	Low ($1M – $20M)	17% - 23% (6 - 8min)	10 years	**$74**
Pilot Variable Pricing (1.2)	Medium ($21M – $50M)	13% - 18% (4 - 6min)	10 years	**$31**
Institute an Appointment System (1.1)	Low ($1M – $20M)	8% - 11% (3 - 4min)	10 years	**$28**
Enhance Advance Information (2.3)	High ($51M – $100M)	13% - 17% (4 - 6min)	10 years	**$27**

[10] NPV is calculated over either a 10 year or 20 year timeframe, depending on the projected time period of benefits realization.
[11] NPV is defined as the present value of an option's future wait time reduction benefit, as translated into economic benefit, minus the initial implementation cost

5 Conclusions

Congestion is affecting our national and economic security. It is a problem that is expected to grow. This report promotes the ongoing dialogue across the many stakeholders necessary to improve the situation. Outreach and deep partnerships will continue to be of great importance.

This study provided:

- A performance metric for system-wide border crossing wait time that captures the broad scope of factors that lead to congestion and delays.
- Border crossing system wait times at the five busiest U.S.-Mexico crossings.
- Economic impacts of border delay for the U.S. economy, key border state economies, and key industries.
- High-level options – some which are time-tested and in-progress and some which are innovative and require additional feasibility analysis.
- Improvement options based on the particular needs of the five busiest southern land border crossing systems.

The support of Congress, every government agency working at the border, and the private sector is needed to make mutually beneficial changes that can improve national security and economic outcomes. Starting today, we can:

- Agree on a wait time performance metric and begin data collection to baseline delays.
- Bring together a true stakeholder-wide working group with the authority it needs to drive change.
- Develop near-term joint funding plans across government agencies and include the private sector.
- Investigate the feasibility of options at the five busiest southern land border POEs.
- Leverage the infrastructure investment program currently in place to base needs on true operational requirements rather than on currently under funded resource levels.
- Secure the trust of Congress that considerable improvement is possible.

INTERNATIONAL JOURNAL OF TRANSPORT ECONOMICS
VOL. XXXVI · NO 2 · JUNE 2009

Tolls, Exchange Rates, and Borderplex International Bridge Traffic

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ABSTRACT: Budget constraints are forcing many governments to consider implementing tolls as a means for financing bridge and road expenditures. Newly available time series data make it possible to analyze the impacts of toll variations and international business cycle fluctuations on cross-border bridge traffic between El Paso and Ciudad Juarez. Parameter estimation is carried out using a linear transfer function ARIMA methodology. Price elasticities of demand are similar to those reported for other regional economies, but out-of-sample forecasting results are mixed.

KEY WORDS: Bridge Traffic, Tolls, Applied Econometrics, Mexico Border.
JEL Classification: R41.

INTRODUCTION

DURING the last 100 years, most highways have been built, owned, and maintained by governments (Geltner and Moavenzadeh, 1987). However, construction costs for new roads, plus maintenance and enhancements to existing road networks, impose substantial public sector budgetary pressures. Those costs can frequently exceed tax revenue capacity. As a result, governments have been forced to look for alternative funding. One mechanism governments have periodically considered as a means for financing the costs of construction and maintenance of new roads is tolls (Matas and Raymond, 2003).

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Acknowledgements: Financial support was provided by National Science Foundation Grant SES 0332001, El Paso Electric Company, El Paso Metropolitan Organization, Hunt Building Corporation, Hunt Communities, Wells Fargo Bank of El Paso, the James Foundation Scholarship Fund, and a UTEP College of Business Administration Faculty Research Grant. Helpful comments and suggestions were provided by Tim Roth, Soheil Nazarian, Martha Patricia Barraza de Anda, and Roberto Tinajero. Econometric research assistance was provided by George Novela and Angel Molina.

In the United States, tollways have been present almost since the establishment of the nation. The first authorized private toll road in the United States, The Little River Turnpike Company, was created in 1785 by legislation passed by the Virginia General Assembly (Newlon, 1987). Most early toll roads did not prove to be productive investments. In the 1980s, however, tollways began to be viewed more favorably. At that time, grid deficiencies caused the public to realize that funding constraints were affecting road maintenance efforts at all levels of government (Federal Highway Administration, 1999).

Another reason the use of toll roads has become more widespread is that they are now becoming an important tool in controlling traffic (Burris, 2006). Tolls imposed on roads can diminish network congestion by increasing transportation costs and thereby reducing transportation demand (Ferrari, 2002). As congestion subsides, vehicle emission reductions also occur. Furthermore, improved technology now allows electronic toll collection, which eliminates the need for toll booths and also saves substantial amounts of time otherwise spent in queues by motorists, at least for tolled infrastructure within countries (Federal Highway Administration, 1999). Tolls can also be utilized to limit vehicle emissions and improve air quality.

Because the use of tollways is becoming more prevalent, there is an expanding literature on this general topic. Matas and Raymond (2003) state that it is of extreme importance to have accurate knowledge of demand for toll roads for the purposes of traffic forecasting and evaluation. That study also argues that, if the toll road industry is to grow in a cost-effective manner, this literature must be available for government officials and private investors to utilize. To generate accurate traffic and revenue forecasts, and to measure the effect of a toll road on a parallel free road, then the price elasticity of demand must be known. Similar analyses are also required for bridges.

The Borderplex economy encompasses the El Paso, USA and Ciudad Juarez, Mexico metropolitan economies. While closely linked in an economic sense, these markets are separated physically by the Rio Grande River, geopolitically by an international boundary, and monetarily by separate currencies. The purpose of this paper is to examine the impacts of tolls on cross-border regional travel patterns using newly available historical data on the international bridge tolls charged by the City of El Paso. To achieve this, southbound commuter travel by pedestrians, passenger vehicles, and commercial vehicles between El Paso and Ciudad Juarez are studied. To model these traffic categories, autoregressive-moving average (ARIMA) transfer functions are utilized. The transfer functions model international toll bridge demand as a function of toll prices and regional economic variables. For this analysis, monthly data from January 1991 – December 2004 are utilized

from three of the international bridges in the area. The data include the tolls charged to pedestrians, passenger vehicles, and commercial vehicles, along with the numbers of pedestrians, passenger vehicles, and commercial vehicles that cross each bridge.

The next section provides an overview of previous research on toll road demand. Data and methodology are described in the following section. Model estimation results are then summarized. Out-of-sample forecast accuracy results are presented next. Policy implications are then discussed. The final section includes the conclusion and suggestions for future research.

Literature Review

Because of budgetary pressures, the number of empirical analyses on tolled transportation infrastructure has grown in recent years. Matas and Raymond (2003) study demand elasticity on toll roads with respect to different variables that influence travel. These explanatory variables include real gross domestic product (GDP), gasoline prices, toll price per kilometer, and a set of dummy variables to represent changes in the road network such as improvements to parallel roads. Parameter estimation is carried out using weighted least squares. Results indicate that toll road usage is positively correlated with GDP and that it is negatively inelastic with respect to gasoline prices. Elasticity with respect to toll prices is found to vary for each tollway depending on the characteristics of the road itself and the alternative roads surrounding it. Not surprisingly, demand for a toll road is more price elastic when there is an alternate free road of better quality.

In an earlier effort, Wuestefeld and Regan (1981) also conclude that each toll road is unique and, therefore, each has a different elasticity. That study focuses on the impact of toll increases on revenue and traffic. Multiple factors are found to affect toll road price sensitivity such as alternate roads, trip length, trip purpose, vehicle mix, and timing of toll increases. If the purpose of a trip is recreational, then an increase in tolls will have a greater impact on traffic than it will have if the toll road is mostly utilized by commuters. Toll sensitivity curves are developed to determine revenue potentials for different price increases based on previous travel patterns.

Hirschman et al. (1995) model the demand for toll bridges and tunnels in New York. Demand is specified as a function of tolls, regional employment, motor vehicle registrations, gas prices, and mass transit fares. Motor vehicle registrations are utilized to represent the size of the market and mass transit fares represent an alternative to paying bridge tolls. A dummy variable for seasonal variation is also included. Similar to other studies, parameter heterogeneity indicates that elasticities must be estimated for each individual toll

bridge since they vary even within the same general market area. Although the elasticities vary for each bridge, all are relatively low and the bridges that are most price sensitive are those that are near untolled roads.

Loo (2003) examines toll traffic for six tunnels in Hong Kong. A public transport dominated city, the toll elasticities in Hong Kong are hypothesized to differ substantially from those of more automobile dominant markets. Monthly tunnel toll traffic is modeled as a function of tolls, spatial distribution of the population, real income, gasoline prices, real parking charges, number of private cars registered, seasonal variations, and improvements in mass transit systems. Surprisingly, the results of the analysis indicate that toll price sensitivities in Hong Kong tunnels (-0.103 to -0.291) are more inelastic than those of New York. Similar to empirical evidence reported in other studies (Oum, Waters, and Yong, 1992), the low elasticity estimates indicate that toll increases would be ineffective in reducing traffic volumes, but would raise revenue for construction and maintenance.

Armelius (2005) analyzes congestion tolls with models that include public transport as an alternative to toll roads and different departure times. A toll on a fast mode of transportation (toll road) can lead to congestion on the untolled slow mode (public transportation). To avoid congestion on public transport system, additional measures must be employed. One possibility is to implement an integrated toll and parking policy. Cars entering the central zone during hours when congestion is lowest would be given parking discounts. This would keep some car users from switching to the public transport system and also reduce congestion on toll roads. Even in cases when public transportation congestion results, tolls are still found to improve welfare. That result is in line with earlier analyses where unpriced roads are treated as substitutes for tolled routes (Braid, 1996; Verhoef, Nijkamp, and Rietveld, 1996).

Several studies examine the performance of congestion pricing programs that vary tolls in order to make traffic flows more manageable (Burris, 2006; Muriello and Jiji, 2004; Olszewski and Xie, 2005). Some reductions in traffic volumes are documented in response to time-of-day pricing. Because most road and bridge demand functions are price inelastic, the resulting gains in travel times tend to be relatively small. Not surprisingly, those same characteristics also lead to important revenue enhancements for the public agencies managing the roads and bridges in question. Many of the results documented confirm conclusions pointed to by separate research involving optimal pricing strategies (Miniason, 1979; Yang and Bell, 1996; Yildirim and Hearn; 2002).

Other studies examine factors that influence the political acceptability of

toll roads and bridges (Lave, 1994; Brownstone et al., 2003; Raux and Souche, 2004). Among the various items that affect whether residents will support tolls are geographic market size and willingness to charge higher tolls for cargo vehicles. Capacity constraints on existing parallel roads increases the likelihood of toll infrastructure approvals. In many regions, it is ultimately funding constraints that convince stakeholders to turn to tolled facilities as a means for addressing network congestion and bottlenecks (Podgorski and Kockelman, 2006).

There have been several analyses of international bridge traffic in the El Paso and Ciudad Juarez Borderplex regional economy (Villegas et al., 2006). Fullerton (2001) builds a structural econometric model of the Borderplex economy that examines the impacts of population, incomes, and maquiladora manufacturing growth on annual bridge volumes. In turn, those traffic flows affect various categories of retail sales activity on the north side of the river. Fullerton (2004) tabulates the historical accuracies of the various annual frequency bridge traffic category econometric forecasts published every year by the University of Texas at El Paso. Fullerton (2000) models the effects of currency fluctuations on monthly frequency international border crossings. Fullerton and Tinajero (2002) also use monthly frequency data to analyze northbound cargo flows.

None of the studies to date on this topic examine the impact of tolls on cross-border bridge traffic. Toll collections, however, represent an important source of municipal revenue in El Paso (www.ci.el-paso.tx.us, accessed 19 March 2007). This study attempts to partially fill that gap by analyzing southbound traffic volumes across tolled international bridges connecting El Paso, Texas and Ciudad Juarez, Chihuahua. Completion of the analysis is now feasible due to newly available historical time series data regarding southbound bridge flows and the tolls charged to each respective traffic category. In addition to bridge tolls, the analysis also examines the roles played by inflation adjusted (real) exchange rate movements and business cycle fluctuations.

Data and Methodology

In December 2004, more than 19.7 thousand pedestrians, 13.3 thousand cars, and 710 cargo trucks used the tolled international bridges linking El Paso and Ciudad Juarez on a daily basis. During fiscal year 2006, the fees for using that infrastructure generated more than $14.2 million for the El Paso city budget (www.ci.el-paso.tx.us, accessed 19 March 2007). To date, however, an empirical analysis of the various traffic categories that pay those tolls charged on international bridge use in El Paso has not previously been attempted. Time series data for southbound traffic flows and tolls are now available to support

such an effort. Historical toll data for the corresponding northbound traffic out of Mexico have not yet been compiled and are, thus, excluded from the analysis.

Different types of users are associated with the various bridges. For example, the Santa Fe Bridge near downtown El Paso is typically used by pedestrian tourists from the United States who want to visit Mexico without driving. The nearby Stanton Bridge is traversed primarily by students, shoppers, and workers who reside in Ciudad Juarez and commute between the two border cities either by car or on foot. The Zaragoza International Bridge mostly carries two types of southbound traffic. One is cargo vehicles headed to maquiladora plants in the eastern quadrants of Ciudad Juarez or farther south in the state capital of Chihuahua City. The second is working professionals who commute to jobs on the opposite side of the border from where they reside.

Data utilized for this analysis are from three of the international bridges in the Borderplex: Santa Fe, Stanton, and Zaragoza. Monthly data gathered from the international bridges include the numbers of pedestrians, passenger vehicles, and commercial vehicles, plus the respective tolls paid by each group. The sample period is January 1991 to December 2004. The information is collected by the City of El Paso Streets Department and reported by the City of El Paso Office of Management and Budget. Those time series, plus others employed in the study, are shown in Appendix Tables A1 and A2 below. As shown in the data tables, the tolls charged for each traffic category generally remain fixed in nominal terms for long periods of time. In real terms, however, the tolls vary on a monthly basis.

Other data utilized include Ciudad Juarez maquiladora employment, Mexico Industrial Production Index, El Paso non-agricultural employment, United States consumer price index (CPI), and a real exchange rate index for the peso. The CPI and El Paso monthly employment data are reported by the United States Bureau of Labor Statistics (www.bls.gov, accessed 19 October 2006). The Mexico industrial production index and Ciudad Juarez in-bond manufacturing employment data series are available from the INEGI national statistics website (www.inegi.gob.mx, accessed 14 November 2006). The inflation adjusted peso index is from the University of Texas at El Paso Border Region Modeling Project (Fullerton and Tinajero, 2002).

The 14-year sample period spans a long enough period to contain expansion, recession, and recovery phases of the national business cycles in both the United States and Mexico. With a total of 168 observations, the sample is sufficiently large to permit time series analysis of the data in question (Wei, 1990). Because El Paso and Ciudad Juarez are both growing fairly rapidly,

the data used in this and other studies of cross-border bridge transportation are non-stationary (Fullerton, 2000). Given that, the variables are differenced prior to modeling (Pindyck and Rubinfeld 1998).

Empirical analyses for each series are completed using linear transfer function (LTF) ARIMA procedures. Cross correlation functions are used to identify the potential lag structures for each equation. Once parameter estimation has been completed for a particular lag structure, diagnostic statistics are utilized to examine its performance. Among the latter, an autocorrelation function is estimated using model residuals to specify autoregressive and moving average terms for any systematic movements in the dependent variable that the lags of the explanatory variables fail to capture. An LTF for a dependent variable y with multiple lags of two explanatory variables, x and z, plus autoregressive and moving components, can be expressed as follows:

$$y_t = \theta_0 + \sum_{i=1}^{p} \phi_i y_{t-i} + \sum_{j=1}^{q} \theta_j e_{t-j} + \sum_{a=1}^{n} A_a x_{t-a} + \sum_{b=1}^{k} B_b z_{t-b} + e_t. \qquad [1]$$

LTF procedures frequently perform well when used to analyze model time series data. Because it emphasizes the relationships between the dependent variable of interest and potential explanatory variables, it has been used in numerous econometric settings. Several examples are from regulated markets such as residential natural gas consumption, electricity consumption, and municipal water consumption dynamics. In addition to good in-sample estimation diagnostics, many studies also indicate that LTF models often exhibit reliable out-of-sample simulation properties. In at least one instance, an LTF modeling approach has been utilized to analyze cross-border bridge traffic, albeit without taking into account the effects of toll changes (Fullerton and Tinajero, 2002).

Individual LTF equations are estimated for each bridge and traffic category. The five equations include cars heading south across the Zaragoza Bridge (ZC), cargo trucks using the Zaragoza Bridge (ZT), pedestrians utilizing the Stanton Bridge (STW), cars using the Stanton Bridge (STC), and pedestrians crossing the Santa Fe Bridge (SFW) into Mexico. In the equations, demand for the use of the toll bridges is modeled as a function of lags of the relevant inflation adjusted toll (TOLL), Ciudad Juarez maquiladora employment (CJMQM), industrial production in Mexico (MXIP), the real exchange rate (REX), and El Paso employment (ELPM). Implicit functions for each traffic category can be expressed as follows:

$$\underset{}{\text{Traffic}_t} = f\ (\underset{(-)}{\text{TOLL}_{t-i}}, \underset{(+)}{\text{CJMQM}_{t-j}}, \underset{(+)}{\text{MXIP}_{t-k}}, \underset{(?)}{\text{REX}_{t-m}}, \underset{(+)}{\text{ELPM}_{t-n}}, \text{AR}_{t-p}, \text{MA}_{t-q}). \quad [2]$$

The arithmetic signs in the parentheses below Equation 2 represent the overall hypothesized relationship between the left-hand side variable and each independent variable. The deflated toll series obviously serve as real price variables for each respective equation and will tend to reduce bridge usage when they increase (Hirschman et al., 1995). The sign underneath the inflation adjusted peso index is ambiguous. While depreciation of the peso generally leads to reduced numbers of Mexican pedestrians and automobiles, it also generates increased volumes of cross-border cargo traffic and tourists from the United States (Fullerton, 2000).

Monthly income data are not available for either Borderplex city. Given that, alternative business cycle indicators are employed. For El Paso, total non-agricultural employment provides a fairly inclusive measure of economic conditions on the north side of the river. Because no similar broad metric is available for Ciudad Juarez, two variables are utilized. They are in-bond manufacturing payroll employment and the Mexico industrial production index (Fullerton and Tinajero, 2002). Transfer ARIMA models assume unidirectional causality from the explanatory variables to the left-hand side variables (Wei, 1990). None of the independent variables employed below violate this assumption. Empirical estimation results from the various models are discussed in the next section.

Estimation Results

Tables 1 through 5 summarize the estimation results for each of the different bridge traffic categories. Due to trend non-stationarity, all of the series are differenced prior to estimation. Following parameter estimation, the series are brought back to level form and a pseudo R-squared is calculated for each equation. A price elasticity of demand is also calculated for each model.

Table 1. Zaragoza Bridge Cargo Vehicles, ZT.

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	-0.136059	0.222145	-0.612477	0.5412
TOLLT(-1)	-81.30670	586.0849	-0.138729	0.8899
CJMQM	0.000172	6.32E-05	2.714161	0.0075
MXIP	0.201084	0.045524	4.417113	0.0000
MXIP(-5)	0.084077	0.035686	2.355987	0.0198
MXIP(-12)	0.133327	0.041862	3.184887	0.0018
REX	0.018559	0.039964	0.464402	0.6431
AR(2)	0.111979	0.079043	1.416676	0.1587

R-Squared	0.448186	Dependent Variable Mean	0.042170
Pseudo R-Squared	0.812798	Dependent Variable Std. Deviation	3.166322
Std. Err. Regression	2.408182	Akaike Information Criterion	4.646492
Sum Sq. Residuals	840.9041	Schwarz Information Criterion	4.804946
Log-Likelihood	-347.4566	F-Statistic	16.82424
Durbin Watson Stat.	2.747830	F-Statistic Probability	0.000000

Linear Transfer Function Table Notes:
Sample Period, January 1991 – December 2004.
ZT, Zaragoza Bridge monthly cargo truck traffic.
ZC, Zaragoza Bridge monthly passenger car traffic.
STC, Stanton Bridge monthly passenger car traffic.
STW, Stanton Bridge monthly pedestrian traffic.
SFW, Santa Fe Bridge monthly pedestrian traffic.

TOLLT, inflation adjusted cargo truck toll.
TOLLC, inflation adjusted passenger car toll.
TOLLW, inflation adjusted passenger car toll.

ELPM, El Paso monthly non-agricultural employment.
CJMQM, Ciudad Juarez monthly maquiladora employment.
MXIP, monthly industrial production index for Mexico.
REX, monthly peso/dollar real exchange rate index.

Table 1 summarizes the results from the linear transfer function estimated for cargo vehicles utilizing the Zaragoza Bridge. An increase in the toll leads to a decrease in cargo traffic within one month of implementation. Ciudad Juarez maquiladora employment, the Mexico industrial production index, and the real exchange rate are all positively correlated with cargo vehicle traffic on the Zaragoza Bridge. A devaluation of the peso leads to a rapid increase in cargo vehicle traffic. Four of the eight parameters in this equation fail to satisfy the 5-percent significance criterion, but the F-statistic is significant at the 1-percent level. That may reflect the presence of multicollinearity such as what has been noted in other border econometric studies

(Fullerton and Tinajero, 2002). With the lone exception of the real exchange rate index, the simple correlation coefficients between the inflation adjusted toll for cargo vehicles with each of the other four explanatory variable range between 0.79 and 0.93. The pseudo coefficient of determination is 0.812. As shown in Table 6, the price elasticity calculated for this model is -0.474 implying that cargo vehicle traffic is not very responsive to changes in the toll. Because there are only two international bridges that carry trucks directly into Ciudad Juarez, the inelasticity with respect to the toll is not surprising (Graham and Glaister, 2004).

The results for Zaragoza Bridge passenger vehicles are given in Table 2. In this equation, Zaragoza Bridge passenger vehicle traffic is positively correlated with El Paso employment, Ciudad Juarez maquiladora employment, and the Mexico industrial production index. The inflation adjusted toll and real exchange rate are negatively correlated with passenger vehicle traffic. That a devaluation of the peso leads to a decrease in passenger vehicle traffic probably reflects the loss of purchasing power experienced by Mexican shoppers who visit large shopping centers such as Cielo Vista Mall and Las Palmas Marketplace in East El Paso. The pseudo R-squared for this equation is also relatively high, 0.813. The price elasticity of demand reported in Table 6 for Zaragoza Bridge passenger vehicles is -0.0035. That indicates that passenger vehicle traffic on this bridge reacts very little to increases in the toll paid by cars. While the failure of the toll coefficient to satisfy the 5-percent significance criterion means that result should potentially be treated with caution, similarly low elasticities have also been documented for other regions (Wuestefeld and Regan, 1981; Hirschman et al., 1995; Loo, 2003). Multicollinearity may also affect these results. With the exception of the real exchange rate index, the simple correlation coefficients between the real toll for cars and the four remaining regressors range between 0.82 and 0.91.

Table 2. Zaragoza Bridge Passenger Vehicles, ZC.

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	0.128304	1.779904	0.072085	0.9426
TOLLC	-122.4508	246.3155	-0.497130	0.6199
ELPM	1.300847	0.584379	2.226032	0.0276
ELPM(-8)1.579734	0.559434	2.823809	0.0054	
CJMQM	5.08E-05	0.000198	0.256336	0.7981
MXIP	0.746725	0.255249	2.925480	0.0040
MXIP(-9)	0.815261	0.259795	3.138095	0.0021
REX	-0.429744	0.168805	-2.545801	0.0119
AR(1)	-0.554606	0.083481	-6.643508	0.0000
MA(2)	-0.339905	0.083091	-4.090762	0.0001
MA(3)	-0.247425	0.080211	-3.084672	0.0024
MA(12)	0.253712	0.076180	3.330448	0.0011

R-Squared	0.531949	Dependent Variable Mean	0.709452
Pseudo R-Squared	0.814279	Dependent Variable Std. Deviation	19.40203
Std. Err. Regression	13.76804	Akaike Information Criterion	8.155932
Sum Sq. Residuals	27486.05	Schwarz Information Criterion	8.389530
Log-Likelihood	-628.2406	F-Statistic	14.98138
Durbin Watson Stat.	2.041143	F-Statistic Probability	0.000000

Linear Transfer Function Table Notes:
Sample Period, January 1991 – December 2004.
ZC, Zaragoza Bridge monthly cargo truck traffic.
ZT, Zaragoza Bridge monthly passenger car traffic.
STC, Stanton Bridge monthly passenger car traffic.
STW, Stanton Bridge monthly pedestrian traffic.
SFW, Santa Fe Bridge monthly pedestrian traffic.

TOLLT, inflation adjusted cargo truck toll.
TOLLC, inflation adjusted passenger car toll.
TOLLW, inflation adjusted passenger car toll.

ELPM, El Paso monthly non-agricultural employment.
CJMQM, Ciudad Juarez monthly maquiladora employment.
MXIP, monthly industrial production index for Mexico.
REX, monthly peso/dollar real exchange rate index.

Stanton Bridge passenger vehicle results are reported in Table 3. In this model, passenger vehicle traffic flows are inversely related to the real toll and exchange rate variables. The sign of the real peso parameter potentially reflects the proximity of this bridge to the downtown retail sector on the north side of the border (Villegas et al., 2006). El Paso employment, Ciudad Juarez in-bond assembly employment, and the Mexico industrial production index are

positively correlated with volume of cars that travel across the artery. With a pseudo coefficient of determination of 0.889, the model explains a relatively high percentage of the variation in passenger vehicle traffic on the Stanton Bridge. As with the other traffic categories, the price elasticity of demand of -0.278 indicates that the number of vehicles heading south on this artery is not strongly affected by increases in the toll. It is also similar to what has been documented for other markets (Matas and Raymond, 2003).

Table 3. Stanton Bridge Passenger Vehicles, STC.

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	-1.524972	2.209717	-0.690121	0.4912
TOLLC(-2)	-8096.849	2405.142	-3.366475	0.0010
ELPM	1.249981	0.567939	2.200906	0.0293
CJMQM(-2)	0.000419	0.000321	1.306284	0.1935
MXIP	0.494718	0.254148	1.946572	0.0535
MXIP(-9)	1.009340	0.257273	3.923231	0.0001
MXIP(-10)	1.088690	0.252339	4.314396	0.0000
REX	-0.191207	0.204161	-0.936551	0.3505
AR(12)	0.705886	0.070025	10.08051	0.0000
MA(3)	-0.155615	0.049561	-3.139830	0.0020
MA(5)	0.351985	0.044083	7.984675	0.0000
MA(12)	-0.649743	0.049563	-13.10953	0.0000

R-Squared	0.515444	Dependent Variable Mean	-0.272089
Pseudo R-Squared	0.888619	Dependent Variable Std. Deviation	18.63443
Std. Err. Regression	13.45447	Akaike Information Criterion	8.109854
Sum Sq. Residuals	26248.31	Schwarz Information Criterion	8.343453
Log-Likelihood	-624.6236	F-Statistic	14.02207
Durbin Watson Stat.	1.949316	F-Statistic Probability	0.000000

Linear Transfer Function Table Notes:
Sample Period, January 1991 – December 2004.
ZC, Zaragoza Bridge monthly cargo truck traffic.
ZT, Zaragoza Bridge monthly passenger car traffic.
STC, Stanton Bridge monthly passenger car traffic.
STW, Stanton Bridge monthly pedestrian traffic.
SFW, Santa Fe Bridge monthly pedestrian traffic.

TOLLT, inflation adjusted cargo truck toll.
TOLLC, inflation adjusted passenger car toll.
TOLLW, inflation adjusted passenger car toll.

ELPM, El Paso monthly non-agricultural employment.
CJMQM, Ciudad Juarez monthly maquiladora employment.
MXIP, monthly industrial production index for Mexico.
REX, monthly peso/dollar real exchange rate index.

Results for the Stanton Bridge pedestrian equation are summarized in Table 4. Large numbers of shoppers who cross on foot from Mexico return home over this structure. Not surprisingly, southbound pedestrian traffic flows on this bridge are inversely related to changes in the inflation adjusted values of the toll and the exchange rate. El Paso non-agricultural jobs, Ciudad Juarez maquiladora employment, and the Mexico industrial production index are all positively correlated with pedestrian traffic on the Stanton Bridge. The pseudo R-squared for this equation indicates that it successfully accounts for nearly two-thirds of the historical variation in the dependent variable for the sample period in question. Most pedestrian travel studies do not examine the impacts of tolls on this traffic category (Hoogendoorn and Bovy, 2005). While a comparison to other estimates is not, therefore, possible, the -0.482 price elasticity measured for this bridge seems fairly reasonable. As with the truck and automobile equations, multicollinearity may affect the pedestrian modeling results. With the exception of the real exchange rate index, the simple correlation coefficients between the inflation adjusted pedestrian toll and the other independent variables ranges between 0.72 and 0.91.

Table 4. Stanton Bridge Pedestrians, STW.

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	-2.213653	0.925308	-2.392341	0.0180
TOLLW(-1)	-38869.99	24449.44	-1.589811	0.1140
ELPM	2.927025	0.720681	4.061471	0.0001
ELPM(-12)	2.245174	0.733973	3.058935	0.0026
CJMQM(-2)	0.000261	0.000320	0.814015	0.4169
MXIP(-9)	1.339868	0.183564	7.299173	0.0000
MXIP(-14)	0.606153	0.191548	3.164490	0.0019
REX(-1)	-0.386083	0.203893	-1.893558	0.0602
AR(5)	-0.141582	0.082408	-1.718054	0.0878

R-Squared	0.597795	Dependent Variable Mean	0.082550
Pseudo R-Squared	0.640829	Dependent Variable Std. Deviation	19.94331
Std. Err. Regression	12.97870	Akaike Information Criterion	8.019102
Sum Sq. Residuals	25435.45	Schwarz Information Criterion	8.192081
Log-Likelihood	-632.5282	F-Statistic	28.05375
Durbin Watson Stat.	2.166103	F-Statistic Probability	0.000000

Linear Transfer Function Table Notes:
Sample Period, January 1991 – December 2004.
ZC, Zaragoza Bridge monthly cargo truck traffic.
ZT, Zaragoza Bridge monthly passenger car traffic.
STC, Stanton Bridge monthly passenger car traffic.

STW, Stanton Bridge monthly pedestrian traffic.
SFW, Santa Fe Bridge monthly pedestrian traffic.

TOLLT, inflation adjusted cargo truck toll.
TOLLC, inflation adjusted passenger car toll.
TOLLW, inflation adjusted passenger car toll.

ELPM, El Paso monthly non-agricultural employment.
CJMQM, Ciudad Juarez monthly maquiladora employment.
MXIP, monthly industrial production index for Mexico.
REX, monthly peso/dollar real exchange rate index.

The results for Santa Fe Bridge pedestrians are given in Table 5. Pedestrian traffic is inversely related to changes in real toll along this bridge. For all other explanatory variables, the regression coefficients carry positive signs. For the real exchange rate, that means that peso depreciation leads to an increase in foot traffic to the downtown Ciudad Juarez tourist district. This bridge is the one that most visitors from the United States use when they walk across the border. The response is more rapid than what is separately reported for total commuter flows (Fullerton, 2000). A stronger dollar probably attracts tourists who visit entertainment venues, restaurants, and shops, as well as medical tourists who are customers at the many health facilities and pharmacies located in this sector of the city. The pseudo coefficient of determination is 0.73. A price elasticity of -0.483 is estimated for Santa Fe Bridge pedestrians, almost identical to that calculated for pedestrians that utilize the Stanton Bridge, even though the two series respond very differently to real changes in the peso/dollar exchange rate.

Table 5. Santa Fe Bridge Pedestrians, SFW.

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	-2.004015	2.303618	-0.869942	0.3858
TOLL(-1)	-91012.84	49918.31	-1.823236	0.0704
ELPM	7.320916	1.184945	6.178274	0.0000
CJMQM	0.000134	0.000587	0.227974	0.8200
MXIP(-9)	2.366747	0.498151	4.751067	0.0000
MXIP(-10)	0.901551	0.508109	1.774327	0.0782
MXIP(-14)	2.301122	0.447109	5.146672	0.0000
REX	0.670519	0.424025	1.581318	0.1160
AR(12)	-0.417738	0.093609	-4.462598	0.0000
MA(2)	-0.242022	0.047020	-5.147209	0.0000
MA(12)	0.705258	0.040071	17.60023	0.0000

R-Squared	0.569027	Dependent Variable Mean	0.982320
Pseudo R-Squared	0.732180	Dependent Variable Std. Deviation	39.93342
Std. Err. Regression	27.12307	Akaike Information Criterion	9.507827

Sum Sq. Residuals	104463.9	Schwarz Information Criterion	9.725701
Log-Likelihood	-716.3487	F-Statistic	18.74873
Durbin Watson	2.157281	F-Statistic Probability	0.000000

Linear Transfer Function Table Notes:
Sample Period, January 1991 – December 2004.
ZC, Zaragoza Bridge monthly cargo truck traffic.
ZT, Zaragoza Bridge monthly passenger car traffic.
STC, Stanton Bridge monthly passenger car traffic.
STW, Stanton Bridge monthly pedestrian traffic.
SFW, Santa Fe Bridge monthly pedestrian traffic.

TOLLT, inflation adjusted cargo truck toll.
TOLLC, inflation adjusted passenger car toll.
TOLLW, inflation adjusted passenger car toll.

ELPM, El Paso monthly non-agricultural employment.
CJMQM, Ciudad Juarez monthly maquiladora employment.
MXIP, monthly industrial production index for Mexico.
REX, monthly peso/dollar real exchange rate index.

The passenger and cargo vehicle price elasticities shown in Table 6 are similar in magnitude to many of those reported over time in the transport economics literature (Wuestefeld and Regan, 1981; Hirschman et al., 1995; Matas and Raymond, 2003). One area in which some uncertainty remains for Table 6 is that comparative results for pedestrian reactions to changes in tolls have not been documented elsewhere. Another source of uncertainty regarding the information in Tables 1 through 6, and not already discussed above, is the absence of variables that reflect the availability of alternative routes that are not subject to tolls (Braid, 1996). Due to the distances involved, realistic untolled international bridge choices only exist for passenger and cargo vehicles. Experimentation with a combination of traffic volume and population estimates did not yield coefficients in any of the equations that satisfied the 5-percent significance criterion. The various traffic volume measures included totals for all bridges, as well as for the untolled Bridge of the Americas alone.

Table 6. Toll Elasticity Estimates.

Bridge	Location	Traffic Category	Elasticity
Zaragoza	East El Paso	Cargo Vehicles	-0.4736
Zaragoza	East El Paso	Passenger Vehicles	-0.0035
Stanton	Downtown El Paso	Passenger Vehicles	-0.2782
Stanton	Downtown El Paso	Pedestrians	-0.4816
Santa Fe	Downtown El Paso	Pedestrians	-0.4829

Results in Tables 1 through 6 are comparable to those reported elsewhere and seem fairly reasonable from an economic perspective (McCloskey and Ziliak, 1996). However, good in-sample traits do not always guarantee reliable out-of-sample simulation performance (Leamer, 1983). For municipal revenue models, forecast performance is an important question that frequently gets overlooked (Chang, 1979; Forrester, 1991). To date, there is little evidence that such an exercise has ever been completed for bridge tolls collected at international borders. Results of such an effort using the LTF traffic models are discussed below.

Comparative Simulation Results

Following LTF parameter estimation, forecasts are generated in rolling 12-month increments over the period covering January 2001 to December 2004 for each bridge category. Predictive accuracy for these forecasts is assessed relative to random walk benchmarks. The random walk (RW) forecasts are assembled using the last actual sample observations for each traffic category. To evaluate the performances of the two forecast categories, three different metrics are employed: a descriptive U-statistic (Pindyck and Rubinfeld, 1998), a non-parametric t-test (Diebold and Mariano, 1995), and a regression based F-test (Ashley, Granger, Schmalensee, 1980).

Out-of-sample simulations for the linear transfer function and corresponding random walks are generated in the same manner. For the first set of predictions, a historical sample period is defined from January 1990 to December 2000. The first simulation conducted is from January 2001 to December 2002. The historical sample period is then extended by one month to include January 2001 and the new forecast period is February 2001 to January 2003. This rolling forecast procedure is conducted sequentially through December 2004. This yields a total of 48 one-month forecasts, 47 two-month forecasts, 46 three-month forecasts, and so forth.

The first measure utilized to compare the LTF and RW forecasts is the U-statistic or Theil inequality coefficient. A U-statistic scales the root mean square error for a forecast such that it ranges between 0 and 1 (Pindyck and Rubinefeld 1998). The second accuracy measure is based on an error differential regression test (AGS) conducted at different step lengths (Ashley, Granger, and Schmalensee 1980). The third accuracy metric employs a non-parametric t-test (DM) based on the differences between RW and LTF root mean square errors (Diebold and Mariano, 1995).

TABLE 7. Zaragoza Bridge Cargo Vehicle Forecast Accuracy Rankings.

Step Length	Number of Observations	U-statistic	AGS Error Differential	DM RMSE Differential
1-Month	48	LTF	LTF	LTF
2-Months	47	LTF	Inconclusive	
3-Months	46	LTF	Inconclusive	
4-Months	45	LTF	Inconclusive	
5-Months	44	RW	Inconclusive	
6-Months	43	LTF	Inconclusive	
7-Months	42	RW	Inconclusive	
8-Months	41	LTF	Inconclusive	
9-Months	40	LTF	Inconclusive	
10-Months	39	LTF	Inconclusive	
11-Months	38	LTF	Inconclusive	
12-Months	37	RW	Inconclusive	
13-Months	36	LTF	Inconclusive	
14-Months	35	LTF	Inconclusive	
15-Months	34	LTF	Inconclusive	
16-Months	33	LTF	Inconclusive	
17-Months	32	RW	Inconclusive	
18-Months	31	LTF	Inconclusive	
19-Months	30	LTF	Inconclusive	
20-Months	29	LTF	Inconclusive	
21-Months	28	LTF	Inconclusive	
22-Months	27	RW	Inconclusive	
23-Months	26	LTF	Inconclusive	
24-Months	25	LTF	Inconclusive	

Sample Period: January 2001 – December 2004
LTF, autoregressive integrated moving average linear transfer function.
RW, random walk.
RMSE, root mean square error.
AGS, error difference regression test.
DM, non-parametric RMSE difference t-test.

Results for the Zaragoza cargo vehicles forecasts are summarized in TABLE 7. The descriptive U-statistics favor the LTF out-of-sample simulations in 19 of the 24 individual step-lengths for this traffic category. The DM procedure also indicates that the LTF root mean square errors (RMSEs) are significantly lower than the RW RMSEs across all step-lengths. The AGS test outcomes for southbound truck travel on this bridge are much less decisive. Only in the case of the single month-ahead forecasts did the AGS test point to LTF predictive superiority. For all other 23 step-lengths, the AGS results are statistically inconclusive. Accordingly, some caution appears warranted with re-

spect to using the LTF equation in operations planning or revenue forecasting applications for cargo vehicle usage of the Zaragoza Bridge.

Table 8 reports the forecast rankings for Zaragoza Bridge passenger vehicles. Results for the descriptive inequality coefficient point to LTF relative forecast accuracy across all step-lengths. Statistically significant results in favor of the LTF predictions are tallied in 20 of the 24 AGS regression tests. Not surprisingly, the DM t-test also yields evidence that the LTF RMSEs are significantly smaller than those of the RW passenger flow to Mexico forecasts via this bridge. These outcomes offer partial confirmation that the price elasticity reported for this bridge usage category in Table 6, while still relatively low, may be accurate.

Table 8. Zaragoza Bridge Passenger Vehicle Forecast Accuracy Rankings.

Step Length	Number of Observations	U-statistic	AGS Error Differential	DM RMSE Differential
1-Month	48	LTF	LTF	LTF
2-Months	47	LTF	LTF	
3-Months	46	LTF	LTF	
4-Months	45	LTF	LTF	
5-Months	44	LTF	LTF	
6-Months	43	LTF	LTF	
7-Months	42	LTF	LTF	
8-Months	41	LTF	LTF	
9-Months	40	LTF	LTF	
10-Months	39	LTF	LTF	
11-Months	38	LTF	LTF	
12-Months	37	LTF	Inconclusive	
13-Months	36	LTF	LTF	
14-Months	35	LTF	LTF	
15-Months	34	LTF	LTF	
16-Months	33	LTF	LTF	
17-Months	32	LTF	Inconclusive	
18-Months	31	LTF	LTF	
19-Months	30	LTF	LTF	
20-Months	29	LTF	Inconclusive	
21-Months	28	LTF	LTF	
22-Months	27	LTF	LTF	
23-Months	26	LTF	LTF	
24-Months	25	LTF	Inconclusive	

Sample Period: January 2001 – December 2004
LTF, autoregressive integrated moving average linear transfer function.
RW, random walk.
RMSE, root mean square error.
AGS, error difference regression test.
DM, non-parametric RMSE difference t-test.

The Stanton Bridge near the downtown region of El Paso also carries passenger vehicle traffic. As shown in Table 9, the out-of-sample simulation results for this variable are very different from those for passenger vehicles in East El Paso. The LTF equation obtains lower U-statistics for the one-month and two-month ahead forecasts. For the AGS error difference regression tests, the evidence against the LTF simulations is also very pronounced. In six cases, the results are inconclusive. For the other 18 step-lengths, significantly better prediction accuracy is recorded for the RW forecasts. The DM t-test also points to lower RMSEs for the RW passenger vehicle benchmarks for this commuter category.

Table 9. Stanton Bridge Passenger Vehicle Forecast Accuracy Rankings.

Step Length	Number of Observations	U-statistic	AGS Error Differential	DM RMSE Differential
1-Month	48	LTF	Inconclusive	Inconclusive
2-Months	47	LTF	Inconclusive	
3-Months	46	RW	RW	
4-Months	45	RW	Inconclusive	
5-Months	44	RW	RW	
6-Months	43	RW	Inconclusive	
7-Months	42	RW	Inconclusive	
8-Months	41	RW	Inconclusive	
9-Months	40	RW	RW	
10-Months	39	RW	RW	
11-Months	38	RW	RW	
12-Months	37	RW	RW	
13-Months	36	RW	RW	
14-Months	35	RW	RW	
15-Months	34	RW	RW	
16-Months	33	RW	RW	
17-Months	32	RW	RW	
18-Months	31	RW	RW	
19-Months	30	RW	RW	
20-Months	29	RW	RW	
21-Months	28	RW	RW	
22-Months	27	RW	RW	
23-Months	26	RW	RW	
24-Months	25	RW	RW	

Sample Period: January 2001 – December 2004
LTF, autoregressive integrated moving average linear transfer function.
RW, random walk.
RMSE, root mean square error.
AGS, error difference regression test.
DM, non-parametric RMSE difference t-test.

The Stanton Bridge also provides southbound pedestrians entry into Mexico. Table 10 lists the relative predictive accuracies of the LTF equation and the RW procedure. The inequality coefficients are lower at every step-length for the RW forecasts. For the AGS regressions, 23 of the 24 sets of forecasts point to superior statistical precision for the RW method. Although those results seem one-sided, the error differences may not be as large or clear cut as the AGS column of Table 10 indicates. That is because the DM t-test for RMSE equality across all 24 step-lengths is inconclusive.

Table 10. Stanton Bridge Pedestrian Forecast Accuracy Rankings.

Step Length	Number of Observations	U-statistic	AGS Error Differential	DM RMSE Differential
1-Month	48	RW	Inconclusive	Inconclusive
2-Months	47	RW	RW	
3-Months	46	RW	RW	
4-Months	45	RW	RW	
5-Months	44	RW	RW	
6-Months	43	RW	RW	
7-Months	42	RW	RW	
8-Months	41	RW	RW	
9-Months	40	RW	RW	
10-Months	39	RW	RW	
11-Months	38	RW	RW	
12-Months	37	RW	RW	
13-Months	36	RW	RW	
14-Months	35	RW	RW	
15-Months	34	RW	RW	
16-Months	33	RW	RW	
17-Months	32	RW	RW	
18-Months	31	RW	RW	
19-Months	30	RW	RW	
20-Months	29	RW	RW	
21-Months	28	RW	RW	
22-Months	27	RW	RW	
23-Months	26	RW	RW	
24-Months	25	RW	RW	

Sample Period: January 2001 – December 2004
LTF, autoregressive integrated moving average linear transfer function.
RW, random walk.
RMSE, root mean square error.
AGS, error difference regression test.
DM, non-parametric RMSE difference t-test.

Pedestrians can also cross the Santa Fe Bridge into Mexico. The out-of-sample simulation rankings in TABLE 11 document the academic equivalent of a forecast shutout on behalf of the RW extrapolations. Both the descriptive U-statistics and the AGS test outcomes indicate relative LTF inaccuracy at all 24 step-lengths. The DM t-test also documents statistically smaller RMSEs across all step-lengths.

TABLE 11. Santa Fe Bridge Pedestrian Forecast Accuracy Rankings.

Step Length	Number of Observations	U-statistic	AGS Error Differential	DM RMSE Differential
1-Month	48	RW	RW	RW
2-Months	47	RW	RW	
3-Months	46	RW	RW	
4-Months	45	RW	RW	
5-Months	44	RW	RW	
6-Months	43	RW	RW	
7-Months	42	RW	RW	
8-Months	41	RW	RW	
9-Months	40	RW	RW	
10-Months	39	RW	RW	
11-Months	38	RW	RW	
12-Months	37	RW	RW	
13-Months	36	RW	RW	
14-Months	35	RW	RW	
15-Months	34	RW	RW	
16-Months	33	RW	RW	
17-Months	32	RW	RW	
18-Months	31	RW	RW	
19-Months	30	RW	RW	
20-Months	29	RW	RW	
21-Months	28	RW	RW	
22-Months	27	RW	RW	
23-Months	26	RW	RW	
24-Months	25	RW	RW	

Sample Period: January 2001 – December 2004
LTF, autoregressive integrated moving average linear transfer function.
RW, random walk.
RMSE, root mean square error.
AGS, error difference regression test.
DM, non-parametric RMSE difference t-test.

The out-of-sample simulation results imply that the LTF model achieves greater accuracy than the RW benchmarks for both the Zaragoza Bridge

cargo vehicle and the Zaragoza Bridge passenger vehicle forecasts. However, the comparative test statistics also indicate that the RW predictions are more accurate than the LTF forecasts for southbound pedestrian traffic flows across the Stanton Bridge and the Santa Fe Bridge. It is somewhat more difficult to interpret the accuracy ranking for the passenger vehicle flows across the Stanton Bridge, but the overall evidence favors the RW benchmark at the expense of the LTF model. These mixed results are similar to those previously reported by Fullerton (2004) using annual frequency data and call for some care to be used with regard to employing the LTF estimates in public administrative exercises.

Policy Implications

Several results from the analysis above can potentially be of use to policy makers. Given that all five categories of bridge traffic are inelastic with respect to the respective tolls charged, rate increases will raise revenues without substantial reductions in volume usage. Although it would be politically, and diplomatically, difficult to use international bridges connecting the United States and Mexico as "cash cows," the City of El Paso should be capable of covering a substantial portion of current maintenance and future structural enhancement costs with the tolls charged. At one point, there was a 9-year period from November 1994 to December 2003 during which passenger vehicle tolls were left unchanged in nominal terms. There is no need to allow real erosion of the tolls to occur for such a long time. All three user fees can be adjusted more frequently without damaging the respective revenue streams. Given the rapid growth of international commerce in this region, plus the strong rates of population and economic expansion in the Borderplex, raising tolls provides one means for financing the infrastructure expansion and upgrades that will undoubtedly become necessary in future years.

The lag structures in each equation are also of interest from a public administration standpoint. All of the traffic categories respond within 60 days or less to toll rate changes. Cargo traffic across the Zaragoza bridges reacts in less than 30 days to variations in in-bond assembly payrolls and industrial production activity in Mexico. Staffing levels at that bridge will have very little time to be altered as economic fortunes wax and wane south of the border. Similarly rapid responses also occur at all three bridges as consequences of variations in the currency value of the peso and non-agricultural employment in El Paso. Accordingly, flexible staffing schedules will have to be maintained in order to maximize efficiencies and revenues at these international exit points from El Paso. Because the price reactions are inelastic, raising tolls

at the bridges would probably not be very effective as a means for reducing vehicle emissions via reduced traffic flows.

Given the mixed outcomes for the comparative out-of-sample simulation results, the LTF models should be used with caution in municipal revenue forecasting endeavors. This is especially true for the two downtown international bridges that charges tolls on southbound traffic to Ciudad Juarez. At a minimum, LTF traffic forecasts should be compared to recent historical observations as a means of providing "sanity checks" for the extrapolation results. During periods in which rate increases are enacted, policy analysts may elect to rely more heavily on the LTF model simulations since those equations provide a quantitatively systematic manner for anticipating potential bridge usage impacts.

To date, the City of El Paso has only used fixed toll schedules. That is probably because nearly all of the congestion that occurs on the international bridges is experienced by northbound traffic heading into El Paso. The latter circumstance is largely due to more time consuming inspection practices historically applied by the United States at its ports of entry. It is possible, however, that Borderplex economic and demographic expansion may also lead to capacity constraints on the southbound lanes of the tolled bridges. Should that eventuality come to pass, variable congestion tolls might offer a viable mechanism for managing the greater traffic flow volumes and raising additional revenues for infrastructure expansion (Burris, 2006). The fixed schedules now in place, however, may be good choices for a regional road network already split in two by an international boundary (Bonsall et al., 2007).

Tolls remain a highly controversial topic in El Paso and other parts of Texas (Podgorski, and Kockelman, 2006; Crowder, 2007). State government funding constraints increase the likelihood that a portion of the road network in El Paso may one day be funded with tolls. Econometric analysis of the long history of charging tolls on three of the international bridges indicates that local traffic behavior patterns are similar to those documented for other regional economies where these user fees are charged. Based on that, it would appear that employing tolls to partially fund the street and highway grid in El Paso should meet with success.

Conclusion

As road construction and maintenance costs continue to increase, governments periodically look to tolls as a means of financing roadway construction and improvements. Although tolls have been charged on three of the international bridges linking El Paso and Ciudad Juarez for many years, em-

pirical assessment of the impacts of those fees on traffic patterns had not previously been completed. This study takes advantage of newly available monthly historical toll data for El Paso to examine this aspect of the Borderplex economy.

A linear transfer function methodology is used to model toll bridge demand as a function of several explanatory variables: Ciudad Juarez maquiladora employment, Mexico industrial production, El Paso employment, inflation adjusted tolls for each traffic category, and the real exchange rate. Individual equations are estimated for each of the five traffic categories that pay the bridge user fees. As with other transfer function studies, multicollinearity appears to be present, but overall in-sample diagnostics are relatively favorable. The price elasticities of demand are similar in magnitude to those calculated for other regional economies. Mixed results, however, are obtained for the out-of-sample model simulation exercises. Given that, caution should be used if the equations are applied in municipal revenue forecasting tasks.

Data constraints currently prevent analyzing the impacts of tolls on northbound international bridge traffic into El Paso, but eventual comparative analyses for the other side of the river would be helpful. It would also be interesting to examine whether the results for southbound traffic out of El Paso into Mexico can be replicated using data for other border metropolitan economies. Potential examples include San Diego – Tijuana, Calexico – Mexicali, Douglas – Agua Prieta, Laredo – Nuevo Laredo, McAllen – Reynosa, and Brownsville – Matamoros. Additional toll bridge research for other regions would also be useful due to the relatively small amount of research currently available for this topic.

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APPENDIX

TABLE A1. Southbound Bridge Traffic Historical Data,

Month	ZT Zaragoza Trucks	ZC Zaragoza Cars	STC Stanton Cars	STW Stanton Pedestrians	SFW Santa Fe Pedestrians
Jan-91	5.942	124.340	165.370	144.804	268.349
Feb-91	4.862	130.563	165.275	145.494	227.893
Mar-91	4.328	157.145	182.847	169.542	280.588
Apr-91	4.613	155.489	186.109	163.370	263.872
May-91	5.507	170.166	213.364	168.550	282.695
Jun-91	4.129	157.384	183.416	155.025	271.726
Jul-91	3.999	170.430	198.481	166.557	286.200
Aug-91	4.453	169.448	195.863	172.837	294.749
Sep-91	9.200	149.559	172.907	153.301	268.434
Oct-91	12.611	162.347	194.068	156.652	281.934
Nov-91	11.937	157.817	188.405	160.817	290.392
Dec-91	10.946	169.981	222.219	187.550	311.561
Jan-92	29.659	150.459	189.804	127.647	261.666
Feb-92	15.246	160.316	213.199	138.220	276.608
Mar-92	15.829	176.396	206.412	129.561	274.413
Apr-92	11.537	177.633	223.444	144.147	295.647
May-92	11.443	190.039	252.487	146.386	302.776
Jun-92	12.123	177.853	237.316	127.947	276.557
Jul-92	11.937	192.173	244.240	131.872	283.318
Aug-92	12.647	186.611	242.853	136.777	292.657
Sep-92	12.699	177.287	231.007	126.480	277.597
Oct-92	17.229	193.713	230.800	139.670	297.528
Nov-92	16.489	179.132	236.051	126.734	268.811
Dec-92	15.761	197.781	250.255	164.871	315.447
Jan-93	15.400	172.006	202.245	117.752	262.785
Feb-93	17.086	173.102	201.349	114.627	250.904
Mar-93	19.776	196.028	225.714	124.505	279.778
Apr-93	14.762	190.881	221.400	131.678	275.774
May-93	18.188	201.354	221.020	133.367	280.263
Jun-93	17.243	190.397	211.197	120.243	263.950
Jul-93	16.106	199.278	221.454	134.560	289.728
Aug-93	16.930	202.501	221.657	131.959	279.101

Month	ZT Zaragoza Trucks	ZC Zaragoza Cars	STC Stanton Cars	STW Stanton Pedestrians	SFW Santa Fe Pedestrians
Sep-93	16.886	195.423	211.200	118.779	248.859
Oct-93	14.518	196.273	219.791	112.174	211.517
Nov-93	17.443	149.799	214.925	115.603	227.714
Dec-93	16.521	203.700	250.898	162.756	289.933
Jan-94	15.971	192.562	200.330	122.690	238.932
Feb-94	14.125	190.063	202.686	137.215	236.257
Mar-94	19.005	205.686	226.999	157.960	273.481
Apr-94	17.195	201.872	216.771	142.224	254.065
May-94	18.774	205.656	221.350	138.006	258.071
Jun-94	17.256	198.643	207.553	115.424	233.207
Jul-94	16.968	214.983	229.457	126.274	259.291
Aug-94	19.965	215.530	224.407	128.049	256.521
Sep-94	21.211	215.314	213.355	124.505	250.404
Oct-94	22.186	222.829	219.234	128.963	268.094
Nov-94	23.619	205.272	228.039	123.174	249.498
Dec-94	20.519	215.317	231.916	166.673	330.061
Jan-95	21.417	194.545	172.031	103.526	218.286
Feb-95	18.417	179.503	160.398	99.514	214.856
Mar-95	20.642	207.313	185.225	103.679	248.588
Apr-95	18.128	203.008	173.123	91.089	217.866
May-95	19.341	205.888	177.253	108.984	258.163
Jun-95	20.000	206.592	194.949	98.294	247.957
Jul-95	18.443	214.971	198.778	99.041	256.152
Aug-95	21.657	221.614	201.976	97.636	247.453
Sep-95	18.476	205.900	198.626	97.583	242.407
Oct-95	23.577	215.638	196.601	98.115	251.081
Nov-95	23.270	202.853	203.824	98.821	244.848
Dec-95	18.865	219.725	205.441	119.127	292.734
Jan-96	21.193	197.902	178.688	94.655	223.563
Feb-96	20.892	203.831	167.434	101.134	232.535
Mar-96	20.262	217.670	182.977	116.202	271.916
Apr-96	18.544	210.304	177.557	106.444	231.541
May-96	23.267	218.023	182.401	104.614	238.713
Jun-96	22.494	206.453	161.501	102.841	258.768
Jul-96	23.464	205.279	158.509	116.178	283.564
Aug-96	26.644	215.081	172.060	118.122	320.470

Month	ZT Zaragoza Trucks	ZC Zaragoza Cars	STC Stanton Cars	STW Stanton Pedestrians	SFW Santa Fe Pedestrians
Sep-96	24.812	209.510	187.751	110.183	281.137
Oct-96	29.402	226.912	213.128	114.753	278.120
Nov-96	27.337	224.958	224.058	104.412	281.740
Dec-96	25.708	231.457	234.503	125.020	326.033
Jan-97	24.288	208.141	182.838	95.257	237.611
Feb-97	22.504	208.959	183.764	98.914	246.414
Mar-97	19.951	239.664	217.976	113.146	306.724
Apr-97	23.864	224.024	203.391	102.050	259.245
May-97	22.955	238.697	205.950	107.820	303.584
Jun-97	23.435	209.849	189.732	91.648	263.979
Jul-97	23.062	234.228	187.825	99.755	269.662
Aug-97	24.623	223.825	197.072	103.741	294.857
Sep-97	27.902	201.277	179.127	103.400	251.365
Oct-97	31.536	222.572	199.998	107.355	262.816
Nov-97	29.324	213.177	188.785	107.281	273.251
Dec-97	20.000	200.000	210.000	140.000	350.000
Jan-98	30.320	216.720	196.645	110.187	278.779
Feb-98	31.681	205.717	221.599	94.403	244.459
Mar-98	32.972	227.660	248.972	102.914	278.231
Apr-98	30.154	215.397	238.901	108.297	276.448
May-98	29.978	240.145	252.943	116.495	291.874
Jun-98	28.686	217.674	203.331	100.790	269.669
Jul-98	27.476	219.338	187.154	98.858	291.560
Aug-98	31.079	229.200	175.878	100.891	310.498
Sep-98	29.863	182.251	162.018	95.865	278.845
Oct-98	34.730	223.023	171.377	105.798	294.487
Nov-98	32.647	215.017	150.503	129.660	336.705
Dec-98	29.945	226.348	176.032	161.722	412.854
Jan-99	28.770	207.505	168.243	107.647	300.722
Feb-99	25.269	206.015	162.927	106.348	295.590
Mar-99	29.286	255.831	188.358	118.942	330.073
Apr-99	26.716	237.571	176.742	110.351	315.691
May-99	26.730	243.848	183.682	108.911	337.540
Jun-99	27.188	240.064	181.351	101.816	309.240
Jul-99	26.708	243.335	184.085	107.496	341.761
Aug-99	26.724	239.471	183.666	104.001	339.988

Month	ZT Zaragoza Trucks	ZC Zaragoza Cars	STC Stanton Cars	STW Stanton Pedestrians	SFW Santa Fe Pedestrians
Sep-99	26.756	240.513	175.592	100.778	306.290
Oct-99	27.038	237.145	184.866	109.070	330.699
Nov-99	29.645	242.488	179.228	116.751	345.884
Dec-99	27.457	253.949	194.914	140.411	410.707
Jan-00	30.000	263.904	167.982	105.765	304.857
Feb-00	25.269	258.611	169.119	107.358	307.949
Mar-00	32.436	272.227	182.203	116.522	336.900
Apr-00	26.716	237.571	176.742	110.351	315.691
May-00	28.800	275.720	181.308	120.278	323.574
Jun-00	31.521	268.714	179.148	107.261	322.236
Jul-00	26.823	265.814	205.603	104.461	338.790
Aug-00	31.872	270.383	189.095	126.924	329.679
Sep-00	28.485	251.864	177.562	129.239	310.112
Oct-00	31.669	263.711	161.476	133.336	320.133
Nov-00	31.969	264.997	162.989	158.520	345.892
Dec-00	23.112	287.785	195.168	215.902	411.688
Jan-01	29.960	265.766	157.664	115.420	301.802
Feb-01	29.012	254.279	148.032	115.316	303.835
Mar-01	32.796	289.013	166.750	122.155	357.385
Apr-01	29.029	273.071	158.671	116.756	330.585
May-01	30.823	291.594	166.903	121.786	340.470
Jun-01	29.274	283.385	164.031	110.981	330.942
Jul-01	25.910	287.870	161.443	113.030	347.109
Aug-01	29.798	297.894	169.858	120.261	352.710
Sep-01	25.431	222.255	112.522	140.029	361.301
Oct-01	29.815	207.889	95.061	134.623	326.788
Nov-01	28.099	211.608	98.523	115.315	300.822
Dec-01	24.076	236.242	122.351	147.209	378.031
Jan-02	28.100	274.390	178.880	125.200	338.540
Feb-02	24.850	254.100	169.500	134.980	278.230
Mar-02	25.500	270.900	169.900	135.750	326.770
Apr-02	20.020	246.750	160.000	140.740	296.300
May-02	29.600	287.000	164.100	170.450	393.010
Jun-02	22.400	245.020	162.020	128.200	385.950
Jul-02	24.800	265.200	163.140	128.820	408.280
Aug-02	25.080	248.159	120.795	145.285	400.529

Month	ZT Zaragoza Trucks	ZC Zaragoza Cars	STC Stanton Cars	STW Stanton Pedestrians	SFW Santa Fe Pedestrians
Sep-02	23.613	235.334	112.806	134.722	344.087
Oct-02	27.052	216.777	118.977	140.920	347.306
Nov-02	29.500	240.620	139.400	150.000	370.060
Dec-02	20.734	257.912	154.194	150.385	357.908
Jan-03	22.440	232.100	127.126	112.695	312.722
Feb-03	21.399	193.195	106.716	118.295	294.115
Mar-03	23.015	229.882	122.045	123.312	308.449
Apr-03	22.596	228.045	121.521	131.737	326.318
May-03	22.919	263.951	135.214	137.841	344.481
Jun-03	22.524	249.664	129.825	118.479	322.585
Jul-03	22.446	249.842	134.495	123.467	340.352
Aug-03	23.600	267.230	141.069	127.594	350.551
Sep-03	24.977	249.087	126.418	126.060	306.741
Oct-03	27.944	254.266	142.015	118.690	313.290
Nov-03	24.979	247.549	135.193	121.620	327.897
Dec-03	21.661	260.413	149.639	157.261	330.164
Jan-04	23.032	231.412	117.622	129.184	273.185
Feb-04	22.537	228.768	111.983	116.686	227.540
Mar-04	26.214	249.024	125.329	138.987	287.445
Apr-04	24.388	243.029	119.855	141.428	280.148
May-04	23.567	254.342	122.188	135.775	364.122
Jun-04	25.533	243.177	121.866	134.443	416.743
Jul-04	23.018	253.460	128.063	127.588	437.068
Aug-04	25.009	253.888	124.451	132.302	360.060
Sep-04	25.240	239.897	118.060	141.435	398.812
Oct-04	25.537	252.321	123.941	144.537	440.429
Nov-04	25.932	238.848	123.531	143.949	346.898
Dec-04	22.281	269.201	145.687	186.477	424.708

Table A2. Real Exchange Rate, Employment, and Toll Historical Data.

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
Jan-91	94.711	207.100	94.60	116989	0.50	1.00	0.25
Feb-91	93.700	206.900	92.90	122875	0.50	1.00	0.25
Mar-91	92.778	207.900	91.70	121174	0.50	1.00	0.25
Apr-91	92.444	209.100	98.90	122399	0.50	1.00	0.25
May-91	92.169	210.500	99.10	123545	0.50	1.00	0.25
Jun-91	91.790	210.500	96.10	123032	0.50	1.00	0.25
Jul-91	91.455	210.500	99.40	121873	0.50	1.00	0.25
Aug-91	91.486	212.300	97.70	124530	0.50	1.00	0.25
Sep-91	91.413	214.100	94.00	127963	0.50	1.00	0.25
Oct-91	90.868	213.800	105.00	129474	0.50	1.00	0.25
Nov-91	89.089	213.800	100.10	127809	0.50	1.00	0.25
Dec-91	86.949	215.800	90.60	124994	0.50	1.00	0.25
Jan-92	85.427	211.000	96.40	123817	0.50	2.00	0.25
Feb-92	84.603	212.100	96.20	125232	0.50	2.00	0.25
Mar-92	84.764	214.300	106.70	125512	0.50	2.00	0.25
Apr-92	84.068	215.600	96.30	127094	0.50	2.00	0.25
May-92	84.481	216.600	101.50	128600	0.50	2.00	0.25
Jun-92	84.497	217.500	104.40	130589	0.50	2.00	0.25
Jul-92	83.897	217.700	104.80	130840	0.50	2.00	0.25
Aug-92	82.714	218.100	99.30	131196	0.50	2.00	0.25
Sep-92	83.196	220.000	101.50	132288	0.50	2.00	0.25
Oct-92	83.349	223.800	104.80	132795	0.50	2.00	0.25
Nov-92	82.334	223.200	100.40	132427	0.50	2.00	0.25
Dec-92	81.137	223.600	96.00	129364	0.50	2.00	0.25
Jan-93	79.925	218.700	95.20	131768	0.50	2.00	0.25
Feb-93	79.581	221.400	96.90	134981	0.50	2.00	0.25
Mar-93	79.498	221.000	108.10	136882	0.50	2.00	0.25
Apr-93	79.365	223.500	98.90	136060	0.50	2.00	0.25
May-93	79.567	224.100	101.80	136392	0.50	2.00	0.25
Jun-93	79.191	224.300	101.10	128074	0.50	2.00	0.25
Jul-93	78.726	225.300	97.70	130822	0.50	2.00	0.25

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
Aug-93	78.426	226.800	98.20	130572	0.50	2.00	0.25
Sep-93	78.124	228.800	98.30	131672	0.50	2.00	0.25
Oct-93	78.103	228.300	101.60	128635	0.50	2.00	0.25
Nov-93	77.702	227.900	101.20	130060	0.50	2.00	0.25
Dec-93	76.957	228.500	101.00	128639	0.50	2.00	0.25
Jan-94	76.554	223.200	97.50	129991	0.50	2.00	0.25
Feb-94	78.940	224.400	96.60	135234	0.50	2.00	0.25
Mar-94	82.576	226.100	106.20	136427	0.50	2.00	0.25
Apr-94	79.982	227.700	106.10	138862	0.50	2.00	0.25
May-94	80.815	228.700	104.60	137426	0.50	2.00	0.25
Jun-94	82.543	229.800	107.30	137842	0.50	2.00	0.25
Jul-94	82.659	230.900	101.80	139735	0.50	2.00	0.25
Aug-94	82.007	233.300	106.70	141343	0.50	2.00	0.25
Sep-94	82.231	234.800	104.00	145617	0.50	2.00	0.25
Oct-94	82.491	236.400	107.10	147322	0.50	2.00	0.25
Nov-94	82.673	237.600	108.00	148070	1.25	2.30	0.25
Dec-94	126.571	237.500	102.80	146990	1.25	2.30	0.25
Jan-95	132.259	231.800	102.20	148475	1.25	2.30	0.25
Feb-95	130.495	233.300	97.70	150355	1.25	2.30	0.25
Mar-95	144.451	234.000	105.50	152129	1.25	2.30	0.25
Apr-95	113.932	233.900	92.80	152937	1.25	2.30	0.25
May-95	116.976	235.100	98.60	155135	1.25	2.30	0.25
Jun-95	114.853	235.100	96.70	154422	1.25	2.30	0.25
Jul-95	108.641	234.100	93.50	152842	1.25	2.30	0.25
Aug-95	111.053	236.800	99.10	153971	1.25	2.30	0.25
Sep-95	110.949	237.900	96.00	151260	1.25	2.30	0.25
Oct-95	121.748	235.100	101.80	153486	1.25	2.30	0.25
Nov-95	126.762	234.900	102.40	154153	1.25	2.30	0.25
Dec-95	122.945	237.500	100.80	160702	1.25	2.30	0.25
Jan-96	115.055	231.400	105.20	161170	1.25	2.30	0.25
Feb-96	115.078	232.500	105.30	161472	1.25	2.30	0.25
Mar-96	113.299	233.700	110.00	161415	1.25	2.30	0.25
Apr-96	108.447	234.600	105.30	161127	1.25	2.30	0.25

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
May-96	106.849	236.200	111.40	164287	1.25	2.30	0.25
Jun-96	108.001	235.300	108.10	165745	1.25	2.30	0.25
Jul-96	106.445	235.300	108.70	167246	1.25	2.30	0.25
Aug-96	105.807	238.100	111.90	171110	1.25	2.30	0.25
Sep-96	103.400	238.500	106.80	177328	1.25	2.30	0.25
Oct-96	109.199	240.700	116.80	180421	1.25	2.30	0.25
Nov-96	105.615	241.100	114.10	180290	1.25	2.30	0.25
Dec-96	102.088	242.400	112.00	177981	1.25	2.30	0.25
Jan-97	107.740	236.200	113.10	184815	1.25	2.30	0.25
Feb-97	99.832	237.800	112.00	183750	1.25	2.30	0.25
Mar-97	98.297	239.400	113.70	185650	1.25	2.30	0.25
Apr-97	98.259	240.800	123.50	188345	1.25	2.30	0.25
May-97	97.567	242.900	121.40	189673	1.25	2.30	0.25
Jun-97	100.070	243.300	121.30	187784	1.25	2.30	0.25
Jul-97	98.364	243.000	121.80	190606	1.25	2.30	0.25
Aug-97	98.135	244.700	120.40	190723	1.25	2.30	0.25
Sep-97	96.730	247.100	121.40	195114	1.25	2.30	0.25
Oct-97	97.217	246.300	130.60	197509	1.25	2.30	0.25
Nov-97	102.007	247.200	123.90	198059	1.25	2.30	0.25
Dec-97	99.358	248.900	123.30	196056	1.25	2.30	0.25
Jan-98	98.431	243.300	122.20	197604	1.25	2.30	0.25
Feb-98	99.838	243.900	121.30	201909	1.25	2.30	0.25
Mar-98	100.167	245.900	135.00	205195	1.25	2.30	0.25
Apr-98	98.245	247.000	126.80	203659	1.25	2.30	0.25
May-98	99.023	249.000	130.50	202097	1.25	2.30	0.25
Jun-98	97.443	248.400	132.20	203216	1.25	2.30	0.25
Jul-98	96.601	246.300	130.40	209872	1.25	2.30	0.25
Aug-98	108.111	248.600	130.50	208124	1.25	2.30	0.25
Sep-98	114.868	249.600	130.60	210629	1.25	2.30	0.25
Oct-98	112.072	250.600	135.30	213675	1.25	2.30	0.25
Nov-98	107.612	251.000	129.90	215429	1.25	2.30	0.25
Dec-98	104.879	251.700	128.40	211356	1.25	2.30	0.25
Jan-99	105.834	246.300	123.50	217014	1.25	2.30	0.25

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
Feb-99	102.983	248.200	124.00	218215	1.25	2.30	0.25
Mar-99	99.607	248.700	137.50	217345	1.25	2.30	0.25
Apr-99	96.143	250.000	132.90	216087	1.25	2.30	0.25
May-99	95.773	250.900	135.40	211662	1.25	2.30	0.25
Jun-99	96.033	250.500	140.50	214369	1.25	2.30	0.25
Jul-99	94.275	249.900	137.60	214987	1.25	2.30	0.25
Aug-99	94.267	251.400	137.90	218356	1.25	2.30	0.25
Sep-99	93.168	253.600	136.90	220793	1.25	2.30	0.25
Oct-99	95.246	251.000	138.30	222507	1.25	2.30	0.25
Nov-99	92.424	251.900	138.20	226816	1.25	2.30	0.25
Dec-99	92.276	256.900	135.80	222808	1.25	2.30	0.25
Jan-00	92.049	252.000	134.20	229478	1.25	2.30	0.25
Feb-00	90.906	253.600	137.50	232541	1.25	2.30	0.25
Mar-00	89.822	255.100	150.30	238593	1.25	2.30	0.25
Apr-00	90.377	255.000	137.60	235280	1.25	2.30	0.25
May-00	91.328	256.300	149.10	251492	1.25	2.30	0.25
Jun-00	94.359	255.900	151.20	252234	1.25	2.30	0.25
Jul-00	90.486	254.300	146.20	253315	1.25	2.30	0.25
Aug-00	88.614	256.700	150.20	258619	1.25	2.30	0.25
Sep-00	89.197	259.100	145.00	262653	1.25	2.30	0.25
Oct-00	90.431	257.900	150.10	264241	1.25	2.30	0.25
Nov-00	91.241	259.500	145.20	258583	1.25	2.30	0.25
Dec-00	89.958	260.700	133.60	255531	1.25	2.30	0.25
Jan-01	92.810	254.900	137.30	257069	1.25	2.30	0.25
Feb-01	92.603	255.600	132.10	249511	1.25	2.30	0.25
Mar-01	91.141	257.600	146.50	245378	1.25	2.30	0.25
Apr-01	88.493	255.100	133.70	241288	1.25	2.30	0.25
May-01	86.792	256.300	145.10	236152	1.25	2.30	0.25
Jun-01	86.162	255.500	143.90	227550	1.25	2.30	0.25
Jul-01	86.961	251.400	138.50	223678	1.25	2.30	0.25
Aug-01	86.109	254.700	142.50	218362	1.25	2.30	0.25
Sep-01	88.435	257.000	135.80	215964	1.25	2.30	0.25
Oct-01	86.943	253.900	142.50	211783	1.25	2.30	0.25

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
Nov-01	85.390	254.800	138.70	208636	1.25	2.30	0.25
Dec-01	84.361	254.700	127.50	205963	1.25	2.30	0.25
Jan-02	83.818	251.600	131.50	209649	1.25	2.30	0.25
Feb-02	83.591	251.900	128.20	208192	1.25	2.30	0.25
Mar-02	83.358	254.700	134.00	205950	1.25	2.30	0.25
Apr-02	84.275	255.300	146.10	203194	1.25	2.30	0.25
May-02	87.423	255.700	144.70	205150	1.25	2.30	0.25
Jun-02	88.333	254.700	140.80	202717	1.25	2.30	0.25
Jul-02	88.347	251.700	141.00	198722	1.25	2.30	0.25
Aug-02	88.769	256.100	141.50	196759	1.25	2.30	0.25
Sep-02	90.274	261.000	135.00	197162	1.25	2.30	0.25
Oct-02	90.569	258.600	144.60	197048	1.25	2.30	0.25
Nov-02	90.794	260.200	136.60	195277	1.25	2.30	0.25
Dec-02	90.153	261.100	129.30	190871	1.25	2.30	0.25
Jan-03	93.497	254.300	132.30	192712	1.25	2.30	0.25
Feb-03	97.022	255.100	129.60	193449	1.25	2.30	0.25
Mar-03	96.773	255.400	139.00	193893	1.25	2.30	0.25
Apr-03	93.563	255.700	136.50	194110	1.25	2.30	0.25
May-03	90.698	254.800	140.30	193928	1.25	2.30	0.25
Jun-03	92.962	251.200	138.40	189976	1.25	2.30	0.25
Jul-03	92.451	249.900	137.00	189680	1.25	2.30	0.25
Aug-03	95.454	253.400	134.90	192913	1.25	2.30	0.25
Sep-03	96.485	257.400	134.40	197809	1.25	2.30	0.25
Oct-03	98.202	257.000	143.10	200247	1.25	2.30	0.25
Nov-03	96.872	258.000	133.10	200057	1.25	2.30	0.25
Dec-03	97.247	258.300	133.40	196933	1.25	2.30	0.25
Jan-04	94.527	254.300	131.60	196500	1.65	3.00	0.35
Feb-04	95.111	255.800	131.60	196578	1.65	3.00	0.35
Mar-04	95.358	256.000	148.10	201767	1.65	3.00	0.35
Apr-04	97.825	257.100	140.80	204922	1.65	3.00	0.35
May-04	100.721	258.100	143.40	205456	1.65	3.00	0.35
Jun-04	99.801	255.400	146.70	207801	1.65	3.00	0.35
Jul-04	100.551	254.700	142.60	207222	1.65	3.00	0.35

Month	REX Peso per Dollar Real Exchange Rate	ELPM El Paso Non-farm Total Employment	MXIP Mexico Industrial Production Index	CJMQM Ciudad Juarez Maquiladora Employment	TOLLC Dollar Toll Charged to Cars, Nominal	TOLLT Dollar Toll Charged to Trucks, Nominal	TOLLW Dollar Toll Charged to Pedestrians, Nominal
Aug-04	99.377	255.200	142.20	205815	1.65	3.00	0.35
Sep-04	99.565	258.900	141.60	206741	1.65	3.00	0.35
Oct-04	98.566	258.900	144.60	207413	1.65	3.00	0.35
Nov-04	97.525	258.600	141.00	211020	1.65	3.00	0.35
Dec-04	95.543	258.600	139.10	206327	1.65	3.00	0.35

Impactos económicos de las cuotas compensatorias y el comercio informal en Ciudad Juárez.

Universidad Autónoma de Ciudad Juárez

Instituto de Ciencias Sociales y Administración

OBJETIVO GENERAL

Analizar el comercio en Ciudad Juárez enfatizando: las características sociodemográficas, esquema arancelario y los impactos económicos del comercio informal, los productos extranjeros, la logística del comercio y las cuotas compensatorias en el comercio de Ciudad Juárez.

CHIHUAHUA
Gobierno del Estado
Secretaría de Desarrollo Comercial y Turístico
Dirección de Comercio

CANACO
SERVYTUR - JUAREZ

SECRETARÍA DE ECONOMÍA
Fondo de Apoyo para la Micro, Pequeña y Mediana Empresa
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BASES PARA EL ESTUDIO

- ***Características sociodemográficas de la región y franja fronteriza***.

- ***Esquema arancelario y no arancelario vigente.***

- **Impacto del comercio norteamericano cuotas compensatorias y comercio informal en Ciudad Juárez**.

- ***Logística del comercio local.***

Cuadro 1.2: Población total de las principales ciudades de la frontera internacional México-Estados Unidos, 2004

México*			Estados Unidos**		
Ciudad	Abs.	%	Ciudad	Abs.	%
Tijuana	1'417,384	24.9	San Diego	1'263,756	49.3
Mexicali	823,406	14.5	Calexico	34,326	1.3
San Luis	155,105	2.7	Yuma	83,322	3.3
Nogales	184,129	3.2	Nogales	20,619	0.8
Naco	5,761	0.1	Naco	N .D	N .D
Agua Prieta	66,801	1.2	Douglas	16,706	0.7
Puerto Palomas	5,399	0.1	Columbus	1,824	0.1
Ciudad Juárez	1'411,551	24.8	El Paso	592,099	23.1
Ojinaga	24,895	0.4	Presidio	4,652	0.2
Ciudad Acuña	140,313	2.5	Del Rio	35,816	1.4
Piedras Negras	138,445	2.4	Eagle Pass	24,847	1
Nuevo Laredo	342,457	6.0	Laredo	203,212	7.9
Reynosa	500,560	8.8	McAllen	120,743	4.7
Matamoros	466,978	8.2	Brownsville	161,225	6.3
Total	5'683,185	100.0	Total	2'563,147	100.0

Fuente: XII Censo General de Población y Vivienda, 2000 y Buró de Censos de los Estados Unidos, 2000.

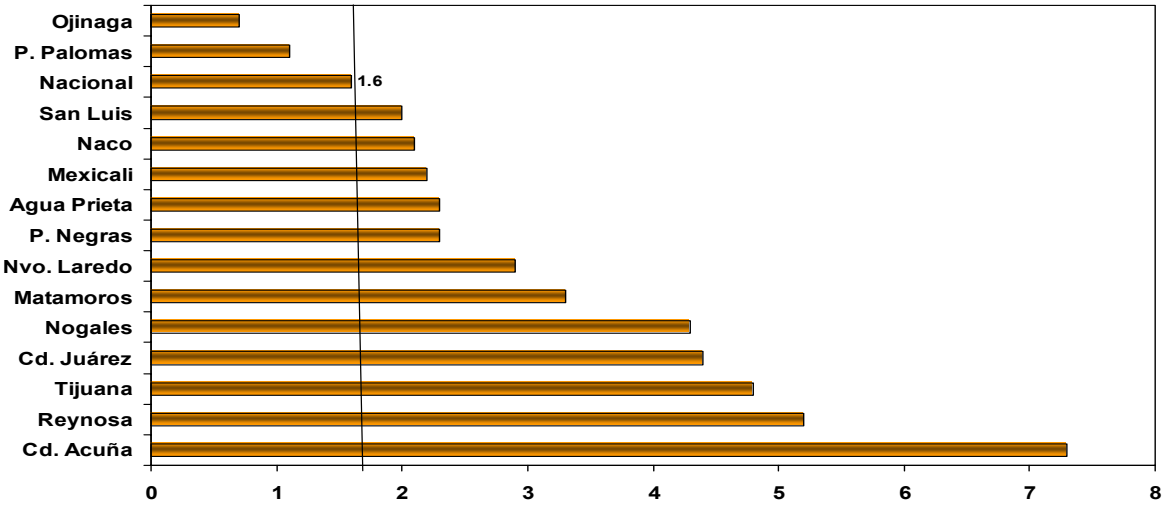
En ambos lados de la frontera internacional, albergaban en conjunto para el año 2004 8´246,332 habitantes, de los cuales más de cinco millones y medio (68.9%) viven en México.

Juárez y Tijuana concentran el 49.37% de la población fronteriza mexicana.

Las ciudades del vecino país que hacen frontera con los dos centros industriales mas importantes, (Tijuana y Cd. Juárez) son San Diego y El Paso, respectivamente, y concentran también la mayor proporción poblacional del conjunto de ciudades vecinas (72.4%)

Otro indicador que da cuenta del dinamismo de las ciudades fronterizas mexicanas es la tasa de crecimiento promedio anual. (Promedio nacional 1.6)

Gráfica 1.1: Tasa de crecimiento medio anual
de las principales ciudades de la frontera norte, 1995-2000



Fuente: Estimaciones propias basadas en INEGI, Conteo de Población y Vivienda 1995 y XII Censo General de Población y Vivienda 2000.

CD. ACUÑA 7.3

REYNOSA 5.2

TIJUANA 4.8

CD. JUAREZ 4.4

NOGALES 4.3

Definición del Problema.

Las Cuotas Compensatorias son un instrumento que permite la igualdad y equidad comercial entre los países, buscando producir que el intercambio de mercancías se desarrolle sin distorsiones, sin embargo, cuando estas cuotas se imponen y aplican de una manera excesiva provocan precisamente todo lo contrario, es decir, generan todo tipo de practicas ilegales y comercio interno desleal, que van desde el contrabando, la subvaluación, el reetiquetado, la piratería, la evasión fiscal, por mencionar algunas, practicas que producen grandes problemas sociales y económicos para nuestro país y específicamente la región fronteriza del mismo.

Con el propósito de evidenciar esta desigual situación comercial, a continuación se señalarán algunos ejemplos comparativos en la importación de ciertos productos y los requisitos que para ello se estipulan legalmente en ambos países:

MERCANCIAS SUJETAS A CUOTAS COMPENSATORIAS PROCEDENTES DE CHINA

MERCANCIA	MEXICO	EUA
ROPA DE VESTIR (HOMBRE Y MUJER)	533%	EX.
ROPA DE CAMA, MESA, TOCADOR O COCINA	79%	EX.
HERRAMIENTAS DE MANO	312%	EX.
CANDADOS DE LATON O BRONCE	181%	EX.
CERRADURAS DE PLOMO Y PERILLA	236%	EX.
ASPIRADORAS MANUALES	129%	EX.
LICUADORAS	129%	EX.
EXPRIMIDOR DE FRUTAS	51%	EX.
LAMPARAS DE MANO	129%	EX.
CAUTINES PARA SOLDAR	129%	EX.
SECADORA PARA CABELLO	129%	EX.
RIZADORA PARA CABELLO	129%	EX.
CAFETERAS	129%	EX.
TOSTADORES DE PAN	129%	EX.
TELEFONOS	129%	EX.
TOCACINTAS	129%	EX.
RADIOGRABADORAS	129%	EX.
BICICLETAS	144%	EX.
JUGUETES	351%	EX.
CALZADO	313%	EX.

Adicional a las cuotas compensatorias, el importador mexicano tiene que cumplir con las demás regulaciones y restricciones no arancelarias, según se podrá observar específicamente en los siguientes los siguientes artículos:

- Padrones sectoriales. (Ej. Calzado: padrón sectorial específico de la industria del calzado.)
- Identificación por prenda en el caso de textiles, calzado, juguetes. (Marca, modelo, estilo, composición, etc).
- Normas oficiales mexicanas.

Casos: Calzado, juguetes, prendas de vestir, electrodomésticos, herramientas entre otros .

PERFIL DEL COMPRADOR JUARENSE EN EL PASO Y ACTIVIDAD COMERCIAL

- Encuesta realizada a 900 personas en los puentes internacionales.
- Existen cruces anuales de 28 millones de compradores potenciales.
- El 75% manifestó las compras como su principal causa de cruce. (21 millones de cruces al año).
- Semanalmente cruzan mas de 400 mil personas para realizar sus compras en El Paso.
- La población que cruza tiene ingresos superiores a los $6,000 pesos mensuales.
- Gasto promedio por persona por visita es igual a $ 80 dólares.

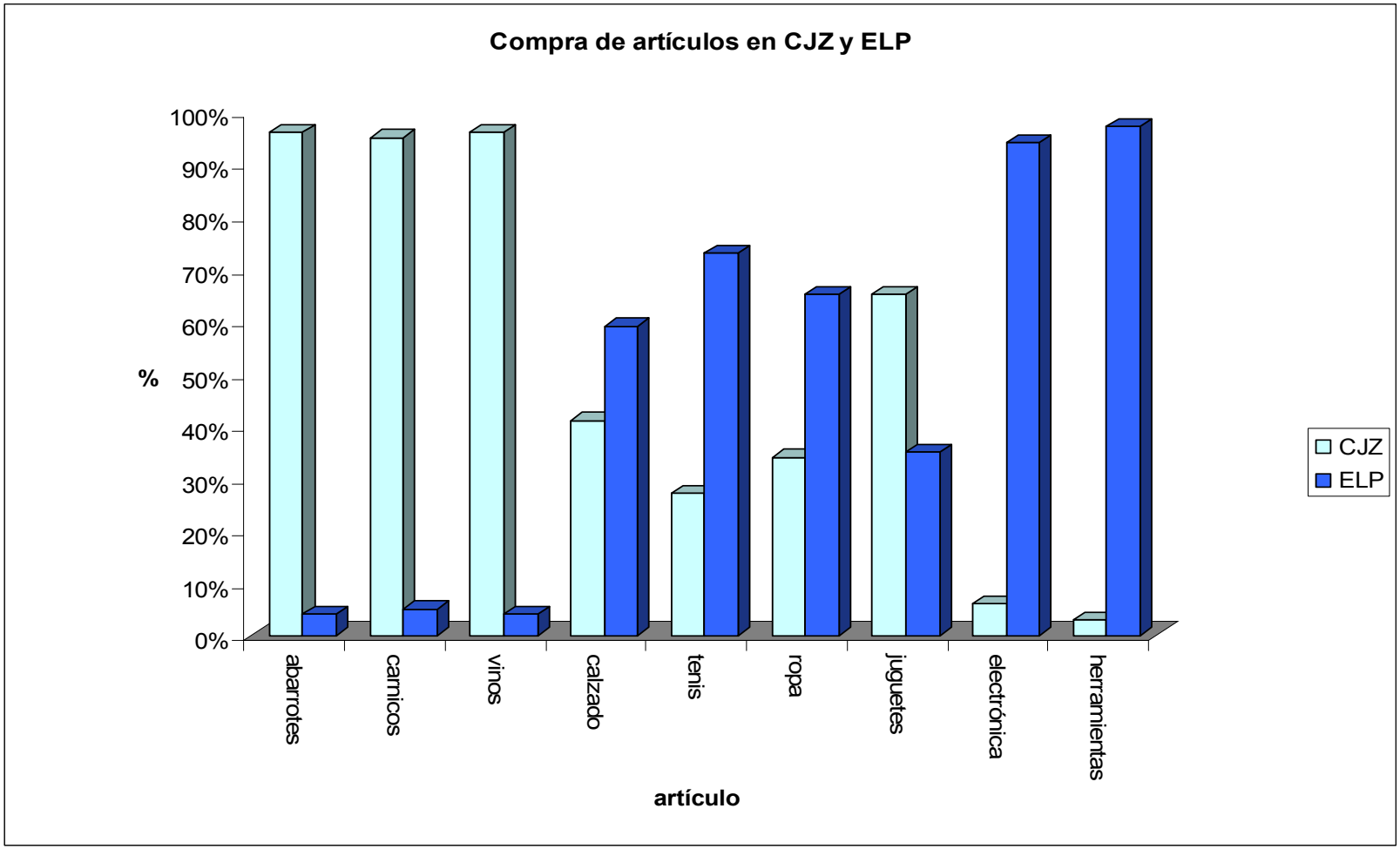
Población en 2005		1,500,000.00
%PEA con visa		30%
PEA estimada		450,000
Gasto promedio por visita		$80.00 USD

Distribución de personas por visita		número de visitas	gasto total annual
Cruces	Personas		
2 o más por semana	180,945	104	$ 1,505,462,400
1 vez por semana	117,945	52	$ 490,651,200
1 vez cada 15 días	72,864	26	$ 151,557,120
1 vez al mes	78,246	12	$ 75,116,160
			$ 2,222,786,880

El monto de las compras anuales que realiza la población de CJZ en ELP se determinó con base en las encuestas aplicadas. La siguiente tabla presenta los cálculos mencionados.

- 2,200 Millones de dólares anuales.
- 185 Millones de dólares mensuales.
- 46 Millones de dólares semanales.

Compras de artículos en Ciudad Juárez y El Paso.



Distribución del gasto en El Paso por giro

Distribución por artículo	%de compra	gasto total anual
Ropa	60.65%	1,348,206,686.90
Zapatos	9.81%	218,018,539.12
Comestibles	18.94%	421,001,169.76
Juguetes	1.47%	32,577,484.59
Herramientas	3.95%	87,708,614.08
Vinos y licores	1.01%	22,553,640.45
Electrónica	4.17%	92,720,533.93
	1.00	2,222,786,668.84

Posibilidad de compra en Ciudad Juárez

Artículo	Monto	Derrama mínima	Derrama máxima
		14%	61%
Ropa	1,348,206,686.90	202,231,003.04	822,406,079.01
Zapatos	218,018,539.12	27,252,317.39	132,991,308.86
Comestibles	421,001,169.76	71,570,198.86	256,810,713.55
Juguetes	32,577,484.59	1,218,397.92	19,872,265.60
Herramientas	87,708,614.08	114,021.20	53,502,254.59
Vinos y Licores	22,553,640.45	1,353,218.43	13,757,720.67
Electrónica	92,720,533.93	1,854,410.68	56,559,525.70
Totales	2,222,786,668.83	305,593,567.51	1,355,899,868.60

* En base al análisis elasticidad-precio (n).

Comercio informal

Debido a que no existe información oficial sobre el comercio informal en Juárez, se recurrió a hacer un muestreo de artículos de procedencia asiática en los mercados Jilotepec, Guillermo Prieto, Juan Gabriel, Oscar Ornelas y el Centro.

El muestreo consistió en revisar 1000 artículos de algunos giros que nos interesan e identificar el lugar de procedencia de dichos bienes. La siguiente tabla muestra un concentrado de la información obtenida por giro y país de origen.

Conteo de artículos de origen asiático

Origen	Tennis	electrónica	Zapatos	juguetes	Herramienta	ropa
China	93%	61%	72%	74%	58%	20%
USA	4%	8%	10%	11%	23%	15%
México	2%	12%	7%	14%	1%	25%
Taiwan	1%	1%	5%	1%	16%	0%
Asiáticos	0%	17%	3%	0%	2%	21%
Resto del mundo	0%	1%	3%	0%	0%	18%

Estimación del comercio informal

Artículo	proporción gasto	origen asiático	propensión a informal (prom. 62%)	Monto comercio informal anual (dls)
electrónica	3%	79%	80%	43,201,850.55
juguetes	1%	75%	40%	6,835,735.85
zapatos	5%	80%	48%	43,748,709.42
ropa	15%	41%	46%	64,460,989.03
tenis	3%	94%	58%	37,268,431.84
herramientas	3%	76%	100%	51,951,592.43
			TOTAL	247,467,309.12

***Las compras de los Juarenses en el Paso* ascienden a la cantidad de**

$2 mil 500 millones de dólares anuales.

Incluyendo los $247. 5 millones de dólares de las ventas realizadas por el comerciante ilegal, que en su mayoría son productos de contrabando, que se venden en el comercio informal.

CONCEPTO	PESOS	DOLARES (10.6)
PIB Chih 2000	**$ 66,966,392,000.00**	**$ 6,320,414,339.62**
PEA Ocupada Chih		**867,934**
Asegurados IMSS Chih		**622,966**
PIB Per Cápita Chih	**$ 77,190.00**	**$ 7,282.14**
% PEA ocupada asegurados		**71.78%**

??

- **¿Cuántos empleos pudiera generar Juárez reteniendo $1,356 Millones de dólares en ventas anuales?**

20% = $135 mdd/$7,282 = 36,986 ???

IMPACTO ECONOMICO GENERADO POR COMPRAS DE MEXICANOS EN TEXAS 2002

	OUTPUT DOLARES (MILLONES)	EMPLEOS GENERADOS	INGRESO DEL EMPLEO DOLARES (MILLONES)	INGRESO POR IMPUESTOS DOLARES (MILLONES)
DIRECTOS	$2,579	57,544	$1,100	$384
INDIRECTOS	$169	1,861	$56	$9
INDUCIDOS	$344	4,209	$112	$24
TOTALES	$3,092	63,614	$1,268	$417

FUENTE: CENTER FOR THE BORDER ECONOMIC STUDIES, UNIVERSITY OF TEXAS PAN-AMERICAN.PRESENTACION DE SUAD GHADDAR.

IMPACTO ECONOMICO GENERADO POR COMPRAS DE MEXICANOS EN CALIFORNIA 2002

	OUTPUT DOLARES (MILLONES)	EMPLEOS GENERADOS	INGRESO DEL EMPLEO DOLARES (MILLONES)	INGRESO POR IMPUESTOS DOLARES (MILLONES)
DIRECTOS	$3,769	60,943	$1,639	$578
INDIRECTOS	$256	2,361	$97	$11
INDUCIDOS	$423	4,254	$146	$28
TOTALES	$4,448	67,558	$1,882	$617

FUENTE: CENTER FOR THE BORDER ECONOMIC STUDIES, UNIVERSITY OF TEXAS PAN-AMERICAN. SUAD GHADDAR.

IMPACTO ECONOMICO DEL GASTO DE MEXICANOS EN ARIZONA 2001

VENTAS DIRECTAS A MEXICANOS	TOTAL DE VENTAS (MULTIPLIER)	EMPLEOS DIRECTOS	TOTAL DE EMPLEOS (MULTIPLIER)
$963 MILLONES DE DOLARES	$1,584 MILLONES DE DOLARES	25,102	35,179

FUENTE: ECONOMIC AND BUSINESS RESEARCH CENTER, UNIVERSIDAD DE ARIZONA, ELLER COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION, PRESENTACION DE ALBERTA H. CHARNEY, PH.D.

ACCIONES ?

- **Participación Estado/Empresarios/ UACJ.**
- **Participación Secretaría de Economía.**
- **Respuesta Secretaría de Economía (Agosto 2006).**
- **Estrategias Estado / Empresarios/UACJ (Septiembre 2006).**
- **Cambio de Gobierno Federal.**
- **Participación Zona Fronteriza.**

CHIHUAHUA
Gobierno del Estado
Secretaría de Desarrollo Comercial y Turístico
Dirección de Comercio

CANACO
SERVYTUR - JUAREZ

UNIVERSIDAD AUTÓNOMA DE CIUDAD JUÁREZ

SECRETARÍA DE ECONOMÍA
Fondo de Apoyo para la Micro, Pequeña y Mediana Empresa
SE
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¡Es Tiempo de Juárez!
Gobierno Municipal
2004 • 2007

POR SU ATENCION

MUCHAS GRACIAS.

The Economic Impact of Mexican Visitors Along the U.S.-Mexico Border: A Research Synthesis

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ABSTRACT: The U.S.-Mexico border region hosts an influx of visitors who cross on a regular basis from Mexico to shop, socialize, vacation and seek a multitude of services in U.S. border communities. Based on a synthesis of regional research and on input-output analysis, Mexican visitors' expenditures along the U.S.-Mexico border generate an estimated eight to nine billion dollars in output (sales) and help support more than 150,000 jobs.

December 2005

I. INTRODUCTION

Mexican visitors constitute an important component in the economy of communities along the U.S.-Mexico border. These visitors enter the U.S. regularly for shopping, tourism, work, and socialization with family and friends. In the process, a considerable amount of money is spent on a multitude of items (groceries, clothing, appliances, furniture, etc.) and services (hotels, restaurants, medical facilities, etc.). Several studies have been undertaken to examine and evaluate this cross-border shopping activity at the regional level. This paper synthesizes the findings of these studies, outlines a profile of the typical Mexican crosser, provides estimates of direct expenditures by Mexican visitors and measures the economic impact of these expenditures in local communities. The paper also hopes to trigger interest in a comprehensive study of Mexican visitors along the U.S. southern border.

To achieve these objectives, several studies in the border states of Arizona (Charney and Pavlakovich-Kochi, 2002), California (Cox, 1998; Kada and Kiy, 2004; San Diego Association of Governments, 2005; San Diego Dialogue, 1994; Sierra López and Serrano Contreras, 2002) and Texas (Ghaddar et al., 2004; Guo et al., 2005; Simpson et al., 2005; Vincent et al., 2003) were analyzed. The data extracted from these studies provided a profile of Mexican shoppers and an estimate of their expenditures, which were then analyzed using an input-output model to arrive at the economic impact to border communities. Results reveal a substantial overall impact in the range of eight to nine billion dollars along the U.S.-Mexico border.

The next section provides some background information on the U.S.-Mexico border region followed by a review of the data obtained from regional studies. Section IV discusses the methodology and reports the results. The last section concludes.

II. BACKGROUND

The U.S.-Mexico border extends 1,952 miles (3,141 km) from San Diego, California on the Pacific to Brownsville, Texas on the Gulf of Mexico. The region is home to more than 12 million people who live primarily in sister cities on both sides of the political borderline. A high level of interaction between the two sides takes place on a daily basis as evidenced by the large volume of crossings that occur. People cross frequently from side to side, either in cars, buses, and/or on foot. In 2004, the number of northbound crossers exceeded 240 million people, the majority of whom, around 80 percent, crossed in personal vehicles. Estimates from border officials indicate that at least half of this crossing activity is attributed to Mexican nationals who enter the U.S. using a laser visa[1] or some other form of legal documentation (I-94, resident alien card, etc.). U.S. citizens comprise the other half. The Texas border is the busiest in terms of crossings by passengers in private vehicles, buses and on foot. The California border is a close second followed by the Arizona border. Minimal crossing activity takes place along the New Mexico border line (Table 1).

[1] A laser visa is a type of visa issued to Mexican citizens allowing them to stay in the U.S. for up to 30 days and to travel within 25 miles of the border (75 miles in the case of Arizona).

Table 1 2004 U.S.-Mexico Border Crossings - Northbound (in thousands)				
Port of Entry	Passengers in Personal Vehicles	Passengers on Buses	Pedestrians	Total
Arizona	25,114	209	9,186	34,509
California	66,394	1,315	18,197	85,906
New Mexico	1,601	18	261	1,880
Texas	97,828	1,846	20,440	120,114
U.S.-Mexico Border	190,937	3,389	48,084	242,409
Source: Bureau of Transportation Statistics				

The majority of Mexican visitors to the U.S. arrive for the purpose of shopping. To cater to this need, malls, shopping plazas and downtown retail areas in border communities have emerged and, in some cases, exist and thrive merely because of Mexican shoppers. Interviews with retailers, hotel owners and business people attest to this fact: border tourist attractions such as South Padre Island in Texas attribute more than half of their activity to Mexican visitors during certain seasons (Ghaddar et al., 2004) and in South San Diego County, Baja Californians account for 10 to 69 percent of area businesses' retail sales (Crossborder Business Associates, 2002). Furthermore, economic crises in Mexico appear to have a significant impact on sales levels in border cities and counties: Patrick and Renforth (1996) find that the 1994 Mexican peso devaluation resulted in a 41.8 percent decline in retail sales in Texas border cities. The 1982-83 devaluation had similar impacts in Texas (Diehl, 1983; Prock, 1983). Gerber (1999) also reports a decline in total taxable sales in California's San Diego and Imperial counties in response to unanticipated peso devaluation. Further evidence of Mexican nationals being an important component of retail sales activity in border regions is the combination of low

per capita incomes along side high per capita retail sales (Table 2). For example, the city of McAllen's per capita income constitutes around two-thirds of the national average while its per capita retail sales are twice the national average. Adkisson and Zimmerman (2004) incorporate this observation in an empirical model and report a positive border effect, whereby retail sales relative to local income are higher in border metropolitan statistical areas (MSAs) than in non-border MSAs.

Table 2
Per Capita Retail Sales and Income of Select Border Cities

City	2002 Per Capita Retail Sales Percent of National Average	2000 Per Capita Income Percent of National Average
San Diego, CA	105%	109%
Calexico, CA	141	46
Yuma, AZ	129	78
Nogales, AZ	172	47
El Paso, TX	91	67
Del Rio, TX	107	57
Laredo, TX	105	51
McAllen, TX	205	69
Brownsville, TX	93	45

Source: U.S. Census Bureau: Census 2000, 2002 Economic Census

III. DATA

This study utilizes data from reports and research projects that evaluate the economic impact of Mexican visitors to various border regions. For the state of Arizona the study included is *The Economic Impacts of Mexican Visitors to Arizona: 2001* (Charney and Pavlakovich-Kochi, 2002). The study administered surveys to 2,612 Mexican visitors as they exited the U.S. through land and air ports of entry in Cochise, Pima, Maricopa, Santa Cruz and Yuma counties. Estimates of these visitors' expenditures amounted to $962.9 million in 2001.

For California, several studies were considered. The first is *Who Crosses the Border: A View of the San Diego/Tijuana Metropolitan Region* (San Diego Dialogue, 1994), which was administered to 5,663 crossers as they entered into San Diego County through land ports of entry. The study estimated annual expenditures of Mexican visitors at $2.8 billion in 1992. The second is a report prepared by Cox (1998): *Survey of Border Crossers: Imperial/Mexicali Valleys*. The report covers findings of 3,188 surveys administered to crossers into Imperial County, California. The results reveal that Mexican crossers spent about $840 million in the County in 1998. The third study reports the findings of *Patrones y Hábitos de Consumo en Baja California* (Sierra López and Serrano Contreras, 2002), a paper which examines the spending patterns of Baja California border residents. The results of 786 surveys show that Baja Californians along the U.S. border spend $1.6 billion annually in the U.S. The last study is a recent research project undertaken by the San Diego Association of Governments (2005) to estimate the economic impact of border wait times. Data was collected from 3,603 crossers at three ports of entry along the San Diego-Baja California border. Findings reveal that border delays result in foregone trips and, consequently, an output loss of $2.3 billion in San Diego County and $0.2 billion in Baja California.

Three Texas studies examine Mexican visitors to the Rio Grande Valley, two of which are tourism reports of visitors to the area (Simpson et al., 2005; Vincent et al., 2003). The third study, *The Economic Impact of Mexican Visitors to the Lower Rio Grande Valley 2003* (Ghaddar et al., 2003), looked at 1,027 visitors to malls and shopping districts in

Cameron and Hidalgo counties. Survey results estimated 2003 expenditures at $1.4 billion.

The above studies were analyzed to estimate expenditures by Mexican visitors per party per trip. Expenditures per trip vary mainly by mode of travel ranging from around $30 for pedestrians to over a $1,000 for air travelers[2], with car travelers spending an average $100-200 per trip and bus travelers paying more or less $75 per visit (Table 3).

Table 3 **Average Expenditures/Party/Trip by Mode of Entry[3]**	
Arizona	$92
Pedestrians	*$39*
Car	*$99*
Bus[4]	*$69*
Airplane	*$1,317*
California[5]	$142
Pedestrians	*$39*
Car	*$170*
Bus	*$80*
Texas	$152
Pedestrians	*$20*
Car	*$182*
Bus	*$80*
Airplane	*$2,038*

To arrive at annual expenditures of Mexican shoppers, estimates of per visit expenditures were projected on 2004 crossing statistics. For Arizona, it is estimated that Mexican

[2] Airplane travelers are those who either enter the U.S. through the airport of an American border city, or those who travel by air from the interior of Mexico to a Mexican border city and then enter the U.S. through a land port. These shoppers constituted a small fraction of collected surveys (10.6 percent of Arizona study and 1.4 percent of Texas study).

[3] Average expenditures are for the years 2001 for Arizona, 2004-2005 for California, and 2003 for Texas.

[4] The Arizona study did not include bus travelers. Reported estimate was calculated as the average of pedestrian and car travelers' expenditures.

[5] San Diego Association of Governments' study provides the $142 figure as overall expenditures per crosser. No breakdown by mode of entry is available. Pedestrian, car and bus estimates were calculated based on that figure, the weight of each mode of entry (obtained from 2004 crossing statistics along the California border), and expenditure patterns depicted by the Arizona and Texas studies.

shoppers spend around a billion dollars a year. In California, these expenditures are close to $3.8 billion and they exceed three billion dollars in Texas annually, for a total of almost eight billion dollars along the U.S.-Mexico border in 2004 (Table 4).

Table 4
Estimated Expenditures of Mexican Visitors by County[6]
(in thousands)

County	Mexican Crossing Parties[7]	Estimated Expenditures[8]
Arizona	**11,522**	**$1,014,976**
Cochise County	2,417	$237,870
Pima/Santa Cruz Counties[9]	5,871	$470,132
Yuma County	3,234	$306,974
California	**26,709**	**$3,768,506**
Imperial County	7,609	$1,037,276
San Diego County	19,101	$2,731,230
Texas	**22,238**	**$3,201,592**
Cameron/Hidalgo Counties[9]	7,486	$1,117,350
El Paso County	7,211	$944,853
Webb County	3,862	$516,662
Other border counties[10]	3,679	$622,728
U.S.-Mexico Border	**60,469**	**$7,985,073**

IV. METHODOLOGY AND RESULTS

The analysis of existing studies had two objectives, the first of which was to establish a profile of the average Mexican shopper. The second objective was to obtain the data

[6] Airplane visitors were excluded from the analysis.
[7] Border crossing statistics along the U.S.-Mexico border were adjusted to reflect crossings by Mexican visitors based on the ratio of Mexican/alien crossings to total crossings as reported in the studies cited. These numbers were then divided by average party size by location and mode of travel to arrive at the number of crossing parties.
[8] 2004 dollars
[9] Pima and Santa Cruz data are combined because, given the counties' geography and location of ports of entry, it is difficult to determine the proportion of visitors who cross through one county's port of entry and then visit the other county. The same is true for Cameron and Hidalgo counties in Texas.
[10] Other border counties in Texas include Val Verde, Maverick, Presidio, and Starr counties.

needed to measure the economic impact of expenditures by these shoppers. To achieve the first objective, results of existing studies were reviewed and integrated within a framework that describes the characteristics of Mexican crossers along two dimensions: location and mode of travel/entry. To achieve the second objective, this profile provided the data needed to conduct the input-output analysis. A description of this methodology is presented in section B.

A. Profile of Mexican Visitors

General Characteristics of Mexican Visitors

Characteristics of Mexican visitors vary widely: they stay anywhere from a few hours to several days, they spend little or considerable amounts of money and their visiting frequency can range from once a year up to once a day. One distinguishing feature, though, is the mode of travel. Pedestrians appear to have a distinct profile from those who enter in their private vehicles. Airplane travelers also seem to be different from the above two groups. Location is another feature that may impact crossing and spending characteristics. Thus, in our attempt to profile this group we take into account the mode of travel as well as the location of crossing.

Shopping is the primary reason to cross into the U.S. for more than two-thirds of Mexican nationals. Other reasons are social in nature, like visiting family and friends, or are work related (Table 5). Around 80 percent of crossers enter in their private vehicles since a car allows them freedom of movement between different shopping locations in the U.S. as well as enough room to handle the volume of their purchases. Pedestrians

constitute 20 percent of crossers with the remaining few (about one percent) crossing by bus (Table 1). Those who cross into California seem to visit more frequently than those who cross into Texas, with around half of California visitors crossing daily or on a weekly basis compared to 16 percent for Texas visitors[11]. Pedestrians generally cross more frequently than those using other modes of travel (Table 6). Regarding the length of their stay[12], almost all of Mexican shoppers to Arizona enter and leave the U.S. the same day. Though the majority of Texas visitors are day trip visitors as well, a considerable portion (36 to 40 percent) stay overnight for usually up to seven nights. Pedestrians, along with bus crossers, are predominantly day visitors, while around 43 percent of those who enter in their personal vehicles tend to stay overnight (Table 7). One possible reason why visitors to Texas stay longer is that these visitors are more likely to have traveled from farther south. Visitors to Arizona border towns are primarily from sister cities right across the border. About a third of visitors to Texas, on the other hand, come from cities farther from the border such as Monterrey[13]. Another variable increasing the likelihood of longer trips in Texas is the proximity of vacation destinations such as South Padre Island to the border.

[11] No data is available to evaluate Arizona visitors' frequency of crossing.
[12] No data is available to evaluate California visitors' length of stay. However, given the higher crossing frequency of this group, it might be concluded that California visitors tend to stay for shorter periods of time relative to Texas visitors.
[13] Monterrey is the industrial capital of northern Mexico with a population exceeding 1.5 million. It is less than 150 miles from the cities of McAllen and Laredo on the Texas border.

Table 5 Primary Reason for Visit				
	Shopping	Social Visits	Work	Other
Arizona	72%	8%	14%	6%
California	42-68%	9-12%	8-29%	7-21%
Texas[14]	85%	41%	10%	48%

Table 6 Frequency of Visits					
	Daily or Almost Daily	1 to 2 Times per Week	Several Times per month	Several Times per Year	Once per Year
Arizona	NA	NA	NA	NA	NA
California	11-19%	29-36%	14-34%	9%	9-17%
Texas	6%	10%	35%	45%	5%
Pedestrians	*12%*	*16%*	*47%*	*26%*	*0%*
Car	*4%*	*9%*	*33%*	*49%*	*5%*
Bus	*2%*	*2%*	*33%*	*48%*	*16%*
Airplane	*0%*	*0%*	*15%*	*39%*	*46%*

Table 7 Length of Stay			
	Day Trip	1 to 7 Nights	8 or more nights
Arizona	96%	3.8%	0.2%
Pedestrians	*97%*	*3%*	*0%*
Car	*97%*	*3%*	*0%*
Airplane	*7%*	*74%*	*19%*
California	NA	NA	NA
Texas	56-63%	36-40%	1-4%
Pedestrians	*98%*	*3%*	*0%*
Car	*55%*	*43%*	*1%*
Bus	*71%*	*27%*	*2%*
Airplane	*8%*	*75%*	*17%*

[14] Multiple responses were possible for Texas' sample, since question asked about reasons for visiting rather than the primary reason.

Mexican visitors spend their money on a variety of items and services. Clothing items constitute more than 40 percent of total expenditures. Groceries are another important category along with food-related expenses such as dining at area restaurants (20-35 percent). Texas visitors also spend a considerable portion on lodging (around eight percent) given their proclivity to stay over night. Figures 1, 2, and 3 provide a breakdown of Mexican shoppers' expenditures in Arizona, California and Texas, respectively.

Figure 1: Expenditures by Category
Arizona

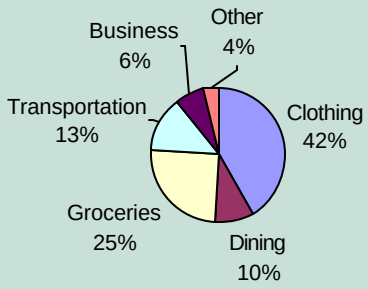


Figure 2: Expenditures by Category
California

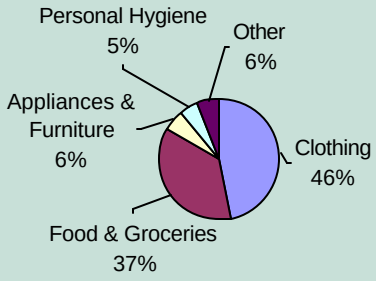
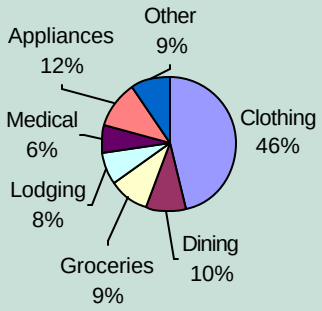


Figure 3: Expenditures by Category
Texas



Shopping Traits of Mexican Visitors

An assessment of the shopping traits of Mexican visitors to the South Texas border region revealed that Mexican shoppers exhibited a very high level of brand loyalty, were very price and quality conscious, and had especially favorable views of U.S. products in terms of their technological advancement, price competitiveness, high quality, and variety of choices (Vincent et al., 2003). Similar findings were reported for Mexican shoppers from Baja California who pointed to prices, variety and quality as main reasons for shopping in the U.S. (Sierra López and Serrano Contreras, 2002; San Diego Dialogue, 1994). Guo et al. (2005) further explore Mexican nationals' motives to shop in the U.S. beyond the external motives of product quality, variety and competitive pricing. Based on structural equation modeling, they find that psychological factors (desire to show off power, enjoyment of a more civilized shopping environment, aspiration to be an opinion leader, and yearning to be a successful person) are positively associated with cross border shopping frequency.

B. Economic Impact of Mexican Visitors' Expenditures

Economic Impact Analysis

Economic impact analysis is the study of changes in the level of economic activity in a given area in response to changes in demand for goods and services. In this case, the change in demand is triggered by Mexican visitors' expenditure outlays. To perform this type of analysis, an input-output model, which depicts inter-industry relationships within an economy, is utilized. Based on monetary transaction flows, both between businesses and between businesses and final consumers, the model estimates a series of impacts (direct, indirect, and induced) to a regional economy. Direct effects are the result of direct spending by Mexican visitors on merchandise, food, accommodations, etc. This direct spending generates sales of goods and services, local tax revenue and employment of workers. Indirect effects are due to inter-business purchases in response to these direct expenditures. The induced effects are the result of households increasing their expenditures when receiving income through the direct and indirect expenditures. Total economic impacts are the sum of direct, indirect and induced effects. In this study, the 2002 IMPLAN (IMpact Analysis for PLANning) model is used to measure the economic impact of Mexican visitors' expenditures to counties along the U.S.-Mexico border.

Economic Impact Results

Mexican nationals who cross into the U.S. through southern land ports of entry make a significant contribution to local economies. Tables 8, 9, 10, and 11 report the economic impact analysis results in terms of output, indirect business taxes, labor income and

employment, respectively[15]. Mexican visitors' direct expenditures in border communities result in total output impact of $8.8 billion, around half of which occurs in California, 35 percent in Texas (approximately $3 billion) and the remaining 15 percent in Arizona (more than one billion dollars). As a result of this output, over a billion dollars are generated in the form of taxes (Table 9) and $3.6 billion are in the form of labor income (Table 10). This economic cycle supports more than 150,000 jobs in border cities and towns (Table 11).

Table 8
Output (Sales)
(in thousands)

County	Direct	Indirect	Induced	Total
Arizona	**$1,014,976**	**$96,122**	**$120,529**	**$1,231,627**
Cochise	$237,870	$18,876	$22,034	$278,780
Pima/Santa Cruz	$470,132	$53,102	$72,419	$595,653
Yuma	$306,974	$24,144	$26,076	$357,194
California	**$3,768,506**	**$256,268**	**$422,656**	**$4,447,430**
Imperial	$1,037,276	$51,537	$69,800	$1,158,614
San Diego	$2,731,230	$204,731	$352,856	$3,288,816
Texas[16]	**$2,578,864**	**$168,973**	**$343,912**	**$3,091,749**
Cameron/Hidalgo	$1,117,350	$56,521	$149,745	$1,323,615
El Paso	$944,853	$78,306	$135,507	$1,158,666
Webb	$516,662	$34,146	$58,661	$609,468
U.S.-Mexico Border	**$7,362,346**	**$521,363**	**$887,097**	**$8,770,806**

[15] Dollar amounts reported in the tables reflect 2004 values.
[16] Excludes the following counties: Val Verde, Maverick, Presidio, and Starr

Table 9 Indirect Business Taxes (in thousands)				
County				
Arizona	**$135,675**	**$4,348**	**$7,882**	**$147,905**
Cochise	$31,709	$914	$1,528	$34,151
Pima/Santa Cruz	$63,193	$2,405	$4,640	$70,237
Yuma	$40,774	$1,029	$1,714	$43,517
California	**$578,045**	**$10,595**	**$28,223**	**$616,863**
Imperial	$163,964	$2,141	$5,598	$171,702
San Diego	$414,081	$8,454	$22,626	$445,160
Texas[16]	**$384,075**	**$8,807**	**$23,993**	**$416,875**
Cameron/Hidalgo	$173,637	$2,388	$10,157	$186,183
El Paso	$136,483	$4,295	$9,402	$150,180
Webb	$73,955	$2,124	$4,434	$80,513
U.S.-Mexico Border	**$1,097,796**	**$23,749**	**$60,098**	**$1,181,643**

Table 10 Labor Income[17] (in thousands)				
County	Direct	Indirect	Induced	Total
Arizona	**$416,413**	**$32,626**	**$40,460**	**$489,499**
Cochise	$96,564	$5,894	$6,926	$109,384
Pima/Santa Cruz	$194,829	$18,168	$24,631	$237,628
Yuma	$125,021	$8,564	$8,902	$142,487
California	**$1,638,758**	**$96,708**	**$145,958**	**$1,881,424**
Imperial	$441,815	$18,305	$21,979	$482,099
San Diego	$1,196,943	$78,403	$123,979	$1,399,325
Texas[16]	**$1,100,351**	**$55,294**	**$112,147**	**$1,267,791**
Cameron/Hidalgo	$478,463	$18,751	$49,424	$546,638
El Paso	$401,180	$25,571	$43,891	$470,641
Webb	$220,709	$10,972	$18,832	$250,512
U.S.-Mexico Border	**$3,155,522**	**$184,628**	**$298,565**	**$3,638,714**

[17] Labor income includes employee compensation and proprietors' income.

Table 11 Employment				
County	Direct	Indirect	Induced	Total
Arizona	**19,968**	**1,073**	**1,450**	**22,491**
Cochise	4,368	204	270	4,842
Pima/Santa Cruz	8,916	568	858	10,342
Yuma	6,684	301	322	7,307
California	**60,943**	**2,361**	**4,254**	**67,558**
Imperial	17,679	587	839	19,105
San Diego	43,264	1,774	3,415	48,453
Texas[16]	**57,544**	**1,861**	**4,209**	**63,614**
Cameron/Hidalgo	25,237	688	1,948	27,873
El Paso	20,458	792	1,526	22,776
Webb	11,849	381	735	12,965
U.S.-Mexico Border	**138,455**	**5,295**	**9,913**	**153,663**

The contribution of Mexican visitors' dollars to local economies varies from one community to the other (Table 12). In certain areas, the economic impact of Mexican visitors' expenditures as a percentage of employment and output figures is close to 40 percent (Imperial County), while in others it does not exceed four percent (Pima/Santa Cruz counties, San Diego County). This is not surprising since the economic impact of cross border expenditures usually varies in importance depending on several factors such as the relative size of the U.S. border city, distance to the border, and type of retail/shopping district (Clark, 1994; Patrick and Renforth, 1996). Within Arizona, the largest relative impacts are felt in Cochise and Yuma counties. In California, Imperial County benefits from the most significant impact[18], and in Texas, Webb County seems to

[18] Similar to the findings of Cox (1998), the size of Mexican visitors' expenditures in Imperial County relative to the size of the County's economy seem unreasonably large. Gerber (1999) concedes that this may be due to the fact that some of these expenditures take place outside Imperial County.

be the one where Mexican visitors make the largest contribution, in percentage terms, to the local economy.

Table 12
Economic Impact of Mexican Visitors' Expenditures

	Share of County Employment[19]	Share of County Output[20]
Arizona		
Cochise	9.4%	10.0%
Pima/Santa Cruz	2.4%	2.5%
Yuma	11.7%	9.9%
California		
Imperial	38.5%	37.1%
San Diego	3.4%	3.1%
Texas		
Cameron/Hidalgo	7.7%	8.5%
El Paso	8.5%	7.9%
Webb	16.6%	16.9%

V. CONCLUSION

The U.S.-Mexico border region is a unique example of social and economic integration, where cross-border shopping is one aspect of that reality. Mexican citizens cross frequently into the U.S. to shop, work, dine, vacation, and visit friends and family. What they spend on those visits results in a key contribution to local economies. Overall, expenditures are estimated at almost eight billion dollars along the U.S.-Mexico border. These expenditures generate a total of approximately $8.8 billion in output (sales), $1.2 billion in business taxes, $3.6 billion in labor income, and more than 153,000 jobs.

[19] Total employment impact divided by 2004 county employment (Bureau of Labor Statistics).
[20] Total output impact (in 2004 dollars) divided by total personal income as reported by 2002 IMPLAN data files (in 2004 dollars).

Despite the conservative nature of these estimates, the reader has to be aware of several limitations given that this paper utilizes data from several studies at different points in time. First, each of the included research projects uses a different survey, different survey locations and a different sampling design. For example, the Arizona study administers surveys to Mexican visitors as they exit the U.S., compared to as they enter for California, while the Texas studies conduct surveys at area malls. Second, there is an underlying assumption that whatever patterns of crossings, expenditures, etc. existed at the time of each analysis still exist today. Third, in the cases where no expenditure or breakdown data was available, data from other studies was projected for those areas. For instance, the expenditures for Texas' Cameron and Hidalgo counties were assumed to hold for El Paso and Webb counties where there are no recent studies exploring Mexican visitors. Nevertheless, the estimates reported in this paper serve to shed a light on the size of this often overlooked market segment and fall in line with educated guesses of local community leaders. The limitations merely serve to highlight the importance of a coordinated and comprehensive research effort between academic institutions and business entities in different regions along the border area to better understand and more reliably evaluate the impact of Mexican shoppers on US border communities.

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