

SUPPLY CHAIN BOTTLENECKS: BORDER CROSSING INEFFICIENCIES BETWEEN MEXICO AND THE UNITED STATES*

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ABSTRACT: The North American Free Trade Agreement (NAFTA) assumes seamless border crossings, without detailing however how this would be achieved particularly in the case of trucking, the most important cargo transport mode. A time-motion study of what actually happens at the border reveals significant time and cost inefficiencies in the border-crossing process, thus defying the general economic interest and the spirit of the Treaty. Inefficiencies identified at the key U.S.-Mexican border crossing, Laredo, Texas, and Nuevo Laredo, Tamaulipas, generate costs for shippers and for the overall economy, in terms of congestion, pollution, and lengthy delays, favouring at the same time specific economic interests. The sources of these inefficiencies are legal and institutional barriers that impede achievement of NAFTA's assumed seamless borders. Technology, along with recent developments regarding security concerns, offer an opportunity for overcoming these barriers.

INTRODUCTION

THE North America Free Trade Agreement (NAFTA) took effect on January 1, 1994. In a formal sense, NAFTA expanded trade links between Canada, Mexico, and the United States, eliminated barriers to cross-border trade in goods and services and established rules guaranteeing the permanent access of each country's domestic products to the other North American markets. The agreement recognizes and encourages the large and growing trade among the three countries. Trade between United States and Mexico increased from \$27 billion in 1982 to an estimated \$239 billion in 2000. Truck-

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ing is the primary means of transportation in this trade, representing roughly 85 percent by value.

Paradoxically, NAFTA does not specify how trade should be administered by the Government agencies of the three NAFTA countries. Trucking is one of the most disputed elements in the Agreement. The relevant Article of the Agreement shows a lack of any valid assumptions, made by the NAFTA negotiators, that would guarantee simplified transportation procedures. Often, it still takes from two to five days and at least three pieces of equipment (trucks and trailers) and three or four drivers, to cross the Rio Grande river with a loaded truck, while the actual driving time from Chicago to Laredo (1,600 miles) is only two days. Apparently, a large discrepancy exists in this respect between NAFTA's expectations and reality.

The paper shows that, in spite of NAFTA, a complex border crossing system exists, creating delays and extra costs that have effectively become non-tariff barriers to trade. The system entails inefficiencies that have proliferated since the 1980's. In essence, such inefficiencies have been the result of long standing practices of governments, transportation interests, customs brokers, and others.

In the case of transportation, the general intent of NAFTA has been circumvented by non-tariff barriers that were inadequately addressed in the Agreement. For instance, the implementation of the provision allowing buses and trucks to operate in the trans-border market was unilaterally suspended by the United States on the grounds of safety. This in turn undermined the ability of the United States to protest restrictions imposed by Mexico on border crossings.

U.S. trucking associations and unions have alleged safety concerns as a reason for delaying implementation of NAFTA's trucking provisions: it is claimed that Mexican trucks are on average considerably older than the U.S. fleet and are not as well maintained. Mexicans counter argue that safety should be a matter of technical inspection of individual vehicles rather than a blanket prohibition. In the meantime, most Mexican firms are upgrading their fleets and continue to purchase new trucks in considerable numbers (Ehinger, 1999). Viewed universally, the long-haul Mexican fleet could now meet the U.S. safety standards better than the U.S. fleet. Not surprisingly, Mexico has challenged the blanket ban before a NAFTA arbitration panel.

BORDER CROSSING BETWEEN UNITED STATES AND MEXICO

The U.S.-Mexican border is the world's longest between a highly industrialized country and a developing one; 1,933 miles, traversing four U.S. and

six Mexican states. This border features sharp differences in economic development, language, political and legal systems, culture, and race. To make things even more complex, Mexico is a major country of origin for illegal aliens and drugs smuggled into the United States. The diversity in culture, language and race, together with a past war in which Mexico lost half its territory to the United States, as well as other armed conflicts, present serious challenges to Mexican and U.S. negotiators in their efforts to harmonize trade facilitation policies across the borders, and differentiate this border from that between the United States and Canada.

At the same time, Mexico is an important trading partner of the United States. The country's total population is 100 million people, with 50 percent under 25 years of age. Mexico City alone (25 million people) has as many people as the whole of Canada. This younger generation is already demanding greater volumes and quality of goods and services. Undoubtedly, the optimization of transport movements and associated logistics of cross-border trade would benefit substantially both countries. The following analysis of the Laredo crossing reveals how far Mexico and the United States still are from what would generally be considered as an efficient situation.

THE LAREDO/NUEVO LAREDO CROSSING POINT

The Laredo border crossing accounts for 40 percent of U.S.-Mexico overland merchandise trade by volume and 50 percent by value. Laredo's proximity to major highways gives motor carriers quick access to Mexico's industrial triangle of Monterrey, Guadalajara, and Mexico City. Laredo handles more freight than all other U.S.-Mexico border crossings combined in terms of value, volume and number of crossings. Customs officials report that Laredo has more than 10,000 trucks crossings daily, while Orreheus, Phillips and Blackburn (2001) place this figure at 15,000 crossings.

Trade through Laredo differs from that of other U.S.-Mexican border crossings, which focus on *maquiladora*¹ factories adjacent to southern Texas. Although such shipments are also present in Laredo, most of the traffic here has origins or destinations in cities in the interior of Mexico, such as Mexico City, Guadalajara, and Monterrey. These locations are major sites of heavy industry.

1. Maquiladoras are manufacturing plants located in Mexico that make products primarily with U.S. components; they are sold mainly to the U.S. market. A large percentage of such manufactures consists of automotive products, electrical components and consumer goods. The Maquiladora program started as an informal agreement in 1966 and, because of its success, it was formalized into law as the Border Industrialization Program (BIP) in 1971.

Mexico has four major transportation corridors: the Pacific, Chihuahua, Central and Gulf Coast. The Laredo crossing serves the most important one, the Central Trade Corridor, extending from Mexico City north to San Luis Potosí, Saltillo, Monterrey, and finally to the border at Nuevo Laredo, Estado de Tamaulipas, Mexico, and Laredo, Texas.

Among the main products moving southbound through Laredo are electronics and electrical equipment; transportation equipment; automobiles and automotive parts; industrial machinery and computers; chemicals and allied products; rubber and plastic products; petroleum and coal; textiles; optical instruments; and paper and cardboard products. Northbound, Laredo handles mainly vehicles and automotive parts; telecommunications equipment; automatic data processing machines; and electronic and electrical equipment.

BORDER CROSSING COSTS AND DELAYS

Substantial time and costs are involved in each and every procedure or movement in the border crossing system. These include: (1) trucking from Chicago to Laredo; (2) handling costs and associated times of Mexican broker inspections for pre-clearance and storage; (3) costs of loading and unloading; (4) drayage costs and times of border crossings; (5) inspections on the U.S. and Mexican sides; and (6) trucking from Nuevo Laredo to Monterrey. The most serious congestion-causing constraints in the Laredo border crossing include infrastructure limitations and antiquated business, government, and regulatory practices. Additional times and costs are involved in the added inspections caused by security concerns in border crossings, after the events of September 11, 2001; these are briefly discussed in the concluding section of the paper.

The research here extends and amplifies important previous research by Smith and Giermanski (1997), who calculated the total variable costs, for the U.S. automobile industry, involved in trans-U.S./Mexican truck shipments through Laredo, Texas. Their study was based on border conditions from the perspective of the U.S. carrier only. Also, the cost data provided by the automotive industry are slightly lower than the costs of smaller firms shipping into Mexico. In their study of the relative efficiency of the automotive industry, Smith and Giermanski used a deterministic model to represent the cost factors involved in border-crossing operations.

In our study of the effects of practices and institutional barriers on efficient trucking, we look at the times involved in each step of the border crossing system. Thus we have adapted the Smith-Giermanski model to analyze the time dimension of the transport of manufactured products

across the border, applying the new model to a hypothetical example of a shipment from Chicago to Monterrey. We subsequently research the costs and movements at the border crossing of Laredo/Nuevo Laredo. Quantitative information on costs and times of border crossings was obtained through interviews with shippers, truckers, International Transportation Data Systems (ITDS) members and transport consultants. The information was verified by examining invoices, observing times and movements, and calculating data from maps, traffic engineering and other sources of information.

FIGURE 1 simulates the movements of a truck transporting cargo from Chicago to Monterrey (ie southbound) and shows the times and variable transport costs of the Laredo crossing. These costs are relevant only to truck crossings; they exclude, for instance, such costs as *pedimento*,² duties, taxes and brokers' commissions that are applicable to all modes.

Transport of a trailer over the 1,600 miles from Chicago to Monterrey involves 10 movements with a minimum of three different trucks and various pieces of equipment for loading and unloading. A U.S. long-haul truck is barred from crossing into Mexico. As a result, the U.S. driver leaves the trailer in a U.S. trucking terminal facility (movement 1) and returns with or without trailer (movement 2). With a team of drivers, the trip from Chicago to Laredo takes 32 hours, plus or minus two hours; a driver working alone takes about 48 hours, plus or minus three hours (Martinez 1999; Weid 1999). The freight bill averages \$1,340 depending on carrier.

The trailer with cargo to Mexico is subsequently moved to the Mexican broker's warehouse facility (in the United States) by a drayage truck³ (movements 3 and 4). The drayage truck then returns empty to its garage (movement 5). The cargo is inspected, counted, and assessed by the Mexican broker to complete the pre-clearance for entry into Mexico; a process that takes from 12 to 74 hours. Charges include warehousing (\$12/night); inspection; classification; verification (\$110-\$300); unloading and reloading (\$90-\$150).

If the U.S. trailer goes into Mexico, there must be an interline agreement between the U.S. trucking company and a Mexican trucking company. Once the pre-clearance process is completed, another drayage truck is called (movement 6) to transfer the trailer through U.S. inspection, cross the bridge, go through Mexican inspection and, finally, enter a designated "corral" (movement 7). The drayage truck returns to the United States with

2. *Pedimento* is the legal document required for cargo entering into Mexico.

3. The drayage truck is the one pulling the trailer through customs and across the border.

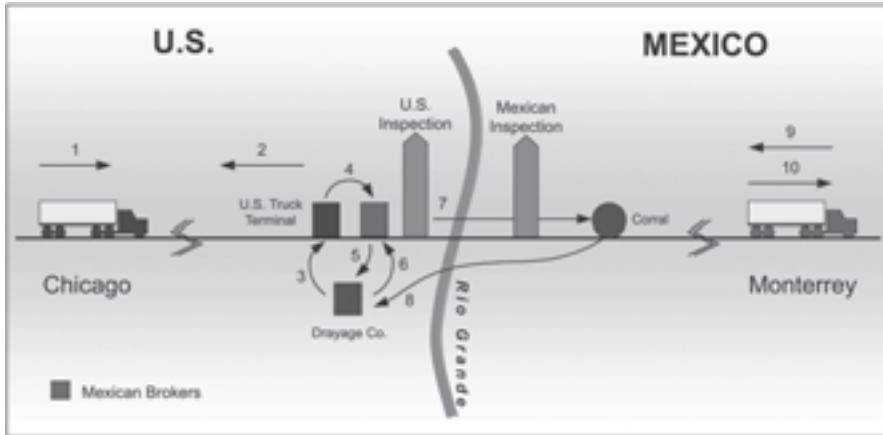


FIGURE 1. Current Situation Scenario Southbound and Breakdown of Border Crossing Costs and Times

| CURRENT SITUATION | | | |
|-------------------|------|--------------|------|
| Costs (US\$) | | Time (hours) | |
| Low | High | Low | High |

United States side

| | | | | |
|--|--------------|--------------|-------------|--------------|
| Trucking Chicago-Laredo | 1,338 | 1,343 | 30.0 | 51.0 |
| Warehouse (\$12/night) | 12 | 36 | 12.0 | 72.0 |
| Inspection, classification, verification | 110 | 300 | | |
| Unloads and reloads as needed | 90 | 150 | | |
| Drayage | 75 | 150 | | |
| US inspection | | | 0.0 | 1.0 |
| Congestion, waiting time | | | 0.0 | 8.0 |
| Others | | | | |
| Totals US | 1,625 | 1,979 | 42.0 | 132.0 |

Mexican side

| | | | | |
|-------------------------------|------------|------------|------------|------------|
| Mexican inspection | | | 0.0 | 2.0 |
| Unloads and reloads as needed | | | 0.1 | 0.3 |
| Trucking to Monterrey | 188 | 210 | 2.5 | 3.0 |
| Others | | | | |
| Totals Mexico | 188 | 210 | 2.6 | 5.3 |

Total US & Mexico

| | | | |
|--------------|--------------|-------------|--------------|
| 1,813 | 2,189 | 44.6 | 137.3 |
|--------------|--------------|-------------|--------------|


Source: Figure and Table by the Authors.

or without cargo or trailer (movement 8). The drayage service charge ranges between \$75 to \$150. The crossing time varies from 1 to 8 hours, depending on the time the drayage starts. Mexican brokers do paper work in the morning, so the trucks are released at about the same time for crossing in the early afternoon. The worse congestion is between 1:30 p.m. and 7 p.m., reflecting these business practices.

A Mexican trucking company picks up the trailer in the corral (movement 9) and drives the 150 miles to Monterrey (movement 10). This takes from 2.5 to 3 hours and costs from \$188 to \$210. The total costs range from \$1,813 to \$2,189.

FIGURE 2 shows the “current situation” scenario and the breakdown of costs and times involved in crossing the border northbound (75% of the southbound crossing costs), reflecting the higher costs of the Mexican brokers that operate in the United States.

These figures highlight the inefficiencies in the Laredo border crossing system and raise several questions: Why has the system remained so inefficient for so many years and why does it diverge so much from economic reality? Why does it take longer to travel a few miles near the border than from Chicago to Laredo?

Geographic distance in the United States costs about a dollar per truck-mile (Boyer, 1997). The cost of distance is somewhat higher on international routes, both north and south of the border. In this light, if we look at the Laredo inefficiencies from a distance equivalent, the border crossing system makes the Rio Grande a very broad river. If border crossings add several 

hundred dollars in costs, Rio Grande is, from an economic perspective, akin to being several hundred miles wide. The trucking provisions of NAFTA, if implemented, would have the equivalent economic effect of moving the United States and Mexico much closer together by shrinking the economic distance of the Rio Grande to something nearer its physical dimension.

SUMMARY OF THE LAREDO CROSSING BORDER PROBLEM

From observations made at the cross-border site in Laredo, and interviews with logistics service providers, shippers, and government officials, the Laredo border problem can be summarized as follows:

- 1) legal and institutional restrictions and procedures imposed by Mexico and tolerated by the United States, along with a U.S. limitation on operations by Mexican truckers in the United States, tolerated by Mexico;
- 2) excessive stops, interrupting transport flows and making the cargo more susceptible to damage, loss, and tampering; in addition, pollution is

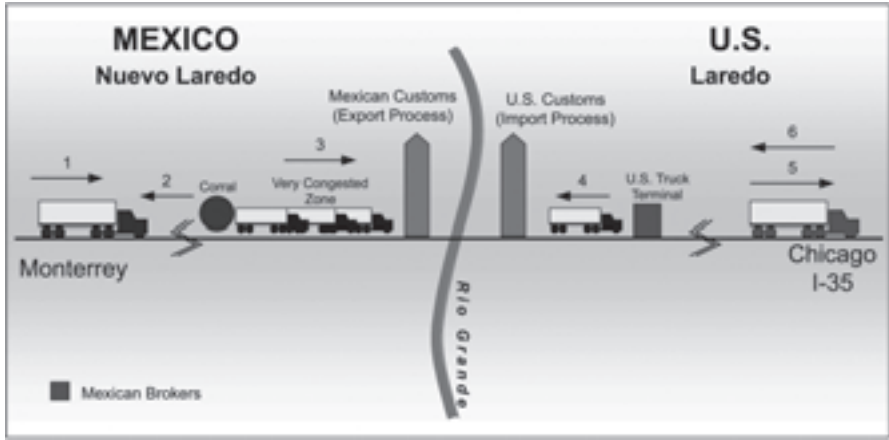


FIGURE 2. Current Situation Scenario Northbound and Breakdown of Border Crossing Costs and Times

| NORTH BOUND | | | | | |
|-------------------------------|--|--------------|--------------|--------------|-------------|
| | | Costs (US\$) | | Time (hours) | |
| | | Low | High | Low | High |
| Mexican side | | | | | |
| Trucking Monterrey-Border | | 188 | 210 | 2.5 | 3.0 |
| Unloads and reloads as needed | | 75 | 150 | 0.3 | 1.0 |
| Drayage | | 75 | 150 | | |
| Mexican inspection | | | | 0.0 | 2.0 |
| <i>Totals Mexico</i> | | 338 | 510 | 2.8 | 6.0 |
| United States side | | | | | |
| Congestion, waiting time | | | | 1.0 | 6.0 |
| US inspection | | | | 0.0 | 4.0 |
| Unloads and reloads as needed | | | | 0.3 | 0.5 |
| Trucking to Chicago | | 1,338 | 1,343 | 30.0 | 51.0 |
| <i>Totals US</i> | | 1,338 | 1,343 | 31.3 | 61.5 |
| Total US & Mexico | | | | | |
| | | 1,676 | 1,853 | 34.0 | 67.5 |

Source: Figure and Table by the Authors.

- generated on the streets of Laredo from diesel engines, accelerating, stopping, idling and starting under heavy loads;
- 3) lack of coordinated procedures and data requirements for border crossing;
 - 4) border crossing infrastructure limitations, such as insufficient access roads to the crossing bridges, leading to high levels of congestion;⁴
 - 5) limited capacity of some inspection areas, aggravating congestion;
 - 6) business practices that unnecessarily create peak hours for border crossings;
 - 7) border crossing services of the drayage industry intensify congestion by doubling the number of vehicles crossing the bridges and by using local streets;
 - 8) lack of sufficient government motivation to add the personnel required to provide inspections 24 hours/day;
 - 9) lack of leadership, both in the private sector and government, to promote change for a more efficient border crossing system; and
 - 10) the cultural environment on the U.S.- Mexican border, characterized by language and race differences, distrust, and acceptance of bureaucracy.

Delays are the most obvious problem in border crossing at Laredo. Traffic problems on the city's streets are heightened by U.S. and Mexican restrictions on trucks, which in turn is exacerbated by urban traffic caused in part by the location of 1,000 warehouses in Laredo that serve the cross-border trade and various other types of traffic (international trade, passenger) served by the I-35 motorway. In 1999, the average number of empty truck crossings had increased to 46 percent, intensifying congestion and the demand for infrastructure. Empty back hauls are a consequence of institutional constraints that create the drayage market and do not allow U.S. carriers to return from Mexico with cargo.

BORDER CROSSING UNDER INSTITUTIONAL CONSTRAINTS

In theory, NAFTA assures a seamless border for the movement of trade among Canada, Mexico, and the United States. To implement this ideal, standardized information needs to be exchanged among the three countries, and the trucking companies or their agents should provide this information to Customs and other government officials in advance of each

4. Although Laredo invested hundreds of millions of U.S. dollars in building The Colombia Solidarity Bridge in 1991, the access roads on either side remained inadequate for years. The World Trade Bridge, build in 2000, still does not have access roads completed (Phillips and Manzanarez, June 2001).

truck's arrival at the border. In this way, government officials can make their risk assessments and decisions beforehand and goods could thus be released or examined based on the pre-arrival information.

Something approximating this ideal situation occurs on the U.S.-Canadian border (excluding, for the moment, the additional security measures following the events of 11 September 2001). The process starts when the truck arrives at the government inspection facility. On the United States side, most of these decisions result in quick release of the merchandise while verification of the information takes place at a later stage. This occurs because the United States and Canada require each shipper to be covered by a bond or insurance policy that guarantees payments of any taxes or fees due. These procedures between the United States and Canada allow for many government actions to take place long after the goods have traversed the border. Any revenue losses detected during later government processing are theoretically protected by bonds. Mexico does not have a system of bonds and insurance and requires payment of taxes and fees before the merchandise is allowed into the country.

From an institutional perspective, however, the overall ineffectiveness of this situation generates substantial economic benefits in a number of ways and for a number of "vested interests" along the border: (i) Mexican brokers who provide services of warehousing, inspection, and classification on the U.S. side of the border; (ii) the Laredo/Nuevo Laredo drayage industry; (iii) U.S. banks who finance the construction of warehouses; (iv) the State and municipal governments on both sides of the border who receive extra toll payments; (v) the Mexican states that receive a share of Customs tax collections and import duties; (vi) the entire regional economy that provides jobs, goods and services to accommodate these "extra" procedural steps; and (vii) the construction and toll industries that provide and charge for the use of infrastructure that would be unneeded if the border crossing process were efficient.

The high costs, delays and congestion at the Laredo cross point are consequence of institutional constraints that generate revenue and employment in the towns on the border.⁵ Since NAFTA took effect in 1994, Laredo has become the United States' second-fastest growing metropolitan area with 190,000 residents, up 50 percent from the last decade. Another 20,000 were expected by year 2000 and 50,000 by 2010. Although the costs and time of border crossing could be substantially reduced, vested interests have successfully blocked change for over 8 years. At the local level,

5. In 1999 the 3 bridges in Laredo collected \$27.2 million in tolls (Phillips and Manzanares, 2001).

politicians are attentive to the electorate and the cross-border industry, which is a source of campaign contributions, tax, revenue and employment. Overall, economic efficiency has thus far lost out to interest groups at the Laredo border crossing.

CONCLUSIONS AND DISCUSSION OF ALTERNATIVES

While many aspects of NAFTA are achieving their intended objectives, the provisions for trucking and border crossings are delayed and may never be implemented in their original form. Implementation would require the solution of conflicts of interest that are relevant to the trading institutions at national and local level. Safety and environmental regulations and anti-smuggling measures must continue to be improved and enforced, but they should not constitute pretexts for failing to implement agreements that will allow truckers to cross national boundaries. In this regard, the U.S. and Mexican authorities have failed to maintain the integrity of this agreement, which is also a precondition for creating the trust necessary for an efficient cross border system.

The NAFTA trucking case was disputed in court and the NAFTA panel issued its decision on February 6, 2001 regarding cross border point to point services and the Mexican ability to invest in U.S. trucking companies. The panel's decision does not mean an automatic right to provide cross border services (Hathaway 2001). The practical implications of the ruling and the regulatory changes that will occur in each country are hard to predict. The issue of truck inspection activities at the major ports of entry adds complexity to an already cumbersome process. These are politically sensitive issues in both countries, given the interest groups and pressures from service providers on both sides of the border.

NAFTA has been an instrument for Mexican economic development. Mexico has integrated its manufacturing industry into the productive processes, going beyond the assembly functions of the maquiladora industry. Progress in heavy manufacturing has been substantial. The services sector, however, has been constrained by powerful interest groups. A sizable number of politicians have their political bases in these districts and have therefore obvious incentives to represent the interests in these districts, so that the political cost of changing this situation is high. Mexican brokers are a prime point in case here, but there are also many others.

The International Trade Data Systems (ITDS) offers a way forward. The objective of ITDS is to facilitate and promote global trade by addressing the problems of the current trade processing environment. ITDS can reduce costs, enhance enforcement and compliance, and improve the quality and

speed of international trade and transportation data. ITDS meets this vision through standard commercially-based data, common business functions, elimination of redundant and confusing processing data, improved risk assessment techniques, convenient access to process requirements and information, improved data editing and validation, and an integrated electronic environment (Ehinger, 1999).

In the United States and Canada, traders post a bond and they are effectively released. They have a grace period to pay taxes, and the trade moves quickly. Mexico has the technology and capability to implement ITDS. Mexico's Customs electronic capability is more advanced than that of the U.S. Customs service. But Mexican Customs see themselves as an enforcement agency, protecting government revenue and abetting business practices of powerful Mexican companies. In Mexico, brokers are merely enforcers of Customs law. Their established practices create a system not highly conducive to standardized procedures and information and communication technologies.

The events of September 11, 2001 in the United States have created a crisis in an already inefficient border crossing system. Before these events, shippers and other parties had apparently found it more practical to put up with border inefficiencies rather than work towards their solution. The general economic welfare argument drew little attention. The additional delays and costs to the public and private sectors created by the external shock of September 11 may offer an opportunity to review the situation and introduce changes. Security risks, costs and delays are directly proportional to the number of unnecessary vehicles crossing the border. This may have created an opportunity to increase security by eliminating all the massive duplication of data, goods handling and truck movements. Focus should be on introducing a smart border crossing system. The consequences of added trips, additional trucks, delays, and stops to a system already inefficient can prove to be disastrous for the economies of the North American countries.

This may be time for fundamental rethinking and consideration of security issues and economic rationality of an efficient border crossing system relieved from legal and institutional barriers. ITDS could present such alternative.

REFERENCES

- BOYER, K. D. (1997) "American Trucking, NAFTA, and the Cost of Distance." *ANNALS, AAPSS*, 553, September.
- EHINGER, R. (1999) Executive Director of International Trade Data Systems, Interview, Washington, D. C., February 1999.

- HATHAWAY, M. (2001) North American Free Trade Agreement, Arbitral Panel In the Matter of Cross-Border Trucking Services, Panel Member, Interview, Washington, D.C., March 1.
- International Trade Data System Office Information (1998) *Cost Benefit analysis for the International Trade Data System*, Technology Architecture/Design Report, ITDS Office, Washington D.C.
- MARTINEZ, J. (1999) South West Motor Transport Co. Interview Oct. 17.
- MCCRAY, J. and HARRISON, R. (1999) "NAFTA Trucks on U.S. Highway Corridors", Transportation Research Board, 78th Annual Meeting, Washington, D.C., January 11-14.
- ORRENIUS, P., PHILLIPS, K, and B. BLACKBURN (2001) Federal Reserve Bank of Dallas, June 2001.
- PHILLIPS, K. and MANZANARES, C. (2001), "Transportation: Infrastructure and the Border Economy", Federal Reserve Bank of Dallas, June 2001.
- SMITH, H. C. and GIERMANSKI, J. R. (1997) "An Analysis of the Added Costs of Transportation of U.S./Mexican Truck Shipments at the Port of Laredo, Texas: NAFTA versus Reality." Texas: College of Business Administration and The Graduate School of International Trade & Business Administration, Texas A&M International University, Laredo, unpublished paper.
- U.S. Department of Transportation (1991) Intermodal Surface Transportation Efficiency Act: Section 1089 and Section 6015, "Assessment of Border Crossings and Transportation Corridors for North American Trade", Report to Congress, Washington, D.C.
- U.S. Department of Transportation (1994) "Making Things Work: Transportation and Trade Expansion in Western North America", Intermodal Surface Transportation Efficiency Act 6015 Study: Assessment of Border Crossings and Transportation Corridors for North American Trade.
- U.S. Department of Transportation (1998) "Binational Border Transportation Planning and Programming Process," gov/binational/reports/Task8/toc8.html, p. 76.