

BINATIONAL BORDER TRANSPORTATION PLANNING AND PROGRAMMING STUDY

Task 8:

Current Trade and Passenger Flow Data

Final Report

*La Empresa
Barton-Aschman*

May 8, 1997

Preface

U.S./Mexico Binational Border Transportation Planning and Programming Study implements a significant binational policy making document entitled "Memorandum of Understanding on the Planning process for Land Transport on Each Side of the Border" signed by the federal governments of Mexico and the United States at the first "NAFTA Transportation Summit" held in Washington D.C., April 29, 1994.

The purpose of this study is to provide policymakers with information needed to establish a continuous, joint, binational, transportation planning and programming process. A goal of this study is to improve the efficiency of the existing binational policy making, planning procedures and funding criteria affecting our Border Land Transportation Systems (BLTS). The BLTS should be seen as a binational transportation system made of international bridges and border crossings and its land connections to major urban and/or economic centers, principal seaports, airports and multimodal/transfer stations, and ultimately to its connections to national transportation facilities.

BINATIONAL BORDER TRANSPORTATION PLANNING AND PROGRAMMING STUDY
TASK 8 REPORT: CURRENT TRADE AND PASSENGER FLOW DATA

This report describes the existing trade and passenger flows between Mexico and the U.S at three levels of geographic detail: national, U.S. Customs district, and port of entry. At the national level the report discusses the various sources of trade data, differences between these sources, maquiladora versus traditional trade, and trends in the major commodity movements. In addition, there is a discussion of mode use by commodity and intermodal facilities. At the district level there is a discussion of the major commodities moving through each of the four U.S. Customs districts along the U.S./Mexican border. There is also, a discussion of the usefulness of the available origin and destination data related to U.S./Mexico trade. At the port of entry level, tables are provided that indicate the mode use at each port of entry.

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Key Words: U.S. & Mexico trade data, national, Customs district, port of entry, commodity trends, origin and destination.

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April 25, 1997

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8.1 Introduction

The “Binational Border Transportation Planning and Programming Study” is composed of five separate phases (I. Inventory, II. Existing Conditions, III. Future Conditions, IV. Recommendations and, V: Live Data Bank Development for Border Transportation). Task 8, “Current Trade and Passenger Flows”, is a part of Phase I, and a source of information required for the completion of Tasks 9, 10 and 11 in Phase II.

Task 8 contains information regarding: a) existing binational trade, passengers, and pedestrian flows; b) a summary of trade flow trend patterns according to their origin and destination, product type, transportation mode, and border crossing point; c) regulatory factors influencing trade flows; and d) trade outlooks for both Mexico and the United States.

Trade between the U.S. and Mexico has been growing in recent years at a faster rate than the economy of either country. For example, between 1989 and 1992, while the U.S. economy was growing at 2 percent and the Mexican economy at 4 percent, U.S. exports to Mexico grew at an average of 20 percent and imports from Mexico grew at an average of 11 percent. U.S.-Mexico trade reached a new peak in 1995, the second full year of the North American Free Trade Agreement (NAFTA) implementation, when it again exceeded the \$100 billion dollar level.

The rapid growth in trade between the U.S. and Mexico began in 1986 when Mexico lowered its tariffs, eliminated most import permits, and joined the General Agreement on Tariffs and Trade (GATT). This growth trend has continued with the implementation of NAFTA. Overall U.S. trade (exports and imports) with Mexico has grown from \$34.9 billion dollars in 1987 to over \$109 billion in 1995. Since the majority of trade between the U.S. and Mexico is land-based, this explosive growth in trade has caused increased traffic at U.S.-Mexico border crossings and strained the ability of the existing transportation infrastructure to meet the demand.

The survey of existing trade flows which follows includes a national overview, trade flows by commodity, trade flows by mode of transportation, and trade flows through the border states and border gateways including traditional and maquiladora trade.

Information about trade flow exchanges between both countries is expressed largely in terms of **commodity value in U.S. dollars**. Since the analysis of border flows is crucial in determining the impact on transportation systems, the ideal would be to account for these flows based on the number of vehicles crossing the border, or in a unit measure directly convertible to vehicles. However, there are no sources of information available which provide such information in a complete and reliable manner.

This report does include some data associated with the number of vehicles crossing the individual ports of entry. Unfortunately, detailed analysis regarding the type of product, origin-destination, “maquiladora”, etc. was impossible at the individual vehicle level. While Secretaría de Comercio y Fomento Industrial (SECOFI) data (Mexico) contains some information associated with freight weight, it is incomplete and not wholly reliable in all cases. Therefore, estimations were developed and used in the analyses based on unit of measure.

This document presents information from both U.S. and Mexican sources. Comparisons of the different data sources considered and an explanation of their differences is provided. The characteristics and processing of the information is also briefly outlined. General aspects of international Mexico-U.S. trade are discussed, with emphasis on the relative importance of trade between the two countries. Trade flows crossing the border are analyzed, and are classified by: (i) Mexico-U.S. movements; (ii) flows crossing the border and not having an origin and/or a

destination in these two countries; (iii) traditional and “maquiladora” trade; (iv) principal products; (v) transportation mode used; (vi) O-D flows for the different customs offices along the border; and (vii) trends experienced in the past several years. An analysis of the Mexico-U.S. trade freight tonnage (estimated) is presented along with an analysis of the truck and person flows for those border points where information is available.

8.2 Mexico-U.S. Trade and Person Flows

The following activities were conducted in undertaking the acquisition, development, and presentation of Mexico-U.S. border trade and person flow data:

1. Identification of and contact with the principal sources of information
2. Data collection, evaluation and selection of data to be used
3. Data base design and creation
4. Data presentation

Identification of and Contact with the Principal Sources of Information

This activity was relatively straightforward for U.S. information sources because most data are readily available to the general public. Some data is classified as confidential or is unpublished (especially rail data), and therefore was not available for this report. Direct contact with personnel at individual source agencies was generally not required since the data sets, along with their associated contents and file structures, were already established and fully documented. U.S. Data sources for trade and person flow data discussed and presented in this Task 8 report include the U.S. Bureau of Census, U.S. Department of Commerce, U.S. Bureau of Transportation Statistics, and U.S. Customs Service.

In contrast with the U.S., there are numerous sources of trade flow information in Mexico, each providing information regarding an area of concern particular to the individual source and at different levels of aggregation. This information is not available to the general public, not necessarily because it is confidential, but because the sources do not normally process it for publication. As a result, the acquisition of statistical information in a usable form required more effort.

In order to determine the types of information that were available from Mexican sources, institutions and agencies related to Mexican trade and the movement of people across the border had to be identified. A contact person was then established at each agency to learn which types of information were available. Interview notes (Spanish only) from each of the identified sources of information are available in the project files.

Data Collection, Evaluation, and Selection of Data to be Used

U.S. trade flow data was obtained through various governmental clearinghouses where these data are offered to the general public for purchase upon request. Data regarding person flows was obtained directly from field offices of the U.S. Customs Service.

Once the Mexican sources and the types of information they could provide were identified, arrangements were made to access the available data. Banco de México (BANXICO), and especially SECOFI, made great efforts in processing their data to provide the database fields required. (La Empresa and SECOFI selected the required fields).

Table 8.1 Mexican and U.S. Trade Data Totals, 1987-1995 (millions of dollars)

	1987	1988	1989	1990	1991	1992	1993	1994	1995
BANXICO DATA									
U.S.-Mexico	7,905	12,631	15,867	20,521	36,868	44,279	46,465	54,762	53,829
Mexico-U.S.	13,326	13,556	15,924	18,456	33,953	37,468	43,116	51,680	66,618
Total	21,231	26,188	31,792	38,978	70,820	81,747	89,581	106,442	120,447
U.S. Department of Commerce Data									
U.S.-Mexico	14,600	20,600	25,000	28,300	33,300	40,600	41,600	50,800	46,300
Mexico-U.S.	20,300	23,300	27,200	30,200	31,100	35,200	39,900	49,500	62,800
Total	34,900	43,600	52,200	58,500	64,400	75,800	81,500	100,300	109,100

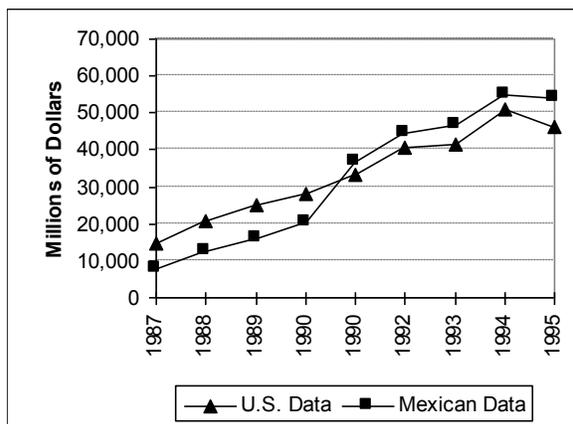
After the Mexican source data were collected, a detailed description of each data field was created and both the data and the possibilities for reporting the data were evaluated. During this evaluation, the level of confidence of the data (for both U.S. and Mexican source data) was evaluated in order to select the information most appropriate to the description of trade flow as required by this study.

An initial determination was made that while none of the databases acquired were perfectly suited to meet the objectives of Task 8, the U.S.-Mexico trade data acquired from U.S. sources was the most complete and reliable. Nevertheless, many of the data from Mexican sources have proven to be very helpful in “filling the gaps” where U.S. source data were lacking. This finding highlights the need for both the U.S. and Mexico to coordinate consistent, seamless, and complimentary databases.

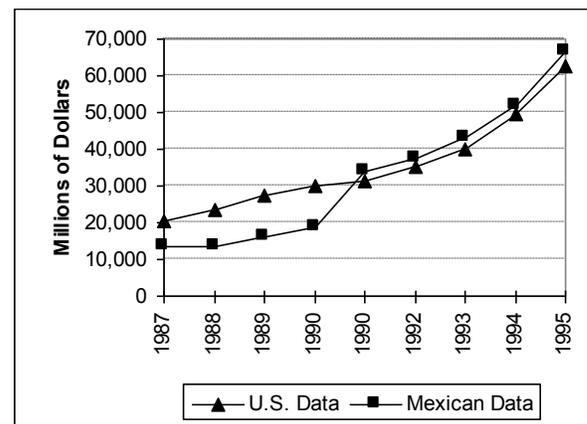
The following brief discussion provides an example of the differences between U.S. and Mexican source data at the national level. Table 8.1 shows total import and export figures provided by sources in each country for the period 1987-1995. Figure 8.1 provides a graphic depiction of these same data.

Figure 8.1 Mexican and U.S. Trade Data Totals, 1987-1995 (millions of dollars)

U.S. to Mexico



Mexico to U.S.



Sources:
 Mexican Data :BANXICO
 U.S. Data: U.S. Department of Commerce - U.S. Bureau of Census

From both exhibits it can be seen that while there are differences in the totals, these differences are generally decreasing over time. This is largely due to more complete and accurate data collection on both sides of the border. Further, it was found that even though *totals* are marginally different, the relative differences among and between categories such as between imports-exports by commodity or by customs district are very closely matched. Therefore, a combination of both U.S. and Mexican source data appear in this Task 8 report. A discussion regarding available data sets, their particular strengths and weaknesses, and a more extensive comparison of U.S. and Mexican source data is presented in Section 8.2.2 of this report. Because the Mexican source data have been acquired from a large number of sources and contain many disparate data types, the discussion regarding these data have been presented in greater detail.

Data Base Design and Creation

The availability and types of data identified as applicable to this study (following guidelines as set forth in the scope of work) largely influenced and dictated the design of the databases. The data collected in the previously discussed efforts were assembled using the software packages dBase III and Excel to create formal database and spreadsheet files. Section 8.2.2 of this report further describes these data bases.

Data Presentation

Once the databases were created, Mexico-U.S. trade movement presentations were developed by type of operation, transportation mode, related customs office, product type, and origin and destination locations. Person and vehicular flow data were presented by type of movement and location of border crossing. Using the tables thus created, a variety of Mexico-U.S. trade flow information is presented in this report, including the identification of principal products moving north and south across the border, “maquiladora” movement and traditional trade, transportation mode utilized, related customs office of import/export, principal import/export states, and the impact of the peso devaluation on these movements. A freight weight (tons) analysis was also performed. All data sets, selected tables, and graphics will be included in the live data bank developed for Task 17 of the Binational Border Transportation Planning and Programming Study.

8.2.1 Information Sources

As a part of the Binational Transportation Planning and Programming Study, the study team investigated various sources for statistical data related to U.S.-Mexico trade flows. Each source was reviewed regarding its ability to provide information on topics such as commodity flows by value or quantity, mode utilization, origins and destinations, and the level of geographic detail (national, state, district or port of entry). For both countries, agencies within the federal governments collect the core data on trade movements and publish the information for public use. The following section discusses the various sources and quality issues related to the data sets available.

Once the potential sources of information were identified, interviews with the personnel responsible for generating the information were conducted where appropriate. The primary purpose of these interviews with Mexican agencies was to gain more detailed information

regarding the contents of the data, frequency of updates, recording system, accessibility, format, purpose, and reliability.

Mexico

The Mexican agencies with information on person and commodity flows are shown in Table 8.2. The table also shows the type of information that each source possesses.

The original source of information for commodity flows is the Dirección General de Aduanas (Customs) of the Secretaría de Hacienda y Crédito Público (SHCP). This office is in charge of authorizing such movements, as well as approving the amount of taxes and duties levied. The border customs offices are responsible for checking, authorizing and registering all paperwork for commodities being imported or exported. Each customs office then forwards this information to the Unidad Central de Informática y Glosa of the Dirección General de Aduanas on a monthly basis. The data from these monthly reports (which contain information from all of the country's customs offices) are compiled into a 64-field data base. A listing of these fields (Spanish only) is available in the project files. The information is stored on a magnetic tape distributed to BANXICO, SECOFI and the Instituto Nacional de Estadística e Informática (INEGI). The following figure shows the procedure used to prepare the information on Mexican commercial flow exchanges.

This figure reveals that BANXICO, INEGI and SECOFI have very little information related to Mexican trade that is available to the public. However, the information that SECOFI does possess includes completely disaggregated data which is quite useful for the purpose of this study.

There is an External Trade Statistics Committee, chaired by INEGI, with Dirección General de Aduanas (Customs), Banco de Comercio Exterior (BANCOMEXT), SECOFI and BANXICO as members. The tasks of this committee include the review and reconciliation of the Mexican external trade statistics to the interior (within the governmental agencies) and the exterior of the country (especially with the U.S.).

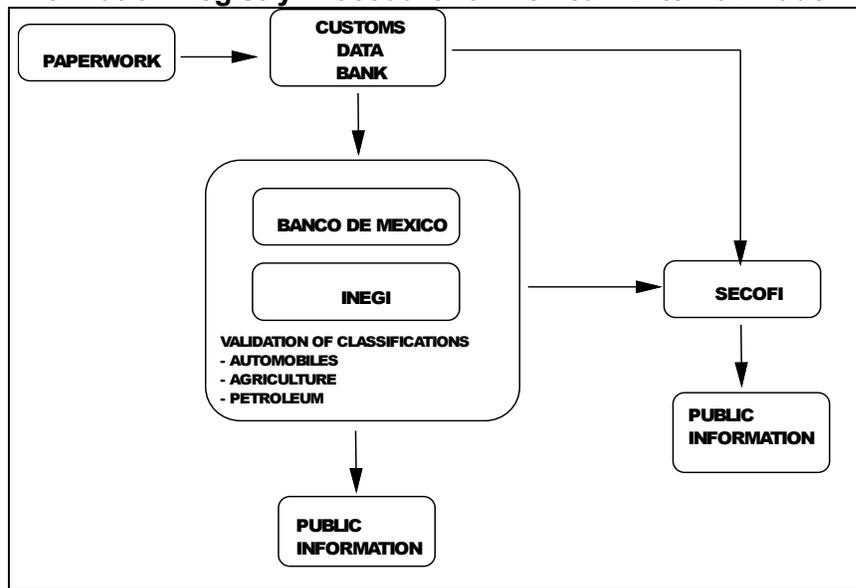
A brief description of the information provided by different sources is given in the following pages.

Table 8.2 Existing Mexican Trade and Person Flow Data

Source	International Trade	Trucks	Rail	Ports	Air	Persons
Secretaría de Comercio y Fomento Industrial (SECOFI)	√	√	√	√	√	
Banco de México (BANXICO)	√					√
Ferrocarriles Nacionales de México (FNM)*			√			
Caminos y Puentes Federales (CAPUFE)*		√				√
Aeropuertos y Servicios Auxiliares (ASA)*					√	√
Dirección General de Marina Mercante*				√		
Dirección General de Puertos *				√		
Dirección General de Servicios Técnicos*		√				
Instituto Nacional Migración (INM)						√
Colegio de la Frontera Norte (COLEF)						√

* Departments of the Secretaría de Comunicaciones y Transportes

Figure 8.2 Information Registry Procedure for Mexican External Trade



Secretaría de Comercio y Fomento Industrial (SECOFI).

The disaggregated information (databases) provided by SECOFI on diskette for the 1992-1995 period contains detailed data on Mexican imports from and exports to other countries, classified by operation type or customs regime: definitive, maquiladora and temporary.

Of all the agencies that provided information, SECOFI was the sole agency that was able to provide information at the level of detail required for this study. Because this agency does not use the same 64 fields present in the original SHCP files, a month by month processing of the data was performed using the magnetic tapes from SHCP. This required a great deal of effort on the part of SECOFI, and took more than two months.

The information provided by SECOFI included 15-field databases for each month. In other words, for each month during the 1992 -1995 period, a database for imports and another for exports was provided, each containing the data from paperwork registered in the different customs offices.

SECOFI also provided catalogs detailing the codes required to use this information such as products or duty chapter, Mexican import and export tariff, country code, city code, Mexican customs, Mexican estate code, transport mode code, and type of operation code.

It is worth mentioning that the structure of the 1992 data base varied significantly from those of 1993, 1994 and 1995. The 1992 data base contains the same basic information as for the other years, however, it required a different analysis approach because the country of origin or destination information was aggregated to only six categories (U.S., Canada, other American countries, Europe, Asia and Australia).

The 1993-1995 databases were formed by aggregating imports and exports for individual months, including a data field for operation type. In the product field, there are eight digits and a country code which identifies all countries. Information contained in the "Mexican state of origin or destination" field, does not necessarily correspond to the origin or destination of the commodities.

According to information provided by SECOFI's personnel, it corresponds to the fiscal address of the importer or exporter. This situation was confirmed by interviews with Customs personnel who indicated that the original source of the information did not include the state of origin or destination of the commodities.

Additionally, the information contained in the "custom" field does not necessarily correspond to the port of exit/entry of the Mexican export/import, but to a location - usually the city where the customs declaration is filed. In reviewing the transport mode registered in the list of customs offices, there are also some inconsistencies. Although the office listed may be a land customs office for example, the mode of transport indicated might be maritime, implying that the commodity entered or left the country through a seaport. It is not possible to define which port, however.

SECOFI also provided the Mexican Foreign Trade Information System (SICM) which includes information regarding Mexican imports and exports for a four year period (January 1992 - September 1995). This system is updated on a monthly basis and is geared toward providing information to the general public.

This system includes information by tariff code (fracción arancelaria) of Mexican imports and exports by country, type of operation, volume and value in dollars. It presents the information in graphic format and comparative charts of the movements by country. It does not provide information regarding origin and destination, point of border crossing, or transportation mode.

Banco de México (BANXICO)

Banco de Mexico receives a magnetic tape from SHCP on a monthly basis that contains the registry of goods that have been imported and exported. BANXICO then validates the information on oil (incorporating information from PEMEX), the automotive industry and agricultural products.

The information provided by BANXICO is related to Mexican external trade from 1991-1995 which is reported on a monthly basis in thousands of U.S. dollars, and which distinguishes between maquiladora, traditional trade and totals. The commodity classification used is the International Industrial Classification System that does not coincide with the system used by SECOFI. The information provides totals by industrial sector.

BANXICO has information on commercial flows dating back to 1988. However until 1991, the registry for maquiladoras was combined with all commodities. In addition, the 1991 information contains many irregular registrations. As a result, this study utilizes only data recorded after 1991.

The BANXICO information regarding person flows across the Mexico - U.S. border is based on an International Traveler Survey in which the number of passengers and their expenses are registered. The survey is done in ten border cities, with three levels of information: a) residents of the border area, b) residents of the border state and c) residents of other states. Two levels of disaggregation are used: tourists (with a stay of less than 72 hours) and excursionists (with a stay of longer than 72 hours). It is important to note that even when it is possible to distinguish between

persons that cross the border on foot and the those that cross via car, it is not possible to determine the number of vehicles that cross the border through this data source.

Ferrocarriles Nacionales de México (FNM)

Information regarding international movements by rail is maintained by Ferrocarriles Nacionales de México. Updated information was unavailable because the FNM is going through a privatization process, however, some information useful for this study was identified.

FNM generates a series of maps on an annual basis that contain the main routes of the system. For each route segment, the average number of trains and the number of empty versus loaded rail cars is presented and the number of gross and net tons moved on the segment are shown with varying band-widths along the route.

FNM also generates statistics in two reports (E-2 and E-6) regarding freight movement in Mexico. E-2 presents internal freight movements and E-6 presents imports and exports by railway. The statistics contained in the E-6 report include two types of data: information by city pair for imports and exports disaggregated by commodity, tonnage and number of rail cars, and information by customs office by commodity, tonnage and number of rail cars on a monthly basis. A nearly complete set of these statistics is available in database format or in printed form for the 1991-1995 period.

Dirección General de Puertos y Marina Mercante

Information for ports was available for: a) vessels served in 1991 for four Mexican ports (Manzanillo, Lazaro Cardenas, Tampico & Veracruz); b) statistical data for 107 Mexican ports for 1993 and 1994; c) port movement statistics of cargo and passengers for the main Mexican ports from 1990 to 1995; and d) origin - destination information for imports and exports through the ports in 1991. The information source for these data was the Dirección General de Puertos y Marina Mercante, from the SCT. This agency has been divided into two different Direcciones Generales, the Dirección General de Puertos and the Dirección General de Marina Mercante.

Origin - destination information on imports and exports is available only for 1991. This information is in database format and is divided into "high sea" and "cabotage" movements for 15 ports. (High sea movements are between two countries while cabotage movements are entirely within one country's territorial waters.) In order to process this information, it was first necessary to capture the information in magnetic form, because the source information was available in a printed document from the Dirección General de Puertos y Marina Mercante. Origin-destination information for 1992 and 1993 could not be analyzed because it was not available in magnetic form.

The Dirección General de Puertos provided the Statistical Report on Cargo and Passenger Movements in the Main Ports which contains information for 1990 and 1995. The information found in these reports is expressed in volumes of operation, served vessels and containers managed by each port.

Caminos y Puentes Federales (CAPUFE) (Federal Roads and Bridges)

Caminos y Puentes Federales (CAPUFE) provided information on traffic at the international border crossings which they manage. The information was provided in a magnetic file and includes traffic type (pedestrians and vehicles) through 1994, summarized on a monthly basis. The data include 11 border crossings and are for the northbound Mexico to U.S. direction, based on tariff by axle, regardless of whether the vehicle is empty or loaded. The information is mainly

for the Mexico/Texas portion of the border, because most of these crossings are on international bridges.

Aeropuertos y Servicios Auxiliares (ASA) (Airports and Auxiliary Services)

Aeropuertos y Servicios Auxiliares (ASA) is the only public source of information for the Mexican Airport Network. The information (through 1993) is produced periodically and includes 58 airports in Mexico. This information source includes the primary physical and operating characteristics of the airports, including deplaned cargo and passengers by traffic type. Based on documents presented by ASA, an Excel data base has been created which contains information for 1992 and 1993.

Instituto Nacional de Migración (INM) (National Migration Institute)

The Secretaría de Gobernación's Instituto Nacional de Migración (INM) generates a Migration Statistics document on a periodic basis. Most of the information contained in this document is sent to INM central offices by the regional and local delegations. This information is sent in a database format which records monthly migration movements, such as migration flow, filings, foreigners expelled or rejected, and entrances of nationals that are deported from the U.S. The information is based on *documented* migration flow. The exit or entrance of persons is recorded by the different migration status without reference to the date on which the migration status was granted. Foreigners that enter the country illegally are not included, nor are entrances of nationals that reside in the northern border area, who are freely permitted to move back and forth across the border. Monthly migration flow is included, as is tourist flow by delegation and by month.

El Colegio de la Frontera Norte (COLEF)

COLEF has information obtained through a Migration Survey on the Mexican Northern Border. This survey was carried out jointly with the Consejo Nacional de Población and the Secretaría de Trabajo y Previsión Social. Information is available from March 1993 through March 1994 in a database form.

United States

In the U.S., information on person and vehicle flows is generated at the ports of entry by U.S. Customs with support from the Immigration and Naturalization Service (INS). Data regarding commercial exchange used in this report are processed by the U.S. Bureau of Census, the Department of Commerce, or the Bureau of Transportation Statistics before they are published for public use. Data available to the general public regarding trade flows includes the Import and Export Histories (1990-1994), the Import and Export of Manufactured Goods files (annual), and the Trans-Border Surface Freight Transportation Data (1993-1995). A thorough description of data available for transportation planning purposes is provided in a 708-page document entitled "Directory of Transportation Data Sources," dated 1996, available from the Bureau of Transportation Statistics.

Import/Export Histories

The most recent set of this data, produced by the U.S. Bureau of Census and Department of Commerce, covers the five-year period from 1990 to 1994. The Import and Export Histories provide detailed information on commodity classifications such as value, quantity, Schedule B designations, Harmonized Tariff Schedules (HTS), and Standard International Trade Classifications (SITC) codes. The lowest level of geographic breakdown is the Customs District

(four along the U.S.-Mexican border). Origin and destination information is limited to the country with a special notation if a U.S. export originated outside the U.S.

Trans-Border Surface Freight Transportation Data

In addition to trade histories released by the U.S. Bureau of Census, the Bureau of Transportation Statistics (BTS), in conjunction with the U.S. Department of Transportation (USDOT), provides U.S. Customs trade data in formats that are designed to address transportation-related issues. Specifically, the BTS data sets include breakdowns by mode of transportation, origin and destination information at the state level (U.S. and Mexico), and breakdowns of trade by port of entry. Unfortunately, many of the data sets do not include breakdowns by commodity type. This is particularly true when addressing trade at the port of entry level. It should also be noted that the BTS data focus on land-based transportation data and do not present any statistical summaries for airborne or waterborne goods.

While the BTS data sets have the most extensive breakdown for transportation planning purposes, much of this detail has been available only since April 1994. At that time, changes were made in the data collection process which allowed for improved data reporting. Data sets that were prepared by BTS prior to April 1994 (April 1983 - March 1994) are not comparable to the sets available within the new reporting format.

Import and Export of Manufactured Goods

Import and Export of Manufactured Goods files, released by the Department of Commerce and Census Bureau, are similar to the Import/Export History files. These data are available on an annual basis and were used to augment the Import/Export History records to include 1995 data.

Rail Waybill Data

Another source of transportation related goods movement data, published by BTS and USDOT, is the Public Use Waybill Sample. The annual Carload Waybill Sample contains shipment data from a stratified sample of rail waybills submitted by freight railroads to the Interstate Commerce Commission. The Waybill sample contains confidential information and is used primarily by Federal and state agencies. The public use version of the sample, however, contains non-confidential data.

Movements are reported at the BEA-to-BEA (Business Economic Area) level and 5-digit Standard Transportation Commodity Code (STCC) level. For a particular commodity, the origin or destination BEA is not included unless there are at least three freight stations in the BEA and there are at least two or more freight stations than railroads. This information would not distinguish between rail movements at Eagle Pass and Laredo since they are in the same BEA area. The confidential data, however, would distinguish this type of movement and provide additional information on the origin, type of commodity, tons, and carloads.

8.2.2 Comparison and Selection of Source Data

There are numerous explanations for differences in the reporting of trade data between any two countries. At one level, if the countries have different currencies and the exchange rates vary, there is the potential for differences when the exchange rate is applied. At another level, there may be differences between how each country categorizes specific products into generalized commodity classifications. This difference in the application of categories makes it difficult to

compare commodity data on both sides of the border. There is the potential for both of these factors to create differences in any trade data produced by the U.S. or Mexico.

Another reason for differences in Mexican and U.S. trade data totals is that each country has a different approach for reporting insurance and freight costs. Mexico typically reports their export data adjusted for the cost of freight and insurance by approximately 10 percent of the freight on board (f.o.b.). Therefore, it is not unusual for reported Mexican export totals to be roughly 10 percent less than the corresponding U.S. import totals.

In addition to these specific elements which may generate differences, there are more fundamental issues which can account for variations in trade data between countries. In a report published by Dean International, Inc., in January 1996, one fundamental and commonly acknowledged problem in trade data is described in the following excerpt:

“It must be noted that it is generally accepted that statistical data produced by one country on imports... tend[s] to be more accurate or precise than the export data of the exporting trade partner. The reason for this is that nearly all countries require payment of a minimum tariff, or import tax, on all products imported into a nation from a trading partner. To the contrary, most trading nations avoid taxing products produced domestically for export so as not to discourage exports. As a result, volumes and values of Mexican exports to the U.S. may be considered more precisely reflected in the official U.S. national statistics on imports from Mexico than in the Mexican national statistics produced on Mexican exports, and vice versa.”¹

In April 1993, Allen I. Mendelowitz, Director of International Trade, Finance, and Competitiveness Issues, testified before a U.S. Senate subcommittee on other issues which further impact the accuracy of import data:

“Although import data are generally considered to be more accurate than export data, they too have problems. Customs and Census use computer edits to identify and correct errors in the data filed by importers. These edits are useful for maintaining data quality. Yet recent evaluations of compliance and quality control procedures by the National Research Council and GAO (General Accounting Office) reveal that there are problems with these procedures that could affect the accuracy of import data as well as export data. ...”²

Mr. Mendelowitz went on to discuss the limitations in the U.S. data collection effort regarding maquiladora versus traditional trade. He indicated that the U.S. had never built in the ability to categorize this type of trade and any “after the fact” analysis was questionable since it relied on guessing which categories of commodities are related to maquiladora activity.

Considering the above statements, it would appear that detailed comparisons of trade data from different countries is, and may always be, problematic. Therefore, for the purposes of the

¹ NAFTA Trade: Past, Present, and Future: A 50-State Analysis and Forecast of U.S. Exports to Mexico; Dean International, Inc.; 1995.

² U.S. Trade Data: Limitations of U.S. Statistics on Trade with Mexico; Statement of Allan I. Mendelowitz, Director of International Trade, Finance, and Competitiveness Issues, before the Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, U.S. Senate; GAO/T-GGD-93-25; April 28, 1993.

Binational Transportation Planning and Programming Study, data from both U.S. and Mexican sources will be used where they are deemed to be the most suitable and reliable.

In order to compare the existing information on trade interchange in Mexico and in the U.S., Table 8.3 shows a schematic presentation of the information available on both sides of the border by source.

It should be noted that the port of entry in the U.S. and the customs office in Mexico are not in direct correspondence. In Table 8.4 the binational customs divisions are shown.

A comparison between Mexican and U.S. statistics, following some of the topics specific to this study, are discussed below:

Table 8.3 Sources of Information in Mexico and the U.S.

	Data Source Description	Modal Breakdown	Commodity		Port		Origin		Destination		
			Value	Quantity	Port of Entry	Custom District	U.S. State	Mexican State	Foreign/Domestic	U.S. State	Mexican State
U.S. Data	U.S. Import Export Histories, 1990-1994; Dept. of Commerce										
	Export History by Country of Destination by Customs District by Commodity		X	X	X	X	X				X
	Import History by Country of Origin by Customs District by Commodity		X	X	X	X		X			
	U.S. Import & Export Manufactured Goods, 1995; Dept. of Commerce										
	Imports/Exports by Customs District by Commodity		X	X	X	X		X			X
	Bureau of Transportation Statistics Apr 94/Sep 95										
	3A Exports to Mexico & Intransits Through Mexico with State of Origin & Commodity Detail		X	X	X		X	X			X
	3B Exports to Mexico & Intransits Through Mexico with State of Exporter & Commodity Detail		X	X	X		X	X			X
	5A Exports to Mexico & Intransits Through Mexico with State of Origin & Geographic Detail		X	X			X		X		X
	5B Exports to Mexico & Intransits Through Mexico with NTAR of Exporter & Geographic Detail		X	X			X		X		X
	11 Imports from Mexico & Intransits Through Mexico with Commodity & Geographic Detail		X	X	X		X		X		X
Mexican Data	Secretaria de Comercio y Fomento Industrial (SECOFI)										
	Export History by Country of Destination by Port of Entry by Commodity (1992-1995)		X	X	X	X		X			X
	Import History by Country of Origin by Port of Entry by Commodity (1992-1995)		X	X	X	X		X			X
	Banco de Mexico (BANXICO) 1991-1995										
	Export History by Country of Destination by Port of Entry by Commodity		X								
	Import History by Country of Origin by Port of Entry by Commodity		X								
	Ferrocarriles Nacionales de Mexico (FNM)										
	Railroad Data (1993 & 1994) by Incoming and Outgoing Station		X	X		X					
	Caminos y Puentes Federales (CAPUFE)										
	Passenger Vehicle and Pedestrian Data		X			X					
	Secretaria de Comunicaciones y Transportes (SCT)										
Traffic Volumes and O/D Surveys		X					X			X	
Dirección General de Puertos											
Imports & Exports 1989 - 1995 at Sea Ports		X	X		X						
Dirección General de Marina Mercante											
Imports & Exports of Containerized Cargo (Mode to Port)		X	X	X	X		X			X	

Shading indicates a source used by the study team.

Table 8.4 Organization of the Customs Agencies along the Mexico-U.S. Border

Mexico				United States		
Administrative Region	Customs	Customs District	Mexican Crossing	Border Cities	U.S. Crossing	U.S. Customs District
Northwest Zone	Tijuana	M. de Otay	Puerta México	Tijuana - San Diego	San Ysidro	San Diego
			Mesa de Otay		Otay Mesa	
	Tecate		Tecate	Tecate - Tecate	Tecate	
	Mexicali	San Felipe	Mexicali	Mexicali - Caléxico	Caléxico	
		Algodones	Algodones	Algodones - Andrade	Andrade	
	S.L.R.Colorado		S.L.R. Colorado	S.L.R.C. - San Luis	San Luis	Nogales
	Sonoyta	San Emeterio	P. E. Calles	Sonoyta - Lukeville	Lukeville	
	Nogales	Sasabe	Sasabe	Sasabe - Sasabe	Sasabe	
			Nogales III	Nogales - Nogales	Nogales III	
			Nogales II		Nogales II	
		Nogales I		Nogales I		
Naco		Naco	Naco - Naco	Naco		
Agua Prieta		Agua Prieta	A. Prieta - Douglas	Douglas		
North Central Zone	R.M. Quevedo	El Berrendo	El Berrendo	Berrendo-Antelope Wells	Antelope Wells	El Paso
			Pto. Palomas	Palomas - Columbus	Columbus	
	Ciudad Juárez	S. Jerónimo	Zaragoza	San Jerónimo	S. Jerónimo - Sta. Teresa	Santa Teresa
				P. Av. Juárez	Cd. Juárez - El Paso	Paso Del Norte
				P. Reforma		Stanton Street
				P. Córdoba		Bridge of the Americas
			Guadalupe Bravo	Caseta - Fabens	Fabens	
			El Porvenir	El Porvenir-F. Hancock	Fort Hancock	Laredo
	Ojinaga		Ojinaga	Ojinaga - Presidio	Presidio	
	Ciudad Acuña	La Linda	Presa Amistad	P. Amistad-Amistad Lake	Amistad Lake	
Ciudad Acuña			Cd. Acuña - Del Rio City	Del Rio		
Piedras Negras		Piedras Negras	P. Negras - Eagle Pass	Eagle Pass		
Northeast Zone	Colombia		P. Solidaridad	Colombia - Webb	Webb	
	Nuevo Laredo		Nuevo Laredo I	Nuevo Laredo - Laredo	Laredo I	
			Nuevo Laredo II		Laredo II	
	Cd. M. Alemán	Cd. Guerrero	Guerrero	N. Guerrero - P. Falcón	Presa Falcón	
			Miguel Alemán	Miguel Alemán - Roma	Roma	
		Cd. Camargo	Cd. Camargo	Camargo - Río Grande	Río Grande	
	Díaz Ordaz		Díaz Ordaz-Los Ébanos	Los Ébanos		
	Reynosa		B. Juárez	Reynosa - Hidalgo	Hidalgo	
		Las Flores	Las Flores (B&P)	N. Progreso - Progreso	Progreso	
	Matamoros	Lucio Blanco	Libre Comercio	Matamoros - Brownsville	Los Indios	
P. B&M (ffcc)			B&M			
Pta. México-Mat.			Gateway			

Source: U.S. Customs, Dirección General de Aduanas, SHCP, México.

Trends of the Mexico - U.S. Trade

The most complete information in this area comes from the U.S. Import/Export Histories. These data are valuable because they cover a longer time period and include most of the information required by this study, even though they do not include information by mode of transport. In order to obtain more detailed information, it was necessary to complement these data with those from BTS, because the BTS data includes the transportation mode used, origin-destination data at the state level (U.S. and Mexico), and movements by U.S. point of entry.

With regard to the Mexican information from SECOFI, even though its level of aggregation is appropriate, the data is incomplete with some months missing from the data for certain years. SECOFI does not have more complete information available.

Transportation Mode Usage

In this aspect, even though both the Mexican and U.S. data sets include similar data, the U.S. data are considered more reliable. In the Mexican information, registration of the transportation mode is not clear because there is no clear definition of transport mode criteria recorded in the paperwork.

Maquiladora

It is possible to obtain information on traditional and maquiladora trade only from Mexican sources. The Mexican information includes classifications by final import and exports, maquiladora and temporaries. Statistics are provided by customs office, transportation mode, commodity type, and origin-destination.

Freight Weight

As a result of the non-existence of reliable or consistent weight information for the Mexico-U.S. trade from U.S. sources, and due to the unreliability and inconsistency of this information from Mexican sources (less than 50% of the register logs contains this information), the commercial flow information in both countries is reported based on commodity value in U.S. dollars. An attempt to provide some data based on freight tonnage is advanced and presented in Section 8.2.4.

Origin-Destination

SECOFI is the sole provider of data including imports and exports based on origins and destinations for both northbound and southbound trade. Their records are incomplete and unreliable, however. In order to collect complete information, it would be necessary to approach all of the different agencies that generate information by mode of transport. While this would provide most of the information, it would not provide a complete accounting because truck transportation has no recorded information. For FNM, the only information available is the amount of cargo arriving at the border, with no detail on what percentage crosses the border or the origin or destination outside of the country. For air transport, there are no records in the Mexican data sources regarding origin and destination. Airborne O-D freight data is available in the U.S. for purchase from The Colography Group, Inc. Finally, information on imports and exports in the maritime sector is recorded but is neither systematized nor updated.

From information regarding binational trade available from both countries, the ingredients for producing relevant origin-destination matrices are summarized in tables 8.5 and 8.6.

From these tables it can be seen that the U.S. data sources provide the opportunity to build O - D tables by state for southbound flows (state in the U.S. to state in Mexico). However, for northbound flows neither source (U.S. or Mexican) provides complete O-D matrix components by state. U.S. source data does not contain the Mexican state of origin for U.S. imports. A complete O-D picture for northbound trade could be established however using matrix balancing methods.

In order to apply the matrix balancing method to derive O-D matrices, using production and consumption vectors as inputs, additional information representing the production and attraction

capacities for each of the states would be required. The transportation characteristics of each state or region would also be required, such as travel times, operation costs, generalized costs,

Table 8.5 Mexico - U.S. Binational Trade Origin-Destination Data Available from Mexican Data Sources

Origin		Destination		United States	
		Mexico		Country	State
		Country	State	Country	State
Mexico	Country			YES	NO
	State			YES	NO
United States	Country	YES	NO		
	State	NO	NO		

and so on. This would require an enormous effort because the matrices would need to be established by product type and transportation mode (depending on the required level of detail and the information available).

It is worthy of further mention that the state of origin-destination information in both countries is considered to be unreliable. In Mexico, this information is obtained from the address listed as the tax identification number of the importer or exporter and this address does not always coincide with the true origin or destination of the commodities. In the U.S., although the information is obtained directly, the state of origin may correspond to the real origin or the point where the commodities are consolidated and distributed.

Product and Weight Classification

The U.S. Bureau of Transportation Statistics uses the Two Digit Trade Sort (Classification) Standard System. SECOFI information uses the same Standard System, but unlike the BTS information, it is maintained to eight digits of detail.³ In order to use and compare SECOFI data,

³ The classification codes in Mexico are known as *Fracciones Arancelarias* (8 digits). The first two digits define the *Chapter*, the third and fourth the *Partida*, the fifth and sixth the *Subpartida* and the seventh and eight the *Fracción*

the information was aggregated to the same 2-digit level as BTS, thereby reporting 98 different groups of commodities. In addition, the SECOFI data required expansion to account for missing

Table 8.6 U.S.-Mexico Binational Trade Origin-Destination Data Available from U.S. Data Sources

Origin	Destination	Mexico		United States	
		Country	State	Country	State
Mexico	Country			YES	NO
	State			NO	NO
United States	Country	YES	YES		
	State	YES	YES		

records associated with particular months and to provide some information regarding freight weights. Supporting documentation regarding the methodological process used to generate this database (expansion to complete years and freight estimation) has been provided to SCT.

8.2.3 Mexico-U.S. Trade.

International trade moves between centers of manufacturing production and consumption. In theory, production centers are located where economies of scale, raw materials, and the availability of technology can produce goods at the least possible cost and the highest rate of return. The most common form of consumption is consumer goods, occurring at the dominant concentrations of population. Another, less obvious, form of consumption is intermediate goods, which occurs at centers of manufacturing. These centers of production and consumption define the origins and destinations for the majority of trade which flows between the U.S. and Mexico. However, the consumption of intermediate goods at manufacturing centers, especially the maquiladoras, plays an important role in the U.S.-Mexico trade flow and creates an additional complexity in the creation of origin and destination matrices.

In the case of Mexican export trade, it is important to note that the U.S. is the most important commercial trading partner, representing nearly 80% of the total trade exchanged with other countries. This is shown in the following table, along with other regions of substantial trade, using Mexican source data.

Similarly, considering total U.S. export trade, Mexico is one of the most important countries trading with the U.S., ranking as its third highest trading partner as shown in Table 8.8.

In contrast with Mexico, the U.S. maintains a more diversified export trade clientele. The value among its top four trading partner countries represents only 47% of total exports. For Mexico, trade exchange with the U.S., alone, represents 79% of its total.

The rapid growth of Mexico-U.S. trade exchange started in 1986, when Mexico reduced its tariffs and joined the General Agreement on Tariffs and Trade (GATT). This growth has continued with the implementation of NAFTA. The Table 8.9 shows Mexico-U.S. trade figures from 1987 to 1995 in millions of dollars.

It can be seen from Table 8.9 that U.S. exports (Mexican imports) decreased while U.S. imports (Mexican exports) increased in 1995. For the first time during the 1991-1995 period, and by a

substantial margin, the value of U.S. imports (Mexican exports) exceeded U.S. exports (Mexican imports). Here it is important to note that one cause of this fluctuation was the peso devaluation which occurred in late 1994.

Table 8.7 Mexican Import-Export, 1995 (millions of dollars)

Country/Region	Imports	Exports	Total	% of Total
Total	79,820	72,480	152,300	100%
United States	66,620	53,830	120,450	79%
Canada	1,980	1,370	3,350	2%
Europe	4,030	7,240	11,270	7%
Asia	2,030	7,430	9,460	6%

Source: BANXICO

Table 8.8 U.S. Import-Export, 1995 (millions of dollars)

Country	Imports	Exports	Total	% of Total
All Countries	770,944	583,030	1,353,975	100%
Canada	148,304	126,024	274,328	20%
Japan	127,195	64,298	191,493	14%
Mexico	62,756	46,311	109,067	8%
Germany	38,043	22,376	60,419	4%

Source: U.S. Commerce Department

8.2.4 Mexico-U.S. Border Trade.

Because the dominant U.S.-Mexico trade flows are by land, and the focus of the Binational Transportation Planning and Programming Study is on the movement of goods across the land border, this report will be devoted to land-based trade flows between the U.S. and Mexico. Trade flows are important in the development of transportation policy because goods movement requires efficient transportation infrastructure. In order to develop a full understanding of the implications of U.S.-Mexico trade movements on infrastructure planning, the following issues are explored: the value of shipments, origin and destination by U.S. and Mexican state, the type of commodity being transported, and the balance between maquiladora/traditional trade.

Trade flowing across the land border includes goods that originate in or are destined to the U.S. and Mexico and goods flowing to other countries that use the U.S. (primarily) as a land bridge. Table 8.10 presents the value of freight crossing the Mexican-U.S. land border and traded with both the U.S. and with other countries. It shows the proportion of freight moved across this border in comparison to total Mexican foreign trade.

Table 8.10 above it can be observed that, in general over the last four years, the proportion of trade crossing the border to the U.S. and to other countries has been stable. Increased flows

associated with Mexican exports in 1995 was caused largely by effects resulting from the peso devaluation in late 1994, as mentioned earlier.

It is also important to note the relative concentration of cross-border trade between individual states in both the U.S. and Mexico. Figures 8.3 and 8.4 show the proportion of total cross-border trade associated with selected U.S. and Mexican states.

Table 8.9 Mexico-U.S. trade, 1987-1995 (millions of dollars)

	1987	1988	1989	1990	1991	1992	1993	1994	1995
U.S.- Mexico	14,600	20,600	25,000	28,300	33,300	40,600	41,600	50,800	46,300
Mexico- U.S.	20,300	23,300	27,200	30,200	31,100	35,200	39,900	49,500	62,800
Total	34,900	43,900	52,200	58,500	64,400	75,800	81,500	100,300	109,100

Source: U.S. Department of Commerce

Table 8.10 Mexican Foreign Trade Across the US-Mexico Border, 1992-1995
(millions of dollars)

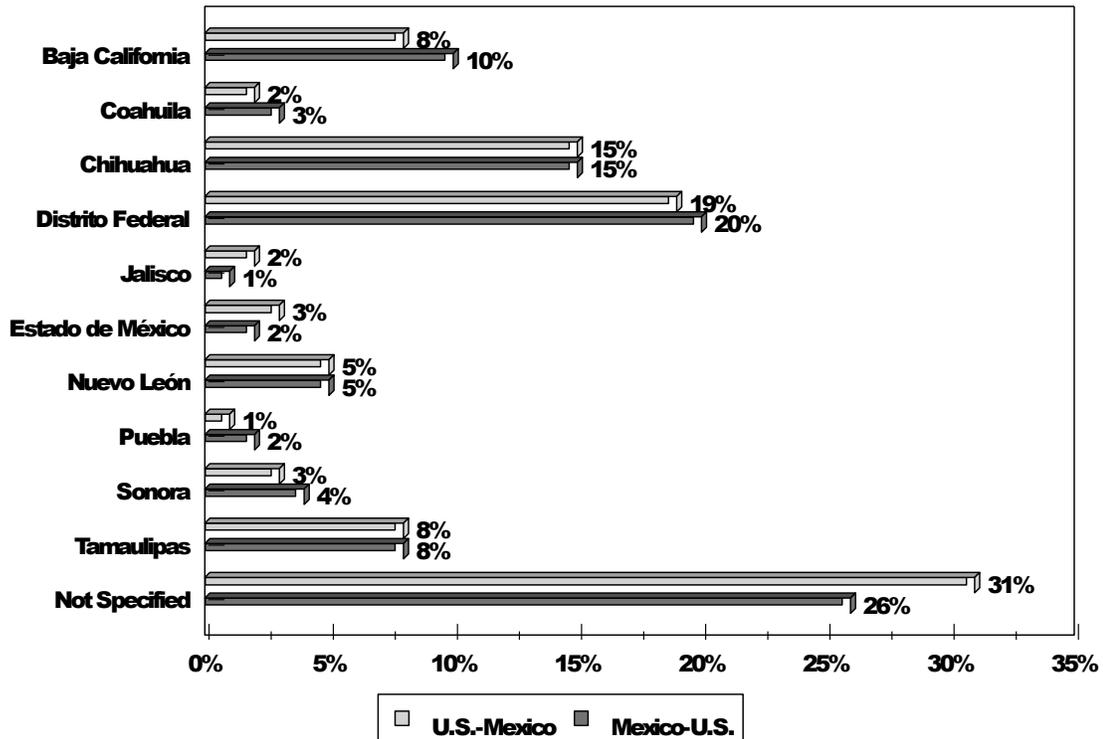
Mexican Foreign Trade	1992	% 1	% 2	1993	% 1	% 2	1994	% 1	% 2	1995	% 1	% 2
With the U.S. crossing the U.S.-Mexico border												
Mexican Imports	28,331	50%	31%	28,538	45%	28%	34,596	47%	30%	39,050	40%	27%
Mexican Exports	24,703	43%	27%	29,608	47%	29%	32,296	44%	28%	51,079	52%	35%
Total with U.S.	53,034	93%	59%	58,146	92%	57%	66,892	90%	58%	90,129	92%	62%
With Other Countries crossing the U.S.-Mexico border												
Mexican Imports	3,092	5%	3%	3,804	6%	4%	5,977	8%	5%	5,712	6%	4%
Mexican Exports	724	1%	1%	1,154	2%	1%	1,321	2%	1%	2,519	2%	2%
Total with other countries	3,816	6%	4%	4,958	8%	5%	7,298	10%	6%	8,231	8%	6%
Total crossing the U.S. Mexico border												
Mexican Imports	31,422	55%	35%	32,343	51%	32%	40,573	55%	35%	44,762	46%	31%
Mexican Exports	25,428	45%	28%	30,761	49%	30%	33,617	45%	29%	53,599	54%	37%
Total	56,850	100%	63%	63,104	100%	62%	74,190	100%	64%	98,361	100%	68%
Total Trade												
Mexican Imports	48,450	---	54%	54,375	---	54%	65,679	---	57%	66,046	---	45%
Mexican Exports	41,626	---	46%	46,756	---	46%	50,028	---	43%	79,515	---	55%
Total	90,076	---	100%	101,131	---	100%	115,707	---	100%	145,561	---	100%

% 1 Percentage of U.S.-Mexico cross-border trade

% 2 Percentage of total Mexican foreign trade

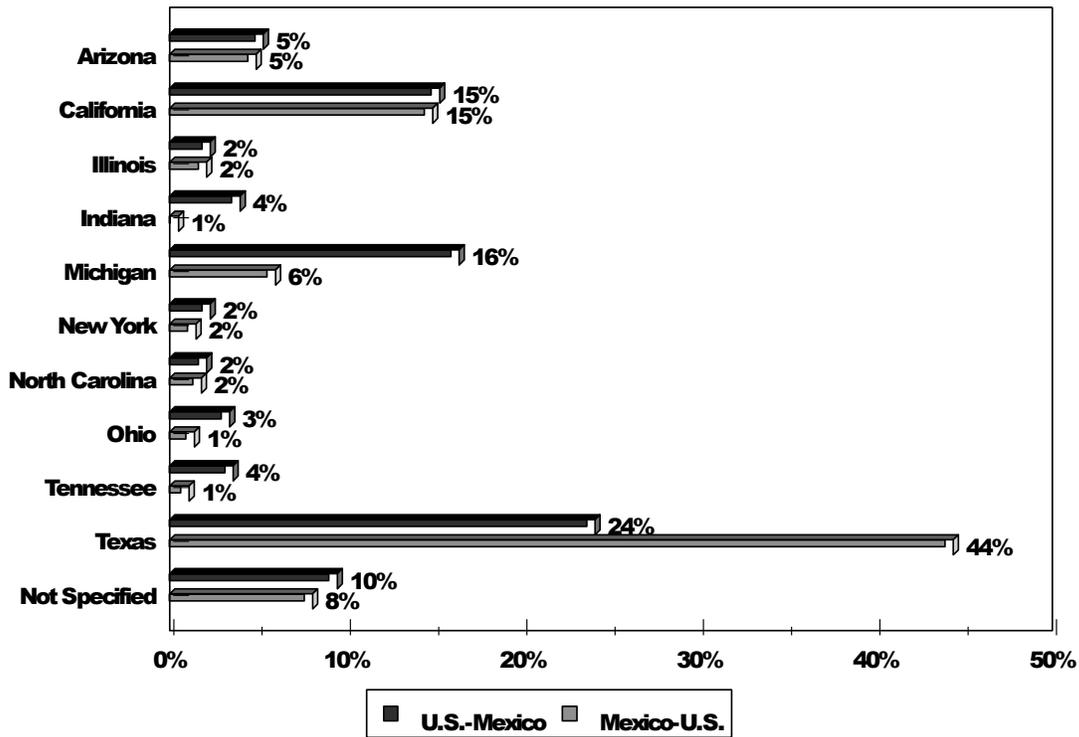
Source: SECOFI

Figure 8.3 Mexico-U.S. Trade Flows of Selected Mexican States, 1995
(Proportion of Total U.S.-Mexico Trade)



Source: SECOFI

Figure 8.4 Mexico-U.S. Trade Flows of Selected U.S. States, 1995
(Proportion of Total U.S.-Mexico Trade)



Source: Bureau of Transportation Statistics

Maquiladora vs. Traditional Trade

To fully understand trade flows between the U.S. and Mexico, it is also necessary to differentiate between two different types of trade flow - maquiladora and traditional. Maquiladora trade is comprised of U.S. exports shipped to and imports shipped from maquiladora factories in Mexico. Maquiladora activities largely involve manufacturing plants in Mexico which assemble products using U.S. or other foreign components. The products of these maquiladora factories are generally destined for consumption in the U.S. market and, therefore, become U.S. imports. A large percentage of these products are automobiles and parts, electrical components, and other consumer goods. U.S.-Mexico maquiladora trade is primarily concentrated between the U.S. and Mexican border states and, between the Mexican border states and the United States' industrial northeast. The latter is particularly true of automotive-related products. Traditional trade, by contrast, is more diverse in terms of product origins and destinations and is usually shipped further into the interior of Mexico or the U.S. Traditional trade consists of products destined for consumption or use as input components for manufacturers of locally consumed products within either Mexico or the U.S.

The maquiladora program began in 1965. Since then, maquiladora factories have grown as Mexican entrepreneurs created modern industrial parks, U.S. firms sought to reduce their labor costs, and an informal agreement between two Mexican Cabinet officers was reached. This informal agreement, which relaxed Mexico's strict foreign investment, customs, and immigration

laws in 1966, was so successful that in 1971 it was formalized into law as the Border Industrialization Program (BIP).

A relatively recent trend is characterized by the establishment of maquiladora factories within the interior states of Mexico. Assuming this trend continues, maquiladora trade may change the pattern of goods movement within the interior of Mexico. Should these facilities locate in coastal areas, an impact on the amount of trade using water-borne transportation alternatives could develop. If these facilities are located in the interior, there may be a need for additional infrastructure to support the movement of these goods.

Approximately 90 percent of maquiladora manufacturing employment is located in the Mexican border states adjacent to the U.S. This tends to concentrate maquiladora trade movements within the border region. Some maquiladora factories produce partial assemblies in Mexico and perform the final product assembly in the cross-border U.S. city. This commonly occurs along the Texas-Mexican border. An example of this relationship is found between the cities of El Paso, Texas, and Ciudad Juarez, Chihuahua. There are also situations where partial assemblies are prepared in Mexico and shipped to a corresponding U.S. production plant in interior states such as Michigan or Illinois.

Within Mexico, international trade is segmented into separate Mexican customs classifications according to the type of goods considered: "final", "maquiladora", and "temporaries". By virtue of the laws that define the classifications and the taxes associated with them, industrial enterprises (commercial or service), including both national and foreign enterprises, have located their operations in Mexico to reduce total costs, recover import taxes or to temporarily hold a commodity within the country without paying taxes. In Mexico, the customs classification most frequently used for imports is "final", those goods ultimately destined for Mexican consumption. Goods returning to their country of origin in the same condition or after processing, modification or repairing are classified as "temporaries". Maquiladora trade has been assigned its own customs classification.

Basically, these are the distinctions between traditional trade (final plus temporary) and "maquiladora". The distribution of maquiladora trade is different for each of the customs offices along the border where commodities enter or exit. In some offices "maquiladora" trade is dominant because of this activity's importance in border city economies. Cd. Juarez, Tijuana, Matamoros and Reynosa are examples of Mexican border cities having high concentrations of maquiladora employment and manufacturing output. Figure 8.5 shows the relative concentration of Mexico-U.S. trade through customs offices and the distribution by type of classification in 1994. The thickness of each arrow indicates the relative concentration of total trade through each customs offices.

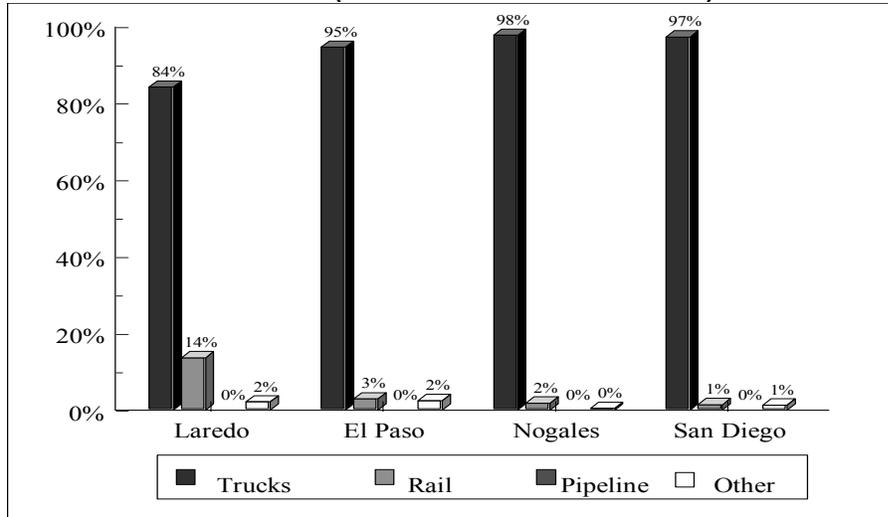
Transportation Mode

U.S.-Mexico trade, as recorded by customs district along the border, flows predominately on roadways (86% of the import and export value), followed by railroads (7% average). At the individual customs office or port of entry, the roadway (truck) mode is the most important in all cases, varying only with the actual existence of railroad facilities and the direction of flow (import or export). Figures 8.6 and 8.7 show the modal distribution by U.S. Customs district and Tables 8.11 and 8.12 report the modal distribution by individual port of (U.S.) export and import.

Figure 8.5 Location of the Maquiladora Plants in Mexico and Trade by Type, 1994

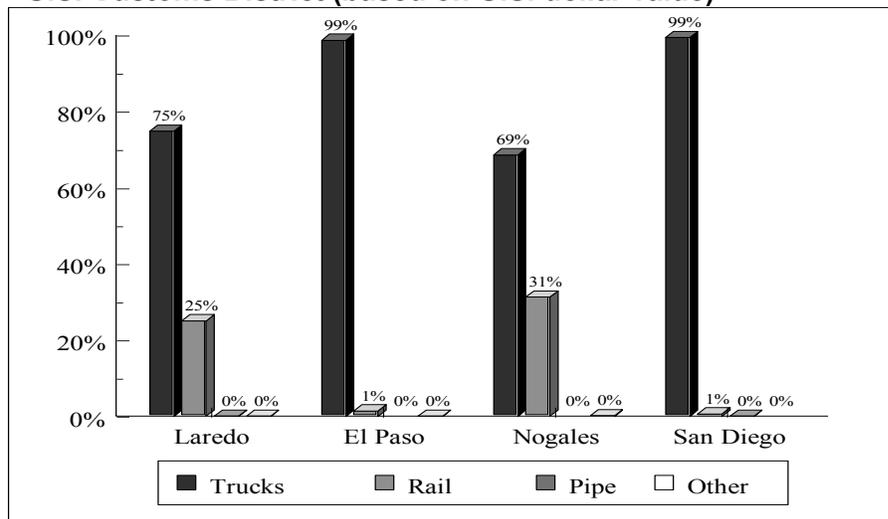
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Figure 8.6 Modal Distribution of Northbound U.S.-Mexico Trade by U.S. Customs District (based on U.S. dollar value)



Source: 1994 Trans-Border Surface Freight Data; U.S. Department of Transportation

Figure 8.7 Modal Distribution of Southbound Mexico-U.S. Trade by U.S. Customs District (based on U.S. dollar value)



Source: 1994 Trans-Border Surface Freight Data; U.S. Department of Transportation

Table 8.11 U.S. Exports to Mexico by Mode and Customs Port of Exportation, 1994

Custom Port of Exportation	Adjacent Mexican Border City	Proportion of Freight Value by Mode			
		Truck	Rail	Pipeline	Other
2304-Laredo, TX	Nuevo Laredo	86.47%	12.32%	0.00%	1.22%
2301-Brownsville, TX	Matamoros	85.80%	7.81%	0.00%	6.39%
2305-Hildago, TX	Reynosa	97.32%	0.01%	0.00%	2.67%
2303-Eagle Pass, TX	Piedras Negras	39.35%	59.12%	0.01%	1.52%
2302-Del Rio, TX	Ciudad Acuna	99.49%	0.01%	0.00%	0.50%
2309-Progreso, TX	Nuevo Progreso	56.98%	2.25%	0.00%	40.76%
2307-RioGrande City, TX	Ciudad Carmago	96.15%	0.08%	0.05%	3.72%
2310-Roma, TX	Miguel Aleman	97.05%	0.51%	0.00%	2.44%
LAREDO DISTRICT		84.20%	13.63%	0.00%	2.17%
2402-El Paso, TX	Ciudad Juarez	94.79%	2.76%	0.00%	2.46%
2403-Presidio, TX	Ojinaga	59.75%	35.03%	0.00%	5.22%
2406-Columbus, NM	Palomas	100.00%	0.00%	0.00%	0.00%
2404-Fabens, TX	Caseta	83.06%	16.94%	0.00%	0.00%
EL PASO DISTRICT		94.58%	2.95%	0.00%	2.47%
2604-Nogales, AZ	Nogales	97.38%	2.13%	0.00%	0.49%
2601-Douglas, AZ	Agua Prieta	99.89%	0.10%	0.00%	0.01%
2608-San Luis, AZ	San Luis Rio Colorado	99.84%	0.01%	0.00%	0.15%
2603-Naco, AZ	Naco	99.95%	0.00%	0.00%	0.05%
2602-Lukeville, AZ	Sonoyta	82.28%	2.21%	0.00%	15.51%
2606-Sasabe, AZ	Sasabe	100.00%	0.00%	0.00%	0.00%
NOGALES DISTRICT		97.72%	1.82%	0.00%	0.46%
2504-San Ysidro, Ca	Tijuana	98.13%	0.45%	0.00%	1.41%
2503-Calexico, CA	Mexicali	95.52%	3.41%	0.00%	1.07%
2505-Tecate, CA	Tecate	98.03%	0.62%	0.00%	1.35%
2502-Andrade, AZ	Algodones	99.73%	0.27%	0.00%	0.00%
SAN DIEGO DISTRICT		97.28%	1.42%	0.00%	1.30%

Data Source: 1994 Trans-Border Surface Freight Data; U.S. Dept of Transportation

Total may not sum to 100% due to rounding

Table 8.12 U.S. Imports from Mexico by Mode and Customs Port of Importation, 1994

Custom Port of Importation	Adjacent Mexican Border City	Proportion of Freight Value by Mode			
		Truck	Rail	Pipeline	Other
2304-Laredo, TX	Nuevo Laredo	75.36%	24.64%	0.00%	0.00%
2301-Brownsville, TX	Matamoros	60.62%	39.38%	0.00%	0.00%
2305-Hidalgo, TX	Reynosa	96.37%	3.11%	0.51%	0.01%
2303-Eagle Pass, TX	Piedras Negras	57.67%	42.30%	0.00%	0.02%
2302-Del Rio, TX	Ciudad Acuna	99.98%	0.00%	0.00%	0.02%
2309-Progreso, TX	Nuevo Progreso	47.35%	51.18%	0.00%	1.47%
2307-RioGrande City, TX	Ciudad Carmago	99.97%	0.00%	0.00%	0.03%
2310-Roma, TX	Miguel Aleman	97.97%	0.00%	0.00%	2.03%
LAREDO DISTRICT		74.82%	25.10%	0.07%	0.02%
2402-El Paso, TX	Ciudad Juarez	98.60%	1.39%	0.00%	0.01%
2403-Presidio, TX	Ojinaga	98.25%	1.27%	0.00%	0.48%
2406-Columbus, NM	Palomas	99.97%	0.03%	0.00%	0.00%
2404-Fabens, TX	Caseta	0.00%	0.00%	0.00%	0.00%
EL PASO DISTRICT		98.60%	1.39%	0.00%	0.01%
2604-Nogales, AZ	Nogales	63.28%	36.70%	0.00%	0.02%
2601-Douglas, AZ	Agua Prieta	97.42%	0.04%	0.00%	2.54%
2608-San Luis, AZ	San Luis Rio Colorado	99.98%	0.02%	0.00%	0.00%
2603-Naco, AZ	Naco	100.00%	0.00%	0.00%	0.00%
2602-Lukeville, AZ	Sonoyta	100.00%	0.00%	0.00%	0.00%
2606-Sasabe, AZ	Sasabe	100.00%	0.00%	0.00%	0.00%
NOGALES DISTRICT		68.56%	31.25%	0.00%	0.20%
2504-San Ysidro, CA	Tijuana	99.32%	0.64%	0.04%	0.01%
2503-Calexico, CA	Mexicali	99.28%	0.72%	0.00%	0.00%
2505-Tecate, CA	Tecate	99.99%	0.01%	0.00%	0.00%
2502-Andrade, CA	Algodones	100.00%	0.00%	0.00%	0.00%
SAN DIEGO DISTRICT		99.34%	0.63%	0.03%	0.00%

Data Source: 1994 Trans-Border Surface Freight Data; U.S. Dept of Transportation

Totals in columns may not sum to 100% due to rounding

Table 8.13 Top Five Commodities of the Mexico-U.S. Trade, 1995 (millions dollars)

Mexican Imports (Southbound)		Mexican Exports (Northbound)	
Product	Total	Product	Total
85- Electrical Machinery & Equipment	11,489	85- Electrical Machinery & Equipment	18,475
84- Nuclear Reactors, Boilers	4,567	87- Vehicles other than Rail	8,447
39- Plastics	3,615	84- Nuclear Reactors, Boilers	5,898
87- Vehicles other than Rail	1,685	62- Apparel and Clothing Accessories	1,461
73- Articles of Iron or Steel	1,639	07- Edible Vegetables	1,323

Source: SECOFI

Principal Commodities

A variety of data were analyzed to determine the principal commodities exchanged across the border between the U.S. and Mexico. The following table was created using Mexican data (this data is not consistent with U.S. data reported in Section 8.2.5). The five commodities with the largest trade value between Mexico and the U.S. during 1995 are shown in Table 8.13.

Considering that imports and exports are performed under different customs regulations, the most important products by operation type (or category) were analyzed. Based on total trade between Mexico and the U.S. (imports and exports) under the Mexican category “final”, the most important products are mineral fuels (27) , vehicles (87), nuclear reactors and boilers (84), and electric appliances and machinery (85). In the “temporary” category, the most important products are vehicles (87), nuclear reactors and boilers (84), optical instruments (90), and imports with special classifications (98). In the “maquiladora” category, the most important products are electric appliances and machinery (85), vehicles (87), optical instruments (90), plastics (39), and steel manufactures (73).

To clarify, the “temporary” category refers to commodities going back to a foreign country in the same condition as arrival, and/or commodities shipped to Mexico to perform a specific function within a limited time frame. The commodities included in this customs category are, among others, trailers, containers, and train cars. There can also be temporary imports to facilitate the transformation or repair of certain products such as certain raw materials, parts, machinery and equipment incorporated or used in the modification of other export products, for example equipment used in the maquiladora industry.

Origin and Destination

Figures 8.8 and 8.9 show origin and destination patterns using the total value of goods moving through the four U.S. Customs Districts. Note that for each of the districts, the adjacent U.S. and Mexican states typically share the highest percentage of origins and destinations. The only exception is in the case of the Laredo District where two interior states, Mexico City (Distrito Federal) and State of Mexico, account for 45 percent of the total value.

While this may appear to be a normal phenomena, in reality these figures indicate one limitation of the U.S. trade data. In years past, the U.S. Customs data tracked the “export state”. The export state did not, however, accurately reflect the state where the export was produced, but instead the state from where the product was exported. More recently, U.S. Customs began to report the state of product origin of movement. This change was designed to improve the quality of the origin data. Neither data set should be relied on to identify true origin of production.

Figure 8.8 Northbound Trade Flow by State of Origin/Destination, 1994

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Figure 8.9 Southbound Trade Flow by State of Origin/Destination, 1994

separate electronic document

The new system still breaks down in the case of consolidated shipments. For consolidated shipments, the practice remains to report either the state of the commodity of greatest value, or the state where consolidation occurs. Since consolidation commonly occurs in the border states, there is reason to believe that the origin/destination data is skewed toward these border states.

Since U.S. Customs does not track the Mexican state of origin, it is not possible to define origin and destination patterns from the U.S. data alone. The Mexican data sources do track Mexican state. Therefore, it is possible to develop a combined origin and destination map for northbound trade, but it is not possible to link actual origins and destinations.

It should again be noted that, similar to the U.S. data, there is a bias to the Mexican O/D data. The Mexican trade data, more often than not, considers the origin state to be the location (state) of the headquarters of the company. Since a large percentage of Mexican companies are located in the Distrito Federal and the State of Mexico, it is not uncommon to see overrepresentation of these states in the O/D data.

Gateway Trade Flows

Trade has developed along the U.S.-Mexico border within four well defined gateways. These gateways are similar to the four U.S. Customs Districts along the border. Both the gateways and the U.S. Customs Districts correspond to the centers of manufacturing and commercial activity, as well as population density. The Customs districts derive their names from the predominate U.S. port in each District (Laredo, El Paso, Nogales, and San Diego). The U.S. ports within each gateway and the adjacent ports in Mexico were found to have common characteristics of trade and traffic patterns, further endorsing the Customs district gateway as a reasonable unit of analysis. In this section, an overview of trade flows through each gateway is provided, with references to specific ports when appropriate.

Tables 8.14 and 8.15 list the percentage break down of southbound and northbound trade activity at the U.S. Customs District and Port of Entry level. Table 8.14 shows that by value, 64.4 percent of all trans-surface southbound trade moves through the Laredo District. Of that, 82 percent of the Laredo District trade flows through two ports of entry: Laredo (69%) and Brownsville (13%). Another 8 percent moves through the port of Hidalgo. The remaining five ports in the Laredo District carry the remaining 10 percent.

The El Paso District accounts for approximately 17 percent of the all trans-surface southbound trade to Mexico. Virtually all (99%) of the goods move through the El Paso port of entry. The remaining three ports carry less than one percent of the value for the district.

The San Diego District carries the third highest volume of southbound goods at 11.2% of the total trans-border value. In this district, 94 percent of all goods pass through the ports of San Ysidro/Otay Mesa and Calexico. The Nogales District carries 7.6% percent of the trade in terms of value. The ports at Nogales, Douglas, and San Luis carry 98 percent of the goods in this district.

It should be noted that all the discussion in this section is limited to the value of goods moving through these districts and ports. Value of goods does not necessarily reflect the quantity of goods moved. In the Nogales District, much of the trade is in agricultural products which have a relatively low value per ton but represent a large volume of goods and truck traffic.

Table 8.15 shows that there is a significant difference in the distribution of northbound and southbound trade flow by port. In terms of northbound trade, the Laredo District accounts for 45% of this trade flow into the U.S. from Mexico. The El Paso District handles 26% of the northbound trade, while San Diego and Nogales carry 16% and 12%, respectively.

Table 8.14 Southbound Trade Activity by District and Port

U.S. Customs District - (% of Total Border Trade)	U.S. Customs Port of Entry	Adjacent Mexican Border City	% of District Total	% of Border Total
Laredo - (64.38%)	2304 Laredo, TX	Nuevo Laredo	68.72%	44.24%
	2301 Brownsville, TX	Matamoros	12.67%	8.16%
	2305 Hildago, TX	Reynosa	8.17%	5.26%
	2303 Eagle Pass, TX	Piedras Negras	7.04%	4.53%
	2302 Del Rio, TX	Ciudad Acuna	2.36%	1.52%
	2309 Progreso, TX	Nuevo Progreso	0.42%	0.27%
	2307 Rio Grande City, TX	Ciudad Carmago	0.37%	0.24%
	2310 Roma, TX	Miguel Aleman	0.26%	0.16%
El Paso - (16.87%)	2402 El Paso, TX	Ciudad Juarez	99.29%	16.75%
	2403 Presidio, TX	Ojinaga	0.60%	0.10%
	2406 Columbus, NM	Palomas	0.10%	0.02%
	2404 Fabens, TX	Caseta	*	*
Nogales - (7.55%)	2604 Nogales, AZ	Nogales	84.78%	6.40%
	2601 Douglas, AZ	Agua Prieta	9.17%	0.69%
	2608 San Luis, AZ	San Luis Rio Colorado	4.53%	0.34%
	2603 Naco, AZ	Naco	1.30%	0.10%
	2602 Lukeville, AZ	Sonoyta	0.22%	0.02%
	2606 Sasabe, AZ	Sasabe	0.01%	*
San Diego - (11.20%)	2504 San Ysidro, CA	Tijuana	61.63%	6.90%
	2503 Calexico, CA	Mexicali	32.46%	3.63%
	2505 Tecate, CA	Tecate	5.84%	0.65%
	2502 Andrade, CA	Algodones	0.06%	0.01%

Source: 1994 Transborder Surface Freight Data; U.S. DOT

Table 8.15 Northbound Trade Activity by District and Port

U.S. Customs District - (% of Total Border Trade)	U.S. Customs Port of Entry	Adjacent Mexican Border City	% of District Total	% of Border Total
Laredo - (45.46%)	2304 Laredo, TX	Nuevo Laredo	54.27%	24.67%
	2301 Brownsville, TX	Matamoros	20.37%	9.26%
	2305 Hildago, TX	Reynosa	13.33%	6.06%
	2303 Eagle Pass, TX	Piedras Negras	7.12%	3.24%
	2302 Del Rio, TX	Ciudad Acuna	3.98%	1.81%
	2309 Progreso, TX	Nuevo Progreso	0.54%	0.25%
	2307 Rio Grande City, TX	Ciudad Carmago	0.28%	0.13%
	2310 Roma, TX	Miguel Aleman	0.10%	0.05%
El Paso - (26.33%)	2402 El Paso, TX	Ciudad Juarez	99.33%	26.15%
	2403 Presidio, TX	Ojinaga	0.53%	0.14%
	2406 Columbus, NM	Palomas	0.15%	0.04%
	2404 Fabens, TX	Caseta	*	*
Nogales - (12.15%)	2604 Nogales, AZ	Nogales	85.12%	10.34%
	2601 Douglas, AZ	Agua Prieta	7.33%	0.89%
	2608 San Luis, AZ	San Luis Rio Colorado	7.01%	0.85%
	2603 Naco, AZ	Naco	0.50%	0.06%
	2602 Lukeville, AZ	Sonoyta	0.03%	*
	2606 Sasabe, AZ	Sasabe	*	*
San Diego - (16.06%)	2504 San Ysidro, CA	Tijuana	52.44%	11.93%
	2503 Calexico, CA	Mexicali	40.63%	3.53%
	2505 Tecate, CA	Tecate	6.93%	0.60%
	2502 Andrade, CA	Algodones	*	*

One explanation for this difference in southbound versus northbound trade flow could be that Laredo represents the port through which most traditional trade flows. While there are a significant number of maquiladoras in Laredo, this port has a larger role as the gateway for U.S. goods moving south into Mexico for consumption in Mexico. The other ports may see a higher return of U.S. goods imported from Mexico in the form of finished products from maquiladora plants.

Freight Weight (Tons)

In the U.S. data there is no consistent information regarding weight for trade flows between the U.S. and Mexico. Instead, the data are presented in terms of quantity of a particular good shipped. In the majority of cases, that quantity is expressed in tons or kilograms. For other products the quantity reported may be expressed in barrels, number of animals, dozens, or various other units of measure depending on the nature of that product. Without a complete and extensive conversion system by which to classify all products in terms of a consistent weight measure, presentation of data in these terms is not practical. It should be noted that, beginning in 1995, BTS data includes a shipping weight field for each record but only for those records relating to U.S. imports.

Mexican Customs, on the other hand, records freight weight for international trade. However, there is no control or verification of the figures reported and in many cases this information is not recorded at all. (In data supplied by SECOFI for 1995, only 33% of the export records have weight data, for imports 45% have this information.) In order to present a picture of weight measure for freight that moves across the Mexico- U.S. border, an expansion to “complete years” of the data presented by SECOFI was done for the years 1993, 1994 and 1995 (as mentioned before there are some months that do not have complete information). The expansion was done following the methodology briefly discussed below and fully detailed to SCT.

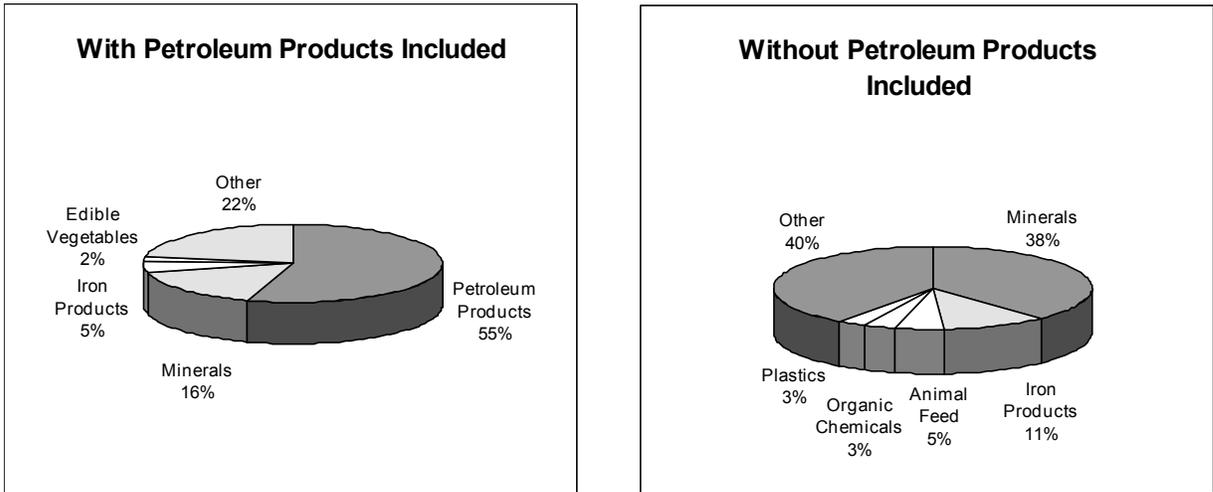
From the original data base records (8-digit original data base) where weight information in tons was present, the average specific weight of commodities grouped to two-digit classifications was calculated. The calculated average weight was then applied to those registers that had no weight recorded

Northbound Freight Weight Movements

From 1995 freight weight estimations, it can be observed that there were a total of 124 million tons of Mexican exports to the U.S. Of this total, 55% (69 million tons) correspond to the product category “Mineral oils and combustion products that include oil” (product code 27). Of the remaining exports, not including those products in category 27, 33% (18 million tons) moved northbound overland across the Mexico-U.S. border, 56% via ports and 11% recorded as traveling through other customs offices (a reporting problem noted previously). The main Mexican export commodities by weight in tons are presented in Figure 8.10. Exports are presented both including and excluding oil exports.

With the estimated weight established, the average value per ton of Mexican exports was calculated for 1995. That value was \$222 per ton for freight exported by ports, and \$2,978 per ton for freight moved across the land border. These values reflect the economies of transporting bulk commodities by ship versus high-value, low-weight products by truck, air, and intermodal rail. This observation is supported by the following figure, which shows that the principal commodities exported northbound (by weight) include electronic equipment and vehicles, while the primary commodities shipped through ports include salt, sand and cement (not considering oil).

Figure 8.10 Principal Mexican Export Commodities by Product Type, 1995



Source: La Empresa estimates based on SECOFI data

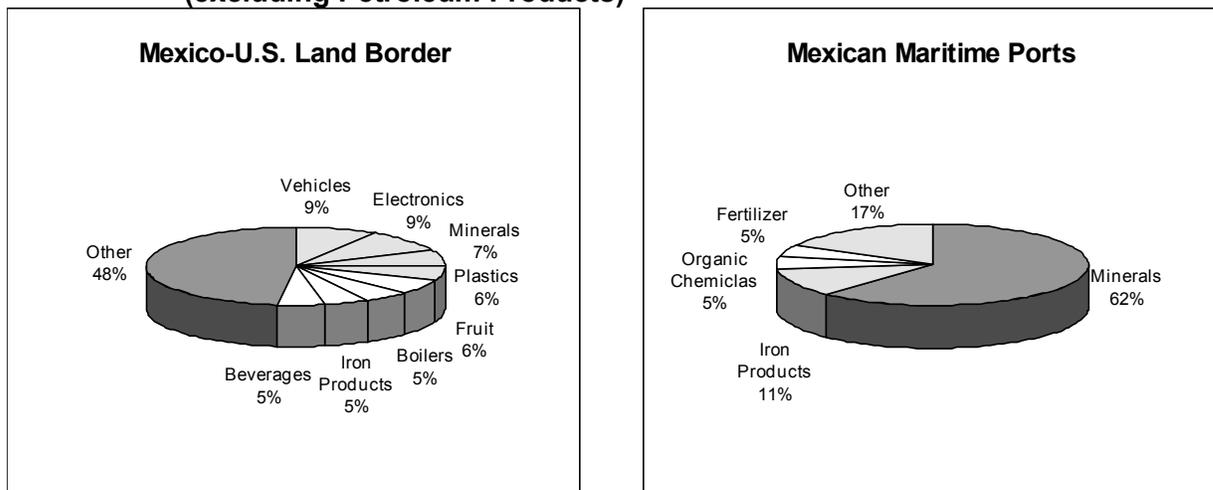
The customs offices at the Mexico-U.S. border that handle the most freight in tons are: Nuevo Laredo with 28%, Matamoros with 14%, Ciudad Juarez and Nogales with 13% each, and Tijuana with 10% as presented in Figure 8.12

Of the total tonnage of freight weight moving northbound across the Mexico-U.S. border, 79% is moved by trucks, 19% by rail and 2% has no mode identified.

Southbound Freight Weight Movements

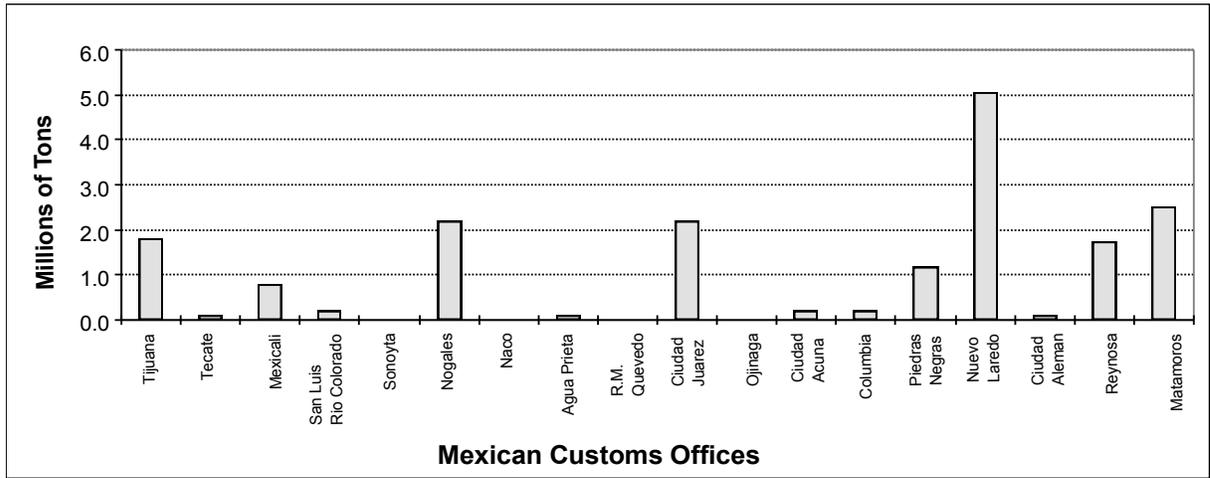
It is estimated that 1995 Mexican freight imports totaled 77 million tons during 1995. Of this total, 47% (36 million tons) crossed the Mexico-U.S. land border. Figure 8.13 presents the main commodities entering Mexico by total weight and those crossing the land border.

Figure 8.11 Principal Mexican Export Commodities by Transport Type, 1995 (excluding Petroleum Products)



Source: La Empresa estimates based on SECOFI data

Figure 8.12 Northbound Freight Through the Mexico-U.S. Border by Mexican Customs



Source: La Empresa estimates based on SECOFI data

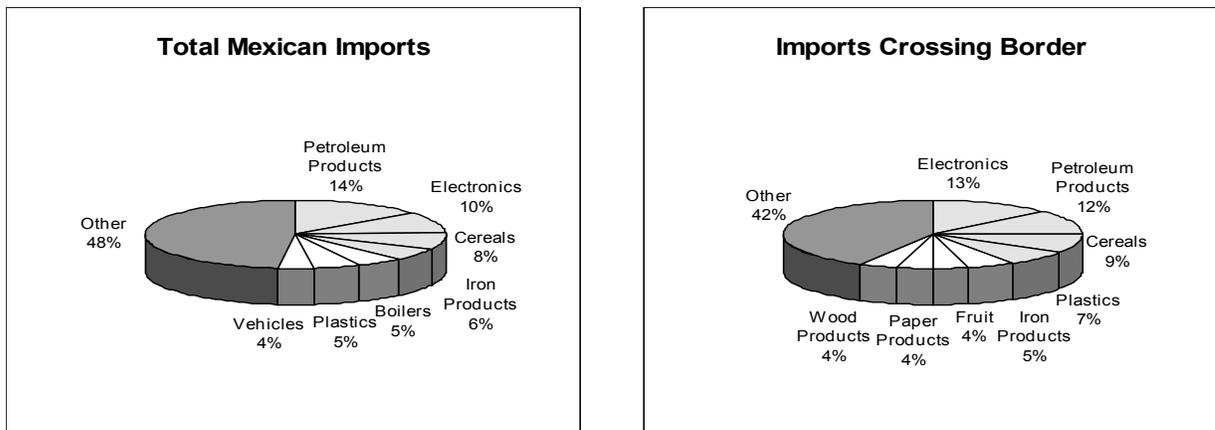
Of the total freight, by weight, moving southbound across the Mexico-U.S. land border, 31% enters at Nuevo Laredo, 30% at Reynosa, 12% at Piedras Negras and 12% at Cd. Juarez as shown in Figure 8.14.

Of the total southbound freight entering Mexico through the land border, 60% is moved by truck, 30% by rail and 10% has no identified mode. Freight weight moved by other modes was insignificant.

8.2.5 Trends in Mexico-U.S. Trade Flows

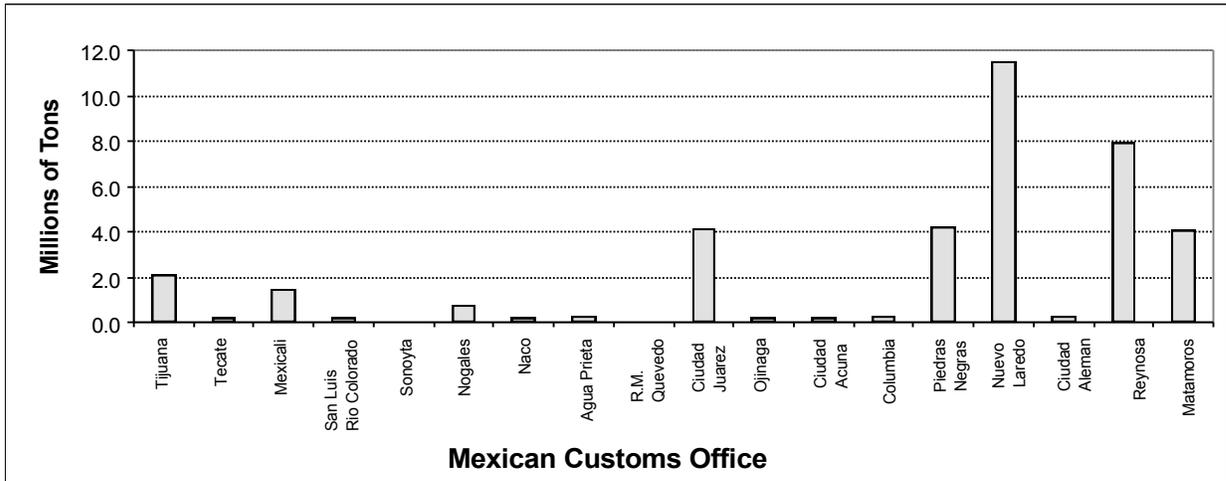
The devaluation of the peso (by 50 percent) in December, 1994 had a dramatic effect on the flow of goods into and out of Mexico. The reduction in imports was immediate as Mexican consumers responded to the loss of purchasing power. An expansion of exports was noticeable

Figure 8.13 Main Commodities by Weight in Tons Entering Mexico, 1995



Source: La Empresa estimates based on SECOFI data

Figure 8.14 Southbound Freight in Million Tons Crossing the Mexico-U.S. Border

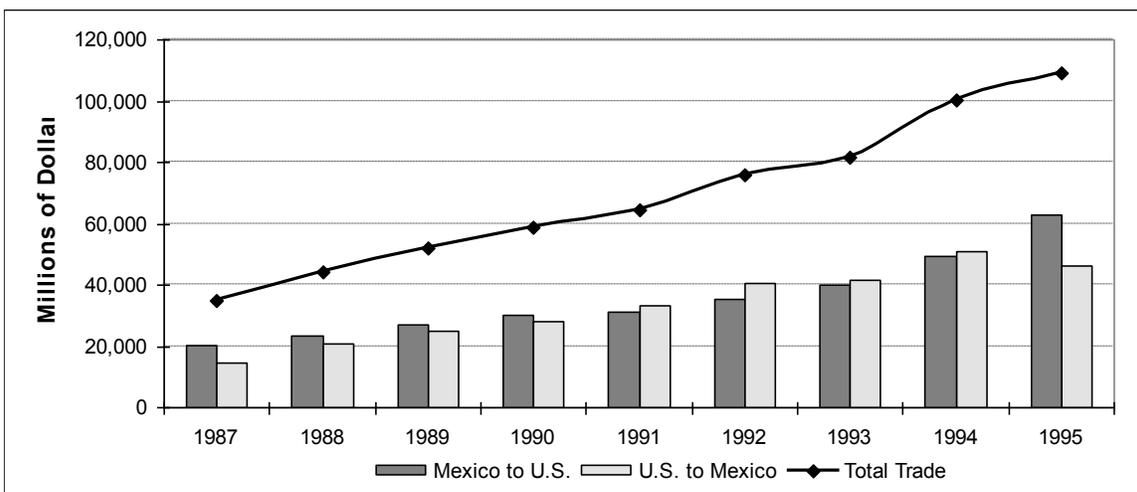


Source: La Empresa estimates based on SECOFI data

but gradual, mitigated somewhat by higher interest costs. Trend analysis of these conditions reflects an important disruption in trade flows that makes reaching clear, long term conclusions difficult. The investigation of these trends will therefore be extended in later tasks as data for 1996 is considered.

Figure 8.15 indicates that U.S.-Mexico trade had been steadily and consistently climbing over the seven years following the GATT accords and preceding the implementation of NAFTA. In 1994, two-way trade embarked on a new, higher trend line only to be stalled in 1995 by the economic difficulties in Mexico. Preliminary indications are that bilateral trade growth during 1996 has again resumed at a quicker pace than experienced during 1995.

Figure 8.15 Trade Flow Trend Mexico-United States, 1987-1995



Source: U.S. Department of Commerce

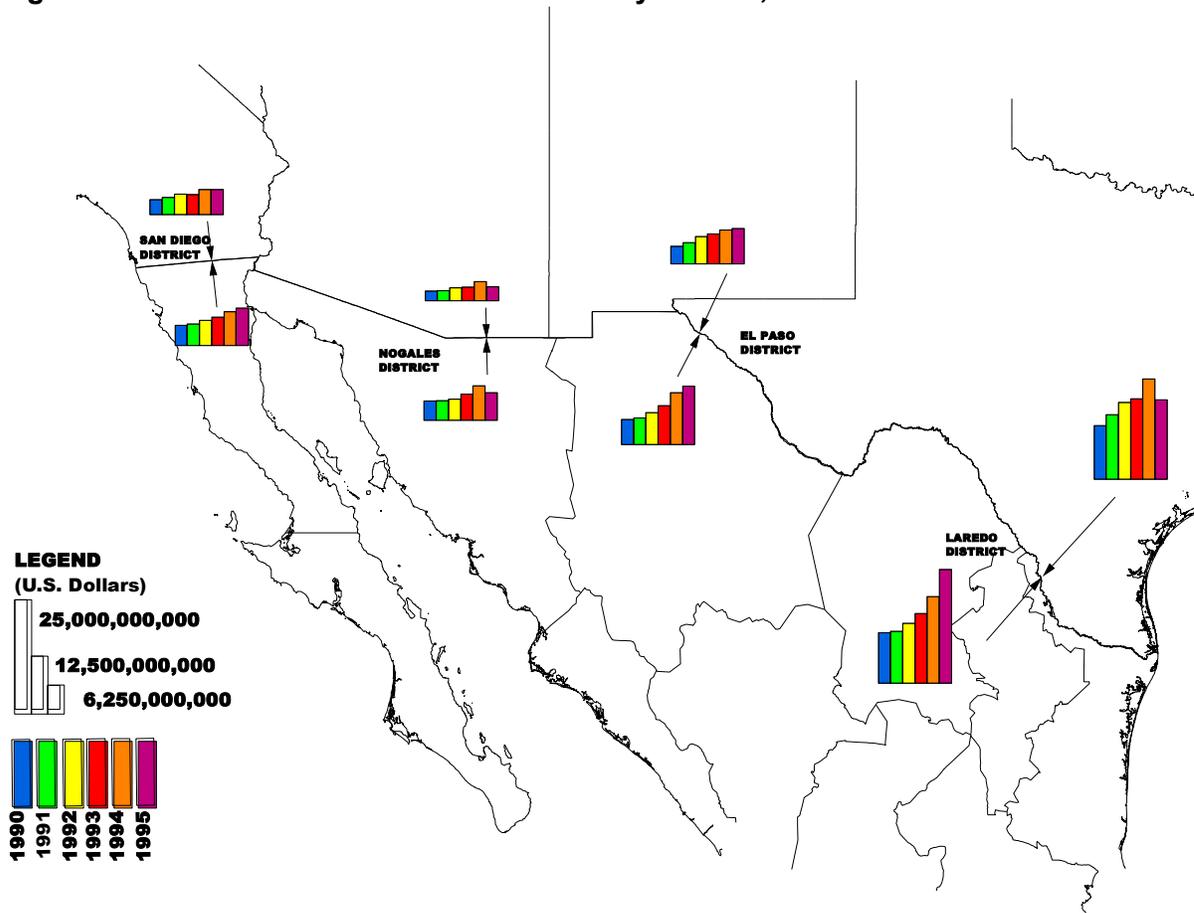
Figure 8.16 shows the trade flow trends by customs district for the period of 1990-1995. Table 8.16 presents the year to year growth rates for northbound and southbound trade, computed on the basis of dollar value. In the northbound direction, all sectors of the border experienced very significant increases in trade, with the exception of Nogales for the 1994 to 1995 time period.

Southbound trade showed similar increases from 1990 to 1991 and 1991 to 1992; more modest growth from 1992 to 1993, and a large increase in trade from 1993 to 1994. Southbound trade during 1994 to 1995 was flat through the San Diego customs district, up slightly through El Paso, and down significantly in Nogales and Laredo.

As stated earlier in this report, SECOFI furnished the consultants with similar trade flow data for the years from 1993 to 1995 and this was used to portray trade flow trends by border crossing. Figures 8.17 and 8.18 display both trends and the overall magnitude of trade for southbound and northbound total trade. Figures 8.19 and 8.20 display the same data for maquiladora trade only. Please note in the latter case (maquiladora) that all trends were positive in both directions, while in the former case (total trade), Laredo suffered the most significant setback according to the SECOFI data.

Please note that the maquiladora trade trends shown in Figures 8.19 - 8.21 are very similar for both trade flow directions, with a noticeable increase during 1995 in the U.S. to Mexico direction.

Figure 8.16 U.S.-Mexico Trade Flow Trend by District, 1990-1995



Source: U.S. Department of Commerce

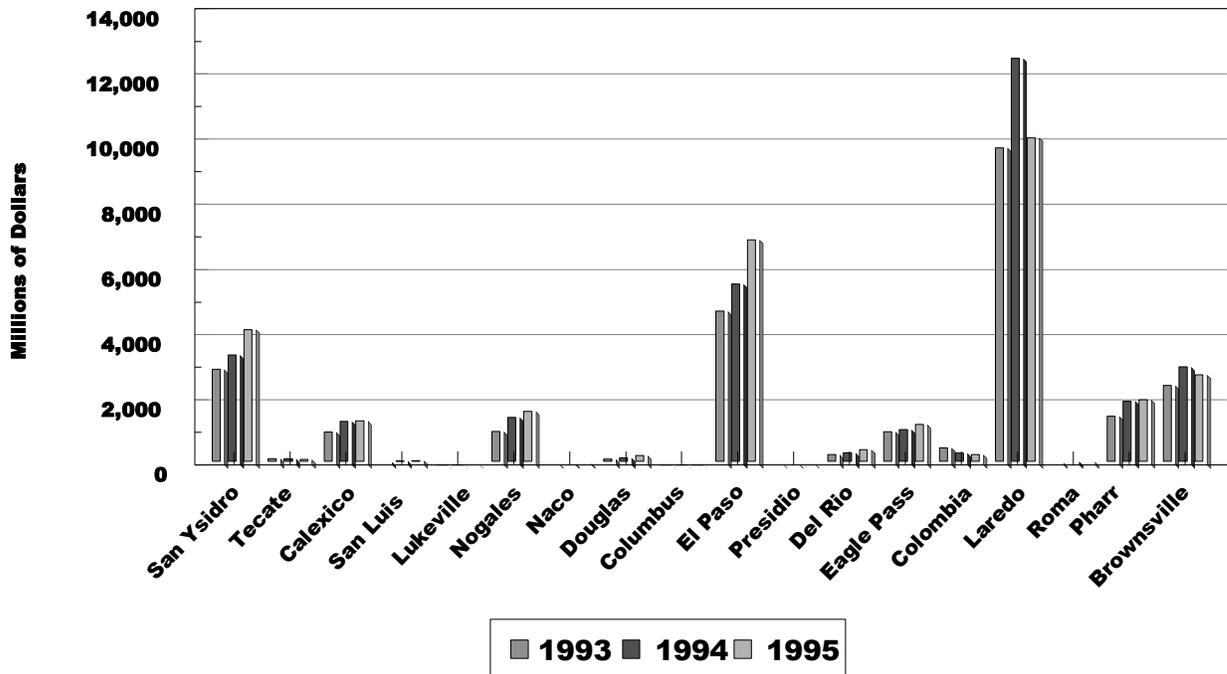
**Table 8.16 Commercial Trends by Customs District, 1990-1995
(Year to Year Change in Trade Values)**

Mexico to U.S					
District	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995
San Diego	9%	17%	12%	19%	10%
Nogales	3%	8%	23%	31%	-20%
El Paso	7%	20%	21%	33%	12%
Laredo	3%	15%	16%	24%	31%

U.S. to Mexico					
District	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995
San Diego	16%	16%	-1%	24%	0%
Nogales	5%	28%	6%	39%	-26%
El Paso	19%	30%	8%	13%	5%
Laredo	20%	19%	5%	25%	-21%

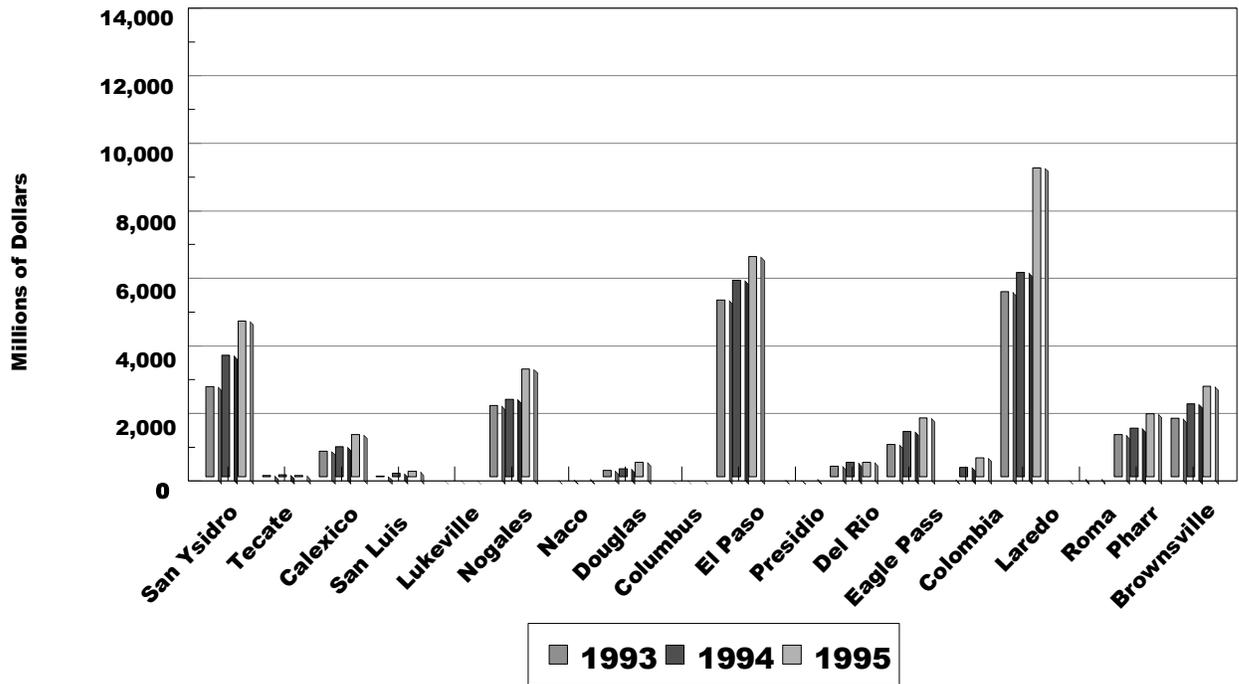
Source: U.S. Department of Commerce

Figure 8.17 U.S.-Mexico Southbound Commercial Flow by Border Crossing, 1993-1995



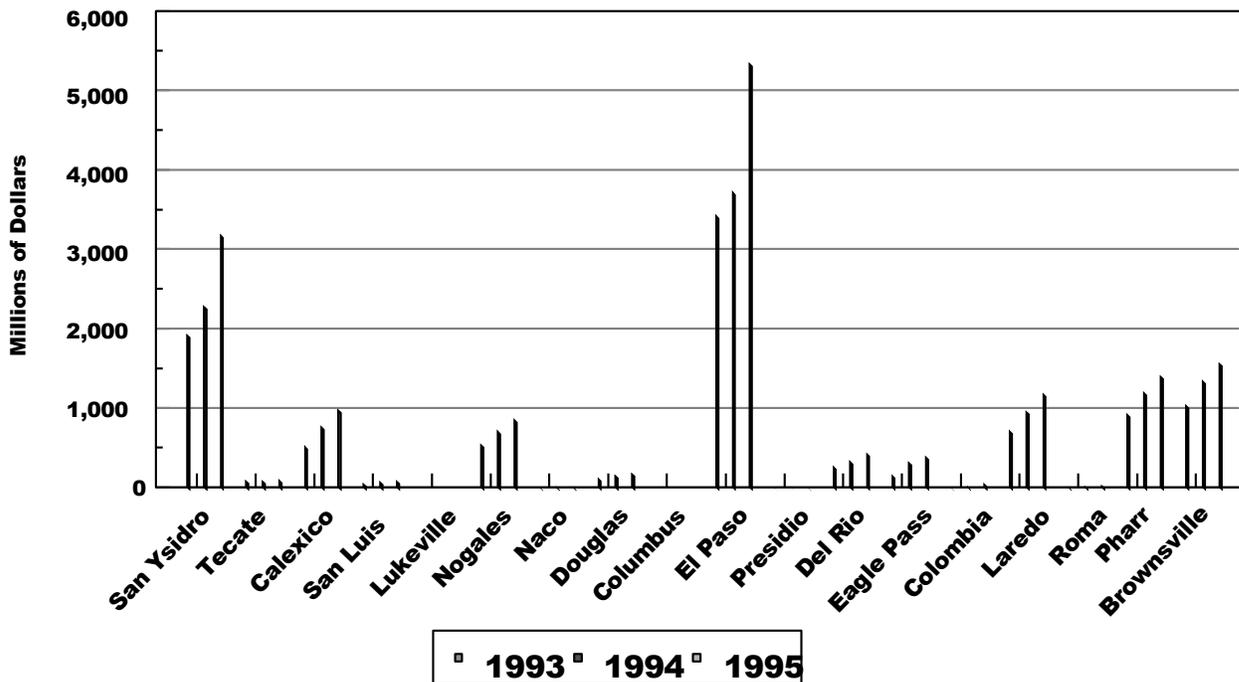
Source: Based on SECOFI data

Figure 8.18 U.S.-Mexico Northbound Commercial Flow by Border Crossing, 1993-1995



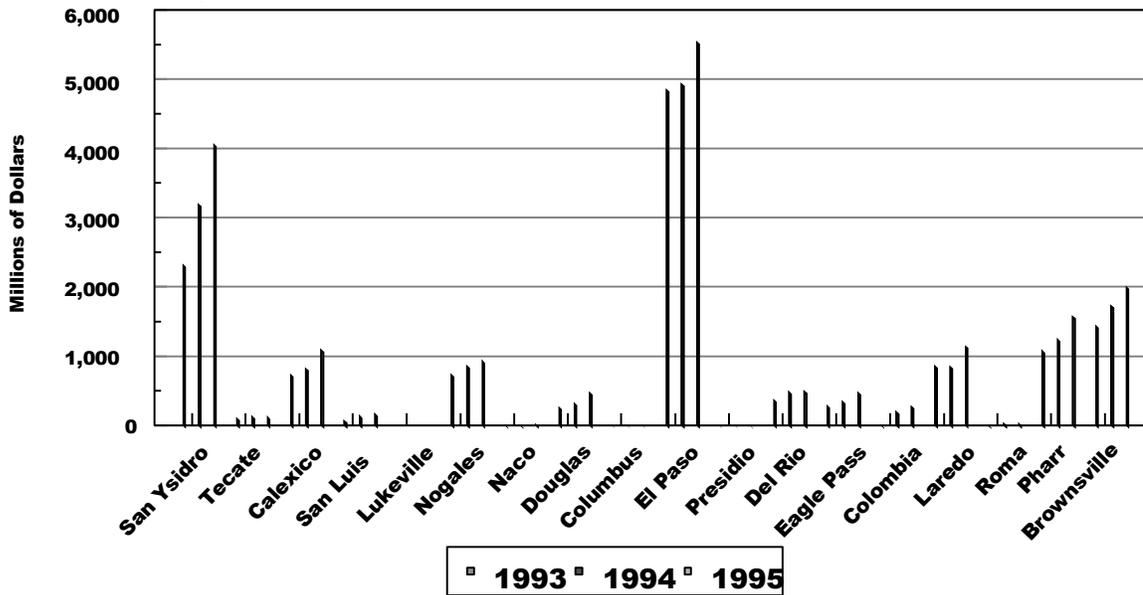
Source: Based on SECOFI data

Figure 8.19 Maquiladora trade in the U.S. - Mexico direction 1993-1995



Source: Based on SECOFI data

Figure 8.20 Maquiladora Trade in the Mexico to U.S. Direction, 1993-1995



Source: Based on SECOFI data

Primary Transborder Trade Products: Mexico - United States

Cross border trade is dominated by three types of commodities which consistently top the lists of both southbound and northbound flows. These are Schedule B commodity classifications as follows:

- 85 - Electrical machinery and parts
- 84 - Nuclear reactors, boilers, and machinery
- 87- Non-railway vehicles and parts

Figures 8.21 and 8.22 illustrate the 1990-1995 trend lines (by value) of southbound and northbound U.S.-Mexico trade for the top six commodities in both directions. The actual values of this trade are reported in Tables 8.17 and 8.18 for the top 15 commodities.

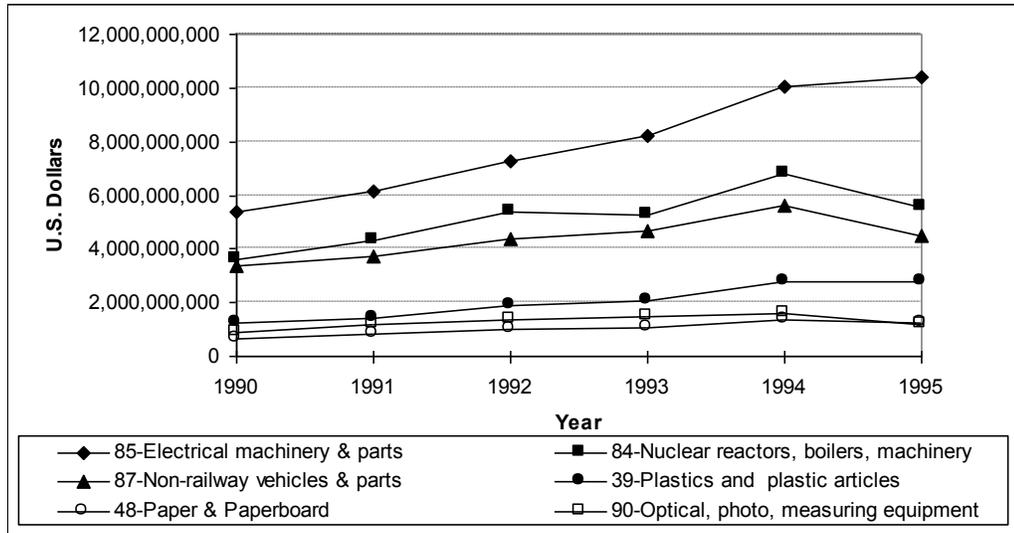
Primary Maquiladora Products

In 1995, the percentage of total southbound products that were maquiladora-related was 50%. In prior years, the percentage was 47% in 1993 and 48% in 1994. The most important products traded were machines, electronics and electrical equipment. Plastics continued to be an important product in 1995 representing 10% of the total, and the percentage for the two prior years was 12% and 11%, respectively.

In 1995, machines, electronics and electrical equipment represented 57% of the northbound maquiladora trade, while for each of the prior two years it was 56%. Nuclear and steam reactors, which rank second in importance, represented 8% of the total in 1993, 9% in 1994 and 10% in 1995.

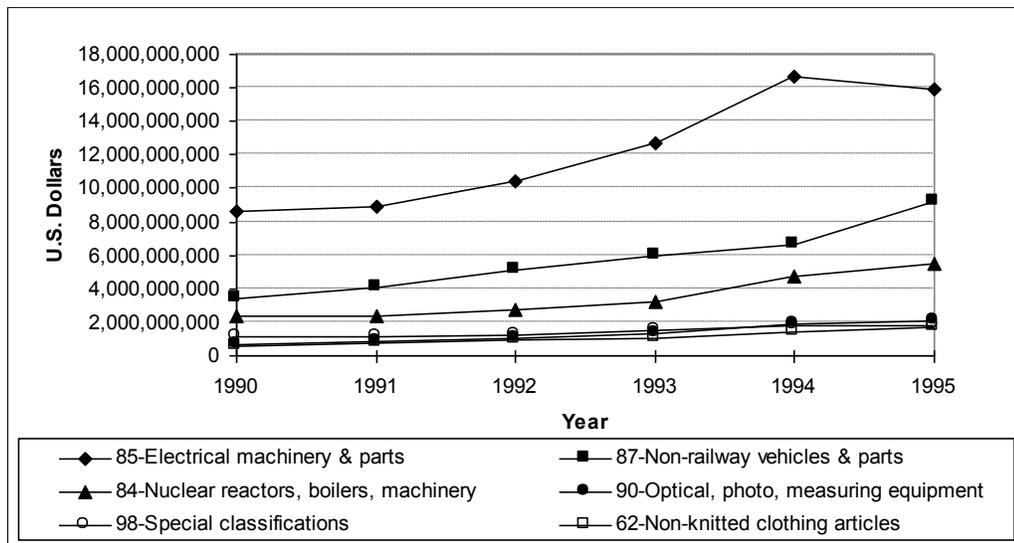
The same maquiladora products are generally dominant with regard to both imports and exports. Machines, electronics and electrical materials generate approximately 50% of the total imports and exports and, based on the identified trends, it appears that this product category will continue its growth pattern. Figure 8.23 shows the trend for the maquiladora products most frequently traded.

Figure 8.21 Trend of Primary Southbound Products Crossing the Mexico-U.S. Border, 1990-1995



Source: U.S. Export History, U.S. Department of Commerce

Figure 8.22 Trend of Primary Northbound Products Crossing the Mexico-U.S. Border, 1990-1995



Source: U.S. Import Histories, U.S. Department of Commerce

Table 8.17 Southbound U.S.-Mexico Top 15 Commodities by Value, 1990-1995

Commodity Code-Description	1990	1991	1992	1993	1994	1995
85-Electrical machinery & parts	5,368,223,142	6,119,794,616	7,285,912,731	8,227,518,229	10,024,914,313	10,430,089,156
84-Nuclear reactors, boilers, machinery	3,628,328,058	4,323,107,096	5,359,544,931	5,254,407,783	6,822,660,896	5,575,512,709
87-Non-railway vehicles & parts	3,352,879,810	3,723,092,085	4,395,136,811	4,689,556,008	5,635,864,539	4,478,927,597
39-Plastics and plastic articles	1,270,362,206	1,437,486,021	1,892,834,307	2,064,541,572	2,804,445,576	2,771,616,257
48-Paper & Paperboard	649,831,962	799,500,390	1,003,375,108	1,089,017,979	1,350,525,087	1,270,297,089
90-Optical, photo, measuring equipment	882,217,693	1,163,377,620	1,382,090,228	1,502,783,910	1,575,257,679	1,206,442,006
73-Articles of iron or steel	424,448,299	555,959,503	686,253,222	707,997,527	1,098,528,244	1,140,163,757
62-Non-knitted clothing articles	252,655,971	362,889,642	502,109,819	545,744,491	670,285,758	752,957,400
94-Furniture, bedding, mattresses	377,114,080	619,244,226	744,402,420	844,012,908	911,126,210	678,533,381
72-Iron or steel	488,453,577	781,652,945	866,613,224	635,434,213	616,000,353	668,488,061
76-Aluminum & aluminium articles	333,284,343	386,179,014	470,100,737	473,902,574	605,129,567	641,288,562
27-Mineral fuels & products	479,595,420	430,192,048	677,588,620	581,239,590	563,424,238	621,356,254
83-Misc. articles of base metals	335,763,737	398,650,802	466,289,936	487,339,214	555,562,687	602,568,477
29-Organic chemicals	480,933,042	507,259,971	565,688,990	518,082,661	574,080,748	573,728,259
2-Meat & edible meat	252,792,183	469,845,244	528,891,064	446,907,204	623,376,206	350,278,661

Source: U.S. Export History; U.S. Department of Commerce

Primary Products by District

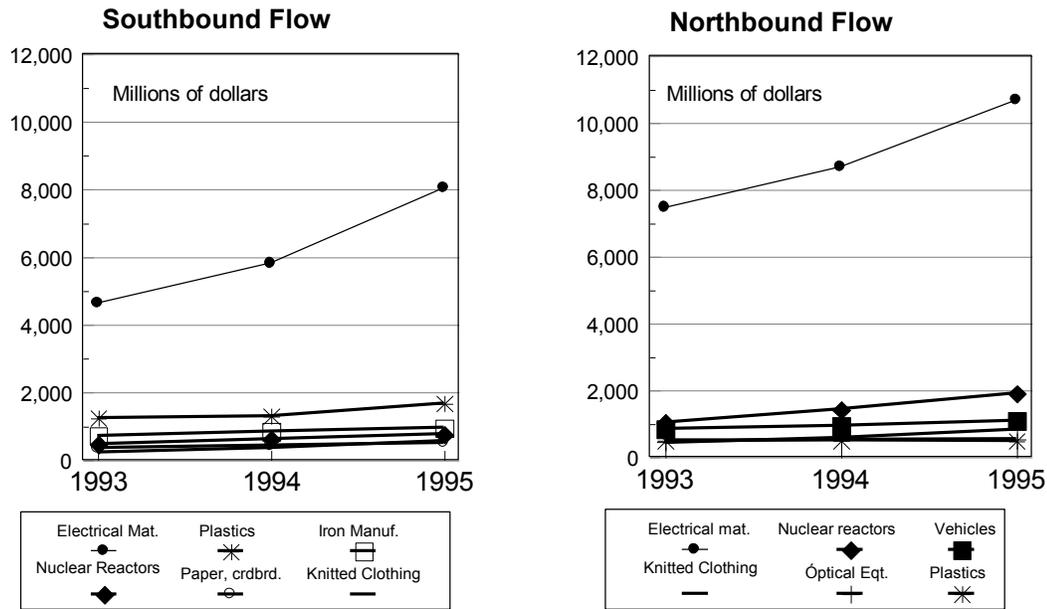
Figures 8.24 and 8.25 illustrate commodity flow trends by product and customs district for the period 1990-1995. Figures presenting the top 15 products for both northbound and southbound flows were created for this study. Figures illustrating trends for the top six products are shown in the following pages. Each figure corresponds to a group of products that are shown in order of importance at a national level (U.S.), first for southbound and then for northbound flows.

Table 8.18 Northbound Mexico-U.S. Top 15 Commodities by Value, 1990-1995

Commodity Code-Description	1990	1991	1992	1993	1994	1995
85-Electrical machinery & parts	8,609,304,483	8,933,425,413	10,440,475,642	12,649,468,888	16,702,588,129	15,882,018,664
87-Non-railway vehicles & parts	3,448,673,590	4,059,749,278	5,093,181,352	5,950,310,442	6,677,637,294	9,158,029,919
84-Nuclear reactors, boilers, machinery	2,375,512,959	2,344,182,012	2,752,349,019	3,184,593,471	4,755,457,267	5,470,559,085
90-Optical, photo, measuring equipment	663,061,995	829,154,112	1,039,954,506	1,337,356,538	1,860,986,534	2,044,551,703
98-Special classifications	1,095,579,417	1,156,846,328	1,223,110,319	1,487,621,874	1,764,614,324	1,773,152,901
62-Non-knitted clothing articles	571,345,004	744,759,718	959,497,188	1,089,150,975	1,374,185,440	1,688,127,345
94-Furniture, bedding, mattresses	672,953,801	754,173,060	917,034,444	1,081,713,802	1,404,265,213	1,385,451,309
7-Edible vegetables	918,063,101	809,135,435	721,730,025	949,837,281	1,006,540,067	1,201,497,729
73-Articles of iron or steel	289,634,071	355,000,472	432,438,896	475,692,114	598,144,927	686,372,529
39-Pastics & plastic articles	261,359,035	317,577,084	364,354,290	408,617,047	561,230,094	641,619,596
95-Toys, games, sporting equipment	282,032,531	299,808,960	325,121,229	430,043,322	599,284,210	591,865,615
70-Glass or glassware	237,235,717	260,728,633	264,278,708	268,688,059	373,766,331	423,896,758
8-Edible fruits and nuts	311,598,793	382,801,668	401,962,364	365,497,128	399,987,670	400,989,257
1-Live animals	420,438,971	361,109,070	343,320,097	432,053,597	352,596,897	397,568,415
44-Wood & wood articles	218,194,153	258,379,654	304,356,016	339,348,727	331,864,949	367,854,925

Source: U.S. Import History; U.S. Department of Commerce

Figure 8.23 Primary Maquiladora Products, 1993-1995



Source: Based on SECOFI data

With respect to machines, electrical materials and electronics, the district with the highest activity is Laredo (with a 39% market share), followed in importance by El Paso (34%), San Diego (20%), and Nogales (7%). This order of importance has been maintained throughout the analysis period, though there are minor variations associated with the Laredo and El Paso districts where considerable increases have occurred in the total dollar value for this product.

For the nuclear reactors and boilers product category, it can be seen that the Laredo district has a significant role in the total exchange of this product between Mexico and the U.S., with 67% of the total in 1995. The participation for the El Paso, Nogales and San Diego districts in the same year was 13%, 9%, and 11%, respectively, and remained stable for the duration of the analysis period.

For the automobile and automotive parts category, Laredo was again the busiest district with 86% of the total flow in 1995. Nogales was the second highest ranking district with 9% of the total in the same year.

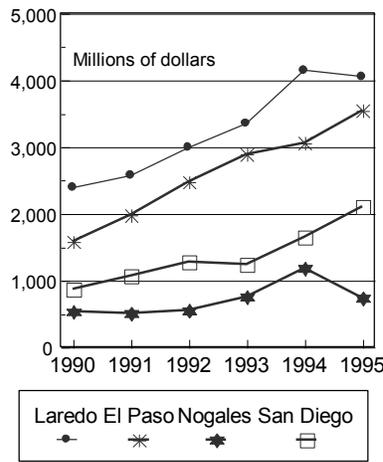
For the movement of plastics, Laredo was once again the district with the largest percentage of the total (53% in 1995). However, it experienced a negative growth during the 1994-1995 period. The percentage of flows associated with the El Paso and San Diego districts has increased significantly over the five year period with an increased market share observed for Nogales as well.

Most optical instrument products pass through the Laredo district. It captured 62% of the total cross-border market in 1990 and maintained a 52% market share in 1995. The level of trade (market share) for this product at the Nogales district also decreased, with 9% in 1990 and 6% in 1995. The El Paso district experienced the greatest overall change.

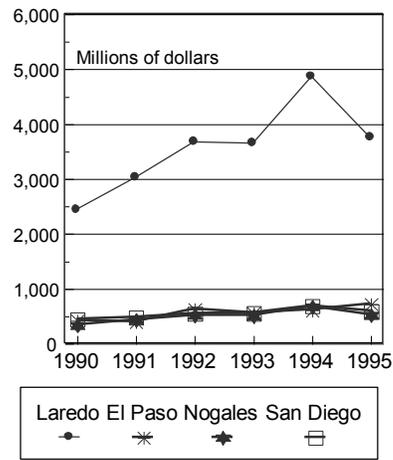
The district of Laredo handles the largest percentage of paper and cardboard products and this trade increased throughout the length of the time period studied, excluding the 1994-1995 period. The other districts were relatively stable from a market share standpoint.

Figure 8.24 Trends in Southbound Trade by Product and Customs District, 1990-1995

Machines, electronics and electrical material

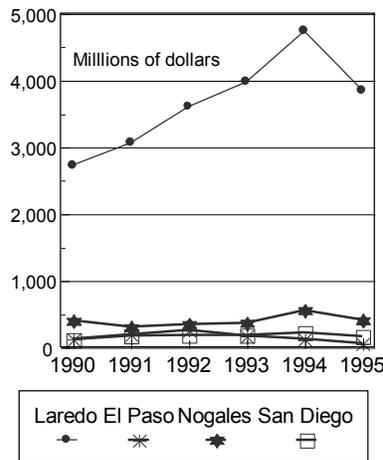


Nuclear reactors, boilers

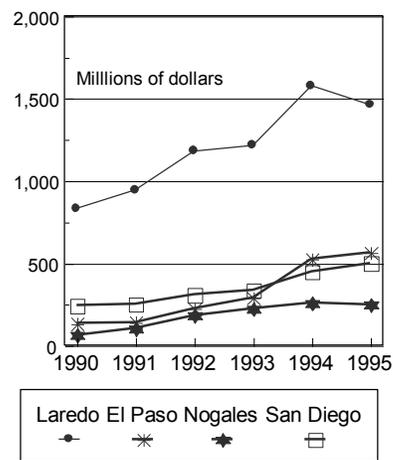


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Surface vehicles

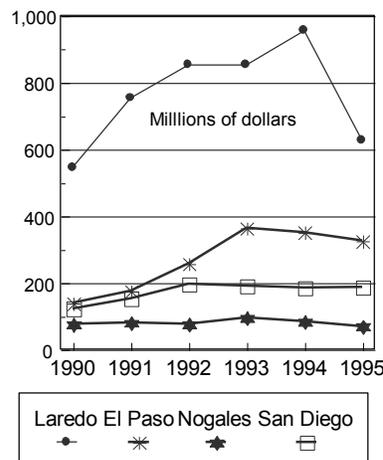


Plastics

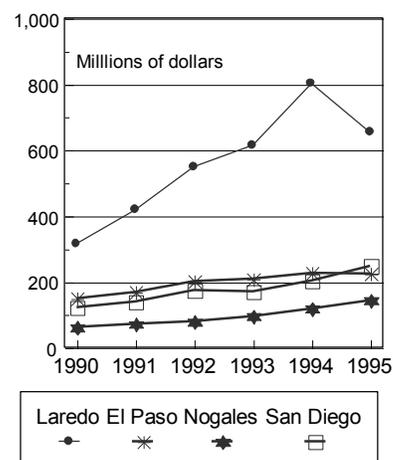


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Optical equipment



Paper and cardboard

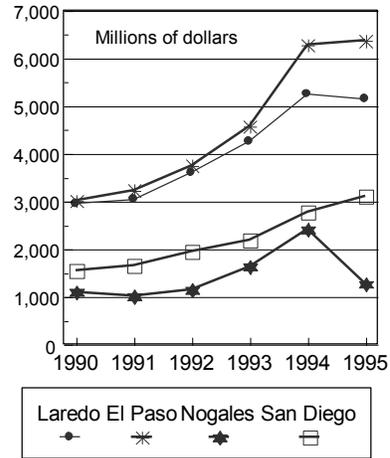


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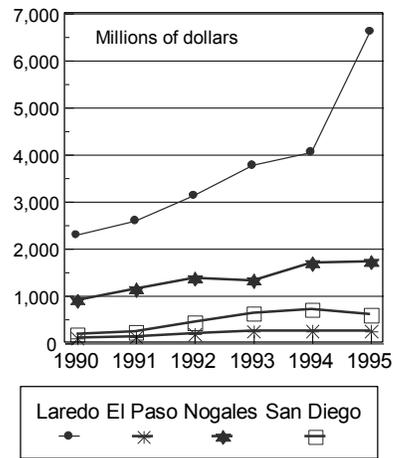
Source: U.S. Commerce Department

Figure 8.25 Trends in Northbound Trade by Product and Customs District, 1990-1995

Machines and electrical equipment

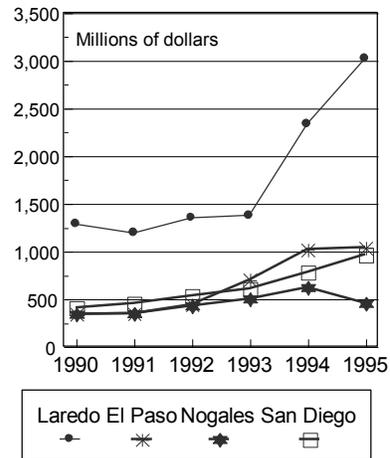


Land vehicles

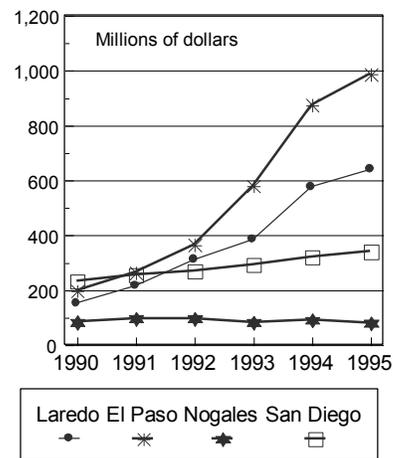


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Nuclear reactors, boilers

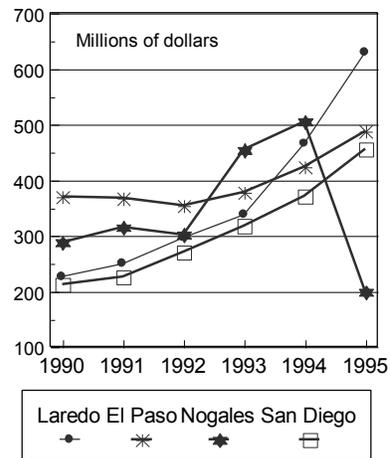


Optical instruments

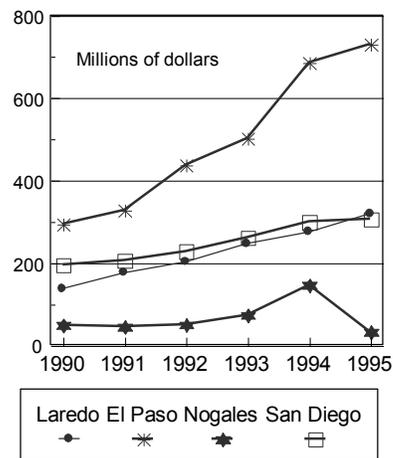


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Specialty class



Furniture, beds, and mattress



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Source: Import/Export Histories; U.S. Department of Commerce

The northbound flow of machines, electronics, and electrical equipment is concentrated at El Paso with 40% of the market in 1995, followed by Laredo with a 32% share, San Diego, 20%, and Nogales, 8%. The relative market share of product flow through the districts has stayed constant for this commodity throughout the analysis period, with only minor variations. El Paso has had increases with regard to its total dollar value for this product while San Diego has had a similar, yet less significant increase in trade. At the Nogales and Laredo districts, decreases in trade occurred between 1994 and 1995.

Laredo handles the largest share of vehicles and auto parts movements with a 72% share of the borderwide dollar total in 1995. In the San Diego district, the trend line was up until 1994 but in 1995 there was a significant decrease. In 1995, the districts of El Paso and Nogales captured 3% and 19% of the dollar value of trade.

Laredo also handled the largest share of the nuclear reactors and boilers with 55% of the total trade in 1995. Both El Paso and San Diego had similar levels of activity with 19% and 18%, respectively, noting that San Diego had more stable growth over the five year period.

El Paso and Laredo dominated the borderwide trade of optical, medical and photographic equipment products with 48% and 31% shares of total dollar trade in 1995. Both districts experienced increases in their share of total trade in this product. The districts of Nogales and San Diego witnessed decreases in their relative share of total trade in this category.

The flow of the special classification products (Code 98) is more evenly spread among the four districts. In 1995, each district's share of total dollar value was as follows: Laredo 35%, El Paso 28%, San Diego 26%, and Nogales 11%.

The El Paso district had the highest proportion of the total trade in furniture, beds and mattress products (53% in 1995), and its share increased during the analysis period. The Nogales district also experienced growth in the trade of this commodity until 1995 when its share dropped dramatically.

8.2.6 Mexico -U.S. Vehicular Flow

Detailed information regarding vehicular crossings of the border between Mexico and the U.S. is not universally available from sources in either country. The only consistent, reliable data are vehicle counts. Information regarding origin and destination of vehicles, freight weight, type of commodity, or number of passengers transported are not routinely collected or recorded by any public agency.

Moreover, information is recorded at all ports of entry only for vehicles crossing the border in the northbound direction (from Mexico to the U.S.). In Mexico, this information is recorded only for those crossings where there is a toll bridge (by CAPUFE - Caminos y Puentes Federales, from the Secretaría de Comunicaciones y Transportes). In the U.S., this information is recorded by the U.S. Customs Service and is summed by fiscal year (October to September).

In Mexico, vehicular flow is classified by vehicle type (Automobiles, Motorcycles, Buses and Trucks). Trucks have a sub-classification based on their number of axles. In the U.S., the vehicular flow is also classified by vehicle type (Automobiles, Buses and Trucks). Trucks are classified as empty or loaded.

Freight Conveyances

According to data supplied by the U.S. Customs Services for fiscal year 1995 (October 1994 - September 1995), 2.9 million conveyances (trucks/trailers and railcars) crossed the border in the northbound direction. The ports of El Paso, Laredo and Otay Mesa carried the highest flows with 21%, 25% and 16% respectively as presented in Figure 8.26 below. Table 8.19 provides details on the number of crossings by port and the number of full and empty conveyances.

Figure 8.27 shows that the majority of total northbound freight conveyance crossings by U.S. state occurred in Texas (65% of the total). Among Mexican states, Tamaulipas had the highest number of crossings, with 39% of the total.

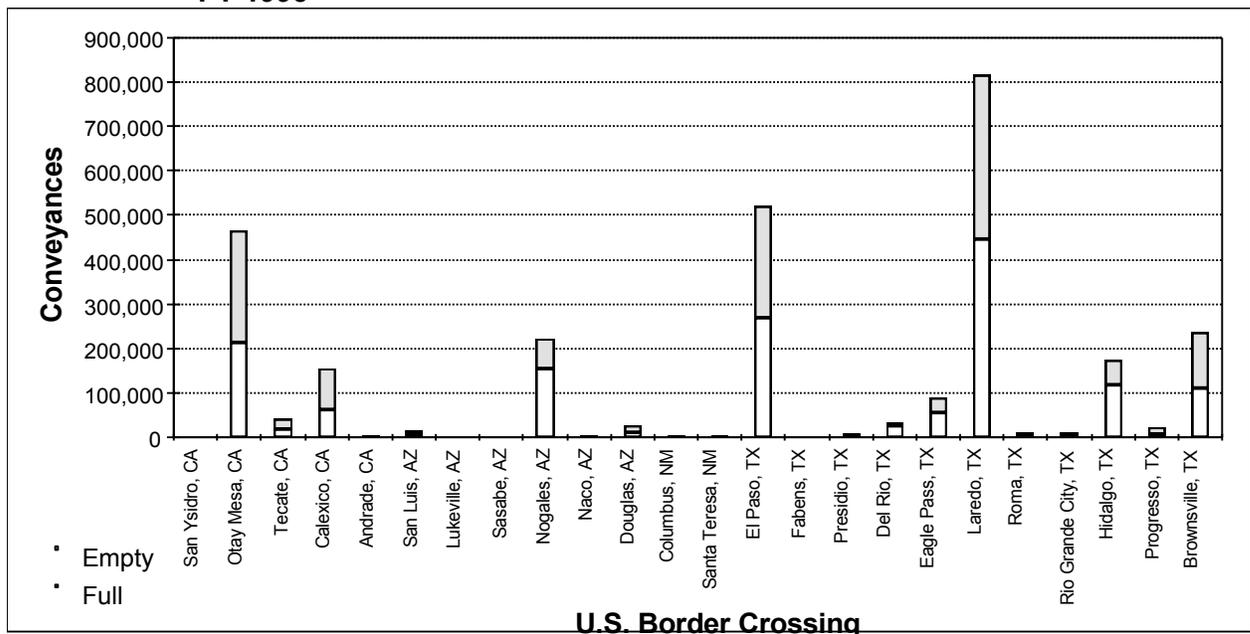
In the period between fiscal years 1991-1995, the number of northbound freight conveyance crossings increased by 48% (annual average rate of 10%). The highest growth occurred in the 1991-1992 and 1993-1994 periods, with a 15% increase during each of these periods. Figure 8.28 illustrates this trend for the 1991-1995 fiscal year period.

Private Vehicle Crossings

The U.S. Customs Service also reports a total of 77.7 million northbound private vehicle crossings in fiscal year 1995. Ports where the most private vehicles crossed the border in the northbound direction are: El Paso with 21%, San Ysidro with 18% and Calexico with 9% of the total as shown in Figure 8.29.

Most of the northbound private vehicle crossings, 54% of the total, occur in Texas. On the Mexican side of the border, the state of Baja California accounted for 34% of the total crossings. Northbound private vehicle crossings by state are presented in Table 8.30.

Figure 8.26 Northbound Freight Conveyance Crossings, Mexico-U.S. Border Ports, FY 1995



Source: U.S. Customs Service

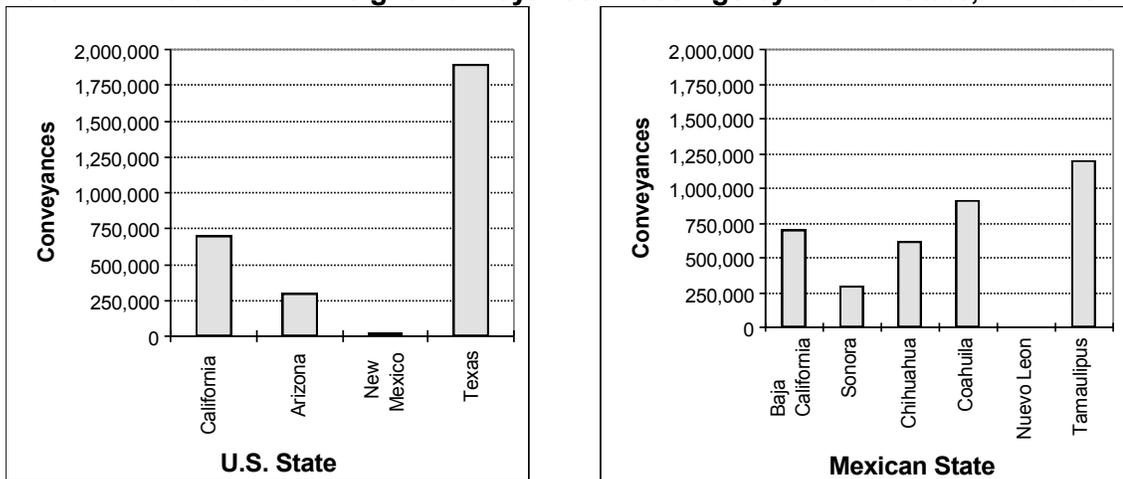
Table 8.19 Northbound Freight Conveyance Crossings at Mexico-U.S. Border Ports, FY 1995

U.S. Port	Total Commercial Trucks/Trailers and Rail Cars		
	Full	Empty	Total
San Ysidro, CA	182	1,631	1,813
Otay Mesa, CA	215,270	249,557	464,827
Tecate, CA	18,046	22,226	40,272
Calexico, CA	60,966	92,315	153,281
Andrade, CA	1,022	2,790	3,812
San Luis, AZ	7,221	6,644	13,865
Lukeville, AZ	237	1,113	1,350
Sasabe, AZ	172	589	761
Nogales, AZ	155,205	67,267	222,472
Naco, AZ	3,094	1,053	4,147
Douglas, AZ	11,630	14,709	26,339
Columbus, NM	1,890	1,013	2,903
Santa Teresa, NM	2,303	1,899	4,202
El Paso, TX	268,190	251,844	520,034
Fabens, TX	n/a	n/a	n/a
Presidio, TX	3,822	2,188	6,010
Del Rio, TX	24,666	7,538	32,204
Eagle Pass, TX	55,227	34,081	89,308
Laredo, TX	444,680	371,288	815,968
Roma, TX	4,217	6,860	11,077
Rio Grande City, TX	5,021	6,549	11,570
Hidalgo, TX	116,850	55,918	172,768
Progreso, TX	9,067	13,711	22,778
Brownsville, TX	109,137	125,955	235,092
	1,518,115	1,338,738	2,856,853

n/a - not available

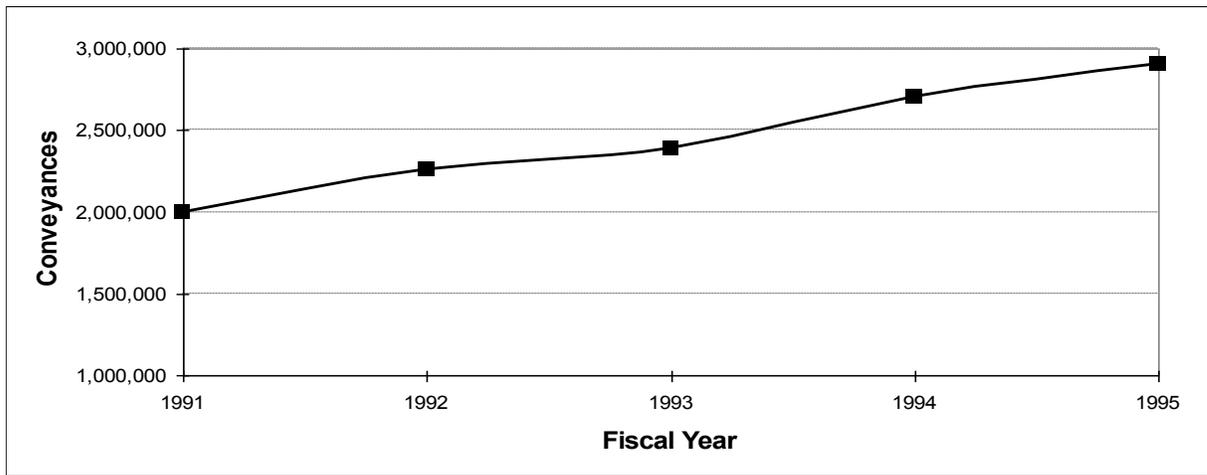
Source: U.S. Customs Service

Figure 8.27 Northbound Freight Conveyance Crossings by Border State, FY 1995



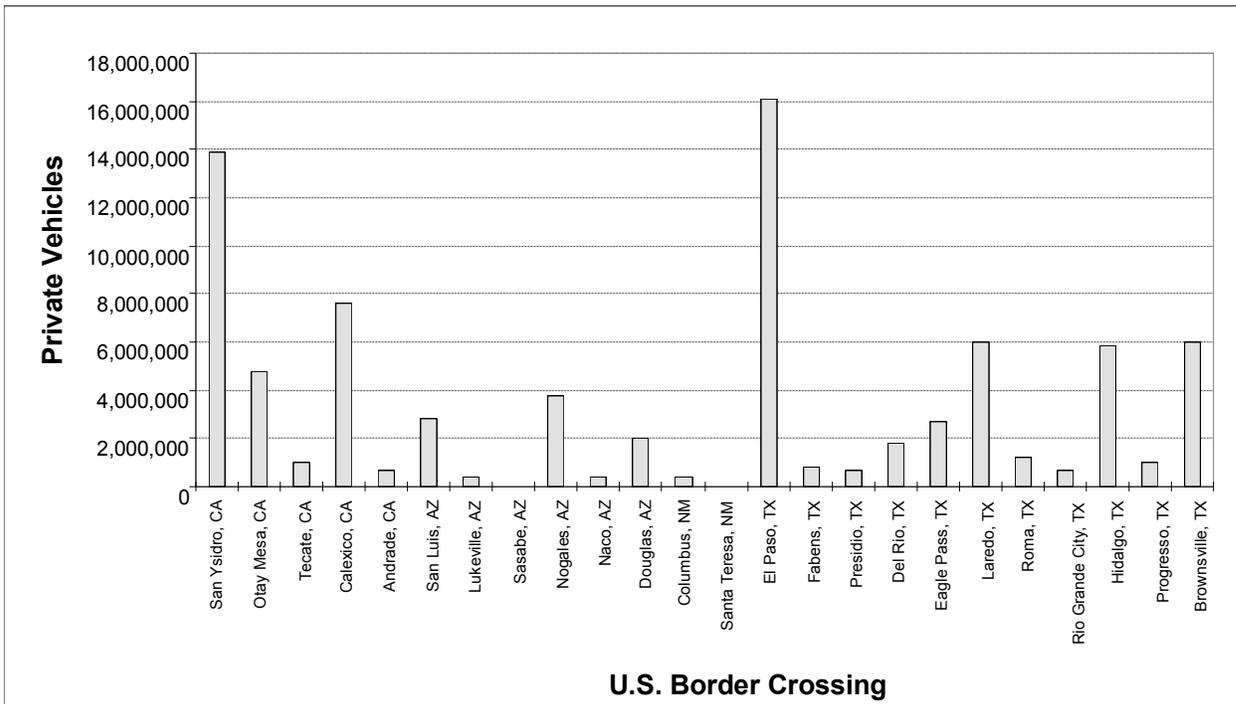
Source: U.S. Customs Service

Figure 8.28 Northbound Freight Conveyance Crossing Trends at Mexico-U.S. Border Ports, FY 1991-1995



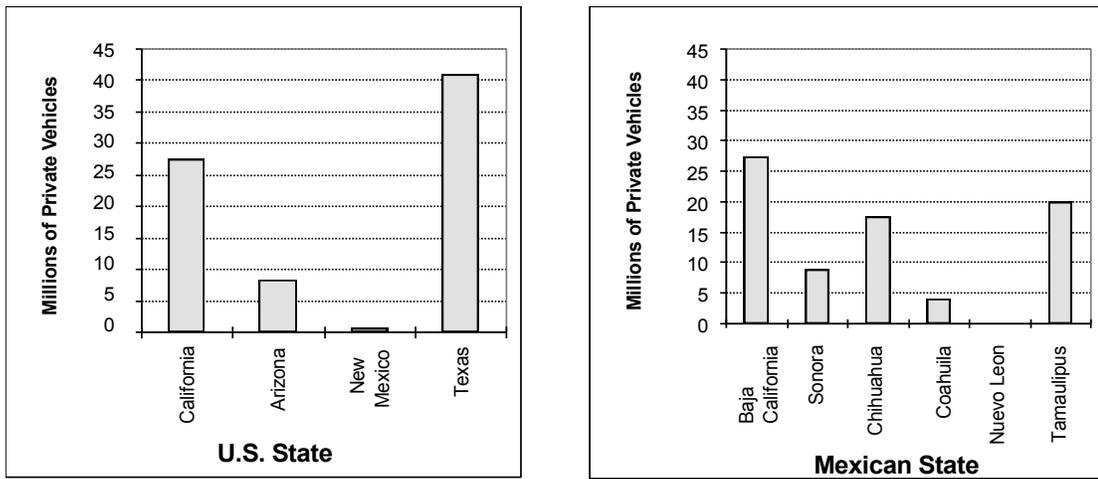
Source: U.S. Customs Service

Figure 8.29 Northbound Private Vehicles Crossing the Mexico-U.S. Border, FY 1995



Source: U.S. Customs Service

Figure 8.30 Mexico-U.S. Border Northbound Private Vehicle Crossings by Border State, 1995



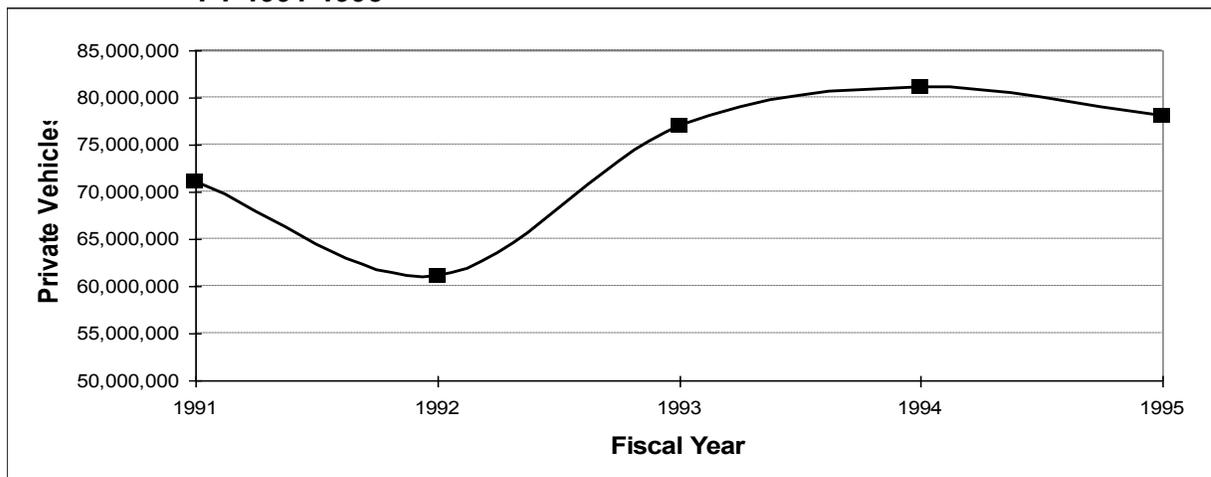
Source: U.S. Customs Service

As shown in Figure 8.31, private vehicle crossings increased by 9% during the time period between fiscal years 1991-1995. During fiscal year 1992, a 15% decrease was observed when compared to the previous year.

8.2.7 Mexico - U.S. Person Flows

There are a variety of information sources regarding the number of people crossing the Mexico-U.S. border. Each of these sources use their own methodologies to record the particular data which meets their individual needs.

Figure 8.31 Northbound Private Vehicle Crossing Trends at Mexico-U.S. Border Ports, FY 1991-1995



Source: U.S. Customs Service

The U.S. Customs Service records the number of northbound persons crossing the border by port of entry. These records are compiled by fiscal years. For ports within the San Diego District only, the available information is categorized by the number of people walking, crossing by bus, crossing by truck, and crossing by automobile. For other ports, the information is only available for people walking.

CAPUFE registers the number of northbound pedestrians that cross on toll bridges. The records are kept by calendar year and by crossing.

BANXICO performs a survey of international travelers, with the objective of estimating the expenses paid and revenues received by Mexico for each international traveler. Additionally, the number of international travelers to the interior of the country, as well as for the Mexican border zone, are obtained from this survey. The information provided by BANXICO is associated with the 10 largest Mexican cities located on the Mexico-U.S. border. This information is classified by trip purpose and by mode of travel (pedestrian or vehicle).

The Instituto Nacional de Migración (INM - National Migration Institute) maintains records of the number of people who enter or leave the country with documents, as does the U.S. Immigration and Naturalization Service (INS). This information does not include foreigners who enter or leave the country illegally, or the entry or exit of Mexican nationals who reside in the Mexico - U.S. border zone.

The following pages summarize the person crossing information obtained from these various sources.

Table 8.20 shows the number of persons crossing the U.S.-Mexico border reported by the U.S. Customs Service, BANXICO, and the INM for 1994. These numbers reflect pedestrians only in

the case of U.S. Customs data, all transportation modes in the case of BANXICO data, and only documented crossings in the case of INM data.

To compare the numbers more directly, Table 8.21 shows the numbers reported by BANXICO and the U.S. Customs Services for pedestrian crossings.

There are clearly great differences between these two sources of information, which may be due to the following:

1. The information reported by BANXICO regarding northbound movements includes only Mexican nationals who reside in the Mexican border area and does not include foreigners that cross northbound.
2. The data from BANXICO are estimates done by surveys, while the U.S. Customs Service data are obtained from direct counts.

Given these possibilities, it can be observed that BANXICO pedestrian data underestimates the number of crossings and that U.S. Customs Service counts are more reliable.

Table 8.20 Comparison of Persons Crossing the Mexico-U.S. Border (millions of persons)

Direction	U.S. Customs Service*	BANXICO**	Instituto Nacional de Migración
Northbound	45.2	109.1	0.2
Southbound	N/A	74.4	1.1

* Fiscal Year
 ** Calendar Year
 N/A Not Available

Table 8.21 Comparison of Pedestrian Crossings the Mexico-U.S. Border (millions of persons)

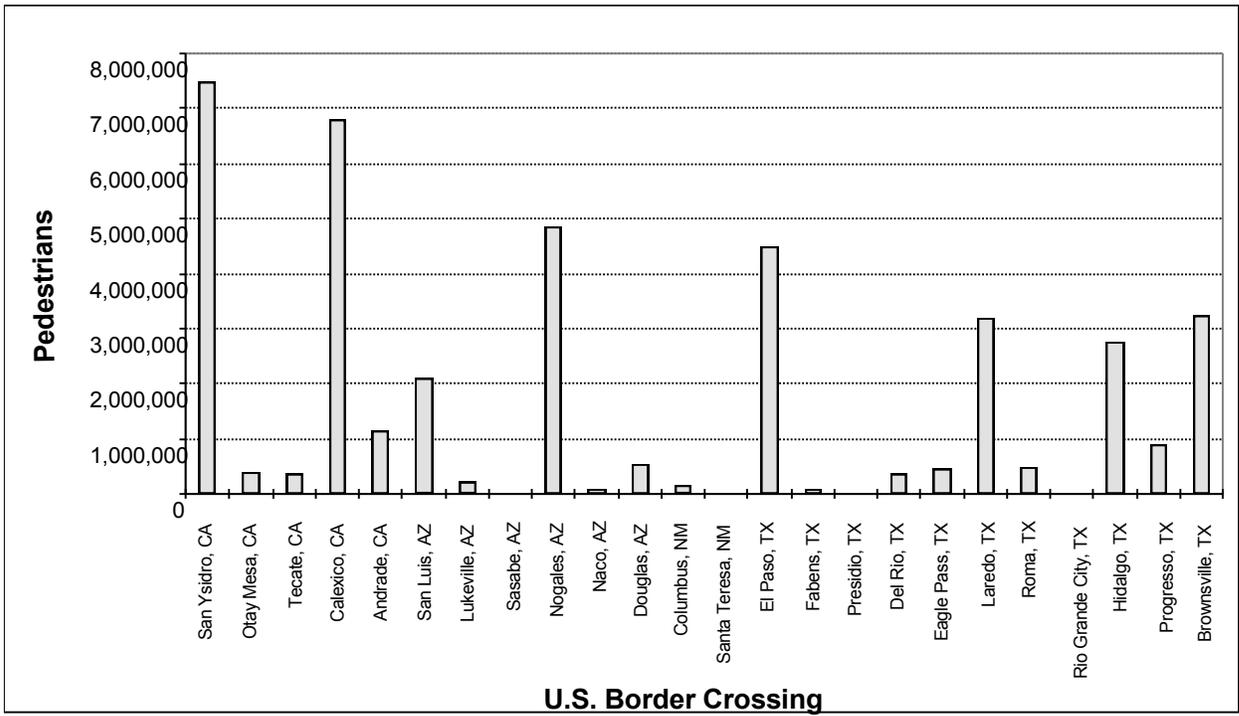
Year	U.S. Customs Service*	BANXICO **
1992	50.5	27.1
1993	44.4	26.4
1994	45.2	25.1

* Fiscal Year
 ** Calendar Year

The U.S. Customs Service recorded the highest number of northbound pedestrian crossings at San Ysidro, California. Here, 7.5 million persons crossed the border in 1995, 19% of total border crossings for that year. Following San Ysidro, in order of magnitude, are Calexico, California, 6.7 million (17% of the total), Nogales, Arizona, 4.9 million (12% of the total), and El Paso, Texas, 4.4 million (11% of the total). Figure 8.32 provides a graphical depiction of the crossing volumes.

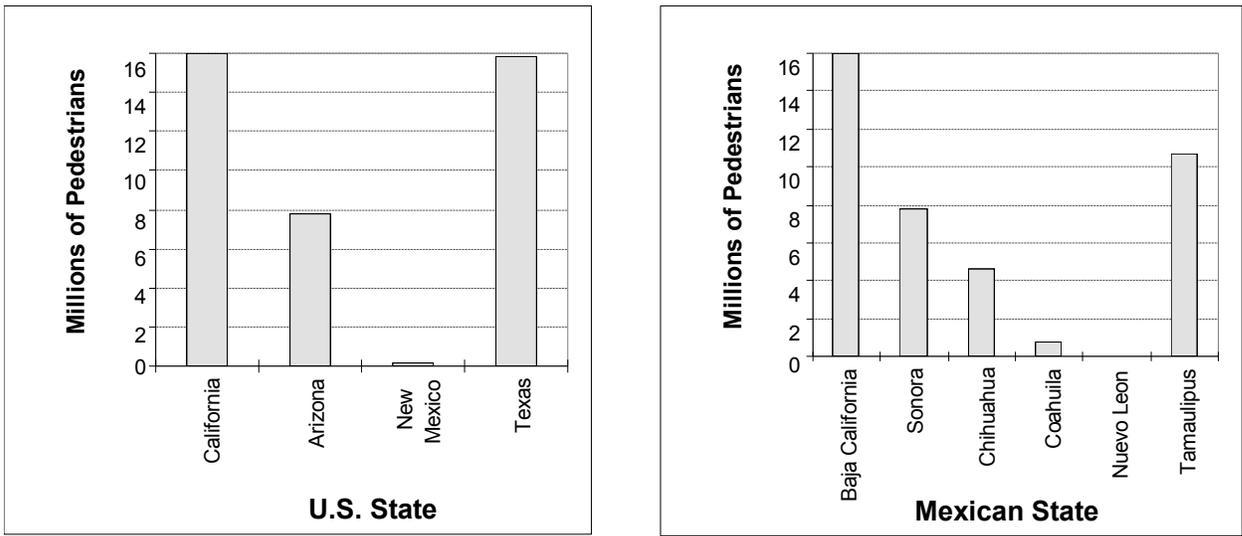
In 1995, the U.S. state experiencing the highest number of northbound pedestrian crossings was Texas with 41% of the borderwide total. This crossing volume was nearly matched by California which accounted for 40% of the total. The Mexican state with the highest number of northbound pedestrian crossings was Baja California, with 40% of the total.

Figure 8.32 Northbound U.S.-Mexico Border Pedestrians Crossing, FY 1995



Source: U.S. Customs Service

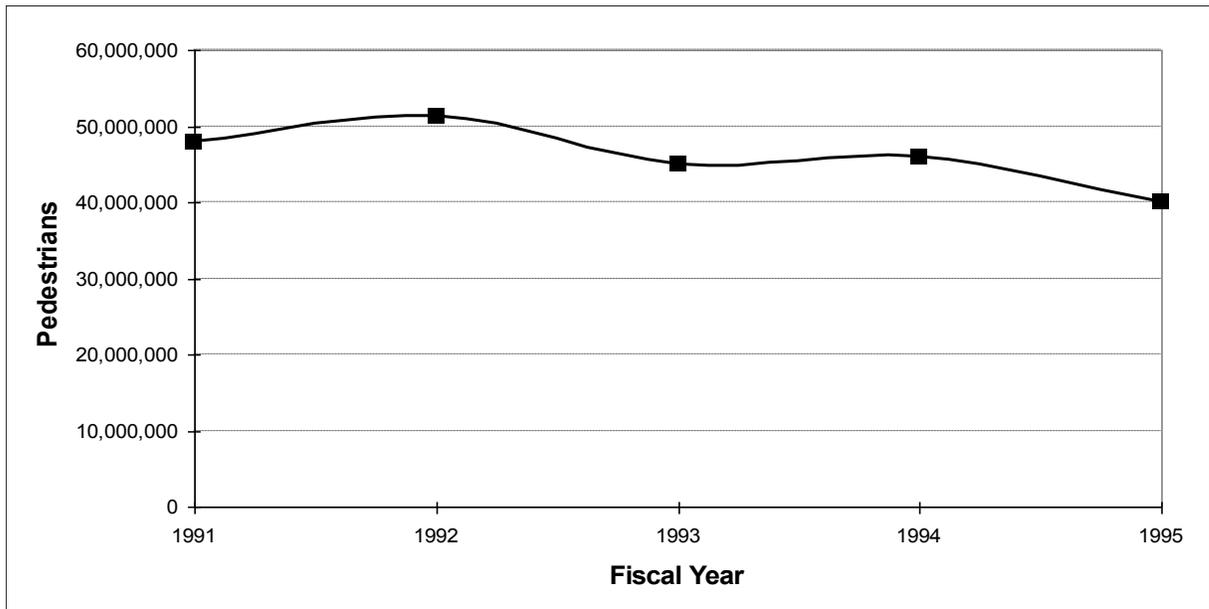
Figure 8.33 Mexico-U.S. Northbound Pedestrian Crossings by Border State, 1995



Source: U.S. Customs Service

The trend of pedestrian crossings at the Mexico-U.S. border is illustrated in Figure 8.34. An 18% decrease was experienced from fiscal years 1991 to 1995. The exception to this downward trend was the 1991-1992 period which experienced a 5% increase.

Figure 8.34 Pedestrian Crossing Trends at Mexico-U.S. Border Ports, 1991-1995



Source: U.S. Customs Service

For calendar year 1994, BANXICO reported a total of 109 million persons crossing the border in the northbound direction as noted in Table 8.20. Twenty-three percent of the crossings were estimated to be on foot, while 77% were by vehicle. The highest concentration of northbound crossings are located at Tijuana, Cd. Juarez, and Mexicali with 27%, 15%, and 13% of the total Mexico-U.S. border crossings, respectively. Ninety-four percent of these trips were attributed to excursionists (people with a stay shorter than 72 hours), while the remaining 6% corresponded to tourists (people with a stay longer than 72 hours). For the same year, the trip purposes of northbound persons (Mexican nationals) were shopping (42%), leisure (3%), visiting relatives (6%), and for other purposes (49%).

The total number of northbound crossings reported by the INM was 248,000 documented persons, of which 94% were tourists,⁴ 5% were non immigrants⁵ and 1% were immigrants.⁶

For southbound crossings during 1994, BANXICO reported a total of 74.4 million persons crossing the Mexico - U.S. border, 17% of which were pedestrians and 83% by vehicle. The highest number of southbound crossings were recorded at Tijuana and Cd. Juarez with 27% and 22%, respectively. Of these trips, 87% are associated with excursionists and 13% with tourists. For the same year, the trip purposes of southbound crossings were: shopping (28%), leisure (10%), visiting relatives (24%), and other purposes (38%).

The INM information shows that one million documented people crossed the Mexico-U.S. border southbound. Of these, 94% were tourists, 6% non-immigrants and less than 1% immigrants.

⁴ Includes foreign tourists, Mexican tourists residing in Mexico and Mexican tourists residing abroad.

⁵ Foreigner that enters Mexico temporarily as a trans-migrant, refugee, student, distinguished visitor, local visitor and provisional visitor with permit from the Secretaría de Gobernación (article 42 of the ley General de Población)

⁶ Foreigner that acquires rights for a permanent residency in the country.

8.3 Impact of Intermodal Terminals

8.3.1 Intermodal Infrastructure Development

The Task 2 reports provide an inventory of intermodal terminals, rail linkages, and supporting infrastructure. The discussion of intermodal infrastructure provided in this section provides context to an understanding of freight flows by mode. Figure 8.35 shows the intermodal facilities in the U.S. (border states) and Mexico.

United States

The intermodal network in the United States is very well developed and well utilized. It is heavily oriented towards east-west movement, and was originally built to distribute maritime cargo to and from the European and Far East markets. In addition, intermodal connections are abundant along the U.S.-Canadian border, particularly in the east. By contrast, intermodalism is in its infancy in U.S.-Mexico trade.

There are two major rail companies providing intermodal service to Mexico are Union Pacific (UP), which merged with Southern Pacific (SP) in 1996, and Burlington Northern Santa Fe (BNSF) which merged with the Atchison, Topeka, and Santa Fe in 1995. Each company offers connections to the Ferrocarriles Nacionales de Mexico (FNM, the Mexican state-owned rail company) and to numerous trucking companies through intermodal facilities. The service connections are rail-rail (for shipments to the interior of Mexico) and rail-truck (for shipments to the maquiladoras in the northern states).

The rail-truck connections are carried out at intermodal facilities typically located north of the border, owned and operated by the rail companies. These facilities are equipped with ramps to transfer trailers and/or cranes and lifts which have the capability to transfer containers (and in some cases both trailers and containers).

Mexico

The intermodal transportation infrastructure in Mexico is oriented to respond to north-south freight flow, to and from the United States. Here, the spatial pattern of intermodal facilities responds to the necessity of integrating Mexican and U.S. transport, particularly where the user is an American enterprise with operations in Mexico.

Several factors have aided the development of Mexican intermodal terminals. These include the deregulation of truck transportation (allowing more competition between service providers) and the establishment of operational agreements between Ferrocarriles Nacionales de Mexico (FNM) and some of the American railroad companies.

Currently in Mexico, there are intermodal public terminals for public service, private terminals for public service, and private terminals for private use. The public terminals are under the control of FNM and private terminals for public use were created with SCT permits according to Reglamento de Terminales Interiores de Enero 1995 (Interior Terminal Regulation, January 1995). These privately financed public terminals were developed by different investors, grouping potential users of the terminals in some cases, such as in Torreón. The private terminals for private use are

operated solely by the automotive plants operating in Mexico. Table 8.22 lists intermodal terminals by user and ownership type.

Table 8.22 Intermodal Terminals in Operation in Mexico (May, 1996)

Users	Ownership	
	Public	Private
Public	Pantaco Monterrey Chihuahua Saltillo	Torreón ¹ Celaya ¹ Querétaro
Private ²		Ramos Arizpe Saltillo (Derramadero) Hermosillo Puebla Aguascalientes

¹ Primarily agricultural uses
² Owned by automobile plants

The operative efficiency and development of the Mexican intermodal terminals has an apparent relation to the type of ownership and market of each terminal. The publicly owned terminals have developed more dynamically, especially Pantaco, because of FNM's control of railroad traffic, traction equipment availability, and the opportunity to establish agreements with the large operators (APL is a relevant case). The Monterrey terminal, on the other hand, has not experienced the projected growth in traffic, apparently because it does not have an interior customs office and/or users do not see a clear advantage in using this terminal instead of the one at Laredo, Texas. The border is relatively close in this instance and intermodal trains frequently experience customs inspection delays of several days.

Privately owned Mexican terminals which can be used by public entities have experienced serious problems in reaching their projected development potentials. The facilities at Torreón and Celaya were originally established to provide services to agricultural products firms. Projected demand at the Torreón facility has not yet been realized due to an unwillingness on the part of potential users to pay the established fees. At Celaya, an attempt has been made to support lagging demand for that facility by offering container transfer services to the General Motors plant in Silao. Other privately owned facilities, such as the one at Querétaro, have been totally dependent on the automotive industry as their sole user. This situation renders these facilities vulnerable to fluctuating demand and prevents the implementation of long term investment programs. In general, these facilities have been unable to grow due to a lack of logistic control. They are subject to the control of the owner/operator who can close the facility or move it to another location. While FNM does not have primary logistic control of these facilities, as is the case at Pantaco, its fundamental importance stems from its role as a provider of the transport equipment necessary in facilitating successful operations.

Private Mexican terminals that are owned by the automotive companies operate successfully because they are designed to accommodate the level of operations that the companies generate. Until recently, automotive assemblers have located intermodal facilities within their plant complexes, particularly when they are located on the freight flow route. The location of automotive plants removed from the north-south corridor, like Cuernavaca and Toluca, have allowed

terminals such as Pantaco to be successfully developed. This could also become the case of Silao with the Celaya plant.

Figure 8-35 U.S.-Mexico Intermodal Facilities



8.3.2 Freight Flows Through Intermodal Terminals

Intermodal facilities represent a potential trade flow data source because of the traffic they handle. By analyzing the volume of activity at a facility, the origin and destination of the trailers and containers moving through the facility, and the type of goods moving through the facility, it should be possible to ascertain what portion and type of traffic originates and/or terminates in the surrounding trade area. Unfortunately, the billing records do not reflect the origin or destination of the goods for containers arriving or departing by truck. In addition, it is difficult to characterize the goods moving through the facilities because consolidators tend to identify the goods being shipped as "FAK" or "freight all kinds."

The volume of traffic moving through intermodal facilities can also be measured by the type of activity: train, truck and lift. Train activity includes the number of trains that stop at the intermodal facility to drop off or pick up trailers or containers. Truck activity can be measured by the average number of trucks arriving or departing from the facility. This includes both empty and full trailers. Lift activity refers to the number of trailers and/or containers that have been lifted from or loaded onto a train car. This number may include lifts that were made to transfer containers for inspection by customs. Since customs inspections typically involve a small percentage of containers, lift activity is a good measurement of the total number of trailers handled by a facility.

Significant freight flows in Mexico have occurred mainly at terminals like Pantaco. The influence of demand from automotive companies resulted in the placement of terminals in the Valle de México (Mexico DF area), and others like Hermosillo and Saltillo which experience stable freight flows associated with the operation of companies owning the terminal. While the Pantaco and Ramos Arizpe terminals handle between 3,000 and 5,000 operations per month (about 1,500 to 2,500 containers per month), Monterrey and Chihuahua conduct only 250 operations monthly (125 containers). However, even in Pantaco, the movement through the intermodal terminals does not represent a major flow, in terms of volume, considering that 2,000 trucks cross the border every day at Nuevo Laredo. (It is recognized that a portion of these trucks originate from or are destined to UP's intermodal terminal at Laredo.)

In Mexico, the automotive industry is the primary user of intermodal terminals as mentioned previously. This industry contracts for unit, double-stack trains from Laredo/Nuevo Laredo to Mexico City, El Paso/Cd. Juarez to Mexico City, and Eagle Pass/Piedras Negras to Mexico City for transport of auto parts and finished assemblies.

Other industries have not yet realized the competitive advantages of containerized, intermodal freight, partly due to border customs inspection delays (discussed in Section 8.3.3) and partly due to the absence of freight forwarders and suppliers of total logistics services within Mexico.

The services provided by the freight forwarder or cargo agent range from load consolidation for transportation by others (such as LTL - less than truckload transport), to total multimodal transport of goods from origin to destination - including border clearance. Particularly in the case of the latter role, the cargo agent serves as the organizer of the logistics chain, arranging for uninterrupted transport of goods through maritime ports, airports, transfer terminals, border crossings and so forth; using the most efficient and cost-effective means of transportation available. By virtue of their specialized knowledge and volume of business, freight forwarders are typically able to package better door-to-door rates than can an individual shipper, unless that shipper is very large.

The development of the freight forwarding industry in Mexico is just beginning, but it is being propelled by joint ventures and alliances with U.S. logistics and transport providers. It is expected

that a more fully developed freight forwarding capability will lead to increased use of intermodal transport, particularly if border customs clearance issues can be resolved.

8.3.3 Effects of Intermodal Terminal Operation on Border Freight Flow

As of 1996, intermodal terminal operations have not had a significant effect on border crossings because of the relatively low percentage of total movements occurring in Mexico. This lack of development is partially due to the absence of any significant change in customs inspections and other routines occurring at the border or at the inland location of the terminals.

At Nuevo Laredo, which represents the border crossing with the highest freight container traffic, the truck proportion compared to rail cars is 15 to 1. This situation demonstrates that freight moved through intermodal systems does not currently have the infrastructure or institutional arrangements necessary to materially reduce border crossing traffic by truck.

Pantaco is the exception to this general observation. Here, 90% of all freight with its origin or destination at Pantaco consists of automotive parts. Customs inspections for this freight are conducted at Pantaco and therefore the direct effect of border port operations is marginal. Customs handles only one owner and one type of (high priority) freight, resulting in rapid and efficient inspections.

One measure of assessing the potential for improvement in intermodal operations is to consider the input of the service providers themselves. Barton-Aschman conducted interviews with the major intermodal providers as part of a borderwide study in 1993. The following themes emerged through our discussions with these intermodal providers.

- A lack of standardization in truck weight, registration and marking requirements presents obstacles to truck-rail intermodal movements at the borders. There is no method of control or tracking of trailers moving in and out of the intermodal facilities. Thus, a trailer may be picked up at an intermodal facility lying along the border, taken into Mexico, overloaded and used for unauthorized shipments and finally returned to the intermodal facility. The ramifications of these movements is seen in damaged trailers and deteriorating streets in the cities located along the border. It has been suggested that scales be located at the bridges in order to prevent overloaded trucks from entering either country.
- Another barrier to "seamless" flow between the United States and Mexico is the customs clearance process on both sides of the border. In cases where pre-clearance is completed by the U.S. carrier, container shipments on rail can pass unimpeded through the border crossing to Mexico City. The shipment is inspected at the Pantaco terminal by Mexican customs if required, rather than stopping the train at the border. This service is only available on a limited basis for single customer trains, but carriers have high hopes that it can be quickly extended to Trailer on Flat Car (TOFC) traffic. TOFC traffic presently takes far longer to clear Customs than do containers. The U.S. Customs Service has a similar line clearance program, but because of deficiencies in the information infrastructure, frequently the documents are not completed far enough in advance to preclude delays at the border, especially for intermodal operators who do not offer door-to-door service. In cases where customs must inspect trailers or containers before entering into Mexico, the trailers must be de-ramped for customs officials. This process can add up to a week to the transit time of the goods depending upon the number of interchanges per week at the particular border point.
- The major constraint to fluid operations in many cases is the lack of space at the intermodal facilities themselves. Those facilities located in downtown areas have no room to expand. Not only is there insufficient space to store trailers and containers, but the access to these facilities is also limited. In many cities such as El Paso, trucks are not allowed to travel through the

downtown area. It is for this reason that UP chose to move from downtown Laredo to I-35 just outside the city. However, the most difficult part of this move was the process of securing the land upon which to build the facility.

- The information systems required to service intermodal movements are fairly advanced in the U.S. and are improving in Mexico. Such systems consolidate billing, customs declarations and other documents, and provide tracking capabilities. The U.S. rail companies offer single bills of lading and Customs pre-clearance, but the lack of information systems has hindered this development, and substantial cost has been incurred to overcome this obstacle. Most of the rail managers felt that the ability to track and report shipment status was an important factor in mode choice among shippers.

Despite these obstacles, the future for intermodal transportation between the U.S. and Mexico appears bright. Intermodal traffic has been increasing over the past few years on all carriers, a trend which is expected to continue in the short term. Intermodal rail service competes with marine shipping, particularly ocean barges. While modernization of the ports in Mexico is underway, they are not likely to be complete for several more years. In the meantime, intermodal land transportation is expected to dominate in most markets. The increasing efficiency of intermodal transportation makes it an ideal solution to congestion at the border crossings. This will be especially true if customs clearance at the destination can be more fully institutionalized, or border clearance impediments can be reduced. This will allow a large number of containers which otherwise would have been part of the border congestion to bypass it completely.

An efficient system consisting of logistic chains between Mexico and the U.S. at border crossings will have the following effects:

- Avoiding transfers from rail to truck at the border, like the ones currently taking place in Laredo.
- Allowing free passage of unit trains, which would be inspected at internal customs facilities to the intermodal terminals, thereby avoiding inspection at the ports of entry, and
- Reducing truck crossings at the ports of entry.

8.4 IMPACT OF LEGAL AND REGULATORY CHANGES ON TRANSPORTATION AND COMMODITY FLOWS IN MEXICO

An analysis of regulatory and legal changes was conducted for the period 1988-1995 in order to determine their effects on the Mexican transportation system and commodity flows across the northern border. Because most major changes regarding transportation deregulation took place well before this period in the U.S., their effects have already been established and are reflected by current conditions. Significant changes in Mexican laws and regulations, on the other hand, are recent and include the following:

- New Customs Law (Nueva Ley Aduanera)
- Regulatory Law of the Railroad Service (Ley reglamentaria del Servicio Ferroviario)
- Roads, bridges, and federal truck transportation law and federal truck transportation and auxiliary services regulation. (Ley de caminos, puentes y autotransporte federal y Reglamento de autotransporte federal y servicios auxiliares)
- Regulation of weight, dimension, and capacity of auto transportation (truck) vehicles that circulate in federal roads and bridges. (Reglamento sobre el peso, dimensiones y capacidad de los vehículos de autotransporte que transiten en los caminos y puentes de jurisdicción federal)
- North American Free Trade Agreement (Tratado de Libre Comercio de América del Norte)
- Ports Law and Regulation of the Ports Law (Ley de Puertos y Reglamento de la Ley de Puertos)

The relevant changes, as well as their possible effect on the transportation system and commercial goods flow are presented in the following discussion.

8.4.1 New Customs Law

The new Customs Law was published in December 1995 and became effective on April 1, 1996.

Before this law was enacted, only the maquiladora industry could import goods by presenting an invoice and, upon exportation, produce a set of paperwork that consolidated the documentation associated with the transaction. Secondary customs inspection were required only in cases when irregularities are found. The new law simplifies these import and export procedures for all users, thereby reducing the administrative costs and improving the efficiency of exports in general.

For dangerous, hazardous, radioactive materials and products without technical documentation, the importer is still required to provide samples of the product before shipment. However, the new law recognizes the practical limitations to the taking samples for all such goods. Therefore, registered importers are exempt from this regulation. Currently there are no specific regulations that define the requirements for registration, however, the obligation of registering with the Padron de Importadores (Importers Registry) has been elevated to a legal requirement. Thus, while this

new law is intended to make border crossing procedures more expeditious, the lack of explicit guidelines on registration has, in effect, hindered the process.

The option of payment through a Customs Account makes it possible for a refund of taxes to be paid when goods return to the country of origin within the maximum time period allowed. Under this option, it is not required that importers also become exporters, and they are no longer required to present the previously required notice or the bi-annual operation report. These changes simplify both the identification of true imports and temporary import procedures.

Once the random selection mechanism is activated at the border (i.e. the shipment receives the red light), changes to the description, quantity, or nature of the goods is allowed, even when the result is free clearance of customs. This measure will also reduce congestion at the border crossings.

The Custom Brokers (Agentes Aduanales) are now free to dispatch products that are different from the ones in which they are licensed. This modification is intended to foster free competition between customs brokers, as well as a higher quality of service.

A legal title of "Customs power of attorney" (Apoderado Aduanal) has been created. Persons holding such title can provide services to both their own employer and to third parties. Similar to the customs broker, the customs power of attorney can handle different products from the ones in which they are licensed. Initially, persons in this newly created position will have a certain lack of experience, especially when the Apoderado has not had previous experience as a customs broker.

8.4.2 Regulatory Law of the Railroad Service

The transformation of the Mexican rail system started with the reform of Article 28 of the Mexican Constitution and continued with the approval of the Regulatory Law of the Rail Service on May 12, 1996 which came into effect on May 13, 1996.

This recent law allows for private participation in the public railroad service via concessions of up to fifty years, with the possibility of a renewal for an equal period of time. Services auxiliary to railroad operations, including the construction and operation of rail bridges, are subject to permit regulations. Under the new law, the federal railroad public service concessionaires will provide their own personnel training and their employees will be required to obtain a license issued by the SCT. It is anticipated that the new regulation measures will bring about higher efficiency and safety in the provision of these services.

8.4.3 Roads, Bridges, and Federal Truck Transportation Law and Federal Truck Transportation and Auxiliary Services Regulation

This law regulates the construction, operation, usage, conservation, and maintenance of roads and bridges constituting general transportation routes. In addition, truck operations on these routes, and their auxiliary services are regulated. The law was enacted on December 22, 1993, and became effective the following day. This law served to modify the General Communication Ways Law.

The private sector can now participate in the construction, operation, usage, conservation, and maintenance of federal roads and bridges through a concession of up to 30 years, with an extension of another 30 years being possible. The measure, with the proper regulation, will allow private equities to respond to the expansion and modernization needs of the roadway infrastructure. However, the regulation is not entirely detailed, especially regarding financing, project development phases (possibility of building in different phases to increase the project

return on investment and decrease tolls), and risk distribution (especially between investors, financing agencies, and the government).

For truck freight transportation over federal routes, rates will be negotiated freely between the trucking companies and clients, thereby eliminating the establishment of fixed rates that previously required SCT approval. This measure could favor the development of intermodal transportation by offering more competitive negotiations between trucking companies and shippers.

The former condition in which trucking firms were required to provide customer service along all routes specified in their agreements with SCT is eliminated. Thus, non-profitable routes no longer must be served. This new condition provides greater flexibility to the trucking company, resulting in lower operational costs and the provision of more competitive services.

8.4.4 Regulation of Weight, Dimensions, and Capacity of Auto Transportation (Trucks) Vehicles that Circulate on Federal Roads and Bridges

Maximum vehicle weights and dimensions are now limited in relation to the road on which they travel. This is specified in Mexican regulation NOM-EM-012-SCT-2-1994, published on November 29, 1994. This measure requires truckers to either control their vehicle weight or face a considerable reduction in the number of federal roadway network routes on which they can legally travel. Because it is common practice to overload trucks to compensate for rate reductions resulting from de-regulation, the economic implications to the transportation sector of this measure are considerable. Nevertheless, this measure does respond to the need for infrastructure conservation and it allows for a cost distribution mechanism through the payment of tolls on highways designed for heavy loads. It also implements a series of regulations arising from NAFTA. When enforced, these measures will likely foster increased intermodal transportation.

8.4.5 Agreement by Which the Modality of Federal Auto-transportation (Trucking) Service at the Border Crossings and in the 20 Kilometer Zone Parallel to the International Line of the Northern States of Mexico is Established.

The modality of trailer and semi-trailer movements with international freight is established through this agreement. It requires a one-year SCT permit which is subsequently renewable. The effect of this measure is to decrease congestion at ports of entry by allowing transfer (drayage) movements to take place for a distance of up to 20 kilometers from the border zone.

8.4.6 NAFTA Overview

While a thorough understanding of the transportation-related implications resulting from NAFTA is evolving, the following aspects of NAFTA are expected to impact broader transportation systems. A more detailed discussion of future and ensuing trends resulting from NAFTA and world economies is presented in the Task 11 report. Also a complete analysis of industry by industry opportunities for trade growth is presented in a publication prepared by the U.S. Department of Commerce entitled "North American Free Trade Agreement Opportunities for U.S. Industries," dated October, 1993.

A time table for removing barriers regarding land transportation services between Mexico and the U.S. has been established, as well as for implementing compatible technical and safety regulations. Once implemented, a gradual increase in competition among providers of transborder services is expected that will provide more equal opportunity in the North American land transportation market. NAFTA provides a transition period to phase in these provisions that allows

member country industries to become more competitive, and not left at a disadvantage during the initial years of the free trade agreement.

According to the agreement, both countries will issue licenses for buses and trucks and allow commercial operators to offer services in the transborder market. The geographic limits of operation are to be phased in over time. Implementation of this provision is behind schedule.

According to the treaty and safeguards established by the Mexican Constitution, American railroads will be able to freely market their services in Mexico. They will also be free to operate unit trains with their own locomotives, to build and own terminals, and to finance rail infrastructure. Mexico will likewise have complete access to the American rail system. These measures, complemented by the *Ley Reglamentaria del Servicio Ferroviario* (Rail Service Regulation Law), should facilitate the establishment of highly efficient north-south rail corridors.

In general terms, NAFTA will directly impact the border transportation system at the ports of entry. On one hand, an increase in commodity flow between both countries is expected and has been realized according to the trade statistics presented earlier in this report. In 1995, this increased flow was largely northbound and consisted of consumable goods due to the peso devaluation. Over time, a more important flow should materialize that involves industries which take advantage of the unique benefits of both countries' production processes, thus creating a bi-directional flow of raw materials, intermediate, and final goods.

On the other hand, and even though a reduction in tariffs facilitates more expeditious customs process at the ports of entry, NAFTA does not eliminate health, illegal migration, transport of illicit drugs, or national security concerns. This makes the reality of a truly barrier-free border very unlikely.

Once the Mexican economy fully recovers from the monetary crisis of 1995, a general increase in economic activity is foreseen as the first effect of NAFTA, especially in the transportation sector. Transportation demand is very sensitive to general increases in economic activity. In order to meet the projected future demand for transportation by all industrial sectors, it is expected that the transportation sector will need to significantly increase its productivity.

Another effect of NAFTA involves the gradual change in the type of goods flowing to and from Mexico, the U.S., and Canada. Tariff reductions are being implemented gradually that will provide free market access to thousands of product types. These tariff charges will undoubtedly change export and import relationships (direction of volumes and product flow).

The effects of NAFTA will be most fully reflected in the regions of the member countries that are currently linked by commercial flows. These regions are obviously the border zone and the major metropolitan areas having a focus of international trade. In Mexico, these include: Mexico City, Guadalajara and Monterrey, the industrial activity centers located in the north of Mexico (especially those integrated with the California and Texas economies), as well as the industrial corridors of Ciudad Juarez - Chihuahua - Delicias - Torreón, Nogales - Hermosillo - Guaymas - Ciudad Obregon - Los Mochis - Culiacan - Mazatlan, and the north of Tamaulipas. In the U.S., metropolitan areas that are strongly linked to binational trade include Detroit, Los Angeles, Houston, Dallas, Phoenix, San Diego, Laredo, El Paso, Brownsville, St. Louis, and Indianapolis.

These trade corridors and linkages will require the construction and improvement of transportation-related infrastructure over time. Financing of this construction may be facilitated by higher levels of foreign investment which are expected to result from NAFTA.

In summary, while many aspects of NAFTA are proceeding on schedule and are achieving their intended objectives, other aspects are proceeding more slowly, delayed by details regarding their implementation. Experience thus far indicates that a continuous working relationship will be

required to resolve conflicts of interest, many of which pertain to the trading partner's internal industries.

8.5 MEXICO TRADE OUTLOOK

8.5.1 Mexican Foreign Trade Behavior

Based on an analysis of foreign trade by economic sectors, it is generally believed that a very uneven economic performance was experienced due to the sudden variation in the exchange rate witnessed between 1994 and 1995.

The only economic activities that achieved significant trade increases, even with the overvaluation of the Mexican Peso that prevailed until 1994, were crude oil and natural gas, electric and electronic equipment, and appliances.

The considerable increases in total trade, resulting in part from the 1995 devaluation, could have been caused in part by improved cost competitiveness resulting from reduced labor costs, and the contraction of internal markets caused by governmentally adopted recession measures.

It is important to note that, at least during the short time period analyzed, the trade balance of various economic activities was not modified significantly, even with the change of the exchange rate.

8.5.2 Effects of the North American Trade Agreement

It appears that initially, implementation of NAFTA increased the Mexican trade deficit as consumers increased consumption of lower cost goods. Future trends have been masked by the changes in the exchange rate and the economic adjustments of 1995.

8.5.3 Trade Balance and Exchange Rate

The behavior of foreign trade, measured by trade balance, is dramatically affected by the exchange rate. This effect can be seen in Figure 8.36 which shows trade balance and real exchange rate for Mexico from 1970 to 1995. This effect is so significant, and the exchange rate fluctuations have been so drastic, that they cloud the possible effects of specialization by the nation's industries.

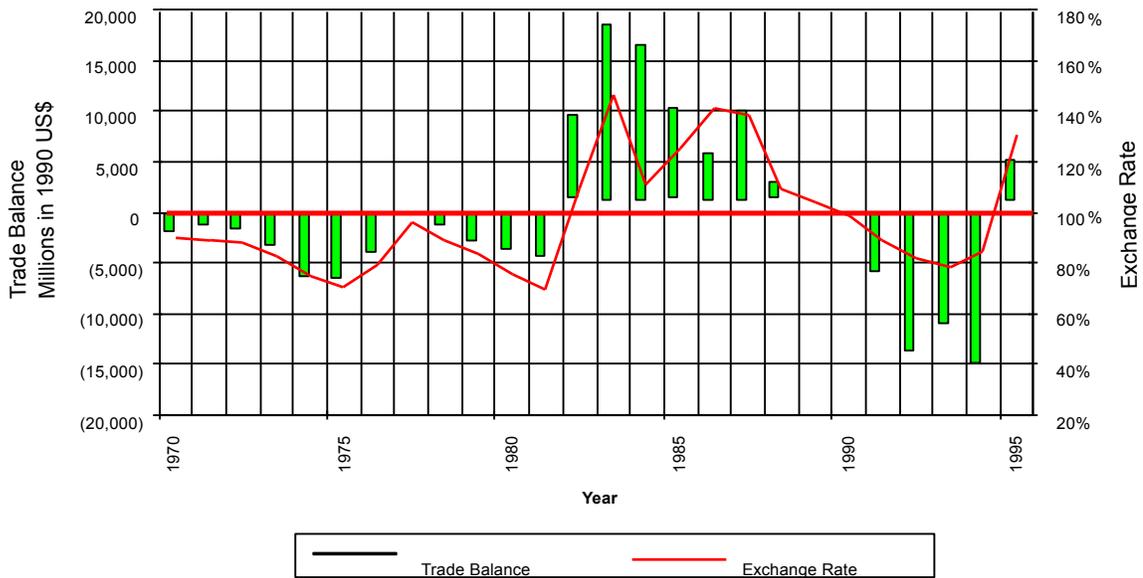
8.5.4 Mexican Maquiladora Industry

The growth of the maquiladora industry has been specifically analyzed to determine if there are elements that define competitive advantage for the manufacturing firms forming this industry.

The rate of recent maquiladora industry growth at the border is nearly the same as for the rest of the Mexican manufacturing industry. The overall growth is substantial and this industry is an important factor in generating employment and exports. Their contributions to the national trade balance are limited however to the value added by these industries, rather than total trade values which tend to double count inputs as outputs.

Tables 8.37 and 8.38 show the relation between the number of maquiladora plants and maquiladora employment growth versus the relative change in the exchange rate. Similar to total foreign trade, maquiladora growth and employment activity follows the change in the exchange rate.

Figure 8.36 Mexican Trade Balance versus Real Exchange Rate



The most important maquiladora industries are those engaged in electric and electronic equipment, transportation equipment, and textile and garment industries. However the industries with the highest growth rates are petrochemical products, wood and metal furniture, and textiles and garments.

Figure 8.37 Maquiladora Plant Growth and Relative Exchange Rate

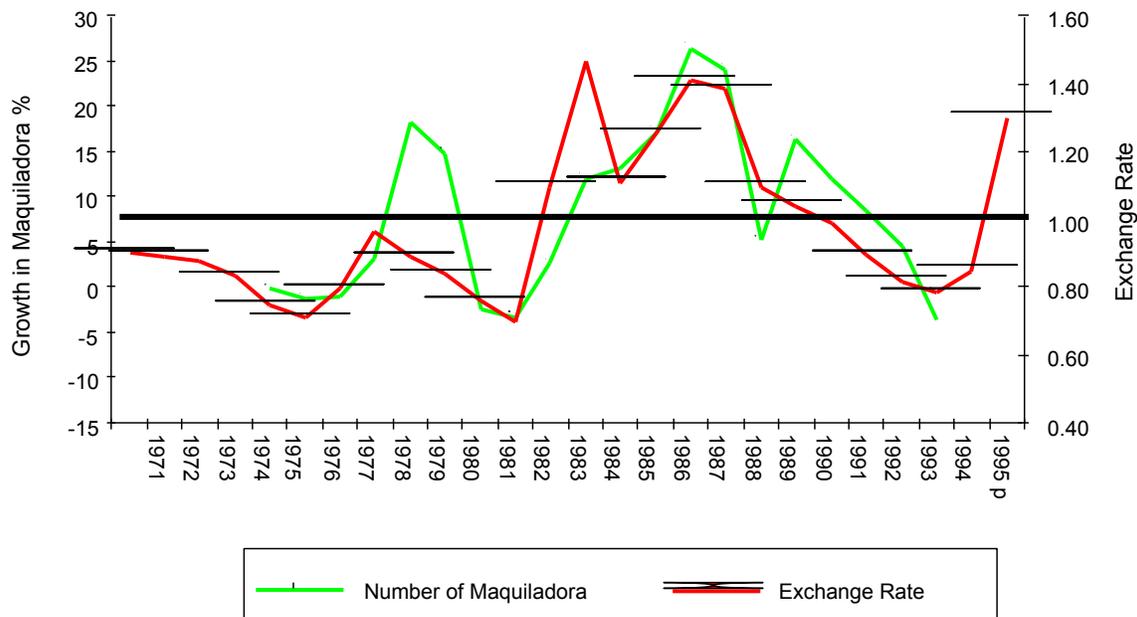
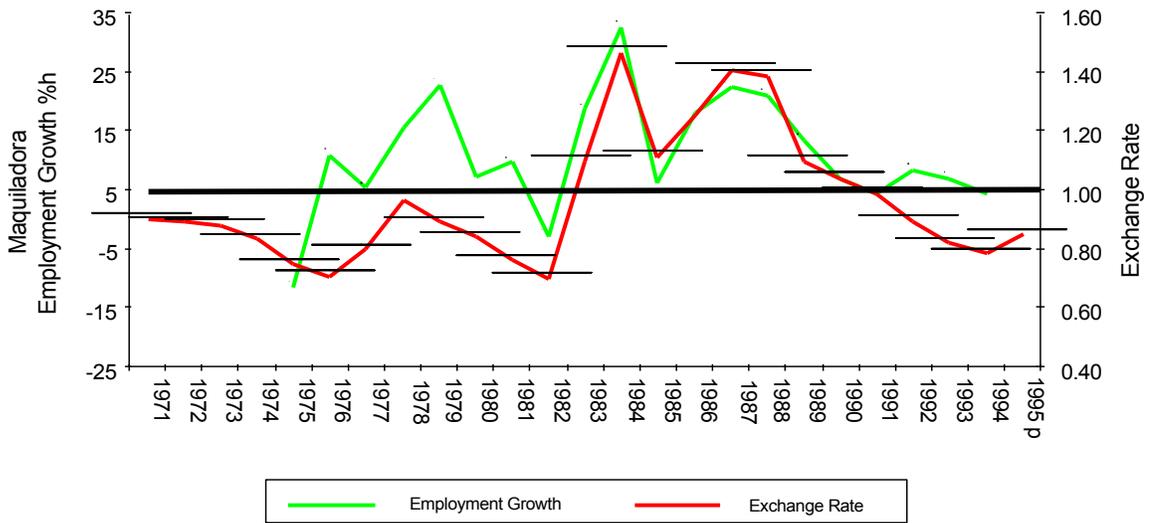


Figure 8.38 Maquiladora Employment Growth and Relative Exchange Rate



Growth in the maquiladora industry has occurred in non-border municipalities as well as the border cities, possibly due to the saturation of urban growth in the border municipalities and population migration. The availability of a suitable workforce to accommodate the needs of the expanding maquiladora industries are now an issue of concern and question regarding the distribution of future growth along the border versus interior cities.

8.6 U.S. TRADE OUTLOOK⁷

The United States expects continued strength in its domestic market, foreign economic growth and improved access to foreign markets over the next five years. Growth will be particularly strong in east Asia markets and “Big Emerging Markets” (BEM’s) through the end of the century. These favorable conditions should allow U.S. exports to grow in the range of 8.5 to 10.0 percent annually in current dollars. Imports are expected to grow by 7.0 to 8.5 percent annually, in line with historic trends experienced since 1990.

8.6.1 Analysis of U.S. Market Sectors

Medical Equipment

This sector is one of the most competitive sectors of the U.S. economy with export growth averaging 14 percent a year over the past five years. Exports totaled \$9 billion in 1994, and are expected to reach \$18 billion by the year 2000.

While industrial economies have traditionally been the best markets, rising income levels in developing countries should shift the majority of future growth to expanding markets. U.S. exports to the BEM’s should grow by 20 percent annually for the next half decade compared to 12 percent for Western Europe.

Motor Vehicles

Except for Canada, U.S. exportation of motor vehicles is mostly concentrated in developing countries, where most future growth should occur. U.S. exports of motor vehicles have increased by 11 percent annually (16 percent excluding Canada) since 1989, but the sector still suffered a trade deficit of \$51 billion in 1994. A little more than half of the motor vehicle exports go to NAFTA partners. Motor vehicle sales have grown by just 1.2 percent annually since 1985 because the developed countries, for the most part, are saturated with automobiles. In real terms, the growth of exports to these markets should be about 4.5 percent annually, but 6.5 percent to the BEM’s. New market growth in developed countries and globalized production is expected to increase production by U.S. firms in developed markets.

Automotive Parts

As the needs of automakers have changed, the automotive parts industry has been forced to become more global in outlook and competitive in nature. Exports in this industry have increased 16 percent annually since 1989.

This industry also suffers from a significant, though improving, trade deficit (\$15 billion in 1989, \$7.7 billion in 1994). Japan is the largest import competitor, supplying over one-third of all U.S. auto parts imports. The trade deficit with Japan has continued despite the strengthening of the yen.

U.S. auto part exports have become crucial to the industry during its recent restructuring efforts. World-wide market growth is slowing (2.5 percent annually for the period 1995-2000) because of slow growth in the industrialized countries. However, better opportunities for market growth in

⁷ U.S. Global Trade Outlook 1995-2000: Toward the 21st Century, U.S. Department of Commerce, Office of Trade and Economic Analysis: Washington, D.C. March 1995.

developing countries are expected (5 percent annually) with a slightly larger 6 percent annual growth expected in the BEM's.

Paper Products

U.S. paper producers remain very competitive in the world-wide market because of relatively low raw material and energy costs and modern facilities. Largely because of significant domestic recycling efforts, the U.S. is the world's leader in the exportation of recovered paper. Overall, exports are expected to increase at a 5 percent annual rate to the year 2000. The best opportunities for market growth are in China, other East Asian countries, and Brazil.

Computer Equipment

The computer equipment industry in the U.S. controls more than 75 percent of the world market through global operations, but the industry has suffered from a trade deficit since 1992 and this deficit is growing. Import growth (16 percent annually) has been significantly greater than export growth (7 percent) during the 1989-1994 period. Foreign sales are the key for the industry and exports are rebounding. They are anticipated to grow at a 7 percent annual rate to the year 2000.

Computer Software

Of the \$77 billion world-wide market for computer software products, 75 percent is supplied by U.S. companies. The industry is quickly developing multimedia products combining video, animation, voice, music, graphics, and, text. These products are expected to be further developed globally due to new international industry alliances. The world market growth for computer software is expected to be rapid and large. A total market of \$153 billion is expected by 2000 - the result of a 12 percent annual growth rate. Asia and Latin America will be the fastest growing markets.

Information Services

The U.S. is the world leader in the provision, use, and export of information services. U.S. firms use the most advanced software, provide innovative solutions to problems, and provide expertise in developing new services to control 46 percent of the world market.

During the past five years, exports of information services by U.S. firms has grown by 22 percent annually, far outpacing imports. Government policies will be crucial to maintain this growth as the information industry is particularly sensitive to policies regarding market access, intellectual property rights, privacy protection, data security, and telecommunications services.

Exports are expected to grow at an annual rate of 13 percent to the year 2000. Industrialized countries compose the largest markets, especially Japan, China, and the United Kingdom. Developing countries where markets are expected to grow are the Chinese Economic Area, Korea, and Mexico - after its financial markets stabilize and the economy benefits from the peso devaluation.

8.6.2 Analysis of U.S. Trade Trends with Mexico

Mexico is among the fastest-growing export market for U.S. companies. Mexico became the third-largest market for U.S. exports in 1985, trailing only Canada and Japan. Mexico moved ahead of Japan as the second-largest importer of U.S. manufactured goods in 1992. Nearly 10 percent of all U.S. exports are now sent to Mexico.

As previously illustrated, bilateral trade flows reached a record \$101 billion in 1994 and were higher still in 1995. Bilateral trade in the first year following the implementation of NAFTA were

fairly balanced. In 1994, the U.S. enjoyed a slight trade surplus of \$1.3 billion, nearly identical to 1993 figures. However, there has been a significant increase in trade opportunities, as both import and export growth exceeded 20 percent. Of the total trade occurring between the U.S. and Mexico, about 20 percent was “newly created” in 1994.

Since the beginning of NAFTA in 1994, 50 percent of all U.S. exports to Mexico have been free of Mexican tariffs. These exports consist of some of the United States’ most competitive products including: semi-conductors and computers, machine tools, aerospace equipment, telecommunications equipment, electronic equipment, and medical devices. NAFTA’s phaseout of nontariff barriers also benefited U.S. companies. For example, U.S. exports of passenger cars to Mexico tripled following the gradual phaseout of the Mexican Auto Decree, and the character of these exports shifted toward higher value vehicles. For the first time in 50 years, in October 1994, Mexico approved the establishment of wholly owned U.S. financial affiliates. These affiliates included such major U.S. banks as Chemical Bank, Bank of America, Chase Manhattan, and NationsBank.

Despite the recent financial difficulties in Mexico, the opportunity for U.S. sales in Mexico remains strong, particularly in the area of infrastructure development where needs for significant investment have been identified. Companies providing infrastructure-related products and services are expected to have opportunities in port privatization, highway construction, railroad services, and water projects.

NAFTA will continue to provide U.S. companies advantages in the post-devaluation Mexican market. U.S. firms will be able to compete more effectively and competitively than in the past because of improved access to governmental procurement, stronger intellectual property protection, and their established ability to provide quality services. Preferential duty treatment of U.S. goods under NAFTA gives U.S. companies an edge over European or Japanese firms whose products are often the principal source of competition.

8.7 Final Comments

The process of compiling data for this report has enabled the authors to identify a number of opportunities for further study and incorporation as elements of an ongoing Binational Transportation Planning Process.

As a first suggestion, active and continuous involvement of the federal agencies that record and maintain trade flow information is essential to the transportation planning process. The efforts of the U.S. Bureau of Transportation Statistics are commendable in this regard. These efforts must be maintained and strengthened to fill data shortfalls identified by this study. A parallel organization (or tasking of an existing agency) is needed within Mexico to streamline the effort required to collect, summarize, and reconcile information that is essential to foreign trade/transportation planning. The North American Trade Automation Prototype (NATAP) may provide a solution to this information shortfall if the data needs of the federal and state transportation planning agencies are reflected in NATAP's database design and public use output.

As a second suggestion on a similar topic, it would be very useful (for transportation planning purposes) to record, maintain, and report information on pedestrian and vehicle flows that is comparable for both northbound and southbound flows. This effort, however resolved, needs to be consistently applied along the length of the border, continuously undertaken, and routinely reported by the agencies responsible for data collection.

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