

**INDUSTRIAL EFFECTS OF A FREE TRADE AGREEMENT
BETWEEN MEXICO AND THE USA**

an INFORUM report for

The United States Department of Labor

1990 September 15
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INDUSTRIAL EFFECTS OF A FREE TRADE AGREEMENT
BETWEEN MEXICO AND THE USA

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CONTENTS

Summary

Acknowledgements

- I. The Framework for Modeling the Impacts of Free Trade Between the USA and Mexico
- II. US-Mexican Trade Relations: a Brief Account of their History and Current Status
- III. Price Elasticities of Mexican Imports and Nominal Protection 1980 - 1987
- IV. The Import Equations of the LIFT Model of the USA
- V. Trade Between the USA and Mexico 1980 - 1989: A Review to Judge the Effects of an FTA
- VI. Import Share Functions
- VII. Effects of Removing the Barriers
- VIII. Some Regional Impacts in the USA
- IX. Some Occupational Impacts
- X. Ways to a Firmer Foundation for Modeling

References

Appendix A: LIFT Sectors defined in SIC terms

Appendix B: MIMEX Sectors in Spanish and English

Appendix C: LIFT, Inforum's Model of the U.S. Economy, by Margaret B. McCarthy

Guide to data on diskettes

Acknowledgements

This report brings together the work of many people. The MIMEX model is the creation of Alberto Ruiz-Moncayo and Luis Sangines of CIMAT together with Douglas Nyhus of the Inforum group at the University of Maryland. The LIFT model, in recent years, is under the direction of Margaret McCarthy, who also did the occupational calculations. The linking of the two models and the running of the scenarios was done by Douglas Nyhus and Constantinos Christou. Jeffry Janoska and Qiang Ma built the state models on the basis of an example developed by Lorraine Monaco. Most of the text of the report was written by Clopper Almon, who was the principal investigator on the project. Janice Anderson helped prepare the manuscript.

It is a pleasure to acknowledge the foresight of Harry Gilman of the Department of Labor in initiating the request for proposal for this project. The lively interest taken by Gregory Schoepfle and Robert Shelburne of the Department of Labor has added an extra incentive to a fascinating project. We are indebted to William Dewald for the opportunity to discuss the results in a seminar at the State Department. We have also had the benefit of written comments from Gregory Schoepfle, Harry Gilman, Thomas Dorsey, Clint Shiells, Kenneth Reinert, and William Ross. They are, of course, not to be blamed for the faults of the final product.

The comments and questions of Lester Davis were, as always, pertinent and penetrating. Attempts to answer them led us to discover several logical errors in threading through the maze of relations between U.S. trade data and the Mexican model. Were it not for his questions, we would have finished the report on time -- and lived to regret it.

We should also explicitly point out that the correction of these errors completely changed our assessment of the macroeconomic effects of a Free Trade Agreement on Mexico. Readers of the draft of this report are urged to read at least the Summary of the present version, which differs markedly from the draft. The present mechanism has passed a number of consistence checks to which we had not had time to subject the one used for the draft.

Opinions expressed in this paper are solely those of the writer. They do not necessarily represent the view of the U.S. Department of Labor or of the collaborators at CIMAT.

SUMMARY

This study attempts to quantify the effects on individual industries of a Free Trade Agreement (FTA) between the United States and Mexico. The influences studied are those which stem directly from the removal of tariffs and various forms of import licensing on both sides. Broader questions -- such as the stimulus to productivity in both countries in industries now enjoying protection, or increased foreign investment in Mexico, or induced changes in the exchange rate, or reductions of barriers to third countries -- have not been studied in the results reported here. Proper modeling of the commercial, trade-connected effects proved challenging enough for a first effort.

This study is conducted with the aid of two linked multisectoral macroeconomic models, MIMEX for Mexico and LIFT for the USA. MIMEX is built by the Centro de Investigaciones Matimaticas (CIMAT) of SPP-CONACYT, located in Guanajuato, and LIFT is built by the Inforum group at the University of Maryland. LIFT has 78 sectors; MIMEX, 74.

Both models generate output, exports, imports, consumption, employment, and income by industry. LIFT has investment equations for individual industries; MIMEX has only one aggregate investment function, for no data on investment or capital stock by industry has been found. The changes in relative prices brought about by the elimination of the tariffs work through price-sensitive import functions and personal consumption functions. In LIFT, investment functions for some industries are sensitive to the price of capital goods. The Mexican data does not yet support the estimation of such investment functions. However, both models are dynamic, that is, investment depends on the growth in output. Whatever stimulates the output -- for example, an increase in exports -- will increase investment. LIFT has been used in many studies; MIMEX is on its maiden voyage in this venture.

The connection between the two models comes through import share functions. These functions were developed on the basis of data (from the U.S. Commerce Department's COMPRO system) on US trade with Mexico and with the world. Trade share functions for Mexico's share in U.S. imports were developed with modest success from the data. Developing functions for Mexico's imports and the U.S. share of those imports was decidedly less successful because of widely varying application of import licensing during the 1980's, the period covered by the COMPRO data source. For many industries, the price elasticities of exports simply had to be made up on the basis of very rough comparisons with results for other countries.

The models were first run to establish a scenario with existing tariffs and non-tariff barriers in effect on both sides. Several iterations, described below, were run to insure that the results of the two models were fully consistent with one another in this base case.

Two alternative FTA scenarios were then run. One, "Tariffs Only" (TO), removed all tariffs effective in 1990. The second, "Tariffs and Barriers" (TAB) removed the tariffs and also allowed for:

gradual lifting of U.S. limitations on imports of apparel assembled in Mexico from pieces cut from textiles made in the United States.

gradual elimination of Mexican import licensing on U.S. agricultural products, computers, and automobiles.

The removal of the non-tariff barriers became "add factors" to the import equations of the importing country. The trade share functions then transfer the changes in imports (relative to the base scenario) to the other partner or to the rest of the world. The specific add-factors assumed, in millions of 1977 dollars, were as follows:

	1990	1991	1992	2000
U.S. Exports to Mexico				
1 Agriculture	125	250	375	625
35 Computers	90	180	270	450
43 Motor Vehicles	180	360	540	900
U.S Imports from Mexico				
12 Apparel	100	200	300	500

These factors are 10 - 20 percent of the 1989 trade in their respective items. They are easily judged relative to present trade in the graphs in Chapter VII, Appendix B.

The add factor for Mexican Agricultural imports brings those imports, after three years, back up to the levels of 1980 and 1981 before the imposition of the last round of licensing constraints. The add factor on U.S. imports of Apparel from Mexico approximately doubles the rate of growth of those imports. The Computer add factor keeps going the rapid rise of the last two years. The same is true of the automobile add factor. Thus, the add factors all seem well within the range of the possible.

The models are run iteratively. In the initial iteration, the LIFT model knows about its increase in apparel imports and the reduced prices of other goods due to the elimination of U.S. tariffs; at this stage it does not know about the increase in Mexican demand for U.S. products caused by the elimination of Mexican tariffs and import licensing. This is referred to as Iteration 0. MIMEX is run to create a similar Iteration 0. Then the increases in Mexican imports in MIMEX's Iteration 0 are converted into "add factors" for LIFT's export equations, and similar "add factors" are computed for MIMEX's export equations. The models are then re-run to produce Iteration 1. This process converged fairly quickly, so that little change was noticed after Iteration 2 on previous runs of the system. The results reported below are from Iteration 2, there were no changes between the add factors generated after iteration 2 and those which went into it.

Though results are available for all years out to 2000, we concentrate here on 1995, after the main effects of the FTA have had time to be fully felt. Besides the base, we have run two free-trade-agreement scenarios. The first we call "Tariffs Only" (TO) and the second, "Tariffs and Barriers" (TAB) where we have also introduced the "add factors" to represent the removal of non-tariff barriers, as they were developed and summarized in Chapter V. The results are presented in detail in Appendix A to Chapter VII. Graphs of U.S.-Mexican trade, described in LIFT sectors and 1977 dollars, follow in Appendix B to that chapter. Here we will first examine the aggregates and then look at some of the industrial detail.

Two summary graphs are shown on the following page. They show (a) that the effect of removing tariffs was larger than the effect of removing the non-tariff barriers and (b) that the stimulus to U.S. exports is greater than to Mexican exports. Given that most of the tariffs and non-tariff barriers were on the Mexican side, this result is not surprising. It will, however, show up in macroeconomic results.

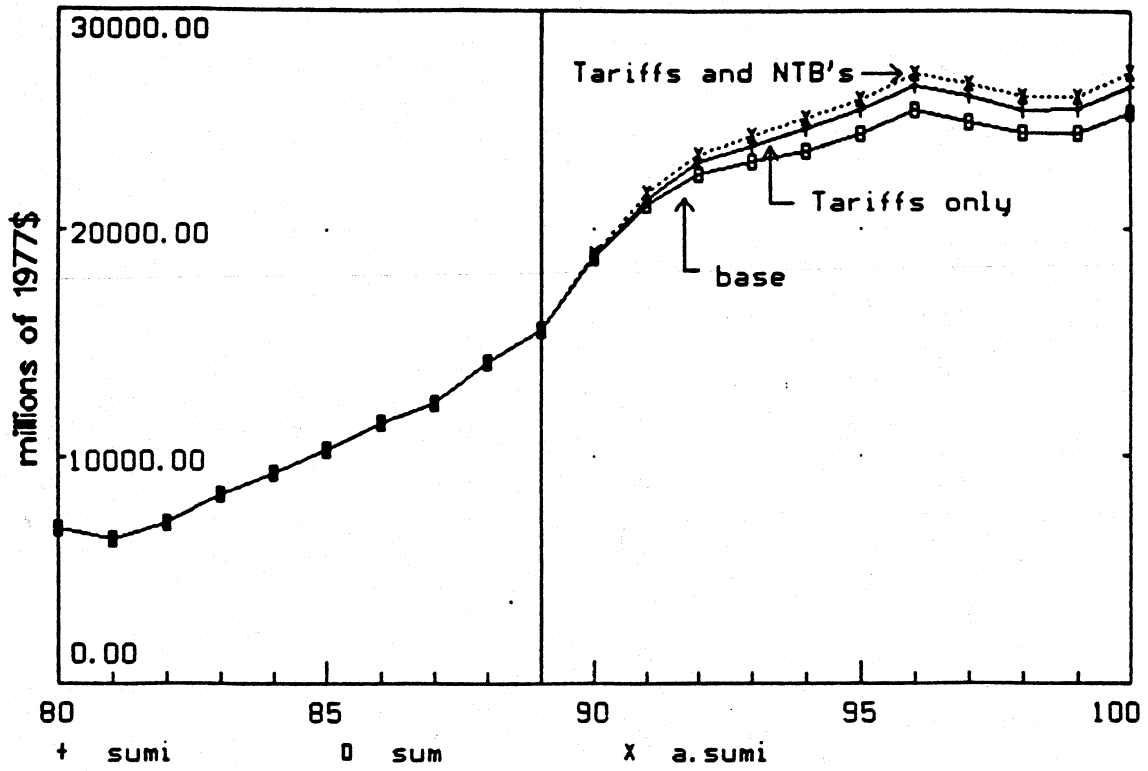
For brevity, we concentrate here on 1995. Under TO (tariffs only), U.S. exports are up by \$3.1 billion. (1977 dollars will be understood, unless otherwise noted.) Under TAB, they are up even further to \$5.0 billion. Mexico's exports to the U.S. increase less, only \$1.1 billion under TO and \$1.6 under TAB. This is the asymmetry noted in the graphs.

Total U.S. exports increase more than exports to Mexico. They are up by \$3.4 billion under TO and \$5.5 under TAB. This extra boost to exports comes about because the reduction of tariffs with Mexico lowers cost of production in the U.S., which then competes more effectively in other foreign markets. On the other hand, total U.S. imports increase by \$0.6 billion under TO and \$1.2 billion under TAB, less than the corresponding increase in imports from Mexico -- \$1.1 and \$1.6, respectively. Clearly, there has been trade diversion from other suppliers. Around forty percent of the rise in imports from Mexico has been diverted from third countries, a proportion which seems plausible enough, given our assumptions.

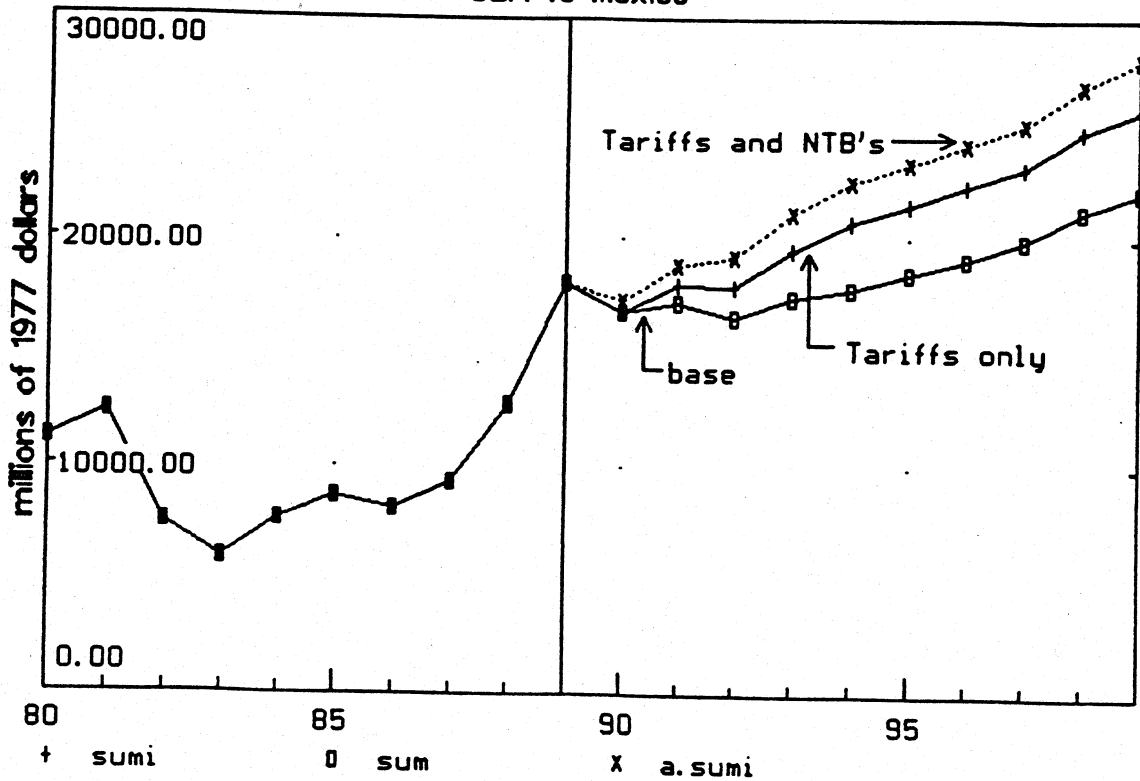
Mexico's total exports rise by \$1.1 billion and \$1.6 billion under TO and TAB, respectively, the same as its exports to the U.S.. Its total imports, however, rise much less than did its imports from the U.S.. Under TO, the rise was \$1.6 billion for the total in the MIMEX model versus \$3.1 billion for imports from the U.S. Under TAB, the total rose \$3.2 billion in MIMEX versus \$5.0 billion from the United States.

It is tempting to say that this excess of the expansion of U.S. exports to Mexico over the expansion of Mexican total imports shows perfectly reasonable trade diversion, given the assumption that Mexico eliminates its fairly substantial tariffs for the U.S. but for no one else. However, the trade share functions for Mexico were specified with parameter values which imply no trade diversion. We cannot, therefore, invoke trade diversion to explain why the change in tariffs produces twice as large an effect on U.S. exports to Mexico as on total Mexican imports. Another explanation of the disparity might seem to be that MIMEX imports do not include maquiladora inputs. Unfortunately, this explanation is also inappropriate, for we have applied the percentage increase in Mexican imports, augmented by the change in the US share, only to

Total Trade Mexico to USA



Total Trade USA to Mexico



the portion of U.S. exports to Mexico not used as maquiladora inputs. We believe that the source of the disparity lies in differences in Mexican import statistics and U.S. export statistics. Until this problem can be resolved, we can only say that we believe that the present numbers offer the appropriate percentage changes in each country.

The difference between the TO and TAB scenarios poses no such disparity problem; it is the same for Mexican imports as for U.S. exports, \$1.9 billion in LIFT versus \$1.6 in MIMEX, with \$.3 extra of U.S. Apparel exports as cut pieces which appear in LIFT but not in MIMEX, because of the difference in the accounting definitions.

The effects on total GNP or GDP are quite different in the two economies. The U.S. is operating at a high level of employment in 1995 in the base scenario. The stimulus of the excess of exports over imports, \$2.8 billion under TO and \$4.3 billion under TAB runs into some of the stabilizing factors in LIFT. Interest rates go up a tenth of a percentage point and residential construction suffers; the savings rate rises slightly and consumers cut back spending, not because they don't have money but because they prefer to save. The net result is that, with a \$2.8 billion increase in net exports under TO in 1995, GNP rises only \$1.7 billion, \$0.6 billion having been cut out of Personal consumption, another \$0.6 out of Residential Construction while \$0.2 billion was added to investment in equipment.

For Mexico, the FTA is a mixed blessing. By 1995, exports are up approximately 3 percent under TO and 4.4 percent under TAB. Imports, however, are up 10 percent under TO and 20 percent under TAB. The FTA was particularly hard on Mexico in 1991 - 1993 when the competition from imports first hit. By 1995, the economy is recovering and investment is slightly above its no-FTA level. Mexican consumers are also richer because of lower prices on imports, so their consumption expenditure is up. Despite these favorable effects, the direct negative impact of the increased imports leads to a minuscule reduction in GDP, less than a tenth of one percent under TO and half of that under TAB. The FTA is not the immediate solution of Mexico's unemployment problem. Employment actually falls by 0.04 percent under TO and by nearly 0.5 percent under TAB. These mild negative effects, while perhaps disappointing, should not be surprising. After all, the substantial tariffs and non-tariff barriers have been there to safeguard jobs in inefficient industries. A more extensive scenario might introduce increased labor productivity in the formerly protected industries so that they might compete more effectively with the foreign products.

At the industry level, the results for TO and TAB are almost indistinguishable except in the industry directly affected by the add-factors.

In looking at the winners and losers in employment by industry, a clear pattern emerges for the United States. Industries which, like Chemicals, Rubber and plastic products, Metal products, and all of the machinery sectors, are in a position to export to Mexico, win. Those that have been protected by tariffs from effective competition from Mexico, such as Apparel, lose. Construction and its suppliers, including Furniture, lose. The service sectors -- in particular, Trade and Eating and drinking establishments -- lose. One should not cry much over

these "lost jobs". They do not represent people put out of work at fast food stores. Rather they represent the people who might otherwise have had such jobs making a career building automobiles or machinery.

In Mexico, on the other hand, the winners are Apparel, Leather and footwear, Textiles, Trade, the Services, and Construction and its suppliers such as Glass. The losers are in Agriculture and Machinery. Most other industries experience employment changes of less than 500 jobs.

In general, one may say that the FTA in either form strengthens the economy of the United States. In aggregate, the tariffs are much more important than the non-tariff barriers as we have expressed them. Under TAB, employment in the U.S. Apparel industry is down 6 thousand jobs, about one percent of employment in that industry. But employment in Metal products is up by over twice as many jobs as employment in Apparel is down. Apparel is virtually the only direct loser. Even Textiles are up. The Mexican situation is less decisively positive, but exposure to the competition from the U.S. does not cripple its long-protected industries nor lead to dire macroeconomic consequences in the first few years of difficult adjustment. Beyond those years, the long-run positive impacts of competition on productivity should become important. They have not been considered in the scenarios run here. An FTA seems unlikely to make a great deal of difference quickly. Gradually, over decades, it may be the route to prosperity in Mexico and the reduction of immigration problems in the United States. The initial impacts as we have studied them here, however, are modest but already beneficial to the United States and to the consumers in Mexico.

Simple models for employment by industry in each state have been developed as part of this study. Summary results are shown in the Appendix of Chapter VIII. Full results for each state are available on diskette. Only Maine and Hawaii have slightly negative effects. States with an increase of more than one tenth of one percent under TO are: Colorado, Delaware, Iowa, Idaho, Kansas, Louisiana, Montana, Nevada, Ohio, Oklahoma, Oregon, South Dakota, Texas, and Wisconsin. In most of them, agriculture is important. States with gains of under 0.02 percent include Arizona, Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, and Vermont. Generally, and without wishing to tread on any toes, they appear to be states which have not participated strongly in recent economic growth and therefore do not claim their proportional share of the growth under the FTA.

The national results were also passed through an occupation-by-industry matrix to calculate impacts on particular occupations. Detailed results are in the Appendix to Chapter IX. Generally the engineering occupations did well, while the Apparel producers suffered ever so slightly.

A final chapter points to things which need to be done to improve the models and add other dimensions to the scenarios. A thorough reconciliation of US and Mexican trade data is at the top of the list, along with building better bridges to Mexican data sources generally.

CHAPTER I
A FRAMEWORK FOR MODELING THE IMPACTS OF
FREE TRADE BETWEEN THE USA AND MEXICO

This study began in late 1989. Then, when we mentioned that we were working on the effects of a possible free trade agreement with Mexico, we got comments suggesting that we didn't understand the realities of Mexican or American politics. Now, a year later, the comment would more likely be, "Better hurry up or history will give the answer before you do."

The subject now needs no justification. It is clear that, since 1985, new economic thinking has been taking hold in Mexico. Protectionism has been tried, and it failed. Openness, competition, trade, and cooperation are key words in a new policy.

This new attitude in Mexico poses real challenges to US foreign policy. As long as Mexico kept out U.S. automobiles and computers, it seemed natural enough in the protection game to retaliate by keeping out Mexican apparel and steel. With Mexico suddenly willing to open up economically, the U.S. faces questions like:

What will free trade with a country where wage rates are far below the U.S. minimum do to employment in our low wage industries?

Can workers displaced from these industries find work elsewhere?

What will happen to wages, salaries, and the American standard of living generally?

Will increased competition in low-wage occupations increase income inequality in the U.S.?

Will some regions be especially hard hit while others benefit?

Will there be a drastic reduction in employment in low-wage occupations which will exacerbate the mismatch already expected between the low skills of new entrants into the labor market and the high skills required by U.S. industry?

More important than these negative questions are the positive questions such as:

Can free trade and investment with Mexico reduce poverty and produce a strong, healthy, and friendly neighbor?

Can free importation of products replace migration of labor with all its attendant problems?

The same questions, turned around, face Mexico. Will it become the haven of industries fleeing the U.S. minimum wage? Can Mexico compete with California as a location for high-skilled industries whose workers want the amenities of good schools, good restaurants, and chic shops? Will it see its industry taken over by foreign capital? Will it find itself losing its cultural identity in a general North American melting pot? Or is free trade the way to the healthy, productive economy Mexicans have long dreamed of but never achieved?

No, this study is not going to offer answers to all those questions. It will concentrate simply on the question of how trading patterns between the two countries are likely to change, and how those changes will affect production and employment by industry. These questions it will treat symmetrically for the U.S. and for Mexico. For the U.S. only, it will attempt to assess the impacts on individual states and on occupations.

LIFT and MIMEX, the Multisectoral Macroeconomic Models

The analysis will be conducted with the aid of two linked multisectoral macroeconomic models, LIFT for the U.S. and MIMEX for Mexico. LIFT (Long-term Interindustry Forecasting Tool), the elder of the two, is built and maintained by the Inforum group in the Department of Economics at the University of Maryland. It has been in operation since the early 1980's, but is constantly undergoing change. MIMEX (Modelo Interindustrial Mexicano) is built by the Centro de Investigaciones Matimaticas (CIMAT), one of the research centers of SPP - CONACYT; it is on its maiden voyage in this study. The linking between the two, built at Inforum, is also new to this study, though it is patterned on the seven-country interlinked system of which LIFT is part. Simple models for relating employment by industry by state to the LIFT totals have also been built for this study.

While this is not the place for a detailed description of either LIFT or MIMEX, a general sketch of their functioning will be helpful. A reader wishing more information may turn to Appendix C, which reproduces Margaret B. McCarthy's contribution to the 9th International Conference on Input-Output Methods, and to the bibliography at the end of that appendix. We will describe LIFT first, and then MIMEX can be described briefly with reference to LIFT.

LIFT distinguishes 78 sectors in the U.S. economy; some typical ones are: Food and tobacco; Textiles; Apparel; Steel; Copper; Construction, mining and oilfield equipment; Finance, insurance, and real estate. (In sector names, we capitalize only the first letter of the first word, so that "Textiles and Apparel" refers to two sectors while "Finance, insurance, and real estate" refers to one.) For each sector, LIFT shows output, imports of similar products, and sales of such products to each other sector, to consumers, to government, to export, to inventory change, and, for capital goods, to capital investment by investing sector. It also gives a price index for each sector and, at a slightly reduced level of sectoral detail, wages and salaries, depreciation expense, interest expense, corporate profits, proprietor income, indirect business taxes, inventory valuation adjustment and capital consumption adjustment. From the totals of these types of income plus government transfers, it makes up personal income and its size distribution. From

this size distribution of income and known tax rates by bracket, it calculates income taxes and disposable income and its size distribution. This distribution of income is then used to calculate personal consumption expenditures on each sector's products. From the taxes and the government spending, the government budget and deficit may be calculated. Money supply also enters into demand, and demand pressures enter the equations for wages and profits. The wages and profits then, through input-output calculations, determine prices. The prices affect, through their proportions, consumer decisions. They also affect imports and exports.

The logic by which the model works is as simple as can be. It merely tries to imitate the way the real economy works. It does not take macro economic measures from some aggregate model and distribute them to industries. Neither does it postulate some omniscient investor who optimizes the distribution of capital over industries nor any "representative consumer" who maximizes some metaphysical welfare function. It simply has investment functions which describe, as best they can, how industries have in the past invested in response to growth in their output and changes in the user cost of capital. Likewise, its consumption functions, while fully consistent with the little that economic theory tells us about such functions at the market level, simply try to capture the way consumers have allocated their expenditures in the past. Their estimation makes extensive use of both cross-section and time series data to obtain plausible income and price effects and some time trends. These functions can express either complementarity between two products (such as gasoline and tires) or substitution (as between private automobiles and public transportation.)

LIFT's macroeconomic properties are simple and comprehensible. At low levels of unemployment, wages rise faster than current inflation; at high levels, slower. Profits also respond strongly to high levels of output. Because these profits must appear in prices, strong growth that pushes up profits also tends to push up prices faster than consumer purchasing power and thus throttle down the expansion. The savings rate also works as a stabilizing factor, for as unemployment falls, the savings rate rises. Money supply is exogenous to LIFT but plays a significant role through its influence on interest rates. Thus, it also works as a stabilizer. Exchange rates, government spending, tax rates, population, labor force, and money supply are exogenous to LIFT.

Though LIFT uses an input-output table, it also employs a thousand or so regression equations. In sum LIFT is simply a fully dynamic, multisectoral description of how the economy works. Like the real economy, it builds up its totals from the behavior of individuals; nothing need be borrowed from an aggregate model.

Is it a general equilibrium model? It certainly computes all the prices and quantities in a way which satisfies all the equations of a given period. But because it is dynamic, it may have important disequilibrium conditions such as unemployment, or excesses of output over capacity. Most of these disequilibria set something into motion to correct themselves, but they are not necessarily corrected in a single year. An important exception is disequilibrium in the balance of payments. Perhaps it should affect the exchange rates, but numerous attempts by us and by others have failed to model any such connection successfully. Instead of incorporating

a highly suspicious relationship, we prefer to be clear: We do not know how changes in the trade balances will affect the exchange rate, so the exchange rate is exogenous in the model.

Precisely because LIFT does not postulate a "representative consumer", it makes no statement about what the level of "welfare" is at any time. It only offers the same variables which real economies offer -- output, price, employment, and the like.

Because the variables cover all the concerns of macroeconomics -- employment, prices, money, interest, and so on -- but give sectoral detail for many of them, we refer to LIFT as a multisectoral macroeconomic model.

MIMEX has 74 sectors and is generally built along the same lines as LIFT and with much of the same software. Major efforts were necessary at CIMAT for organizing the data and estimating the behavioral equations for the real side -- the outputs, consumer demands, investment, exports, imports, and employment. For lack of data, there is only one investment equation, not sectoral ones. It is an accelerator equation with four terms: three lagged first differences of real gross domestic product (GDP) and the current value of GDP to represent replacement. (The fit is close.) The income side is still rudimentary but suffices to generate prices and total disposable income for the consumption functions.

Though the number of sectors is nearly the same in LIFT and MIMEX the actual nomenclature is rather different. MIMEX has more detail in agriculture, mining, and food; LIFT has the greater detail in machinery. Elsewhere the detail is similar.

Because LIFT is already a member of a group of linked models of this sort -- other members are Japan, Canada, France, Germany, Italy, and Belgium -- and MIMEX along with models for Spain, Austria, and Korea will soon join, it is essential to keep in mind the requirements of linking within the larger system. In that system, each model calculates its own imports for each product based upon its own domestic demand and the domestic price relative to the "world price". The "world price" is a weighted average of prices in other countries weighted by the importance of the other country in the imports of the given country for that product. The exports, on the other hand, depend on the imports of all other countries, weighted by the shares of the given country in those exports, and on the ratio of domestic to foreign prices.

In the LIFT-MIMEX linking, we wanted to keep the primary role of the import functions but to add specific trade flows between the two countries. Trade share functions were estimated (or assumed) so that -- given total U.S. imports, world prices, and Mexican prices -- U.S. imports from Mexico could be calculated. The LIFT import functions were all re-estimated to include Mexican prices in the world price. They are described in Chapter IV. Chapter III describes the MIMEX import equations and the circumstances which make their econometric estimation often impossible. Chapter VI describes the import trade share functions.

The basic data for modeling U.S.-Mexico trade came from the U.S. side. There was therefore no problem in matching it to the LIFT sectors or to the U.S. definitions of exports and

imports. The same was not true on the Mexican side. The match with the Mexican sectors involved some approximation, probably small. The Mexican definition of imports from the U.S., however, is radically different from the U.S. definition of exports to Mexico. Namely, the U.S. counts as exports to Mexico the parts and pieces which go to the Mexican in-bond, *maquiladora*, assembly plants. Likewise, the exports of these products back to the USA counts as U.S. imports but not as Mexican exports. In one respect, the Mexican treatment is ideal for our purposes: removal of Mexican tariffs on imports should not affect the imports of inputs into the *maquiladoras*, for they are already free of tariffs. On the other hand, the percentage change in imports calculated in MIMEX cannot be carried over as a percentage change in U.S. exports to Mexico, for those exports include the inputs to the *maquiladoras*. We must make an adjustment. To do so correctly, we need to know the share of U.S. exports to Mexico which, in each industry, went into *maquiladoras*. We have not found such statistics, but have approximated them by the ratio of U.S. content of imports from Mexico in a certain sector to U.S. exports to Mexico in that sector. Even after this adjustment, we find that U.S. exports to Mexico (net of this *maquiladora* adjustment) are larger than total Mexican imports for that sector, as they appear in MIMEX. After narrowing down this statistical discrepancy as much as we could, we had to live with it. There will therefore be a disparity between the increase in Mexican imports as calculated in MIMEX as a result of a Free Trade Agreement and the corresponding increase in U.S. exports to Mexico as they appear in LIFT. Namely, the increase in LIFT will be nearly twice as large. Before blaming this difference on under-reporting of imports on the Mexican side, we would like to do a detailed comparison of trade data from the two countries. Initially, we did not have access to the data from the Mexican side. We understand, however, that this material will soon be available to us. Pending its careful examination, we believe that the present numbers represent approximately the correct proportional changes in each model, though the absolute magnitudes do not appear to be consistent.

The basic logic of modeling an elimination of tariffs between the two countries might follow this pattern:

Run both models under the base case scenario with the tariffs still in place. Put imports through the trade share functions to see how much of U.S. imports come from Mexico and of Mexican imports, from the U.S..

Eliminate the U.S. tariffs and reduce the Mexican prices as seen from the U.S. accordingly. Compute new world prices. Rerun LIFT. Generally, but not necessarily, the imports will have gone up. It is conceivable that, say, so much more Apparel is imported that less Textiles are imported. Put the imports through the trade share functions to get imports from Mexico. Compute the vector of differences from the imports from Mexico in the base case. Convert this vector to MIMEX sectors and call it D.

Eliminate Mexican tariffs and reduce U.S. prices as seen from Mexico accordingly. Compute new world prices as seen from Mexico and rerun MIMEX with D added to its export vector. Put the imports through the trade share functions to get

imports from the U.S.. Compare with the base case, convert the vector of differences to LIFT sectors and call it E.

Rerun LIFT with E added to the vector of exports. Compute a new D.

Continue this process until the D and E do not change significantly from one iteration to the next. The new solution can then be compared with the original base solution.

This procedure requires at least one refinement. In a few cases, there are significant non-tariff barriers to be removed. Instead of trying to convert these barriers into tariff equivalents, estimates will be made of the direct quantitative impact of removing them. These changes are then added to the import functions of the country removing the barrier. When the vector of changes in the imports is found, this "add factor" is removed before applying the trade share function and then added back.

Limitations

There are important limitations implicit in the method set out above. Comments on the previous version of the paper show that some of them need to be made explicit and perhaps even defended.

1. It must be repeated that the peso-dollar exchange rate and the exchange rates between the dollar and other currencies are the same in the base case as in the alternatives. The peso-dollar rate is different in each year, but in each year, it is constant across scenarios. The removal of tariffs reduces production costs in both countries, so it is not surprising that the merchandise balances of both countries improve at the expense of unspecified third countries. Some have argued that we should therefore have both the peso and the dollar appreciate relative to all other currencies. Of course, undeniably, they might appreciate. But they also might not. The empirical evidence is not unambiguous. We prefer to leave the reader with a clear statement that no such induced change of exchange rates has occurred than to confuse the issue by using an exchange rate function which most readers would, with good reason, doubt.
2. The M2 money supply is constant across alternatives. Some readers have argued that money supply should be adjusted to keep interest rates or real interest rates constant across alternatives. It is clear to us, however, that the Federal Reserve System is targeting money supply, not interest rates. There is good reason for its doing so. Namely, if it tries to bring down interest rates with monetary growth, it may find it impossible to achieve the target, for faster monetary growth simply turns into inflation which pushes up interest rates. It would probably prove as impossible in the model as in reality to target interest rates. We believe the greatest realism is achieved by targeting what the Fed targets, namely M2.

3. There has been no increase in productivity in the Mexican or U.S. industries as a result of the increased competition with imports. On the U.S. side, this factor is hardly likely to be important, but it may be the crucial response on the Mexican side. Detailed comparison on Mexican and U.S. productivity levels on an individual product level could be helpful in assessing the probably changes. Such an assessment, however, is a whole different study from the present one.
4. No other exogenous variables in the models have changed across scenarios. Population and labor force, for example have not been varied, though one argument for the FTA is that it would replace migration of labor with migration of goods. Government expenditures are the same under all scenarios, though the boom that the FTA produces in the Mexican Apparel industry might well require additional investments in infrastructure. We have deliberately kept the scenarios plain so that the reader can see the effects of the purely commercial aspects of an FTA untainted by our notions about how various institutions might respond to them.
5. We have not modeled a massive move of foreign capital into Mexico. It has been argued to us, for example, that as soon as it was clear that Spain would be admitted to the European Community, foreign investment poured in. The case would be very different for Mexico. In Spain, the low-wage country was *soon to gain access* to the well-protected markets of Europe. Moreover, with the prospect of "Fortress Europe" after 1992, many American firms were eager to get a toe-hold inside the Community. By contrast, Mexico *has long had* virtually unrestricted access to the U.S. markets outside the Apparel, Textile, and Steel industries. Foreign investment in Mexico for producing for export has been almost unrestricted since 1972. Further, there is no prospect of a "Fortress USA" looming ahead. An FTA would remove, at most, the prohibitions on majority foreign ownership for firms investing in Mexico to sell in Mexico. In fact, there seem to have been numerous important exceptions to the present prohibitions. For example, all of the six major automobile companies operating in Mexico have over 90 percent foreign ownership. While an FTA would, we believe, improve the atmosphere for foreign capital in Mexico, there seems little reason to believe that the inflow would be massive. Even if we thought such an inflow likely, our present state of total ignorance about investment by individual industries would make it difficult to quantify the flow or assess its impact on productivity in individual industries.
6. There is a significant technical problem in handling maquiladora or other "hollowed-out" production processes. The model implicitly assumes that, say, the Mexican Apparel industry will continue to draw supplies -- mainly cut pieces -- from the USA in the same proportions in which it presently does. To allow for changes in those proportions requires the creation in the model of two industries in each country for every product in which trade in partly fabricated products within the same industry is important. To continue the apparel example, one Mexican Apparel industry would buy textiles locally while the other would import cut pieces from the U.S. "cut pieces" industry. The U.S. model would then need a "cut pieces for apparel" industry that had high textile inputs and low labor

inputs per dollar of output. The remaining U.S. apparel industry would produce finished garments from textiles with much more labor per dollar of output. It would be interesting to see if these refinements could be done. Making them would be relevant to the whole question of the "hollowing out" of U.S. manufacturing. It is, however, beyond the scope of the present work.

7. Both countries are presumed to preserve existing barriers to third parties. This assumption may be the most implausible of all. Why should Mexico eliminate tariffs on U.S. merchandise but retain them on, say, Japanese or Korean goods? Can the U.S. get away with lowering tariffs and relaxing quotas for Apparel from Mexico but not from other countries? We have reduced the impact of the assumption in the case of Mexican imports by specifying trade share functions which imply no trade diversion. Nonetheless, scenarios in which either or both countries proceeded to even wider free trade would be interesting.

Outline of the study

To model the effects of a free trade agreement (FTA) we must begin by asking about present deviations from free trade. These deviations may be either tariffs -- the easiest to quantify -- or non-tariff barriers. Chapter II looks briefly at the present situation in both. On the Mexican side, it also deals with some of the recent institutional history which is highly relevant for interpreting the data on trade.

Chapter III reports our not very successful efforts to estimate import functions for MIMEX. The material in Chapter II proves crucial for understanding the difficulties encountered in Chapter III. This chapter also shows measures of nominal protection in Mexico, that is, ratios of Mexican prices to foreign prices.

Chapter IV presents very briefly the import equations of the LIFT model.

Chapter V is a historical examination of trade flows between the U.S. and Mexico in the 1980's. Its goal is to identify areas where the Free Trade Agreement might be expected to have its greatest impact. In the course of this chapter, the "add factors" to represent the removal of non-tariff barriers are developed.

Chapter VI uses the data studied in Chapter V to estimate the trade share functions. More correctly, it estimates the U.S. trade share functions, for we have despaired of estimating the Mexican ones and simply specify them without estimation. A simple theorem, proved in the appendix to this chapter is an important guide, for it tells us that the elasticity in the trade share function must not be less than the elasticity in the total import function.

Chapter VII then reports the main results of running the linked models with two free-trade scenarios. The first scenario removes only tariffs but leaves the non-tariff barriers in place. The second uses "add factors" to represent the removal or reduction of the non-tariff barriers to

Mexican imports of agricultural products, computers, and automobiles and U.S. barriers to imports of apparel.

Chapter VIII extends these results to states in the United States. The effects on all employment are for all states are reported. Back of these results, however, are projections of employment industry-by industry for all states. California is given as an example, but the full details for all states are too voluminous to print. These details are available on the diskettes which accompany the study.

Chapter IX reports the implications for occupations in the United States. Summary results are given, with details for hundreds of occupations available on diskette.

Chapter X outlines some steps which we believe would create a firmer foundation for any studies of trade between the United States and Mexico.

We are very conscious we have not exhausted the subject of free trade between the United States and Mexico and that, indeed, other researchers are already hard at work on the subject. We believe that some of the data we have developed may be useful to them and have included it on a diskette which accompanies the report. A guide to the data on this diskette appears at the end of the report. The diskette also contains some voluminous tables, such as results for individual states and occupations, which would not have added to the general interest of the report.

CHAPTER II

US-MEXICAN TRADE RELATIONS A BRIEF ACCOUNT OF THEIR HISTORY AND CURRENT STATUS

Free trade between the United States and Mexico will have significant effects on both countries, but the relative impact on Mexico is certain to be much greater. From the US side, trade with Mexico has recently averaged about six percent for both exports and imports, whereas from the Mexican side the same trade is about sixty percent of both exports and imports. Table 1 shows, for each country, the shares of the other in its exports in 1985. The US share of Mexican exports is brought down by the relatively low share (53 percent) for the largest item, petroleum. For many of the manufactured goods, the US share of Mexican imports exceeds ninety percent. Aside from natural gas, which the US can hardly export other than to Mexico and Canada, and Apparel and Furniture, where the meaning of the data is distorted by exporting cut pieces for assembly in Mexico, no industry sends more than 15 percent of its exports to Mexico and few reach even ten percent.

Table 1: US AND MEXICAN EXPORTS - 1985

	US Exports			Mexican Exports		
	total m\$	to Mexico m\$	percent	total m\$	to USA m\$	percent
Total	203427.0	12850.5	6.3	23665.8	15555.5	65.7
Livestock	1878.4	253.7	13.5	149.4	143.9	96.3
Fish	913.5	19.4	2.1	356.6	337.5	94.6
Fruit, Vegetables, Cereals	441.3	11.0	2.5	623.6	463.7	74.4
Other agricultural products	12732.4	753.9	5.9	210.6	138.4	65.7
Coffee, sugar, spices	346.6	11.7	3.4	589.2	431.8	73.3
Beverages and Tobacco	2939.9	1.8	0.1	135.2	113.9	84.3
Non-metallic minerals	1051.3	57.8	5.5	171.0	93.9	54.9
Ores	2353.5	147.5	6.3	197.9	13.8	7.0
Petroleum	0.0	0.0	0.0	13012.0	6914.5	53.1
Refined Petroleum	4439.9	244.6	5.5	1151.1	962.4	83.6
Gas	710.1	293.8	41.4	134.0	62.2	46.4
Chemicals	21197.1	1395.0	6.6	730.7	327.8	44.9
Textiles	2342.1	170.3	7.3	191.1	151.6	79.4
Stone, Clay, Glass	1860.0	90.3	4.9	308.7	279.4	90.5
Iron and Steel	1221.4	177.1	14.5	185.2	131.9	71.2
Non-ferrous metals	2121.1	190.6	9.0	422.8	290.0	68.6
Fabricated metal products	2819.2	246.8	8.8	214.2	193.6	90.4
Non-electrical machinery	41373.7	2388.3	5.8	1572.9	1326.4	84.3
Electrical Machinery	21194.0	2318.1	10.9	1745.9	1692.5	96.9
Automobiles	19649.1	1408.1	7.2	446.4	362.7	81.2
Other transportation equipment	14774.7	247.3	1.7	90.6	77.0	85.0
Furniture	705.9	121.9	17.3	58.3	57.9	99.2
Footwear, leather, luggage	612.1	51.4	8.4	70.2	67.4	96.0
Apparel	721.9	157.2	21.8	146.1	143.8	98.4
Instruments	5036.0	201.4	4.0	173.7	141.0	81.2
Misc. Mfg.	10766.5	634.8	5.9	321.9	277.1	86.1

Source: Aggregated from data reported to the United Nations in SITC categories

The institutional changes for Mexico implicit in free trade are also much more sweeping than those for the US. In view of this disproportional significance for Mexico, we will review first the history of trade policy in Mexico and then turn to the specific aspects of US policy which would be most involved in a free trade treaty with Mexico.

Mexican Trade Policy

The protectionist tradition in Mexico is long and deep-rooted. Just the fact that, as of 1980, Mexico was not a member of GATT and publicly renounced any intentions of becoming one marked it as one of the most protectionist of the major market economies at that time. It had, like all of Latin America, inherited from colonial days the mercantilist tradition of eighteenth century Europe. In other Latin American countries, this tradition was broken soon after independence in the 1820's by the attractiveness of exchanging agricultural products for British manufactured goods in the major population centers which were also seaports. In Mexico, by contrast, the formidable natural barriers to importing foreign goods to the population centers in the central plateau reduced this pressure to break with the past. These barriers also kept alive into the middle of the 19th century handcraft industries which perished decades earlier in Venezuela, Brazil, and Argentina. In Mexico, there were even internal customs which were not eliminated until the building of the railroads. [Furtado] It was thus hardly surprising that as late as the 1830's Mexico imposed prohibitive duties on imports into Texas from the United States. These duties became one of the principal factors leading to the Texas rebellion in 1836.

As the railroads began to overcome the natural barriers, a new problem appeared. It arose from the nature of Mexico's exports -- primarily precious metals. These exports provided the wealthy with foreign exchange for purchasing imported manufactured goods but did not provide employment for Mexico's massive population. The situation was thus quite different from that of, say, Argentina, where the agricultural exports were labor-intensive and the population scarce. Faced with the elimination of its artisan industries without alternative sources of employment, it is hardly surprising that Mexico maintained a determined effort to keep out foreign manufactures. It is probably also fair to say that a spirit of cooperation with the neighbor to the north was not encouraged by the memory of Mexico's humiliating defeat in 1847 and the forced sale of Texas, Arizona, New Mexico, and California.

In this century, oil began to replace silver as Mexico's principal export. In 1921, Mexico accounted for one quarter of the world's petroleum production. Competition from Venezuela then began to push down prices and drive out the Mexican producers. By 1938, Mexican production was a fifth of what it had been in 1921; and half of that went to the protected domestic market. The oil companies were largely foreign-owned and wanted to close down the Mexican industry with little regard for the social consequences in Mexico. When they ignored a Supreme Court order, the government nationalized the industry and created PEMEX, the state-owned petroleum monopoly. [Furtado]

This recent experience with foreign competition and capital was still no doubt fresh in the memories of many Mexicans when, in 1947 in a world trying to get away from the isolationism and protection of the 1930's, Mexico not only took no part in the General Agreement on Tariffs and Trade (GATT) but instituted a new system of "previous permissions" or licenses for imports. In 1972, it limited foreign investors to a 49 percent share in any firm producing in Mexico. The old fear of the elimination of the handcraft industry was transmuted into a fear of being turned

into a sweatshop for cheap-labor industries, while the industries with skilled, highly-paid labor forces would remain abroad. The policies which resulted were intended to protect -- and thereby promote -- these "up-scale" industries while offering low prices on the basic products.

By 1979, the earliest year of a comprehensive price comparison between the US and Mexico, Mexican prices had, indeed, the pattern required by such a strategy. [Ten Kate, 1989a] Prices of basic products and low-cost foods were lower in Mexico than in the United States by such percentages as:

Non-ferrous ores	4	Tobacco	27
Agriculture	5	Basic organic chemicals	42
Corn meal	8	Sugar	48
Wood	12	Refined petroleum	54
Pesticides and fertilizers	18	Coal	55
Iron ore	22	Soft drinks	60
Beer	23	Petroleum	74
Wheat flour	24		

It is interesting to note that the state petroleum monopoly was offering highly advantageous prices. Clearly, Mexican industries and consumers were being insulated from the effects of the oil shocks. At the same time, the up-scale, high-skill industries were enjoying prices considerably higher than comparable products in the US by such percentages as:

Textiles	1	Electrical machinery	17
Leather and footwear	7	Non-electrical machinery	20
Meat and milk products	9	Paper and board	20
Preserved fruits and vegetables	9	Clothing	24
Coffee	9	Plastic resins, san. fibers	29
Non-ferrous metals	11	Home appliances	36
Basic chemicals	12	Plastic products	40
Metallic furniture	14	Automobiles	42
Rubber products	16	Electronic goods	58

The weighted average of the deviations was -1 percent, that is, Mexican prices were one percent lower than US prices. The combination of tariffs, import licensing, and official ceiling prices had produced the pattern of price "distortions" the strategy called for. If it did not produce the desired results, it was not because the price manipulating-tools had failed in their job.

In the last half of the 1970's, there was some liberalization. Oil revenues were pouring in; the balance of payments was in good shape; Mexico announced some intention of joining GATT. All these factors led to a gradual reduction of the number of products requiring previous permission for importation.

By 1980, however, there was growing concern about the cost of debt service and uncertainty about the future of petroleum prices. The Mexican government responded in the traditional way: it decided to give up the GATT application and to increase the number of products subject to import licensing. From covering products accounting for 64 percent of domestic production in April of 1980, the licensing was extended to cover 70.5 percent of products by December 1981. In 1982, the peso fell from 25 per dollar at the beginning of the year to 100 (official rate) or 150 (free rate) by the end of the year. Inflation was only about 100 percent, so the cost of US goods to Mexicans went up sharply, while the cost of Mexican goods in US dollars dropped by half or more. The Mexican government, however, was not prepared to wait for effects of these measures. In its interventionist tradition, it extended the import licensing to all products in September of 1982. It further controlled what products were imported by the way in which the financial authorities allocated the scarce foreign currency at official rates. Imports fell from \$6.0 billion in the fourth quarter of 1981 to \$1.6 in the first quarter of 1983.

As the balance of payments crisis eased, there was, between 1983 and the middle of 1985, only a slight reduction in the import licensing. Though 3,500 of the total 8,100 customs categories were relieved of licensing, they represented a mere eight percent of domestic production. Tariffs were also increased to an average of 23.5 percent with a maximum of 100 percent on some items. Despite this continued restriction of trade, the balance of payments grew worse in mid 1985. The reserves of the Bank of Mexico were nearly exhausted.

Then the totally unexpected happened. Altogether new thinking emerged in Mexican trade policy. To this new thinking, it was clear that the old ways had not worked; all the regulations and price distortions had not made Mexico into the modern, high-wage industrial country it aspired to be. Indeed, it seemed to be moving away from rather than toward that goal. It was time to try another route. And thus, against all previous precedent, liberalization came at the height of a crisis. In July, import licensing was dropped on 3,600 categories, covering 45 percent of domestic production. To avoid a flood of imports, tariffs were raised slightly to an average of 28.5 percent, and the official exchange rate was devalued 22 percent. "For the first time, it was implicitly recognized that policies restricting imports were not the appropriate way to maintain equilibrium in the balance of payments. The exchange rate was given the role it deserves. In effect, the reforms of July 1985 represent the definitive abandonment of the model of import substitution that had dominated the economic policy of Mexico from the second world war to the mid seventies." [Ten Kate, 1989a, page 323].

Import licensing remained on certain agricultural products, crude and refined petroleum, and most consumer goods such as food, beverages, clothing, shoes, medicines, household appliances, and automobiles. But other changes followed quickly. In the summer of 1986, Mexico joined GATT. Tariffs were lowered to an average of 24.5 percent with a maximum of 50 percent. Official prices were repealed on most goods. Import licensing was eliminated on wood products, metal furniture, some electrical machinery and some auto parts. Coverage of domestic production by import licensing fell from 47.1 percent to 39.8 percent. Only one

industry (auto parts) was compensated for the loss of licensing by an increase in tariffs. This liberalization continued despite falls in oil prices.

In the course of 1987, partly as an anti-inflation measure, import licensing was removed on more products including beverages, medicines, cosmetics, plastic products, home appliances, and some electronic products. By May of 1988, only a "hard core" of 23 percent of domestic production was protected by import licensing. Ironically, this list was composed largely of such "high-tech" industries as Agriculture, Fishing, Meat and milk products, Coffee, Sugar, Tobacco, and Fats and oils. It also contained included Crude oil, Petroleum products, Automobiles, and computers. Personal computers came off the list in the spring of 1990. Tariffs were further reduced so that 20 percent became the maximum rate.

The first group of products still requiring import licensing reflects no doubt concern over "dumping" in Mexico of agriculturally based products in excess supply on world markets. Petroleum and products were presumably on the list because PEMEX officials remembered what had happened to the Mexican industry in the 1920's and 30's and wanted to take no chances on it happening again in the 1980's as world oil prices fell. Automobiles were on the list for reasons connected with a special chapter in the history of Mexican trade policy, the *maquiladoras*.

In 1965, Mexico authorized the virtually unlimited importation without duty of parts or materials for assembly and re-export. The imported pieces were kept in bonded areas to insure that they did not escape into the general market to compete with domestic products. The Spanish word for such an in-bond assembly plant is *maquiladora*, a word which has caught on in English so thoroughly that we will use it hereafter without italics. Initially, the maquiladoras were limited to a 20 kilometer strip along the northern border, but this restriction was removed in 1972. In 1987, however, 82 percent were still located along the border. In December 1989, in the estimates of Mexican officials, there were 1,674 maquiladoras employing 440,000 people. [Schoepfle, 1990b, p. 7] "From 1983-87, US imports of assembled products from Mexico grew at an average rate of 21 percent, compared to a rate of four percent for all U.S. imports from Mexico...." [Schoepfle, 1990a, p.33]. Since 1965, permission for 100-percent foreign ownership was granted to establishments assembling products in Mexico and exporting the entire output. (Permission to market up to 40 percent of the product in Mexico in granted in some cases.) The US, for its part, has a standard policy of charging duty only on the value added outside the country; and, indeed, as we shall see below, has adopted other policies which encourage the maquiladora. These products are frequently referred to as "807" products after a section of the US Tariff Schedule which permits products assembled abroad to re-enter the US without tariffs on the US-made components. While very successful in business terms, the maquiladoras are coming to present a major social problem. The wages are low, about \$4 to \$6 a day; prices in the area are high for Mexico; the population of the border zone has far outgrown its infrastructure of roads, water and sanitary service; and housing is often just sheds made of crates and cardboard.

The automotive industry is a special case in its relation to the maquiladora system. Essentially, there are two automobile industries in Mexico, one for export and one for domestic sales. The domestic one is heavily protected with prohibitions on imports of new and most used vehicles. The government specifies the types of cars to be produced for the domestic market, the number of lines to be operated, and high domestic content requirements. The export industry is much freer in its financing and operation. The result is that the industry supplying the domestic market produces low quality vehicles at high cost while the same firms operate other plants, such as the Ford plant at Hermosillo, producing high quality cars at prices competitive on the world market. The fact that protection had provided Mexicans with second-rate cars at high prices while the growth in employment in the auto industry was coming in the less regulated export segment was, in late 1989, moving the Mexican government toward removing import licensing on passenger cars.

The Mexican protection which constitutes the point of departure for our study of the impacts of a free trade agreement is summarized in Table 2. For each trading sector of the Mimex input-output model, it shows the average ad valorem tariff and the percent of production covered by import licensing.

Table 2: Mexican Import Licensing and Tariffs -- May 1988

	Tariffs	Licensing		Tariffs	Licensing
01 Crops	6.0	63.0	31 Paper and paperboard	5.3	0.6
02 Livestock	5.3	7.5	32 Printing	3.9	0.0
03 Forestry	9.7	0.0	33 Petroleum refining	1.1	87.2
04 Fishing and hunting	19.7	63.3	34 Basic petrochemicals	1.7	0
05 Coal	7.5	0.0	35 Basic inorganic chemicals	8.9	39 0.3
06 Crude oil and gas	0.0	100.0	36 Pesticides and fertilizers	3.3	0.0
07 Ferrous mining	0.0	0.0	37 Plastic resins, san. fibre	12.1	0.0
08 Non-ferrous mining	11.2	0.0	38 Pharmaceuticals	16.4	12.0
09 Stone, sand, gravel, clay	8.6	0.0	39 Cleaning and toilet prep.	18.7	0.0
10 Oth. non-metal minerals	3.4	0.0	40 Other chemicals	12.1	7.4
11 Meat and milk products	5.8	23.5	41 Rubber products	16.2	0.0
12 Prepared fruits and vegetables	9.1	0.0	42 Plastic products	17.8	0.0
13 Wheat milling	18.3	0.0	43 Glass	13.8	0.3
14 Corn milling	19.5	0.0	44 Cement	10.0	0.0
15 Coffee	20.0	99.7	45 Ceramics	16.1	3.5
16 Sugar	0.7	90.0	46 Steel	4.2	0.0
17 Fats and oils	4.8	57.0	47 Non-ferrous metals	10.9	0.0
18 Food for animals	9.9	0	48 Metal furniture	17.9	0.0
19 Other food products	16.2	8.8	49 Structural metal products	16.1	0
20 Alcoholic beverages	19.9	0	50 Fabricated metal products	14.4	1.4
21 Beer and malt	19.4	5.6	51 Non-electrical machinery	15.0	3.6
22 Soft drinks and flavorings	19.7	2.1	52 Electrical machinery	16.9	0.0
23 Tobacco products	20.0	100.0	53 Household appliances	19.8	0.0
24 Cotton, wool, san. textiles	13.8	1.9	54 Electronic equipment	17.5	0.0
25 Jute, rough textiles	11.7	1.2	55 Other electrical equip	15.6	0.0
26 Fabricated textile products	18.3	4.2	56 Automobiles	17.2	95.1
27 Apparel	20.0	0	57 Autoparts	13.2	12.8
28 Leather and footwear	16.8	0	58 Other transportation equip	6.3	2.8
29 Lumber, plywood	13.5	0	59 Misc. manufacturing	17.6	0.0
30 Other wood products	19.2	0	Average	11.0	23.2

The "Tariffs" column shows the average ad valorem tariff for the sector, while the "Licensing" column shows the percentage of domestic production protected by licensing.

Source: Adriaan Ten Kate and Fernando de Mateo Venturini, "Apertura comercial y estructura de la proteccion in Mexico." *Comercio Exterior*, Abril de 1989, cuadros 7 and 9.

US Barriers to Mexican Imports

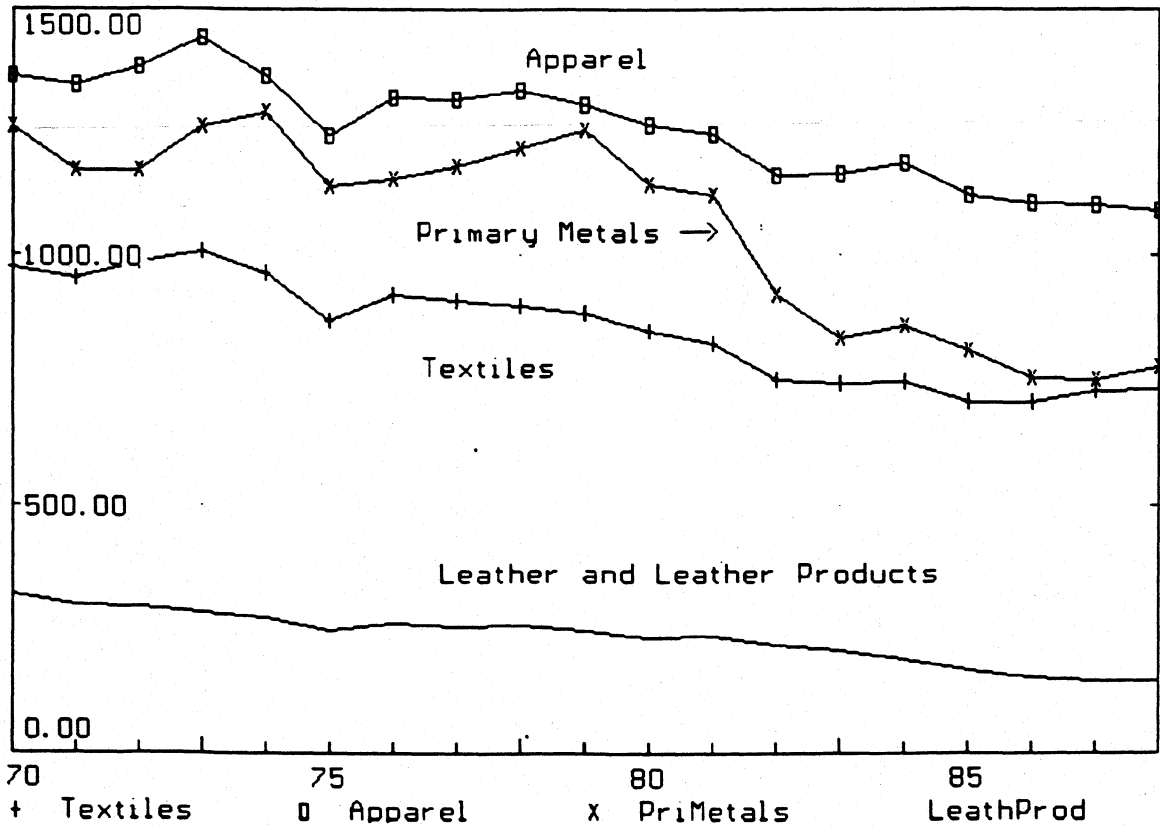
Like Mexico, the US maintains both tariff and non-tariff barriers to trade with Mexico. The tariff barriers are the simplest and are summarized in Table 3.

Table 3: US Imports and Calculated Duties by LIFT Sectors -- Jan - May 1988
millions of dollars

LIFT sector	Total	Duty Free	Dutiable	Duty	Duty as % of	
					Dutiable	Total
01 Agriculture, Forestry, Fish	9505.0	5740.5	3764.5	242.02	6.429	2.546
02 Iron ore mining	170.6	170.6	0	0	0	0
03 Nonferrous ore mining	659.7	624.7	35	1.01	2.886	0.153
04 Coal						
05 Gas Extraction	1198.4	1198.4	0	0	0	0
06 Crude Petroleum	16020.5	413.3	15607.2	122	0.782	0.762
07 Non-metallic minerals	154.6	89.7	64.9	2.1	3.236	1.358
08 Construction						
09 Food and Tobacco	1760.4	266.4	1494	67.9	4.545	3.857
10 Textiles, exc knits	2615.2	183.5	2431.7	265.1	10.902	10.137
11 Knitting						
12 Apparel	7917.4	177.4	7740	1446.8	18.693	18.274
13 Paper	3464.3	2840.8	623.5	21.1	3.384	0.609
14 Printing and Publishing	608.1	525.1	83	2.4	2.892	0.395
15 Agricultural chemicals, exc	535.6	535.6	0	0	0	0
16 Chemicals, exc agric.	5013.1	1681.6	3331.5	234.2	7.030	4.672
17 Petroleum refining						
18 Fuel oil						
19 Rubber products	987.4	84.1	903.3	38.1	4.218	3.859
20 Plastic products						
21 Shoes and leather	3441.9	93	3348.9	345.5	10.317	10.038
22 Lumber	2843.4	2522.3	321.1	20	6.229	0.703
23 Furniture						
24 Stone, clay, and glass	1138.2	312	826.2	78.3	9.477	6.879
25 Ferrous metals	4647.8	204.8	4443	205.5	4.625	4.421
26 Copper	850.2	138.1	712.1	10	1.404	1.176
27 Other non-ferrous metals	9380.2	5176.3	4203.9	165.7	3.942	1.766
28 Metal products						
29 Engines and turbines	4421.8	2306.1	2115.7	77.3	3.654	1.748
30 Agricultural machinery	1511.6	1447.8	63.8	2.2	3.448	0.146
31 Constr., mining, oilfield eq						
32 Metalworking machinery	1353.5	115.3	1238.2	52.1	4.208	3.849
33 Special industry machinery	895.7	80.4	815.3	27.7	3.398	3.093
34 Misc. non-electrical mach	5245	1057.3	4187.7	163.6	3.907	3.119
35 Computers	8624.1	3904.1	4720	178.2	3.775	2.066
36 Other office equipment	210.5	66.2	144.3	4	2.772	1.900
37 Service industry machinery						
38 Communic eq and electronic comp						
39 Elec incl apparatus						
40 Household appliances						
41 Elec lighting & wiring eq,	11594.2	5333.7	6260.5	281.3	4.493	2.426
42 TV sets, radios, phonograph	7810	803	7007	338.6	4.832	4.335
43 Motor vehicles	31281.2	10457.6	20823.6	516.4	2.480	1.651
44 Aerospace	2055.1	2054.2	0.9	0.2	22.222	0.010
45 Ships, boats						
46 Other transportation equipment						
47 Instruments	2671.4	585.1	2086.3	93.8	4.496	3.511
48 Misc. manufacturing	2223	557.6	1665.4	96.8	5.812	4.354

Source of Data: Census Bureau FT-990, November 1988

Employment in Declining Industries



The origins of the US non-tariff barriers are easily seen in the graph above showing employment in the US textile, apparel, primary metal, and leather industries. Between 1974, the first year of the Multi Fiber Agreement, and 1988, employment (in thousands of persons) in these industries changed as follows:

	1974	1988	Drop
Textiles	965	729	136
Apparel	1363	1092	271
Primary Metals	1289	773	516
Leather and Products	271	144	127

Source: Bureau of Labor Statistics data tapes

Employment in the aggregate of other US manufacturing industries increased over this period. It is these drops in employment which explain why the barriers have been erected.

The US Barrier to Textiles and Apparel

The import quota system which protects the US textile and apparel industry is a series of bilateral agreements negotiated under the Multi Fiber Agreement (MFA), itself negotiated under GATT. The origins of the MFA go back at least to 1962, when an agreement concerning only cotton textiles was arranged under GATT. Over the next ten years, restrictive agreements on trade in textiles made of other fibers were reached. In 1973, these were unified into a single Multi Fiber Agreement, which was to be effective for four years, beginning January 1, 1974. It has been repeatedly renewed, the last renewal being on July 31, 1986 and extending it through July 31, 1991. The MFA does not itself set quotas. Rather it sets up a framework for the negotiation of specific restrictions. It explicitly recognizes that the agreements it sanctions are "exceptional", desperation measures to prevent the complete elimination of the textile industry in importing countries. Specifically,

... since measures taken under this Arrangement are intended to deal with the special problems of textile products, such measures should be considered as exceptional, and not lending themselves to applications in other fields.

The quotas are authorized where market "disruption" exists. Appendix A of the MFA explains that "disruption" exists where there is "a sharp and substantial increase or imminent increase of imports of particular products from particular sources" caused by the fact that "these products are offered at prices which are substantially below those prevailing for similar goods of comparable quality in the market of the importing country." Appendix B of the MFA provides that the quotas should grow by six percent per year, except where such growth rates would "damage" the importing country's "minimum viable production."

In fact, imports have been allowed to grow, especially since about 1980 and, as the graph above shows, employment has decreased steadily in the domestic Textile and Apparel industries, although industrial production in both industries has increased by about a quarter over the period.

In 1988, a new "special regime" was created for products "assembled in the United Mexican States from fabrics wholly formed and cut in the United States." This "special regime" expanded the "maquiladora" or "in-bond" industry described above. The special regime sets a maximum, in physical units, on the imports of a particular item and then sets a maximum fraction of this total which can be made with non-US fabric. The 1988 quota levels under the new Special Regime are, on average, 63 percent above the quotas for 1987. The women's coats quota rose by 200 percent; the underwear quota, by 212 percent; the nightwear quota, by 156 percent.

An extensive bureaucracy and computer system has been set up to handle this program on the US side. Most of the goods move out of the US in trucks and return in trucks, so many small shipments are involved. When each truck returns, it has to be possible to pull up the records on the shipment and verify that it is indeed made of the cut parts which were sent out. On the Mexican side, there has to be some sort of allocation mechanism to distribute the rights to export under the quotas. The agreement specifies only that the "government of the United

Mexican States" will make this allocation, not how it will be done. Mechanically, it is done by a "visa" stamp on the papers accompanying the shipment, but we have so far been unable to learn how it is decided which applicants get the visas and which do not. The quotas are nearly all filled to within a few percent, so it appears that they are binding. If we could somehow learn the "market price" of a quota allocation, we would have a handle on the welfare cost of the restriction. No one has encouraged us to believe that it is possible to find that price easily and safely in Mexico, though in Hong Kong these visas are sold at a public auction.

The US Barrier to Steel

The barrier to steel has the form of one of the 28 "voluntary export restraint" (VER) agreements currently in force. This one was originally negotiated for the period October 1, 1984 through September 30, 1989 for the ostensible purpose of "creating a period of trade stability in order to facilitate industry modernization." The agreement has been renewed, but the new agreement was not yet available for study in early October 1989. The agreement was remarkable chiefly for the small amounts involved. Specifically, it limits US imports of Mexican steel to the following percentages of the "projected U.S. Apparent Consumption" [Steel VER]:

Hot-rolled sheet and strip	0.05
Cold-rolled sheet and strip	0.09
Other sheet and strip	0.28
Plate	0.32
Structurals	0.21
Wire rod	1.16
Bar	0.13
Standard pipe	2.40
Line pipe	2.00
OCTG	2.00
Other pipe and tube	0.35
Wire and wire products	0.45

The percentages essentially locked in place the shares of the Mexico in the US market. With these tiny percentages, it is clear that imports from Mexico were not responsible for the massive drops noted above in employment in the US steel industry. This VER was simply part of a comprehensive plan of protection for the US Steel Industry.

Free trade in steel between the USA and Mexico in steel would certainly lead to increases in US imports of Mexican steel, but would not threaten the existence of the US industry. The tricky part of such an agreement would be insuring that Mexico did not become a channel for non-Mexican steel entering the otherwise stoutly protected US market.

CHAPTER III

PRICE ELASTICITIES OF MEXICAN IMPORTS AND NOMINAL PROTECTION 1980-1987

In the previous chapter, we have seen that Mexican trade policy changed radically during the 1980's. In this chapter, we shall look at what those changes, coupled with massive, ten-fold inflation and even more massive devaluation of the peso, did to the relative prices of products in Mexico and the United States. We also examine the ratio of Mexican imports to Mexican outputs in the industrial classification used for the Mimex model.

The relative prices which we show are those developed by Adriaan Ten Kate and Fernando de Mateo Venturini of the Secretario de Comercio y Fomento Industrial [Ten Kate 1989a]. These data cover the year 1979 -1981 and (quarterly) 1984-1987. The years 1982 and 1983 are not covered; in our graphs, the data for those years are filled in by interpolation. The indexes of relative prices are based on a detailed comparison of prices for 917 products. In the later period, the prices compared to the Mexican price were, in 75 percent of the cases, US internal prices. In 15 percent of the cases, the comparison was with unit values in international trade; in 5 percent, with international price quotations; and in 5 percent, other sources.

The accompanying graphs show these series marked by +'.s. They also show the index (with 1985 = 100) of the ratio of imports to domestic output for the sectors of MIMEX which have imports. This second series is marked with squares. A third series, marked with x's and a dotted line, shows the index (with 1985 = 100) of the ratio of US exports to Mexico to Mexican domestic output. It is derived from US export data, and the bridging to the Mexican sectors is no doubt imperfect, for it exceeds total imports for some sectors. Nevertheless, the index may be of interest. Table 1 shows the ratio (multiplied by 100) of the Mexican imports to domestic output. These are the absolute numbers back of the indexes shown in the graphs with the line marked by squares. Table 2 shows the relative prices.

The briefest perusal of these graphs reveals that, with the single exception of Textiles, Mexican prices fell relative to foreign prices between 1980-81 and 1987. This sharp fall in prices has prompted Ten Kate and de Mateo to distinguish between "commercial protection" achieved by tariffs, quotas, import licensing and the like, and "exchange rate protection" achieved by undervaluation of the currency. Strangely, these two types of protection are marked by opposite ratios of domestic to foreign prices. Commercial protection leads to domestic prices above the foreign price, whereas exchange-rate protection is characterized by prices below those abroad because of an undervalued currency. Both tariffs and an undervalued currency give domestic producers a captive home market. Mexico has switched from heavy commercial protection of the industries it wanted to promote to exchange-rate protection of industries it probably never intended to promote. Quite possibly this coming apart of the nice structure of protection has been one stimulus to give up the system altogether.

Table III - 1: Imports as percent of Domestic Output in Mexico

	1980	1981	1982	1983	1984	1985	1986	1987
01 Crops	15.9	14.2	8.5	18.7	14.5	8.7	7.7	7.9
02 Livestock	0.8	1.2	1.2	0.5	1.0	1.2	1.5	1.0
03 Forestry	10.6	8.2	6.8	9.1	8.2	6.0	7.7	13.1
04 Fishing and hunting	0.2	0.5	0.4	0.2	0.3	0.5	0.6	0.6
05 Coal	19.7	13.9	16.9	8.8	8.0	7.6	10.9	8.4
06 Crude oil and gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07 Ferrous mining	4.4	3.8	0.0	0.0	0.0	1.8	2.5	0.9
08 Non-ferrous mining	7.2	6.5	4.6	4.8	5.5	5.0	3.8	4.4
09 Stone, sand, gravel, clay	3.8	3.3	3.3	3.1	3.4	4.9	6.0	9.0
10 Oth. non-metal minerals	21.8	27.1	29.2	18.8	21.1	19.2	18.0	29.1
11 Meat and milk products	3.9	4.2	4.0	3.3	3.4	3.6	4.6	5.5
12 Prepared fruits and vegetable	4.0	5.7	4.1	1.6	1.3	2.4	2.8	2.5
13 Wheat milling	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 Corn milling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 Coffee	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16 Sugar	39.9	21.6	15.9	17.7	5.3	1.3	0.0	0.0
17 Fats and oils	8.4	5.8	9.3	5.6	7.9	6.7	8.7	6.5
18 Food for animals	2.2	1.8	1.4	1.0	0.6	1.3	1.9	1.2
19 Other food products	3.9	3.4	2.2	1.4	2.7	2.8	3.0	4.6
20 Alcoholic beverages	6.8	5.6	3.3	0.4	0.4	1.1	1.5	2.8
21 Beer and malt	0.4	0.5	0.4	0.5	0.4	0.4	0.5	1.1
22 Soft drinks and flavorings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23 Tobacco products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24 Cotton, wool, syn. textiles	2.1	2.1	2.2	0.8	1.4	2.4	3.1	3.7
25 Jute, rough textiles	2.1	3.6	2.5	2.7	5.5	11.5	10.8	10.4
26 Fabricated textile products	5.2	4.7	3.6	0.7	0.9	1.3	1.7	2.3
27 Apparel	3.4	4.8	4.8	0.9	1.3	1.6	2.0	2.1
28 Leather and footwear	0.9	1.3	0.6	0.5	0.6	0.5	0.6	0.9
29 Lumber, plywood	4.8	5.3	4.7	3.6	3.5	3.8	5.3	6.2
30 Other wood products	1.3	0.8	0.6	0.4	0.4	0.6	0.7	0.6
31 Paper and paperboard	18.8	15.8	14.4	13.1	12.6	14.1	16.5	20.0
32 Printing	4.9	6.5	5.9	2.6	3.1	5.0	6.1	4.7
33 Petroleum refining	12.2	11.8	13.8	17.6	29.0	22.5	22.2	23.9
34 Basic petrochemicals	69.3	65.2	44.0	55.5	61.6	50.8	53.0	50.8
35 Basic inorganic chemicals	54.6	41.0	30.3	24.4	25.1	27.5	28.5	30.5
36 Pesticides and fertilizers	22.9	27.5	22.1	15.8	23.1	15.4	14.4	7.0
37 Plastic resins, syn. fiber	22.1	21.0	19.2	16.7	15.6	17.5	19.3	17.7
38 Medicinal products	11.5	10.6	10.4	11.0	11.6	12.8	13.5	12.3
39 Cleaning and toilet prep.	3.2	2.8	1.7	0.5	0.5	0.7	0.9	0.8
40 Other chemicals	14.8	12.8	11.4	11.7	11.8	12.8	14.9	16.7
41 Rubber products	9.4	15.1	6.8	3.8	3.9	5.0	6.9	6.8
42 Plastic products	6.0	5.5	4.9	4.6	5.2	9.9	12.1	9.8
43 Glass	5.1	5.9	4.8	2.4	3.1	3.9	4.8	5.1
44 Cement	2.3	2.3	1.5	0.7	0.6	0.6	0.6	0.7
45 Ceramics	3.5	2.9	2.3	1.4	1.9	2.3	3.0	3.0
46 Steel	29.7	26.5	17.4	9.7	10.1	10.6	12.1	10.6
47 Non-ferrous metals	24.8	33.5	19.0	10.4	19.0	17.1	17.7	16.2
48 Metal furniture	0.4	0.5	0.6	0.2	0.4	0.7	1.0	0.8
49 Structural metal products	10.9	11.7	5.3	3.4	4.0	4.1	5.4	4.1
50 Fabricated metal products	20.6	25.1	18.8	11.9	14.5	18.1	21.2	18.5
51 Non-electrical machinery.	132.2	146.1	124.8	85.1	89.0	95.4	130.4	116.0
52 Electrical machinery	30.7	35.7	32.8	30.5	33.8	38.0	46.5	30.6
53 Household appliances	4.1	3.2	2.2	1.0	1.2	2.3	3.1	4.3
54 Electronic equipment	24.3	27.9	29.0	18.7	25.6	47.2	56.2	49.4
55 Other electrical equip	34.4	30.6	31.6	28.8	37.6	57.6	71.9	44.1
56 Automobiles	8.9	8.1	4.4	5.3	2.7	2.4	3.4	3.3
57 Autoparts	69.8	70.8	54.5	44.3	34.9	35.1	46.3	65.1
58 Other transportation equip	101.0	116.6	98.5	120.3	111.4	115.3	160.1	123.1
59 Misc. manufacturing	36.7	42.1	33.6	23.5	25.5	37.7	47.0	45.6
61 Electricity	0.3	0.3	0.1	0.1	0.1	0.4	0.4	0.5
65 Communication	4.0	3.9	4.7	5.7	4.1	4.8	4.8	4.1
66 Financial services	14.6	14.2	21.4	18.3	14.7	13.3	13.4	12.6
68 Professional services	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.0
71 Amusements	2.0	3.1	0.6	0.5	0.3	0.3	0.3	0.3
72 Other services	0.4	0.5	0.6	1.0	1.1	1.0	1.2	1.2

Source: Mimex

Table III-2: Mexican Prices Relative to Foreign Prices

	1980	1981	1984	1985	1986	1987
01 Crops	113.0	123.0	90.5	98.8	84.2	93.8
02 Livestock	114.0	131.0	101.5	112.0	82.5	80.2
03 Forestry	102.0	126.0	77.8	93.8	65.5	53.0
04 Fishing and hunting	97.0	98.0	93.5	95.2	87.0	102.8
05 Coal	47.0	49.0	98.2	89.5	80.8	77.2
06 Crude oil and gas	12.0	11.0	24.2	27.5	50.8	46.8
07 Ferrrous mining	81.0	102.0	98.0	97.8	97.5	100.0
08 Non-ferrous mining	98.5	101.0	101.8	101.5	103.2	104.2
09 Stone, sand, gravel, clay	100.0	114.0	100.0	100.0	100.0	100.0
10 Oth. non-metal minerals	88.0	89.0	63.2	90.5	83.2	73.8
11 Meat and milk products	121.0	160.0	100.5	110.2	80.0	81.5
12 Prepared fruits and vegetable	108.0	117.0	84.2	89.0	73.2	68.8
13 Wheat milling	75.0	61.0	64.0	69.5	59.2	63.8
14 Corn milling	94.0	80.0	27.0	26.8	24.8	27.5
15 Coffee	112.0	102.0	54.8	59.8	71.2	66.8
16 Sugar	85.0	95.0	69.8	70.8	53.2	52.0
17 Fats and oils	116.0	115.0	88.5	91.5	94.5	85.0
18 Food for animals	103.0	115.0	54.8	78.5	52.2	38.5
19 Other food products	115.0	139.0	81.5	86.8	63.2	67.5
20 Alcoholic beverages	140.0	143.0	56.2	66.0	48.0	41.8
21 Beer and malt	75.7	74.4	70.5	70.8	51.2	47.8
22 Soft drinks and flavorings	63.0	75.0	56.5	57.8	49.0	61.8
23 Tobacco products	70.0	66.0	54.2	53.8	47.8	52.0
24 Cotton, wool, syn. textiles	106.0	109.0	159.8	187.5	152.5	181.5
25 Jute, rough textiles	120.0	117.0	69.8	78.5	85.5	94.2
26 Fabricated textile products	112.0	128.0	76.5	74.2	61.8	73.5
27 Apparel	139.0	171.0	92.5	93.8	73.2	75.2
28 Leather and footwear	120.0	157.0	57.5	65.0	47.0	54.2
29 Lumber, plywood	118.0	107.0	115.8	144.5	101.0	89.8
30 Other wood products	130.0	153.0	64.5	64.2	72.5	48.5
31 Paper and paperboard	129.0	131.0	93.8	97.0	70.5	92.0
32 Printing	100.0	108.0	68.5	60.2	48.8	53.8
33 Petroleum refining	32.0	24.0	57.5	59.2	82.0	72.2
34 Basic petrochemicals	59.0	37.0	80.0	79.8	74.8	84.5
35 Basic inorganic chemicals	117.0	141.0	107.8	104.8	99.0	86.8
36 Pesticides and fertilizers	67.0	58.0	73.0	74.8	73.8	68.0
37 Plastic resins, syn. fibre	138.0	117.0	124.5	128.0	94.5	96.5
38 Medicinal products	118.0	122.0	50.5	53.2	44.8	51.0
39 Cleaning and toilet prep.	109.0	104.0	92.5	91.8	71.0	75.8
40 Other chemicals	124.0	124.0	121.0	115.5	91.8	108.2
41 Rubber products	144.0	168.0	127.8	129.5	99.0	104.2
42 Plastic products	170.0	185.0	79.5	91.8	78.2	79.8
43 Glass	104.0	106.0	75.2	77.2	60.0	55.0
44 Cement	100.0	100.0	107.8	124.8	119.0	125.5
45 Ceramics	111.0	106.0	81.2	82.5	64.0	67.2
46 Steel	105.0	109.0	107.8	103.8	84.8	84.0
47 Non-ferrous metals	113.0	123.0	99.5	97.5	92.5	100.0
48 Metal furniture	136.0	157.0	77.8	70.8	55.5	61.2
49 Structural metal products	116.0	134.0	132.2	120.5	98.2	106.5
50 Fabricated metal products	123.0	135.0	85.2	80.8	66.5	67.2
51 Non-electrical machinery.	132.0	141.0	123.8	116.0	84.2	88.0
52 Electrical machinery	129.0	143.0	162.5	150.0	120.2	131.2
53 Household appliances	149.0	157.0	126.5	127.2	95.5	105.8
54 Electronic equipment	183.0	213.0	117.2	112.8	86.5	103.2
55 Other electrical equip	146.0	152.0	73.8	71.0	59.8	80.8
56 Automobiles	157.0	159.0	117.5	113.8	85.5	89.8
57 Autoparts	114.0	120.0	130.5	131.0	105.2	114.2
58 Other transportation equip	130.0	154.0	152.0	145.0	98.5	113.5
59 Misc. manufacturing	135.0	141.0	56.2	55.0	42.0	43.5

Source: Ten Kate and de Mateo

For estimating price elasticities of imports, the industries of Mimex fall into four groups according to the history of these price ratios. The first is a small group of crude materials in which the Mexican price has consistently remained equal to the comparable foreign price. This group includes Ferrous mining, Non-ferrous mining, Stone, sand, gravel, clay, Cement, and Steel. (As usual, we capitalize only the first letter of the first word of a sector title.) Clearly no import price elasticities can be estimated for this group since there is no variation in the independent variable, the price ratio.

The second group has Mexican prices above the foreign or international price and rising relative to it. There is only one industry in this class: Cotton, wool, and synthetic textiles. (This sector excludes jute, hemp and other "hard fiber" textiles.) The domestic price started 6 percent above the foreign price in 1980, rose to 9 percent above the next year, then to 36 percent above in the first quarter of 1984, reached a maximum of 97 percent above in the first quarter of 1985, then slid to 45 percent above at the end of 1986, but climbed back to 85 percent above at the end of 1987. Despite the fact that domestic prices were rising relative to foreign prices, imports were slashed some sixty percent between 1982 and 1983 by import licensing. The relaxing of licensing, however, brought imports back to the 1980 relation to domestic production by 1985. By 1987, they had risen to 55 percent above the 1980 ratio, while prices averaged about 75 percent above the 1980 ratio. This would seem to suggest an elasticity of about -0.7 for the ratio of imports to domestic demand as a function of foreign prices relative to Mexican prices. If, however, we allow for incomplete adjustment in 1987, a value of -1.0 may be appropriate.

In both the third and fourth groups, the Mexican price has fallen relative to the foreign price from 1981 to 1987, except, possibly, for a slight rise in one year or another, usually 1985. In the third group, the imports are definitely lower relative to output in 1987 than in 1980 or 1981, so that a sensible price elasticity can be inferred. Usually the imports will have fallen sharply in 1982 and 1983 but then bounced back in the later years. If we assume that the high point of imports in 1980 or 1981 represents imports constrained only by tariffs (not by licensing) and that the 1987 results also reflect a similar situation, then we can make some very crude estimates of the elasticity of imports as a fraction of domestic production. The table below shows such a calculation for these sectors "group 3" sectors. The first column shows 100 times the change in the logarithm of the ratio of imports to domestic production, the second shows 100 times the change in the logarithm of foreign prices relative to Mexican prices, and the last shows the implied elasticity of imports as a fraction of domestic production. The last two columns show the percent of domestic production falling in tariff lines covered by import licensing in April 1980 and December 1987. All show less licensing in 1987 than in 1980; without licensing in 1980, the imports would have been then been greater, the change in log share greater, and the estimated elasticity greater. Leather and Other wood products were especially affected by the reduction in licensing; since they have low estimated elasticities, it seems reasonable to revise them to -1.0.

	change log share	change log price	elas- ticity	% covered by licensing	
				1980	1987
Prepared fruits and veg	-37	26	-1.4	42.5	0.0
Alcoholic beverages	-36	48	-0.8	0.9	0.0
Fabricated textile prod.	-31	17	-1.9	40.3	18.1
Apparel	-35	35	-1.0	97.4	88.2
Leather and footwear	-19	45	-0.4	88.5	0.0
Other wood products	-38	49	-0.8	70.3	0.0
Basic inorganic chemicals	-26	21	-1.2	33.3	0.3
Rubber products	-35	18	-1.9	21.9	0.0

In the fourth group, despite the lower domestic prices, imports are up or strongly rising in 1987. It includes all other sectors. These sectors have been so dominated by variations in Mexican quantitative restrictions that there is little or no possibility of estimating import price elasticities from the available data. The effort to do so led to very small and often positive elasticities. For all of these items, we have despaired of even the crudest estimation from the historical data. We have simply made up the elasticities on grounds described below.

If we are going to make up the import functions, we need a very simple form of function. We have taken

$$m = m_0 p^\eta (d - m)$$

where m represents the imports of a sector, d represents the domestic demand for the product of the of the sector, and p is the ratio of foreign to domestic prices. (Statistically, $d = q - x + m$, where q is domestic output, x is export, and m is import. However, in the iterative solution of the input-output equations in the model, d is calculated as the sum of intermediate plus final demands except exports and imports. Thus, d is known at the time that m must be computed.) In the above formulation, m appears on both sides of the equation. It can be solved for m as:

$$m = [m_0 p^\eta / (1 + m_0 p^\eta)] d$$

This form makes it clear that imports will always be a fraction less than 1.0 of domestic demand. Had we taken as our basic equation

$$m = m_1 p^\eta d,$$

we would not have had this assurance. Sufficient changes in prices might then have led to imports in excess of domestic demand and possibly negative gross outputs. In the formula used, imports of a given product do not depend directly on the exports of that product. If, however, the product goes into producing products (including itself) which are exported, then the imports

depend upon exports.

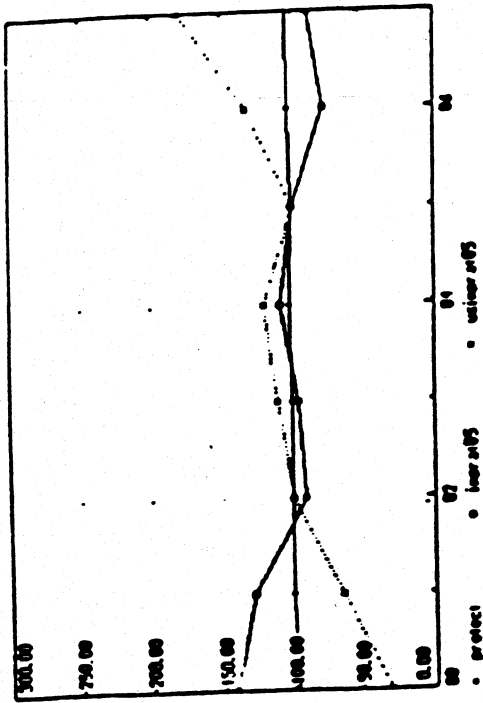
In making up the η for the various industries, we have several guides. First is the theoretical consideration that a devaluation should reduce a deficit in the balance of payments if exchange rates are to be at all stable. If the value of η for a particular industry is -1, the fall in the peso leaves unchanged the dollar value of the imports; only values of $\eta < -1$ would contribute to stability of exchange rates. Since real exchange rates do appear fairly stable, we presume that most of the η must be below -1 in algebraic value. A second guide is the group of half a dozen η for which we could make crude estimates. They seemed to indicate a range of roughly $-2 < \eta < -1$. Finally, there are the values of η estimated for the US model. Table III - 3 gives the estimates based on these considerations.

Table III - 3: Best Guesses of Mexican Import Price Elasticities

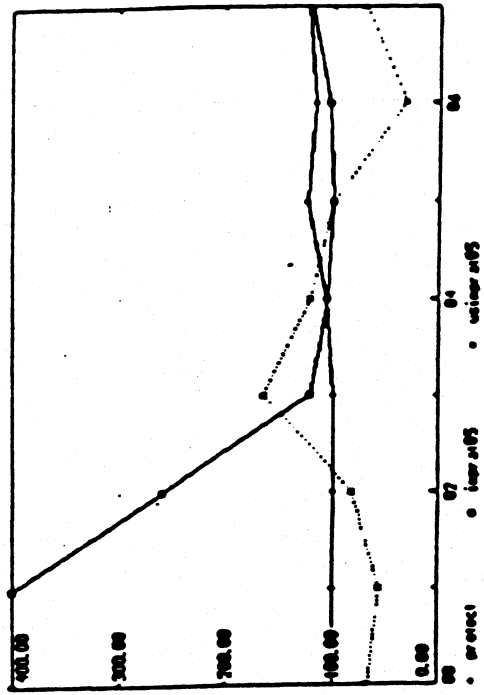
01 Crops	.5	31 Paper and paperboard	.6
02 Livestock	.5	32 Printing	1.5
03 Forestry	.5	33 Petroleum refining	.6
04 Fishing and hunting	.5	34 Basic petrochemicals	.5
05 Coal	1.0	35 Basic inorganic chemicals	1.2
06 Crude oil and gas	.5	36 Pesticides and fertilizers	1.0
07 Ferrous mining	.5	37 Plastic resins, syn. fibers	1.2
08 Non-ferrous mining	.8	38 Medicinal products	1.2
09 Stone, sand, gravel, clay	.5	39 Cleaning and toilet prep.	1.5
10 Oth. non-metal minerals	1.0	40 Other chemicals	1.5
11 Meat and milk products	1.0	41 Rubber products	1.9
12 Prepared fruits & vege.	1.4	42 Plastic products	2.0
13 Wheat milling	1.0	43 Glass	2.0
14 Corn milling	1.0	44 Cement	.5
15 Coffee	1.0	45 Ceramics	2.0
16 Sugar	1.0	46 Steel	1.5
17 Fats and oils	1.0	47 Non-ferrous metals	1.9
18 Food for animals	1.5	48 Metal furniture	2.0
19 Other food products	1.5	49 Structural metal products	1.0
20 Alcoholic beverages	.8	50 Fabricated metal products	2.0
21 Beer and malt	.8	51 Non-electrical machinery.	2.0
22 Soft drinks and flavoring	1.0	52 Electrical machinery	2.0
23 Tobacco products	1.0	53 Household appliances	2.0
24 Cotton, wool, syn. textiles	1.5	54 Electronic equipment	2.0
25 Jute, rough textiles	1.5	55 Other electrical equip	2.0
26 Fabricated textile products	1.9	56 Automobiles	1.2
27 Apparel	1.0	57 Autoparts	1.2
28 Leather and footwear	1.0	58 Oth transp. equip	2.0
29 Lumber, plywood	1.0	59 Misc. manufacturing	1.5
30 Other wood products	1.0		

Group 1

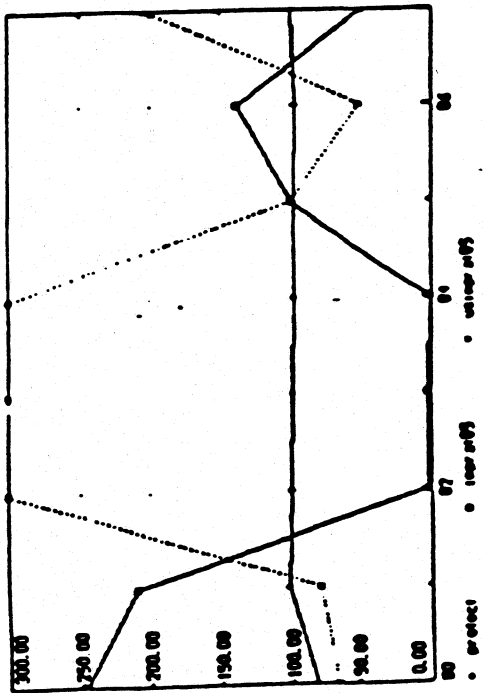
06 Non-ferrous mining



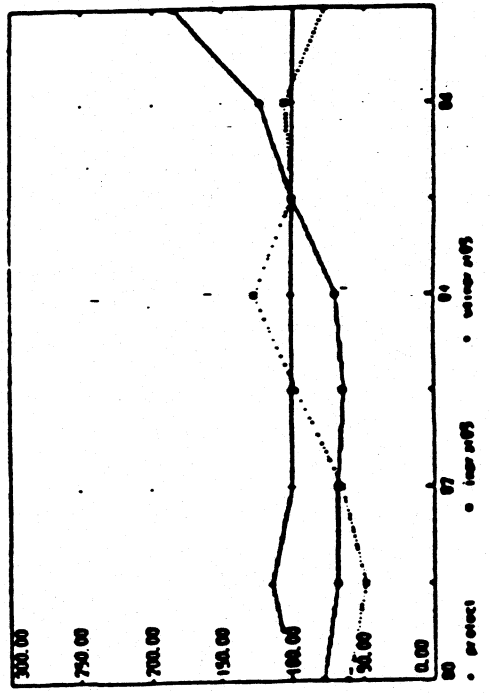
44 Cement



07 Ferrous mining

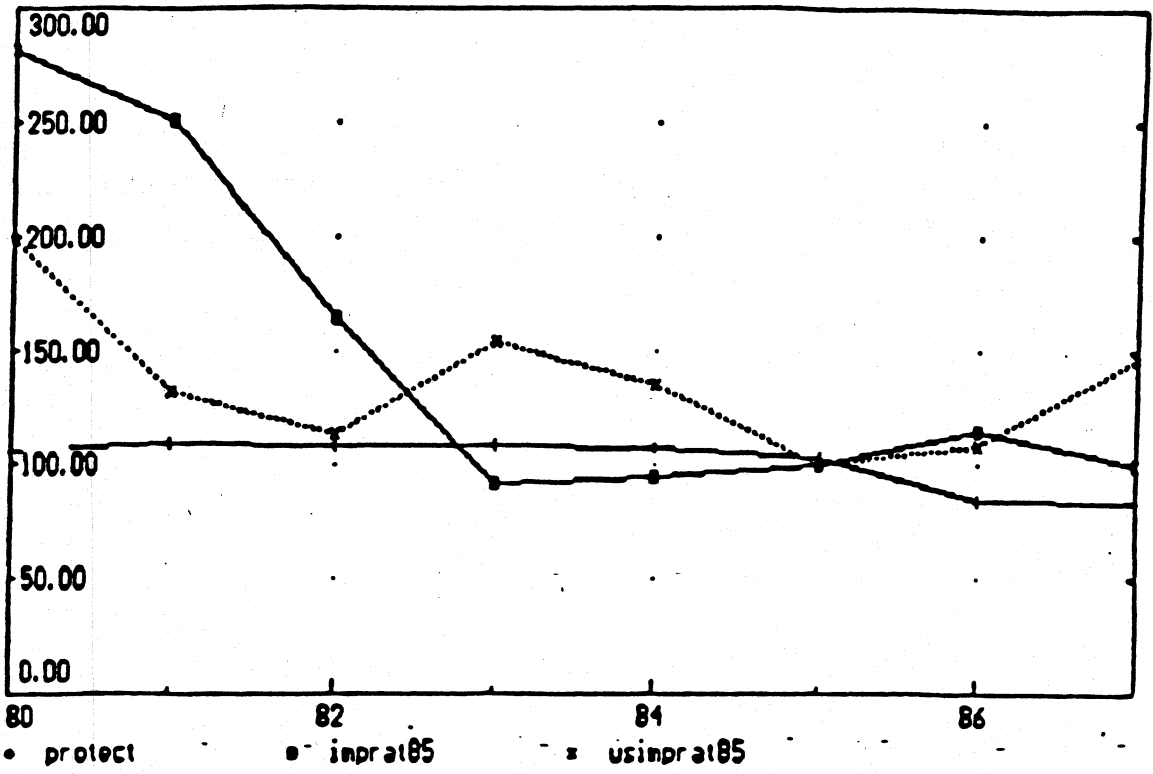


09 Stone, sand, gravel, clay



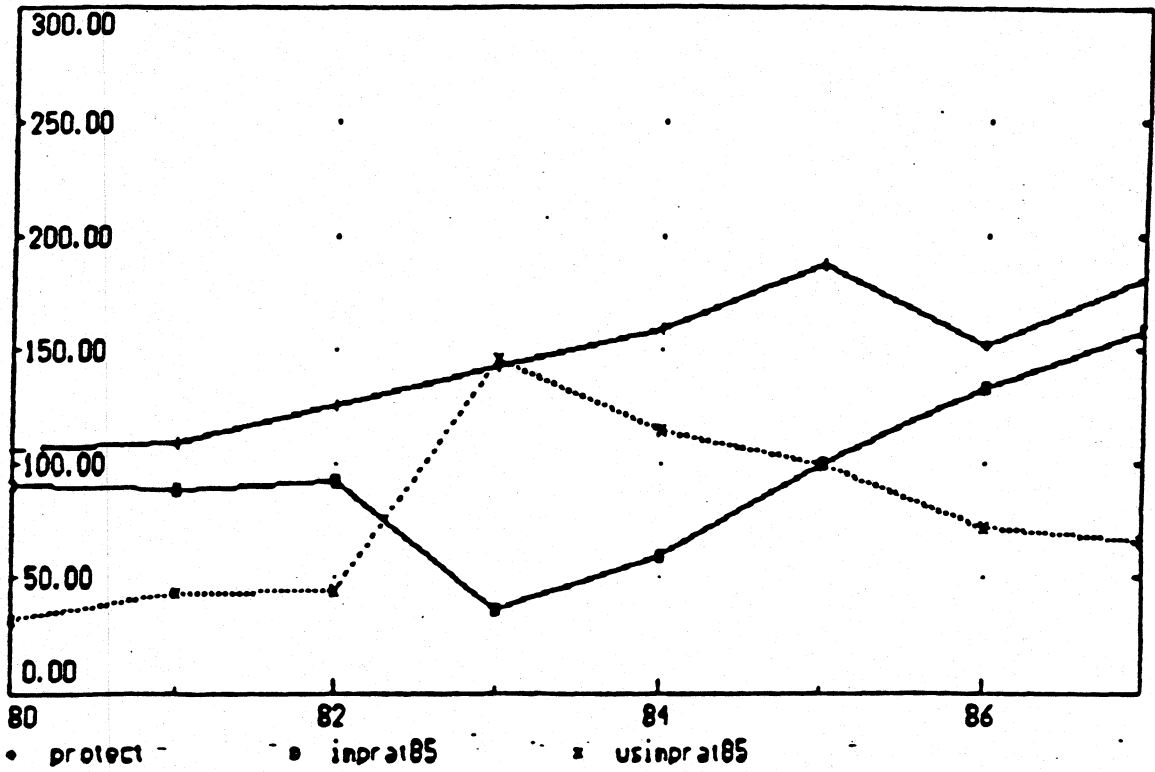
Group 1

48 Steel

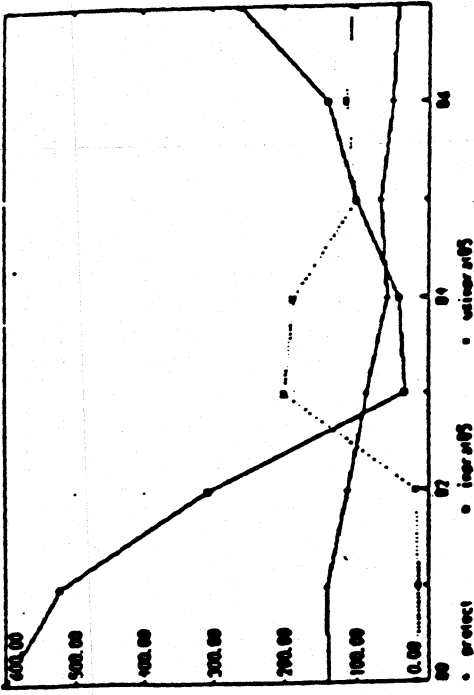


Group 2

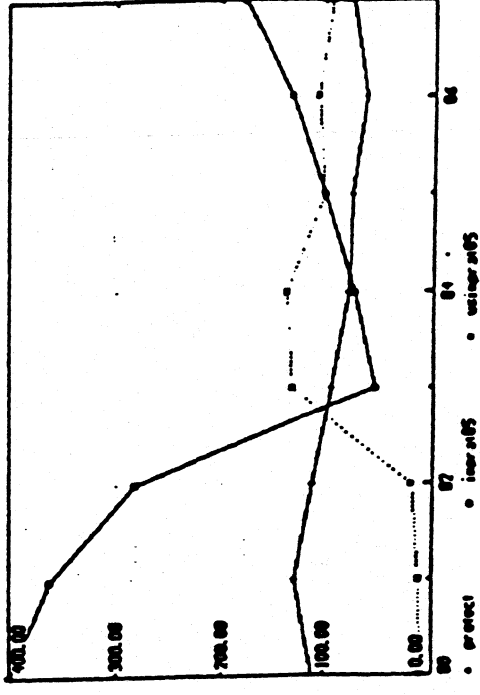
24 Cotton, wool, syn. textiles



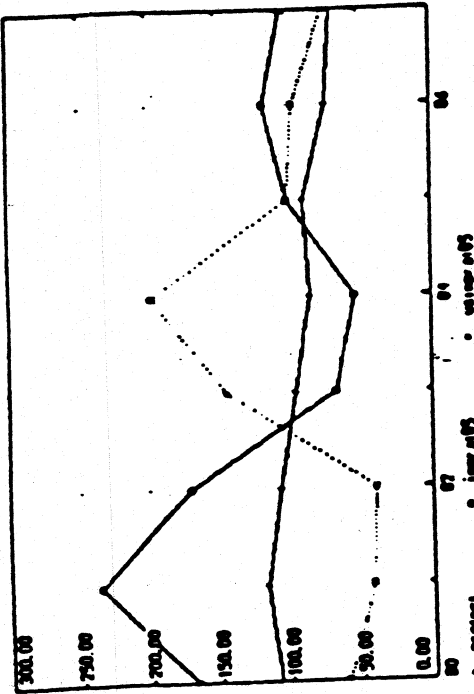
20 Alcoholic beverages



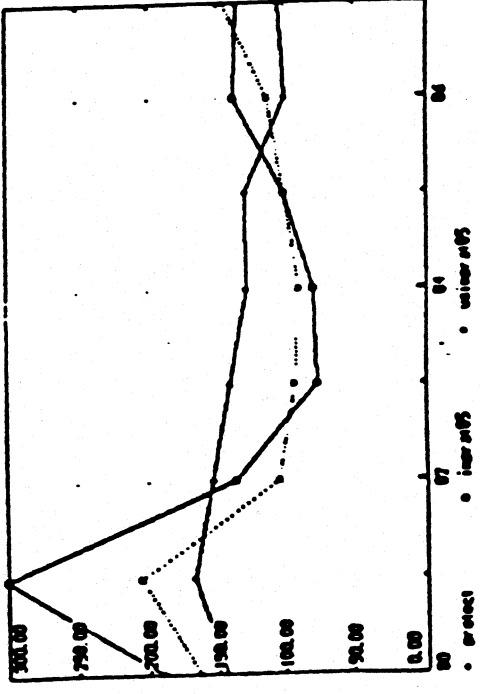
26 Fabricated textile products



12 Prepared fruits and vegetables

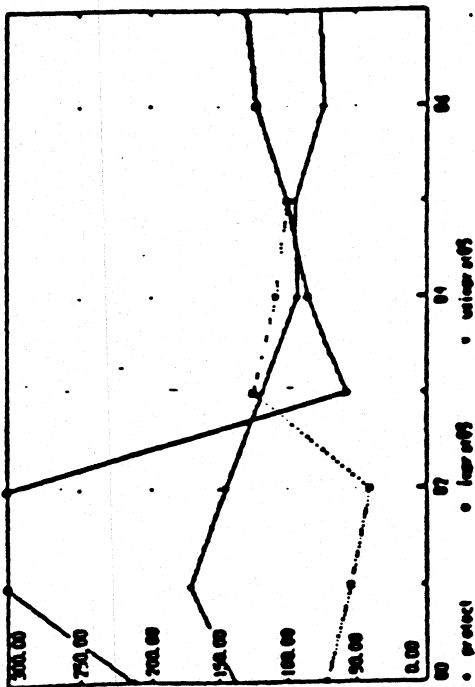


41 Rubber products

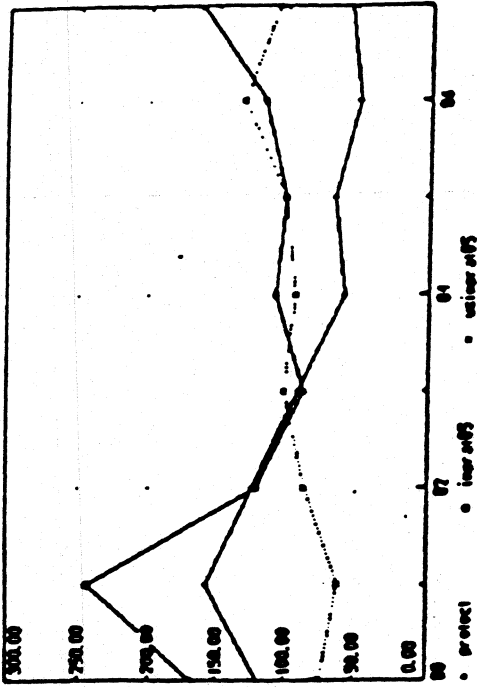


Group 3

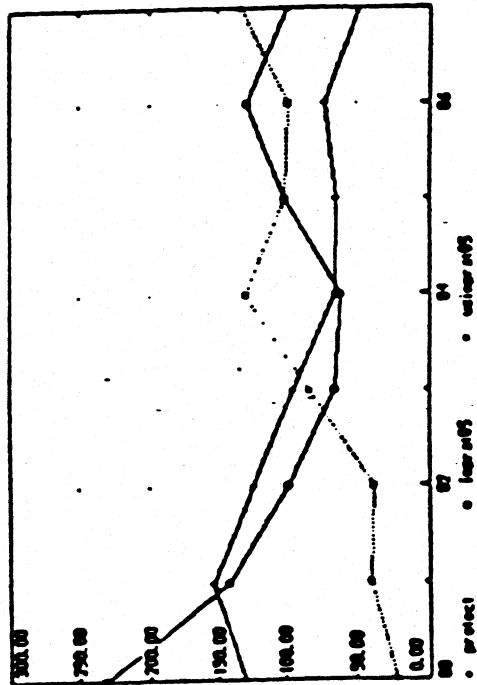
27 Apparel



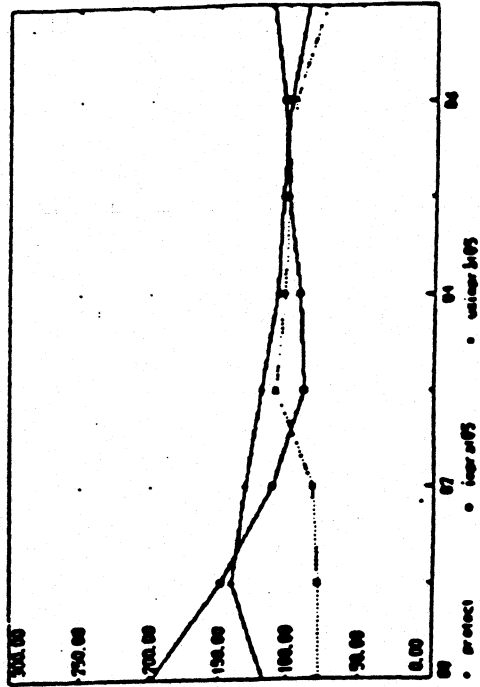
28 Leather and footwear



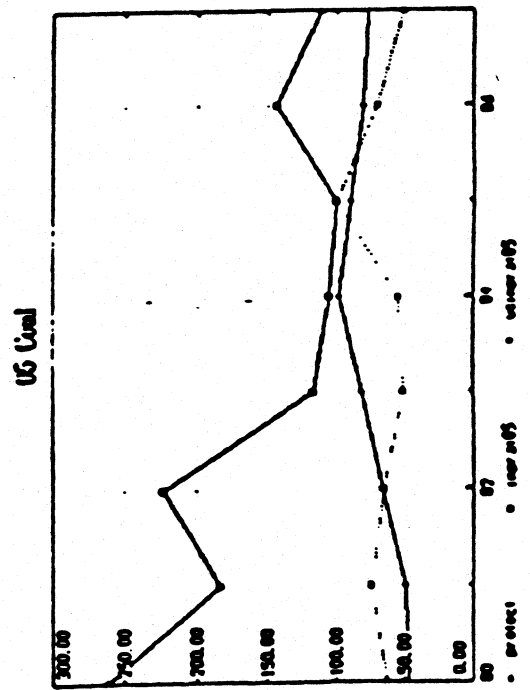
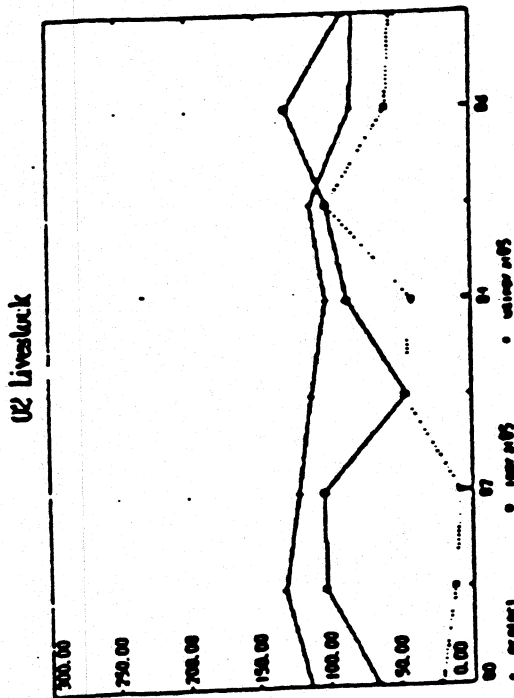
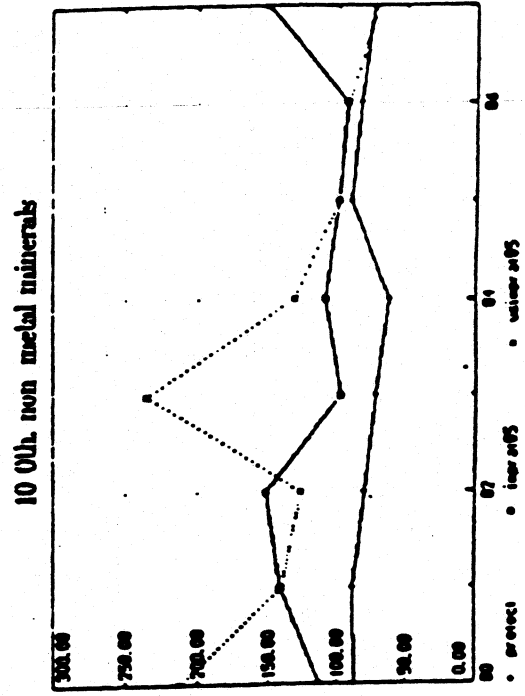
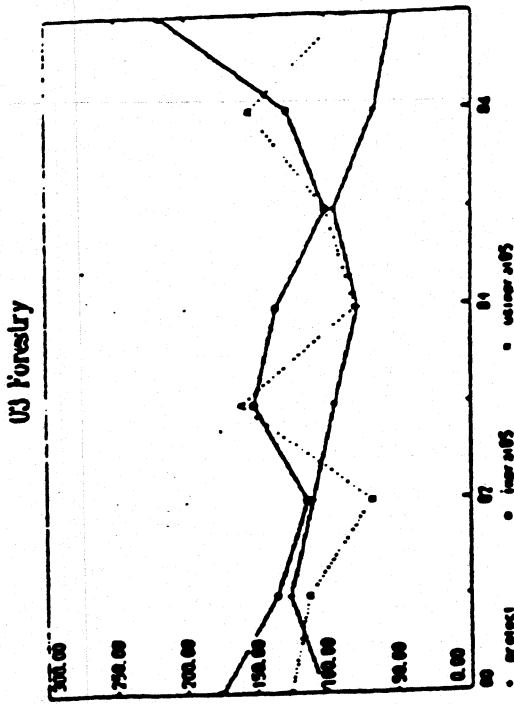
30 Other wood products



35 Basic inorganic chemicals

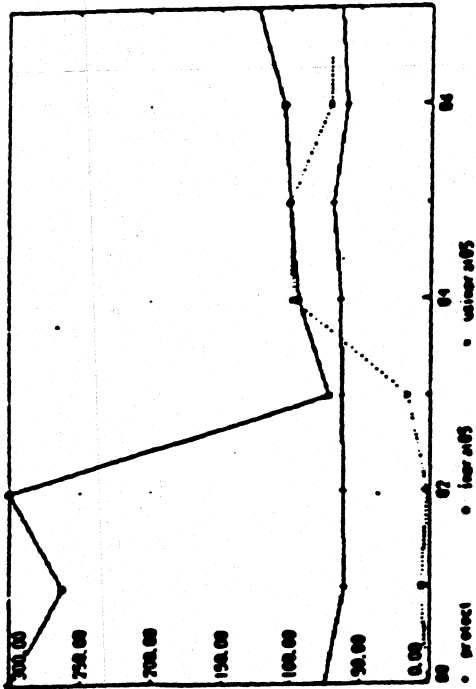


Group 4

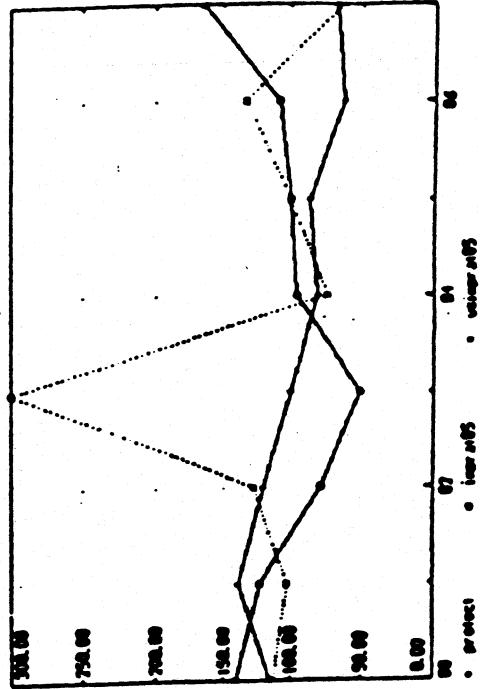


Group 4

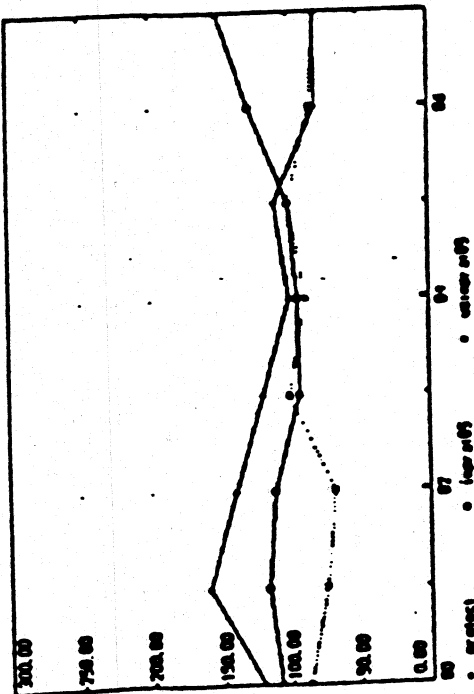
13 Wheat milling



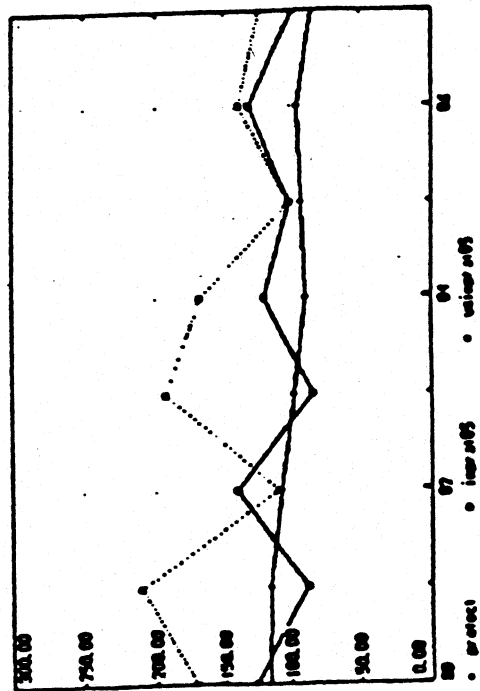
19 Other food products



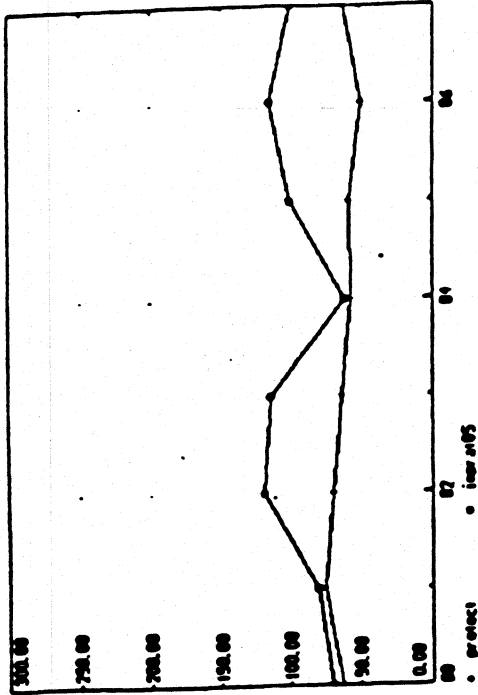
11 Meat and milk products



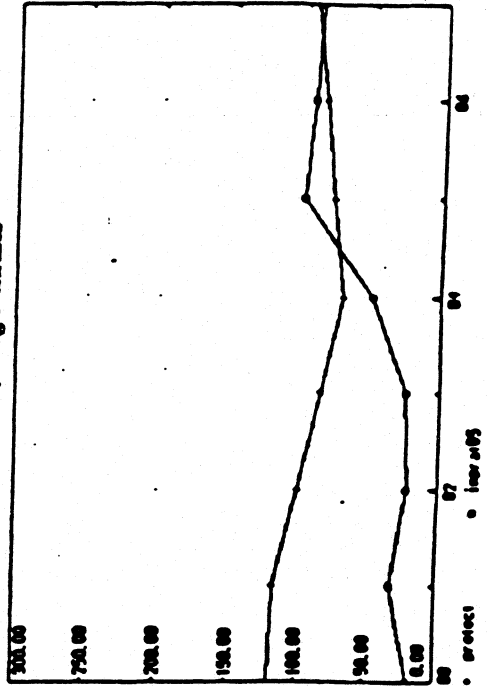
17 Fats and oils



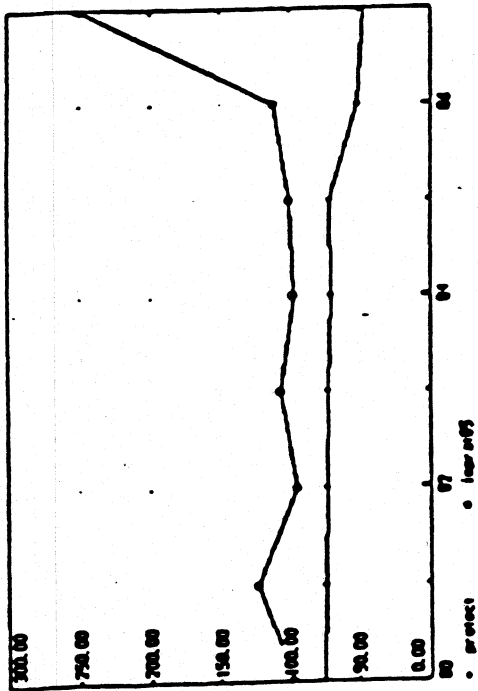
22 Soft drinks and flavorings



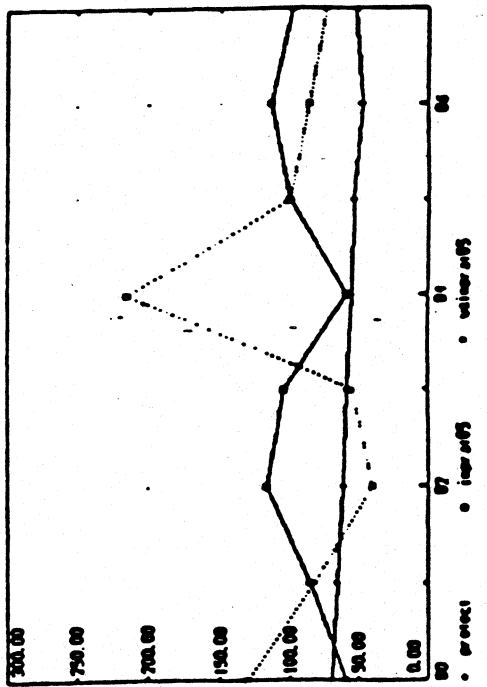
25 Jute, rough textiles



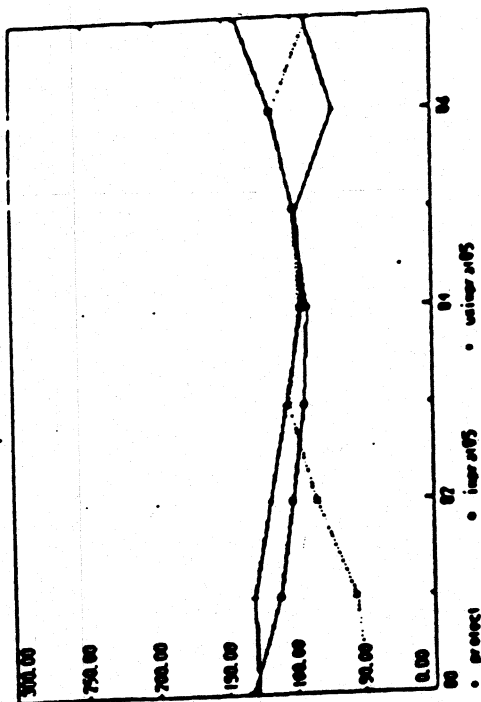
21 Beer and malt



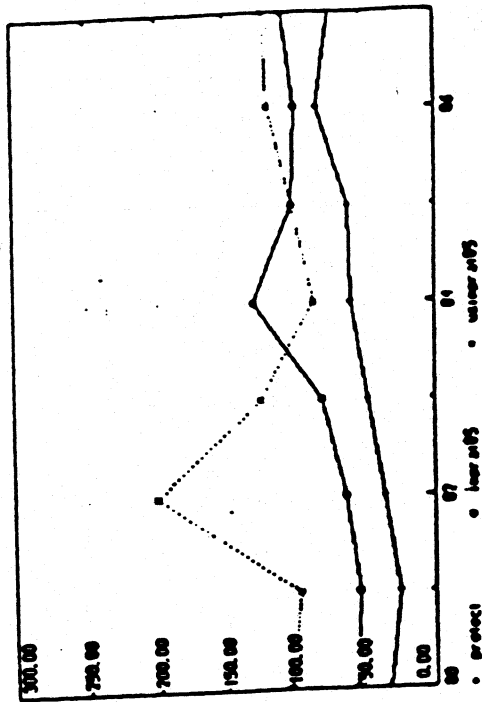
23 Tobacco products



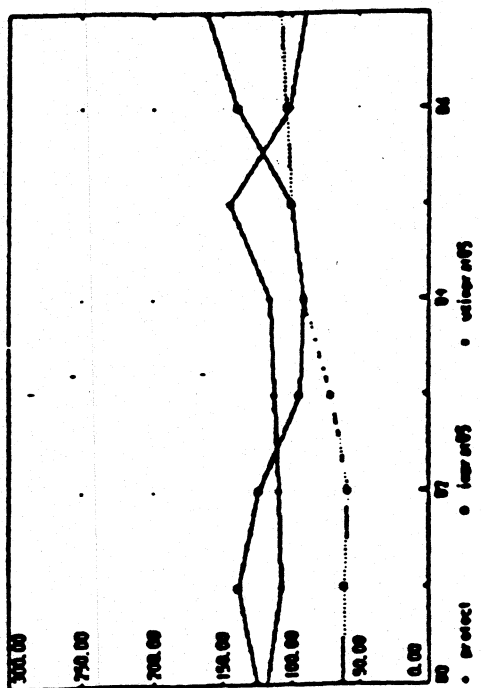
31 Paper and paperboard



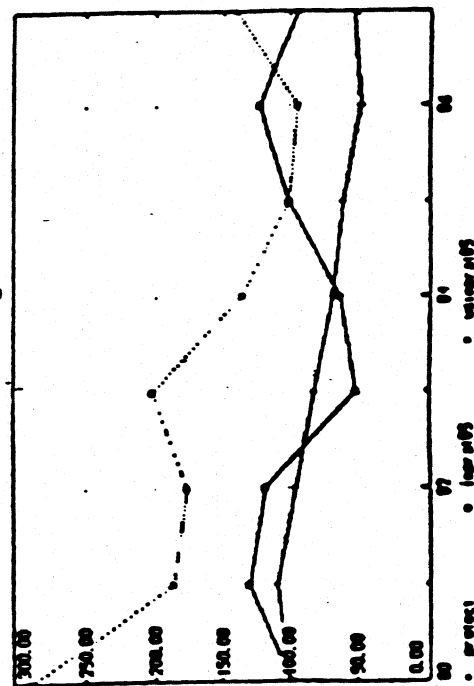
33 Petroleum refining



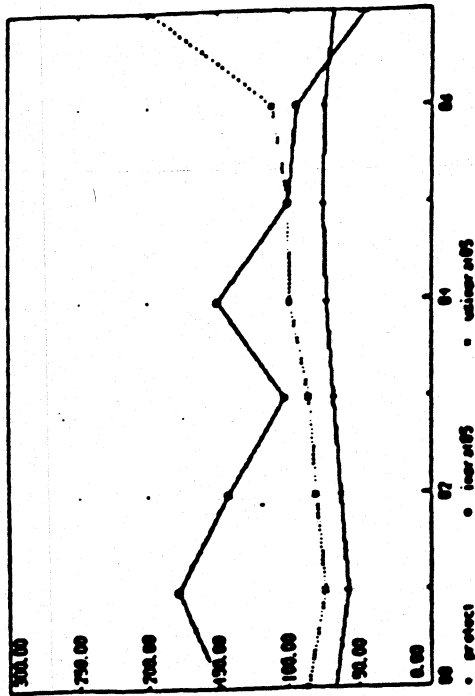
29 Lumber, plywood



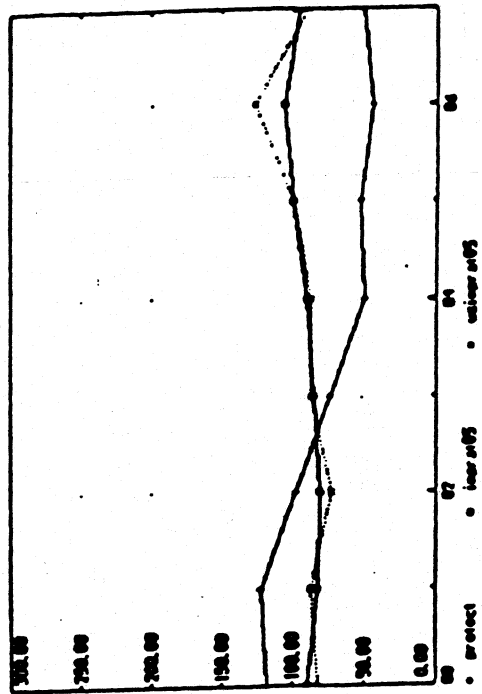
32 Printing



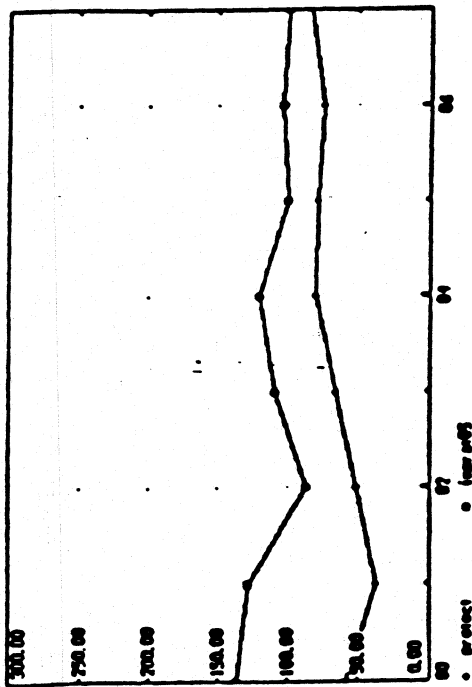
38 Pesticides and fertilizers



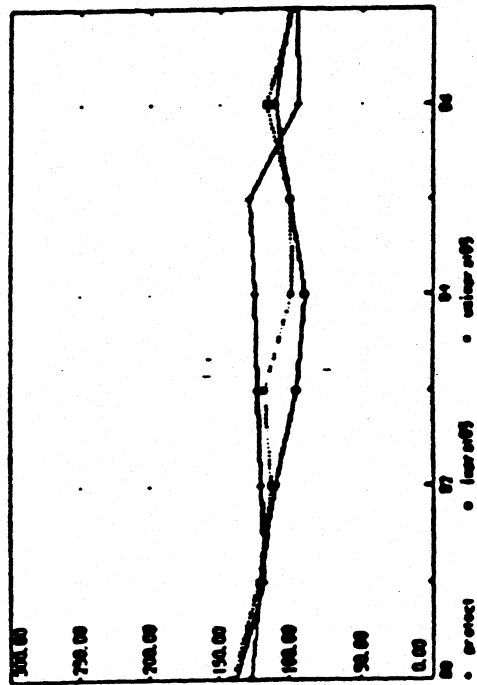
39 Medicinal products



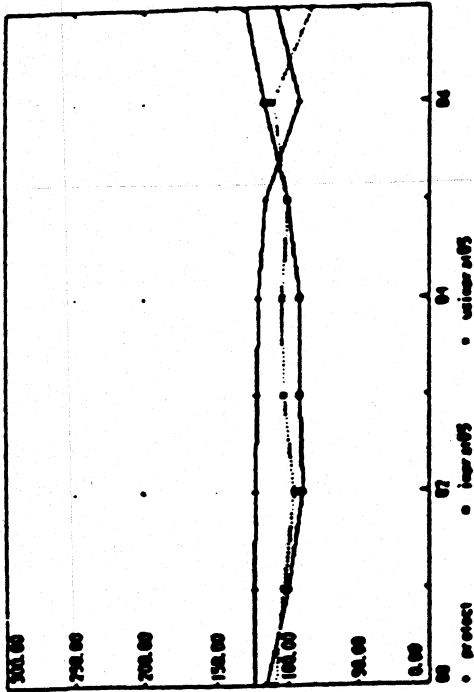
34 Basic petrochemicals



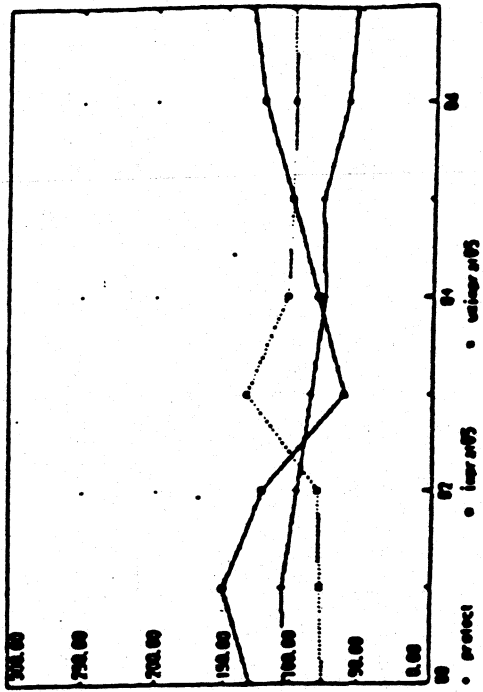
37 Plastic resins, syn. fibre



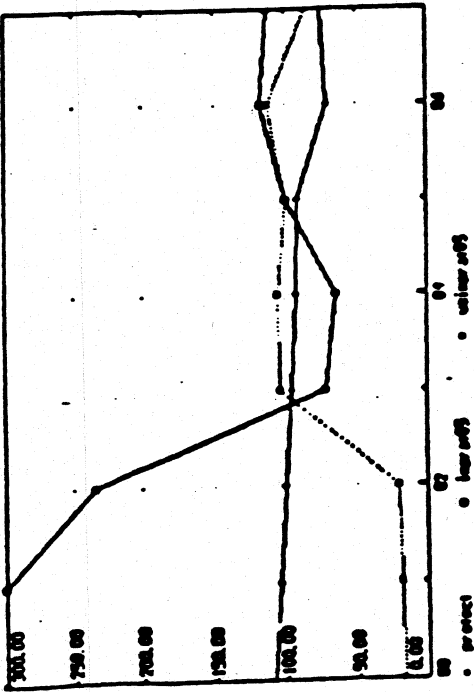
40 Other chemicals



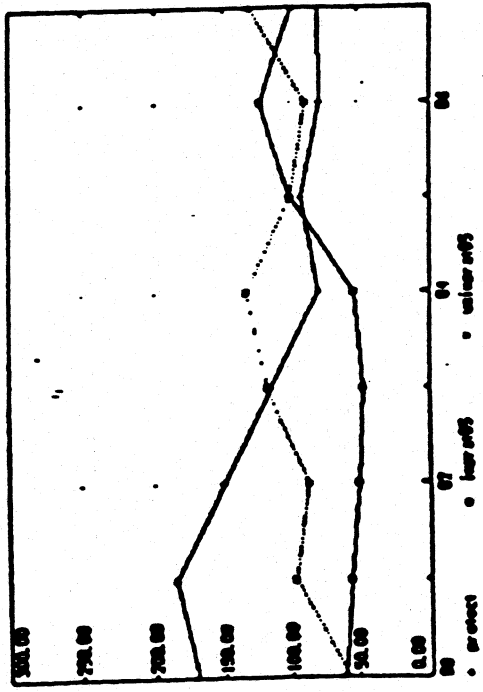
43 Glass



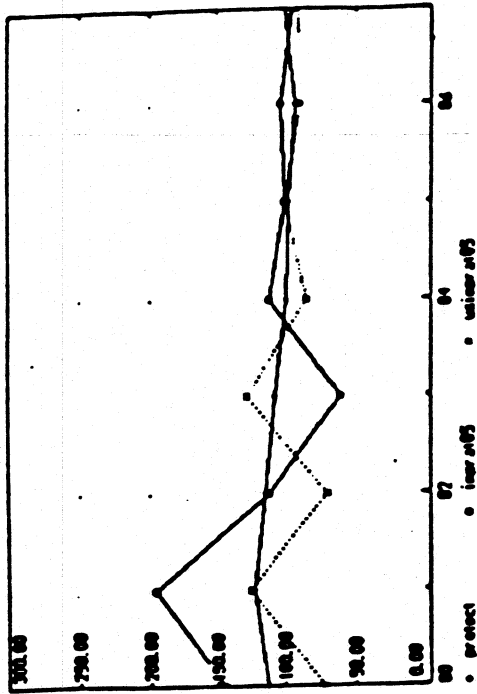
39 Cleaning and toilet prep.



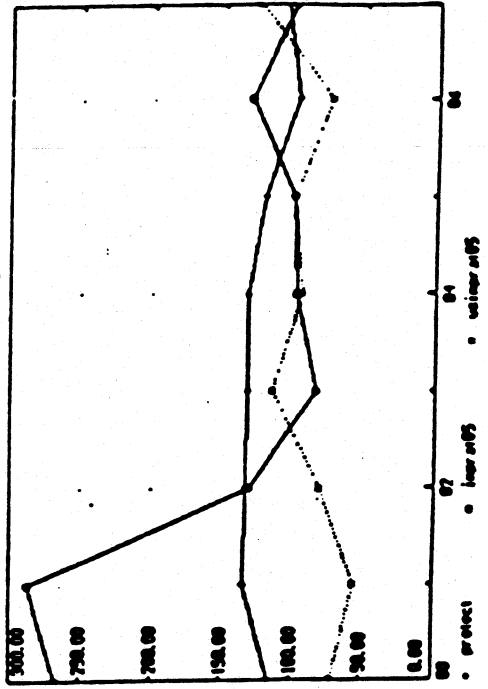
42 Plastic products



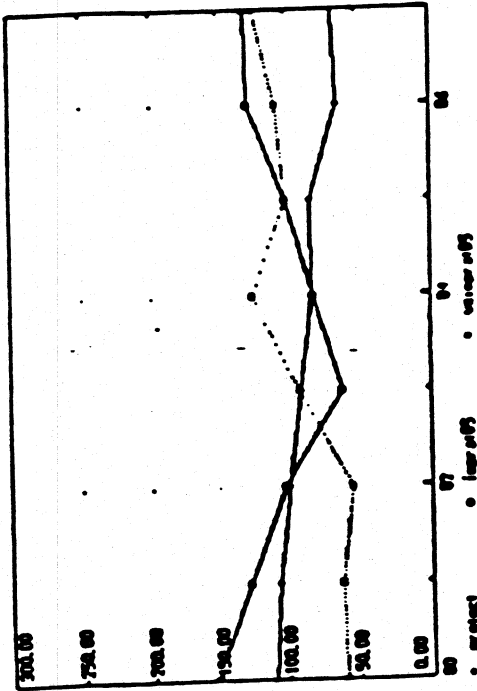
47 Non-ferrous metals



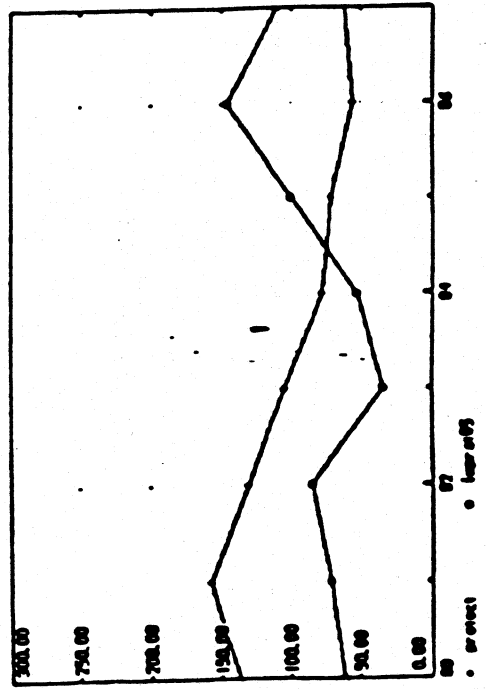
49 Structural metal products



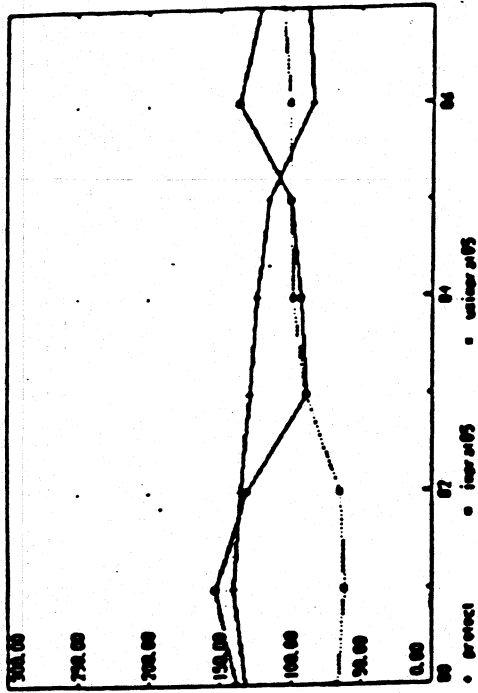
45 Ceramics



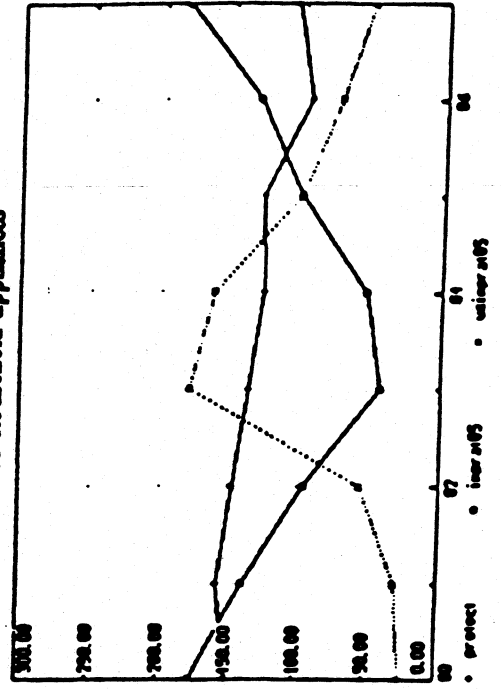
48 Metal furniture



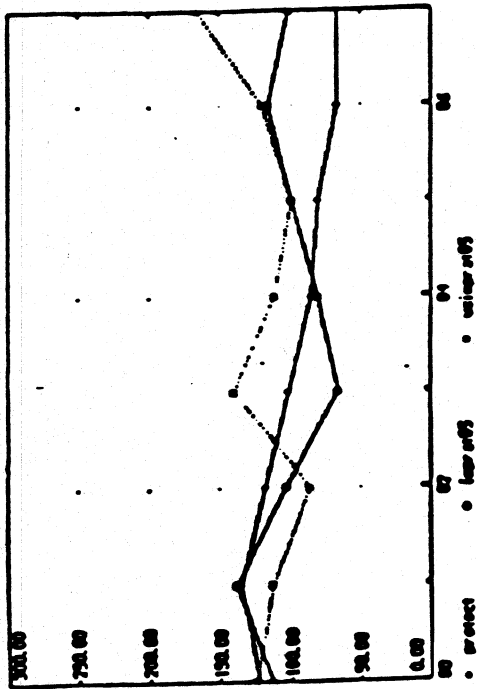
51 Non-electrical machinery.



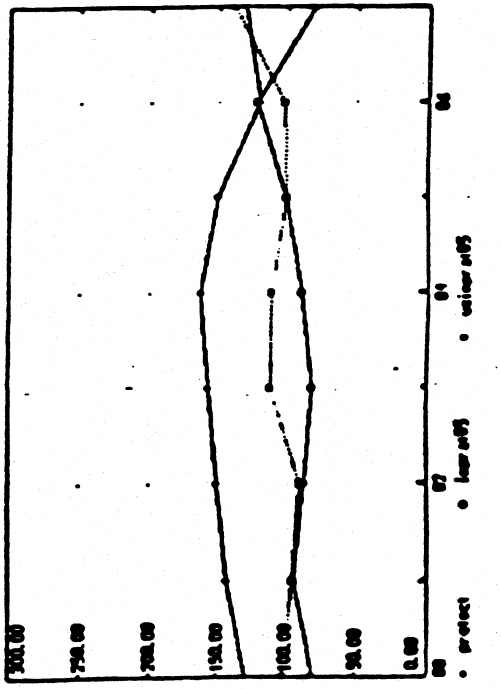
53 Household appliances



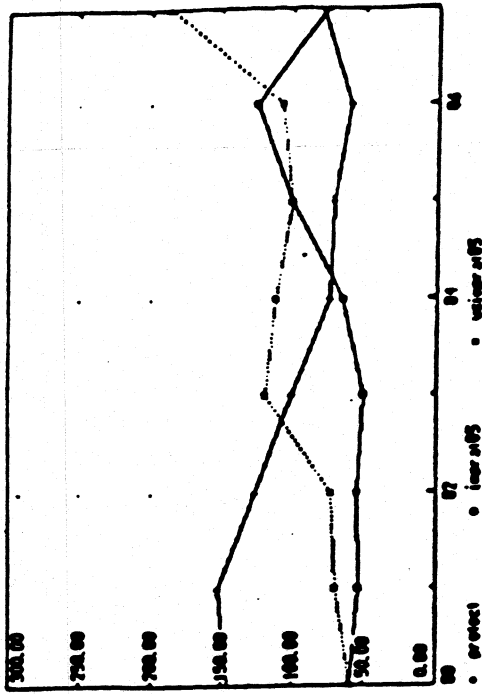
50 Fabricated metal products



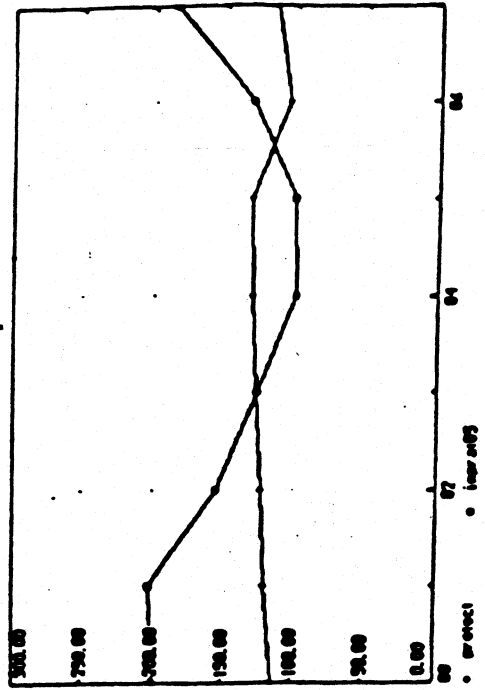
52 Electrical machinery



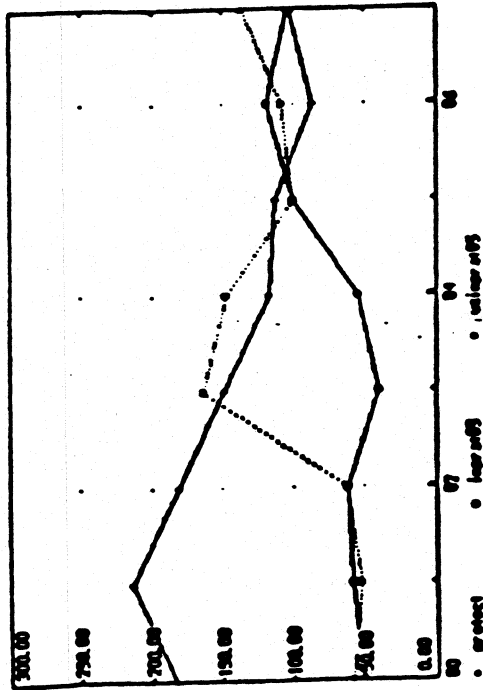
55 Other electrical equip



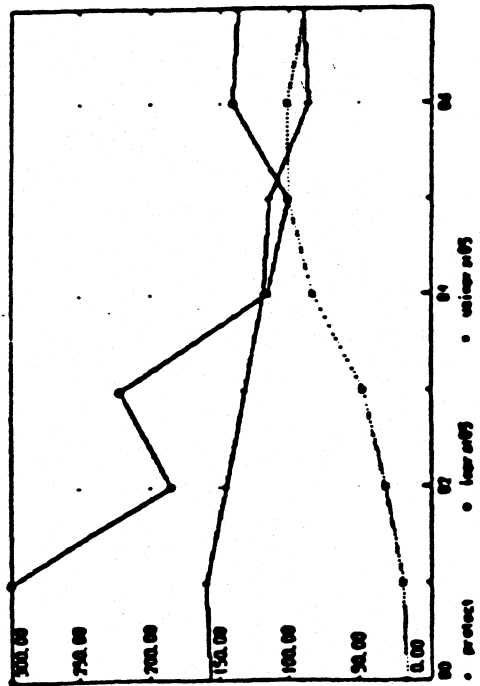
57 Autoparts



54 Electronic equipment

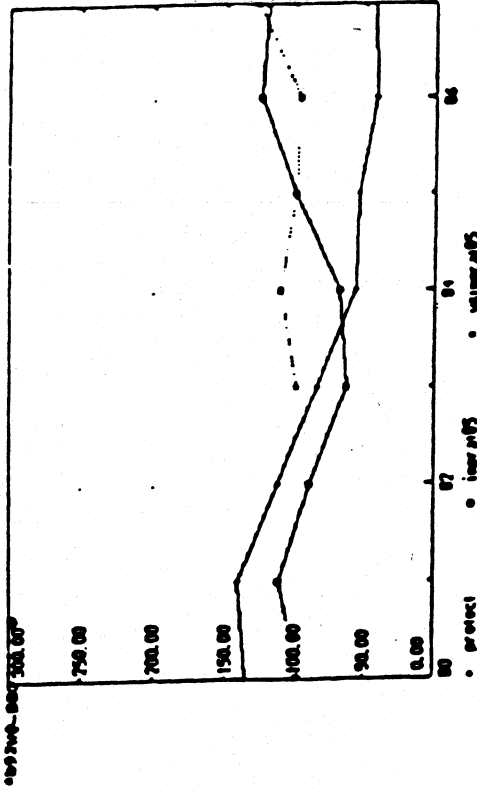


56 Automobiles

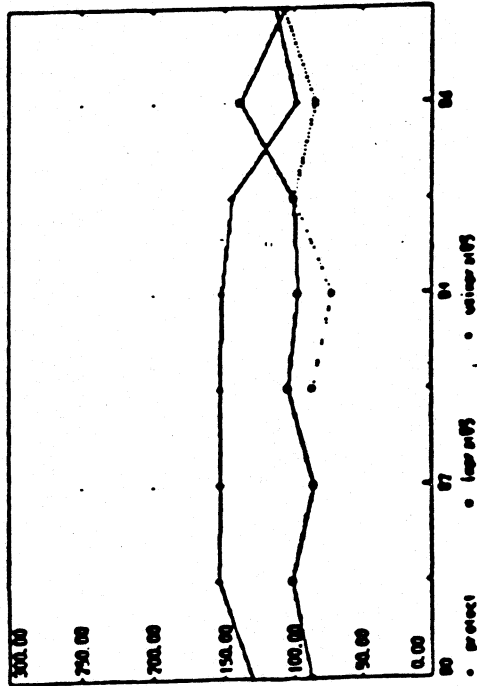


Group 4

59 Misc. manufacturing



50 Other transportation equip



CHAPTER IV

THE IMPORT EQUATIONS OF THE LIFT MODEL OF THE USA

Imports are computed simultaneously with outputs in both MIMEX and LIFT. The general solution method for the input-output equations is the Seidel iterative process. In it, one takes an initial guess of all the outputs and then revises them one-by-one so that each is equal to its use in all other sectors plus final demands minus imports. The imports are calculated just before the revision of the sector's output. At that point, the program has available the sum of all domestic demands for the product. This domestic demand, D in the following equations, is the crucial driver of imports from the real side of the model. The other driver is the ratio of the price index of foreign goods relative to the price index of the corresponding domestic product. The basic equation for the import of a particular product is

$$m = (a + bD) \left(\frac{p_w}{p_d} \right)^\eta \quad (\text{IV} - 1)$$

The reason for this form which is non-linear in the parameters is very simple. If the function were linear in the price, growth in the D term would imply a reduction in the price elasticity, an implausible feature to build into the structure of the equation. If, on the other hand, we gave the equation a constant elasticity in terms of both price and domestic demand and the domestic demand elasticity were greater than 1.0, then imports would certainly eventually exceed output. The simple non-linear form avoids both problems.

The world price variable is made up from individual product prices at the level of 436 products. For each of the 436, if there is Bureau of Labor Statistics import price index, it is used; if not, an average of the domestic prices of this product in several major countries is used. The weights used in the average are proportional to the US imports of that product from the various countries. The price ratio in equation (1) is actually a weighted average of the ratio in the current and three previous years.

The equations have been estimated over the period 1958-1988. Even with this long period, it was not possible in all cases to obtain reasonable estimates of η without some "coaching" of the equations. For all sectors, a considered *a priori* estimate of η was made; these are shown in the second column of Table 1. The sources of these prior expectations are mainly the broad findings of more aggregate studies. Then the following function was maximized:

$$U = \bar{R}^2 - .05 \frac{|A-E|}{|A|} \quad (\text{IV} - 2)$$

where A is the *a priori* value of η and E is the estimated values. The estimates are shown in the first column of Table 1. Only 10 of 45 of them are less than one in absolute value; they run particularly high in the machinery areas.

The constants a and b of equation (1) are shown in the next two columns of Table 1. The

elasticity with respect to D in 1988 is shown in the column labeled "Demand Elasticity". Most of them are between 1 and 2. The low value for Ferrous metals is doubtless due to the heavy protection of this sector by "voluntary" export restraints. Similarly, the low value for knitting may be due to protection.

The last two columns give \bar{R}^2 and the value of imports in 1988.

TABLE 1. SUMMARY IMPORT REGRESSION RESULTS

Import Equations: 1958-88 November 1989
T COEFFICIENTS ARE IN PARENTHESES

SECTOR	PRICE ELASTICITIES		CONSTANT(A)	DEMAND(B)	DEMAND ELASTICITY	RBARSO	88 IMPORTS
	ESTIMATE	A PRIORI					
1 FARMS AND AGRICUL.	-0.25	-0.25	-6118.0 (-5.81)	0.084 (9.75)	2.18	0.807	8749.
2 IRON ORE MINING	-0.50	-0.50	-546.4 (-4.59)	0.486 (14.39)	1.83	0.876	593.
3 NONFERROUS METALS	0.00	-2.00	-152.3 (-0.79)	0.259 (4.83)	1.24	0.482	707.
4 COAL MINING	-1.00	-1.00	-64.5 (-2.34)	0.009 (5.02)	1.57	0.527	163.
6 CRUDE PETROLEUM	0.00	-0.25	-26881.7 (-10.30)	0.856 (15.99)	2.59	0.901	22734.
7 NON-METALLIC MININ	-1.40	-1.00	530.0 (2.32)	0.000 (0.01)	0.01	0.716	1023.
9 FOOD, TOBACCO	-0.80	-1.00	-4053.2 (-3.42)	0.066 (11.78)	1.31	0.927	17862.
10 TEXTILE	-1.50	-1.50	-3956.3 (-4.83)	0.181 (7.22)	2.42	0.683	5049.
11 KNITTING, HOSIERY	-2.90	-1.50	61.1 (0.81)	0.005 (0.52)	0.42	0.539	243.
12 APPAREL, HOUSEHOLD	-1.00	-1.00	-24878.3 (-13.06)	0.713 (17.45)	2.42	0.913	29326.
13 PAPER	-0.60	-0.60	-1495.0 (-4.98)	0.104 (18.35)	1.24	0.900	11211.
14 PRINTING	-1.60	-2.00	-418.7 (-8.20)	0.016 (16.79)	1.49	0.939	1697.
15 AGRICULTURE FERTIL	-1.00	-1.00	-632.1 (-5.60)	0.115 (9.85)	1.92	0.777	967.
16 OTHER CHEMICALS	-1.20	-1.00	-6295.4 (-6.53)	0.123 (12.71)	1.55	0.951	21948.
17 PETROLEUM REFINING	-0.60	-2.00	-2707.0 (-1.25)	0.064 (2.71)	1.72	0.027	6611.
18 FUEL OIL	-1.00	-1.00	-1075.9 (-0.95)	0.216 (4.96)	1.25	0.847	6507.
19 RUBBER PRODS.	-0.50	-0.50	-3418.3 (-5.16)	0.338 (7.50)	2.20	0.730	4415.
20 PLASTIC PRODS.	-1.80	-2.00	-502.2 (-4.21)	0.065 (14.88)	1.18	0.924	5016.
21 FOOTWEAR AND LEATH	-0.40	-2.00	-17359.0 (-5.55)	2.093 (6.96)	3.58	0.792	12952.
22 LUMBER	-1.00	-2.00	-1698.9 (-5.00)	0.124 (14.40)	1.36	0.954	6187.
23 FURNITURE	-1.00	-1.00.	-2610.8 (-9.89)	0.218 (14.01)	1.94	0.896	5218.
24 STONE, CLAY, GLASS	-2.40	-2.00	-2611.1 (-2.17)	0.139 (3.79)	2.06	0.677	7004.
25 FERROUS METALS	-1.40	-2.00	6900.3 (5.20)	0.005 (0.26)	0.04	0.466	14381.
27 OTHER NON FE METAL	-1.90	-1.00	-6652.0 (-5.41)	0.329 (8.45)	2.59	0.788	10039.
28 METAL PRODUCTS	-2.40	-1.50	-5534.8 (-4.32)	0.101 (6.64)	2.11	0.896	10965.
29 ENGINES AND TURBIN	-2.40	-1.50	-563.0 (-2.58)	0.135 (5.30)	1.56	0.900	4915.
30 AGRICULTURAL MACHI	-1.90	-1.00	-138.5 (-1.25)	0.116 (9.36)	1.17	0.902	2353.

TABLE 1. SUMMARY IMPORT REGRESSION RESULTS

Import Equations: 1958-88 November 1989
T COEFFICIENTS ARE IN PARENTHESES

SECTOR	PRICE ELASTICITIES ESTIMATE A PRIORI		CONSTANT(A)	DEMAND(B)	DEMAND ELASTICITY	RBARSO	88 IMPORTS
31 CONSTRUCTION, MINI	-2.90	-1.50	1058.8 (4.08)	0.003 (0.12)	0.02	0.849	4370.
32 METALWORKING MACHI	-1.80	-1.50	-301.3 (-0.29)	0.135 (1.88)	1.17	0.560	5247.
33 SPECIAL INDUSTRY M	-1.40	-1.00	-726.3 (-1.20)	0.259 (4.24)	1.33	0.914	6693.
34 MISC NON ELEC. MAC	-3.40	-2.00	-1592.4 (-4.73)	0.123 (9.81)	1.57	0.963	8766.
35 COMPUTERS	-1.00	-1.00	-948.2 (-2.27)	0.162 (8.91)	1.16	0.772	9805.
36 OTHER OFFICE MACH.	-0.90	-1.50	-1019.5 (-6.44)	0.665 (22.08)	1.17	0.960	12603.
37 SERVICE INDUSTRY M	-1.60	-2.00	-626.8 (-5.24)	0.082 (7.24)	1.98	0.672	1806.
38 COMMUNICATION MACH	-2.00	-2.00	-3300.0 (-4.77)	0.173 (15.60)	1.26	0.948	28565.
39 ELECT. APPARATUS	-1.60	-2.00	-2403.8 (-6.78)	0.215 (10.85)	1.94	0.931	6552.
40 HOUSEHOLD APPLIANC	-1.50	-1.50	-1542.3 (-8.13)	0.251 (13.15)	1.85	0.915	3839.
41 ELECTRICAL LIGHTIN	-2.00	-2.00	-1777.7 (-6.21)	0.200 (11.04)	1.64	0.923	7487.
42 RADIO, T.V. SETS,	-1.00	-1.00	-2707.7 (-15.73)	0.734 (55.44)	1.20	0.987	15724.
43 MOTOR VEHICLES	-1.10	-1.00	-19814.5 (-3.77)	0.363 (8.19)	1.54	0.843	80601.
44 AEROSPACE	-2.80	-1.50	275.2 (0.90)	0.016 (1.77)	0.72	0.808	6415.
45 SHIPS, BOATS	-2.60	-2.00	-49.2 (-1.24)	0.025 (4.94)	1.28	0.876	847.
46 OTHER TRANSP. EQUI	-1.60	-2.50	-663.3 (-1.60)	0.267 (4.71)	1.75	0.602	2213.
47 INSTRUMENTS	-1.00	-1.00	-2486.1 (-10.82)	0.235 (27.06)	1.34	0.974	13683.
48 MISC. MANUFACTURIN	-1.00	-1.00	-7485.7 (-11.01)	0.575 (17.83)	1.79	0.958	19339.

SUMMARY OF TIME EQUATIONS
SECTOR
26 COPPER

LN(IMPORTS) = A + B*TIME + C*RELATIVE PRICE
PRICE ELASTICITIES CONSTANT(A) TIME(B) RBARSO IMPORTS
0.00 4.1 0.033 0.420 1746.
(7.01) (4.29)

CHAPTER V
TRADE BETWEEN THE USA AND MEXICO 1980 - 1989
A REVIEW TO JUDGE THE EFFECTS OF AN FTA

In the previous chapters, we have reviewed trade policies of the USA and Mexico, and we have looked at the imports of each from the entire world. We have not yet dealt, except briefly in Chapter 2, with trade between the two countries. In this chapter, we will review that trade. Our purpose will be, of course, to identify areas where free trade might have significant impacts beyond those derived from reducing tariffs.

The data on which this chapter is based were obtained through the Labor Department from the COMPRO data files maintained by the Commerce Department. We obtained a file showing US exports to Mexico and to the whole world and another file showing US imports from Mexico and from the whole world for the years 1983 - 1989. The classification was the US domestic 1987 Standard Industrial Classification (SIC) and gave 3-digit SIC detail. These series were the product of a double bridging operation among commodity classifications. For the years 1983 - 1988, the data were collected in the Tariff Schedule USA (TSUSA) classification and then later converted into the new Harmonized System (HS) now used by many countries. For 1989, they were collected in the HS. A second bridging was then done to put the series in the domestic SIC. All this bridging was done by the COMPRO system. Our task was only to convert the series once again to the sectoring plans of the LIFT and MIMEX models. For LIFT, this step is fairly straight forward; for MIMEX, it required careful study of the contents of the sectors and even then remained only approximate.

The series prepared in this way were then compared with series obtained earlier from COMPRO for the years 1980 - 1987. These earlier series were in the 1982 SIC and were derived by converting directly from TSUSA into SIC. These were available at the 4-digit SIC level. These series were also put into the LIFT sectors. In this way we had two overlapping series for what should be the same thing, namely, US trade with Mexico in LIFT sectors. There was considerable uncertainty in the government offices through which we obtained these series about their quality and comparability. For each LIFT sector, therefore, we plotted on the same axes the two overlapping series which should be the same. We found only one case, Agricultural Chemicals, in which the two series were not closely parallel; and even in this case it was only 1983 and 1984 in which the two diverged significantly. In the other sectors, the series sometimes differed ten or twenty percent, but always moved closely parallel to one another. Since the series based on the Harmonized System is the one which is "growing", we have standardized on it and used the earlier series to extend it backward to 1980 with 1983 as the linking observation. It is these series which have been used in the tables and graphs accompanying this chapter.

It was also desirable to convert the series to constant prices. In the National Income and Product Accounts (NIPA), it is quite noticeable that the prices of exports and imports have moved differently from the prices of goods both produced and sold domestically. We therefore wanted to avoid the use of the domestic Producer Price Indexes. We have used instead deflators from the NIPA for about ten categories of merchandise to deflate the exports and imports. Use

of the BLS series on export and import prices would have been preferable, but the coverage of these series is not complete and changed over the period considered. In general, prices of traded goods (except petroleum and products) rose less than untraded goods, so the deflator is not crucial to the meaningfulness of the series.

The graphs on the following pages show the series we have just described. US exports to Mexico are shown by the lines marked with the squares, while US imports from Mexico are indicated the lines marked by the +’s. All series are in millions of 1982 dollars. The graphs are arranged roughly in the order of the size of the larger series on each graph. Please note carefully that the scale on the vertical axis is not the same for all series. It is, however, uniform within each of five broad groups composed as follows:

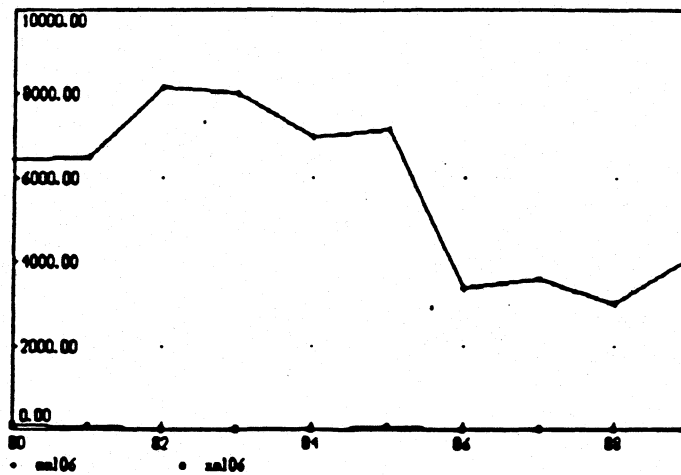
Upper limit million \$	Sectors
10,000	HUGE Crude petroleum
2,800	VERY LARGE Communication equipment and electronic components Motor vehicles
2,000	LARGE Agriculture, forestry, fishery Other non-ferrous metals (exc. copper and aluminum) Chemicals except agricultural Petroleum refining
1,200	MEDIUM Electrical industrial apparatus Electric lighting and wiring equipment TV set, radios, phonographs Instruments Food and tobacco Fabricated metal products Agricultural machinery Construction, mining, oilfield equipment
800	SMALL Non-metallic minerals Textiles, exc. knits Apparel

The numbers back of the graphs and the current price numbers from which they were derived, together with deflators and growth rates, may be found in the tables at the end of this chapter.

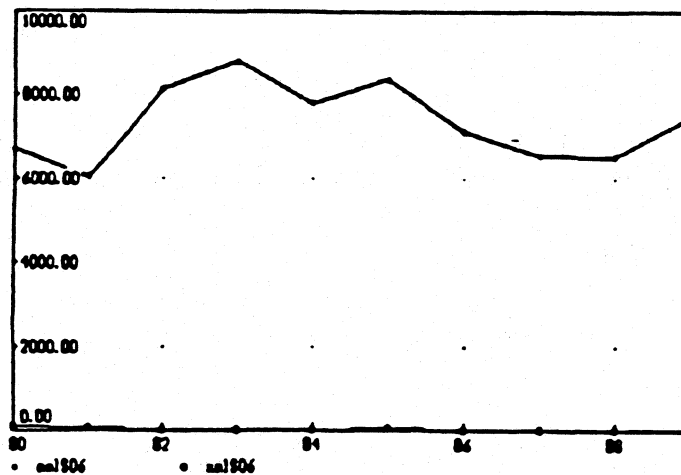
We will now examine each of these sectors to ask how it might be affected by a Free Trade Agreement (FTA) other than by changes in tariffs.

The one HUGE sector, Crude Petroleum, is unlikely to be affected at all. Mexico has in place 100 percent import licensing and, in fact, allows no imports. The US forbids export, so it seems likely that the FTA would not extend to this sector, the largest of all by far. Even if it did, there would seem to be little likely effect.

08 Crude Petroleum - Current Prices

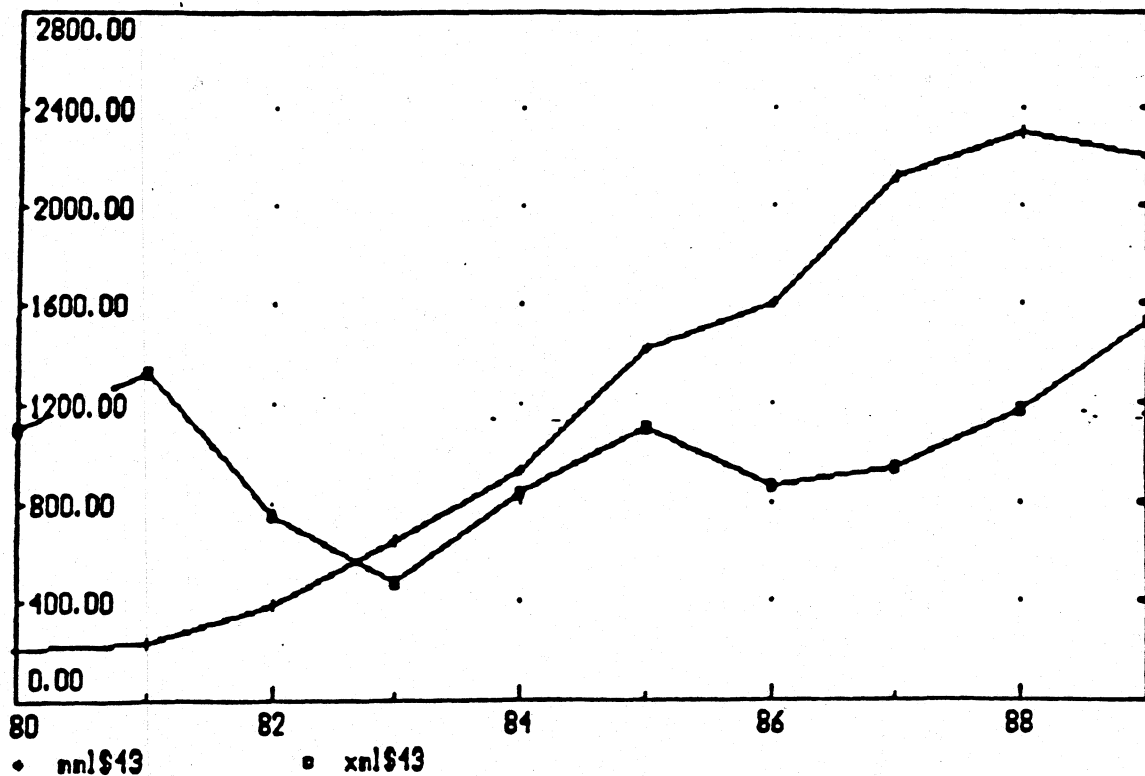


08 Crude Petroleum - Constant Prices



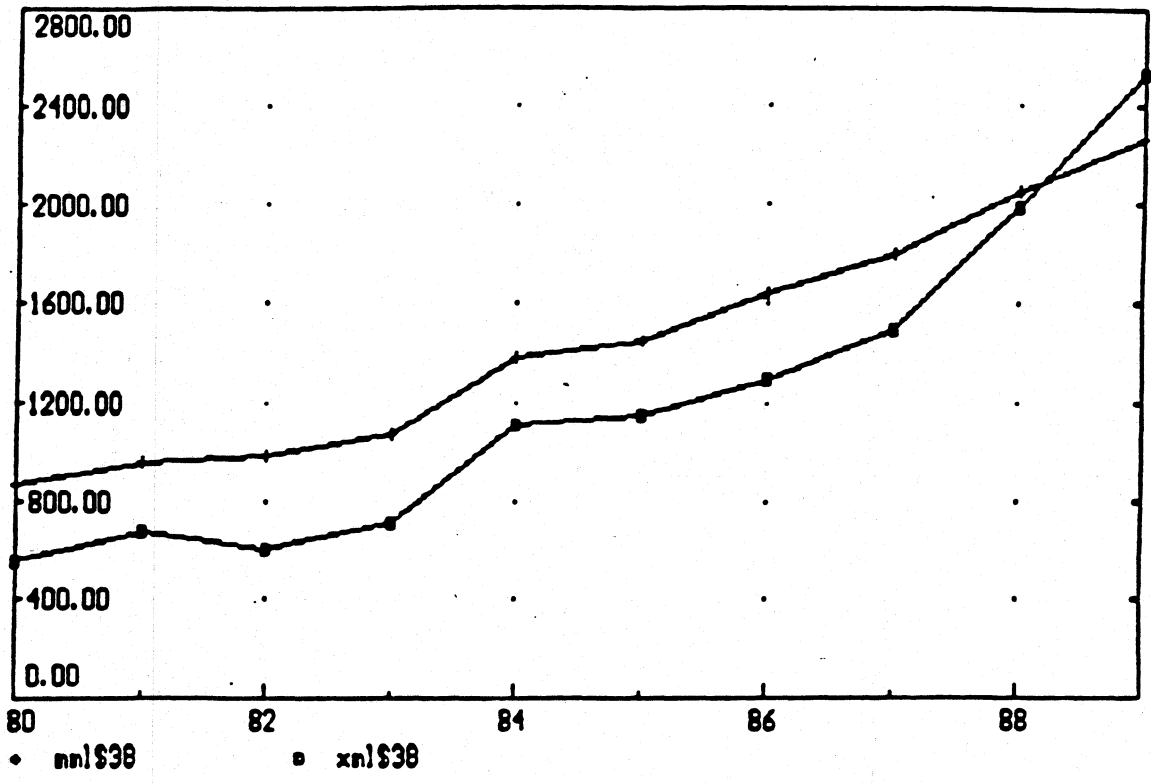
The two VERY LARGE sectors, Communication equipment and electronic components and Motor vehicles, are both dominated by maquiladora trade. In 1987, ninety percent of Motor vehicles and parts imported from Mexico were maquiladora items, that is, they were entered under US Customs category 807. In the same year, 37 percent of the value of these imports originated in the US and entered free of duty. [Schoepfle 1990, Table 1. All subsequent statements about US content are based on this source.] US exports to Mexico of Motor vehicles and parts was about 37 percent of imports. In other words, virtually everything which was exported was for re-import after assembly. This conclusion is consistent with the fact that Mexico had 100 percent import licensing on Motor vehicles and, in fact, granted almost no licenses. In 1988, US exports to Mexico of Motor vehicles grew faster than US imports, so some of the increase must have been for Mexican consumption. In 1989, exports rose by a quarter while imports declined -- strong evidence for increasing Mexican consumption. We anticipate that, with an FTA and simply the dropping of licensing, there would be a substantial increase in US exports of Motor vehicles to Mexico for Mexican consumption. Part of these exports would be in the form of completed vehicles; part in the form of parts for assembly in Mexico. Just how large the rise would be is well-nigh impossible to judge. In our scenario with removal of non-trade barriers, we decided to continue the 1989 expansion tempo and have added twenty percent of the 1989 value (180 million 1977 dollars) per year for the first three years. After the three-year phase-in, the tempo falls to one third, or about six percent of the 1989 value per year.

43 Motor vehicles



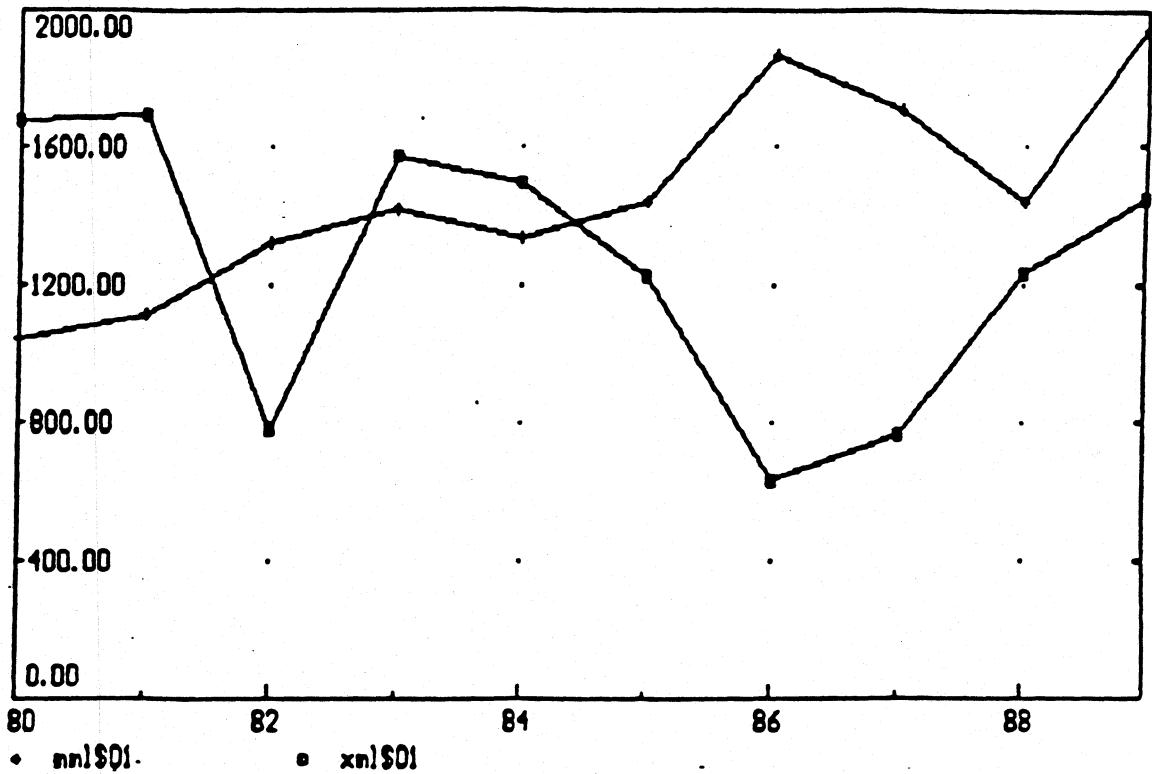
Communication equipment and electronic components also has a considerable maquiladora content, namely, 43 percent of the value of imports from Mexico was US content. Most of this content was in electronic components. The difference from Motor vehicles is that, even in 1987, exports were far more than 43 percent of imports. Nearly half of them must have been for Mexican consumption. Moreover, exports soared in 1988 and 1989, rising above imports. We judge that the essential liberalization has already occurred in this sector and do not attribute to it an extra burst of growth due to an FTA, other than what the tariff reductions would do.

38 Communic eq and electronic comp



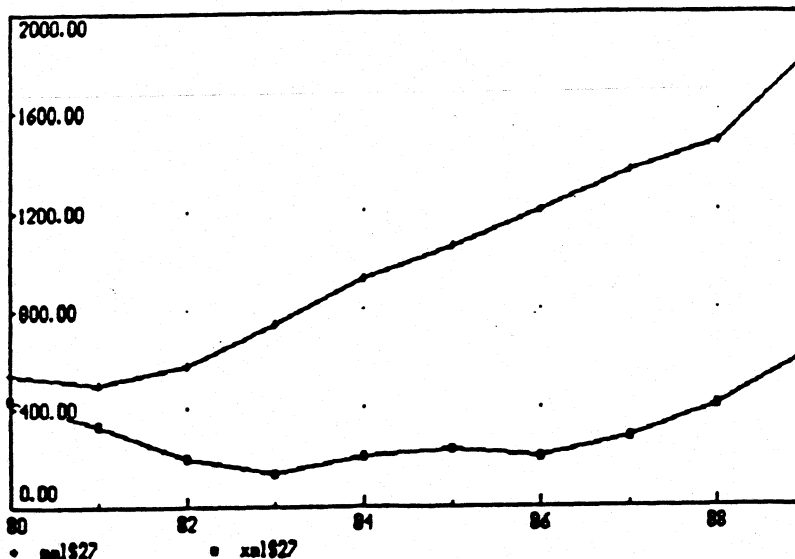
Turning to the LARGE sectors, we come first to Agriculture, Forestry, and Fishery. That Mexico exports substantial quantities of fresh fruits and vegetables to the US comes as no surprise. The almost equally large US exports to Mexico coupled with widespread licensing still prevailing in 1988 (63 percent coverage) and the relatively high Mexican prices suggest that an FTA might indeed increase US agricultural exports to Mexico. While Mexican prices of crops were slightly below US prices for these products, the difference was much less than average, so a slight rise in the peso could make US crops very attractive in Mexico. We will give to US exports to Mexico in this sector 10 percent per year growth for three years over and above what comes from reduction of tariffs.

01 Agriculture, Forestry and Fishery



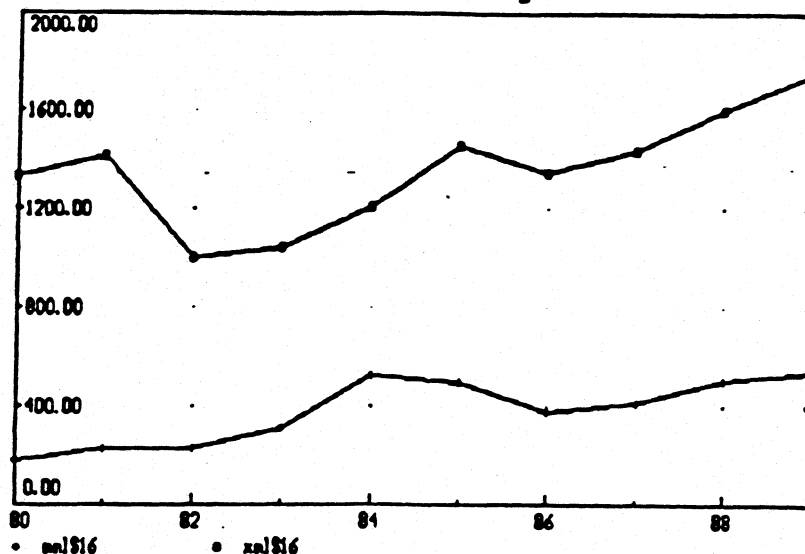
The exports of the sector Other non-ferrous metals are mainly Mexico's most traditional product, silver. There is no licensing in this sector and prices are low in Mexico. There would seem to be little grounds to expect direct impacts of a FTA other than from the elimination of the small tariffs.

27 Other non-ferrous metals



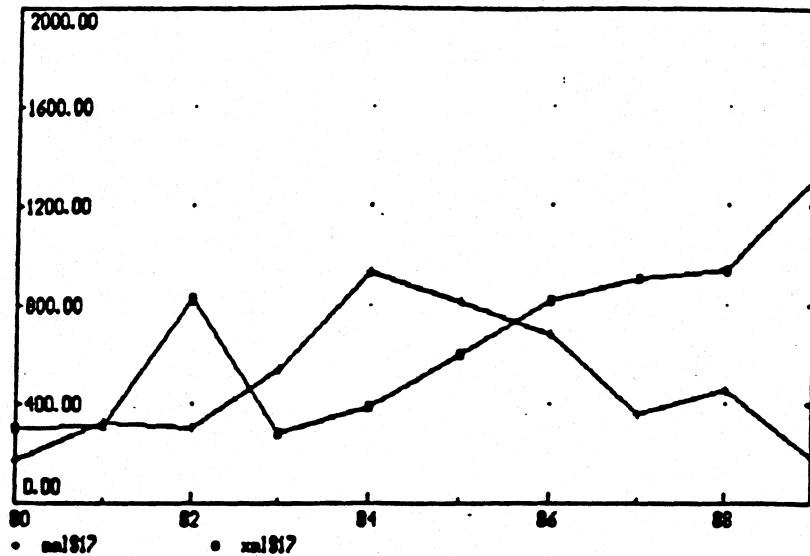
Trade in Chemicals is, with one exception, quite free and not likely to be strongly affected by an FTA one way or the other. The one exception to freedom here is in pharmaceuticals. Like many Latin American countries, Mexico does not recognize US patents on medicines and takes its imports mostly from other Latin American countries. The US replies, of course, by embargoing medicines made in violation of the US patent. It seems unlikely that this issue would get resolved in the course of negotiating a FTA, so we assume no impact on this sector.

16 Chemicals, exc agric.



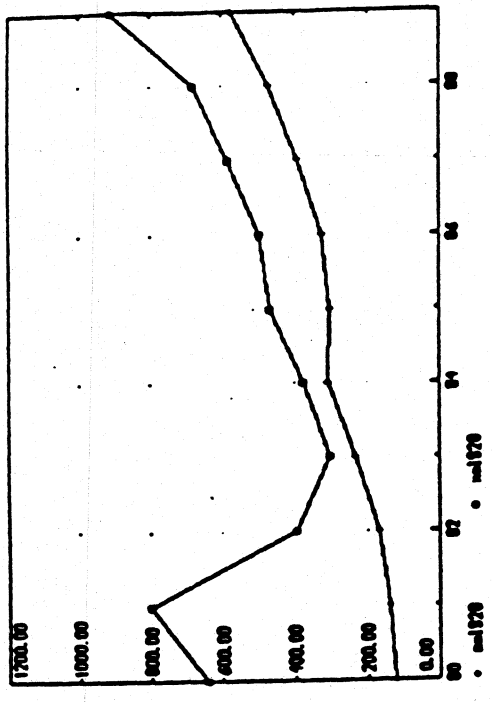
In Petroleum refining, licensing is now low (7.2 percent coverage) and Mexican prices are low relative to the US. US imports from Mexico have fallen over the last five years while exports to Mexico have been rising and are now much larger than imports. We see no special effects of an FTA on this sector.

17 Petroleum refining

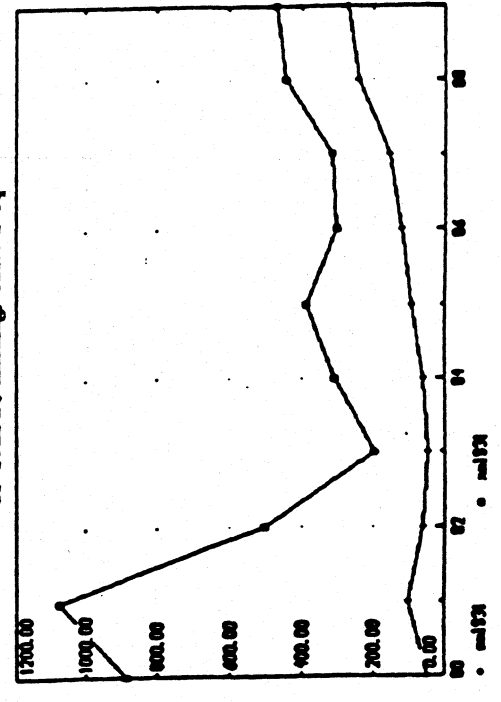


On the facing page are the graphs for the first four of the eight MEDIUM sized sectors. In all of them, US exports to Mexico exceed US imports from Mexico by 1988. Food and tobacco experienced a major liberalization in 1988. US exports tripled in only two years. All the others appear to be sectors in which there are presently few non-tariff barriers.

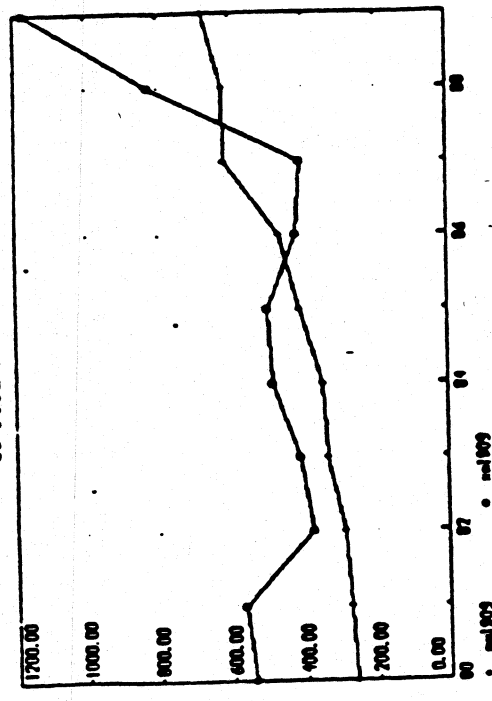
28 Fabricated Metal products



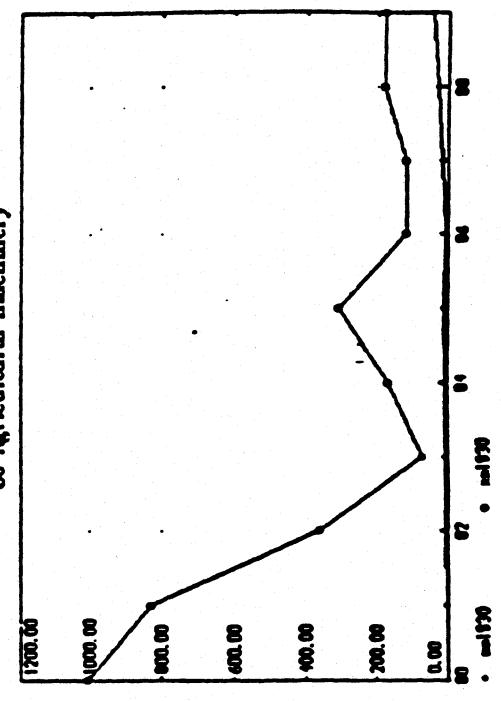
31 Constr. mining oilfield eq



09 Food and Tobacco



30 Agricultural machinery



The remaining four of the MEDIUM sector are shown on the facing page.

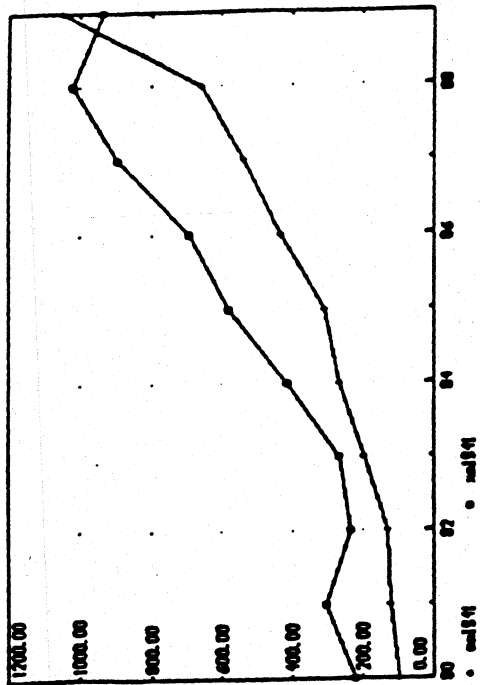
In Electrical industrial apparatus, over half of the 1987 imports from Mexico was US content being re-imported. At that time, most of US exports to Mexico were for assembly and re-import. That situation changed radically in 1988 and 1989. In 1989 alone, US exports to Mexico increased 75 percent with much smaller increases in imports. Again, the liberalization seems to have already occurred, and we anticipate no special effect from a FTA.

Electric lighting and wiring equipment is in a similar position. Some sixty percent of US imports were re-imported US content in 1987. On the other, hand exports had exceeded imports until 1989, when exports fell and imports surged. Again, this sector appears to be already fairly open and not subject to large non-tariff effects from an FTA.

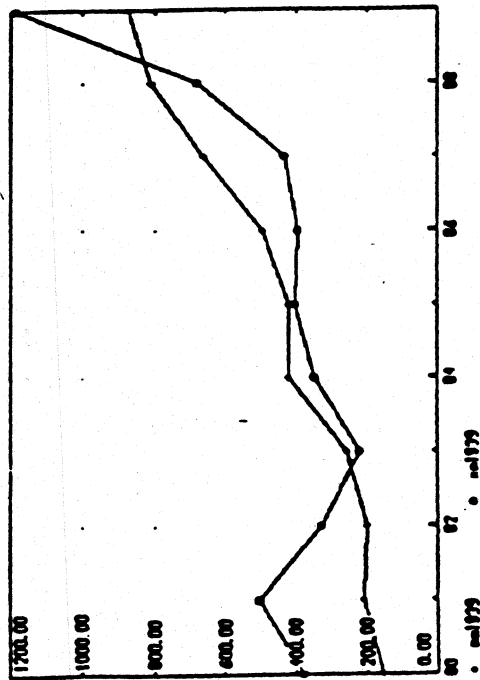
The Instruments sector has a similar picture. Two thirds of the value of the imports is re-imported US content, but exports are much larger than this re-import. Perhaps even the downturn in 1989 may be interpreted to mean that the effect of the liberalization which had produced a tripling of US exports between 1983 and 1988 was complete and 1989 exports simply reflected normal business fluctuation.

The final sector in the MEDIUM group, TV sets, radios, and phonographs, is the quintessential maquiladora industry. Virtually all of the US exports to Mexico came back as re-imported US content. Virtually all of the US imports from Mexico had some US content, but on average the US content was only 30 percent of the value of the re-imported item. By 1989, there was no import licensing. Clearly, however, the US products in this industry don't sell in Mexico. Indeed, apparently Mexican assembled products with US-made components do not sell. This failure to sell, however, is probably not something an FTA would remedy, but has to do with competition from other countries.

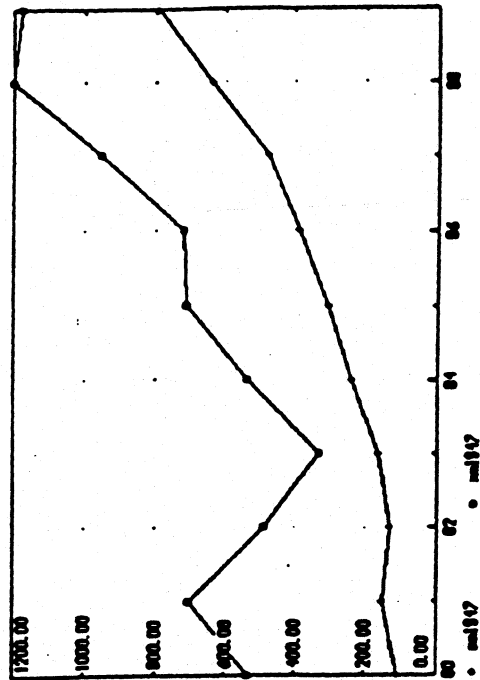
41 Elec lighting & wiring eq & nec



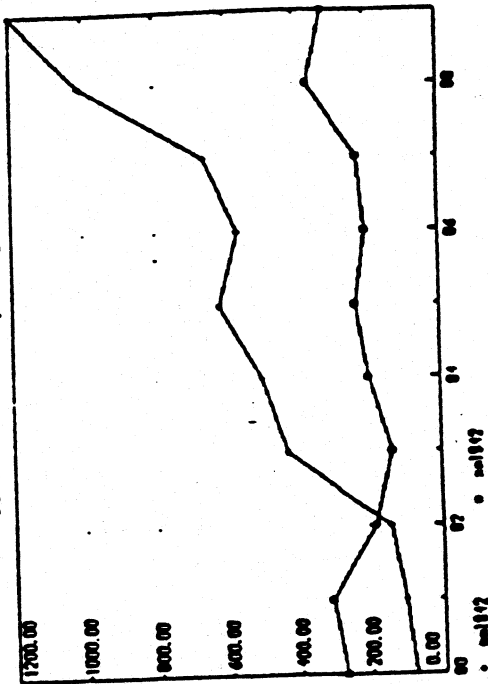
39 Elec indl apparatus



47 Instruments



42 TV sets radios phonographs



The final group of sectors, the SMALL ones, are shown on the opposite page. Please notice the change in scale of the graphs.

The Non-metallic minerals were large enough to merit a graph only in two years, 1985 and 1986. Frankly, we have no idea what happened in those years to set them apart. These are not likely products for FTA impacts.

From reading about the complexities of the Multifiber Agreement and the extensive system for administering it, one might suppose that Apparel and Textiles loomed large in Mexico-US trade relations. In fact, in 1985, Apparel imports from Mexico were \$337 million, less than one percent of \$43 billion of product shipments of the US Apparel industry. In 1988 and 1989, imports grew just over twenty percent per year, as quotas were relaxed for garments made entirely from pieces cut in the US from US-made fabric. We anticipate that this growth rate would continue under an FTA. That is, we add twenty percent per year growth to the tariff effects. The US exports of Apparel to Mexico are virtually all cut pieces for assembly there and re-import. We presume that with expanded Apparel imports there would be an expanded export of cut pieces, for the agreement would be framed in a way which did not allow Mexican apparel to become the vehicle for importing textiles from the Orient.

The Mexican Textile industry, surprisingly, seems to pose no threat to the US industry. Its prices, as we saw in Chapter III, were some fifty percent above foreign prices in 1987. US imports from Mexico are negligible and declined in 1988 and remained stable in 1989. On the other had, the Mexican industry has not had significant protection from licensing since 1985. US exports to Mexico have grown steadily over this period, but it seems unlikely that an FTA would accelerate that growth save by the elimination of tariffs.

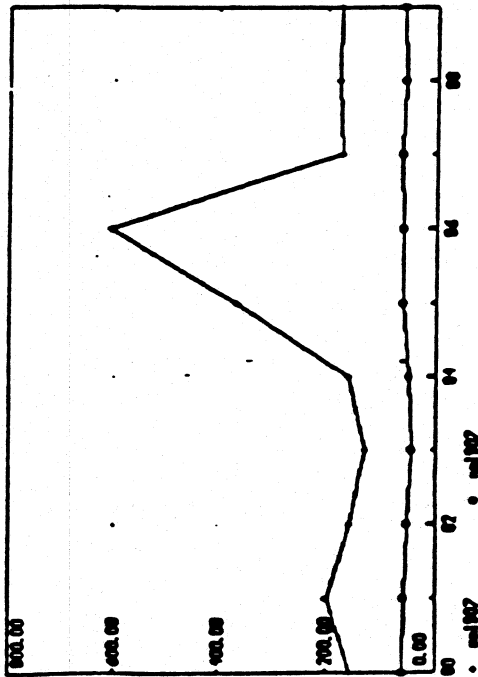
In 1989, computers were still subject to import licensing in Mexico, but apparently the licensing was rapidly becoming more lenient, for imports were growing rapidly. The is every reason to believe that this growth would be promoted by an FTA. We have added fifteen percent of the 1989 value each year for the first three years to represent the effect of the removal of the licensing. Following this liberalization boom, we continue to add five percent of the 1989 value per year out to 2000.

* * *

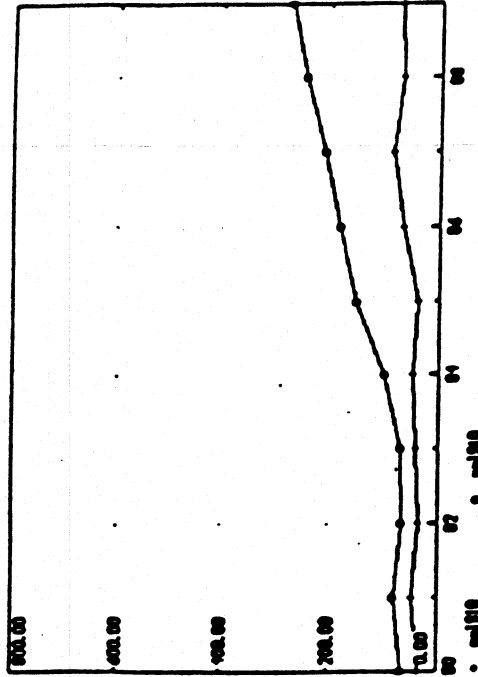
Our review of the individual industries has produced relatively few cases where we believe that an FTA would stimulate trade above beyond what the reductions in tariffs would bring. There were only four:

- Stronger US exports to Mexico in Agriculture
- Stronger US exports to Mexico in Motor vehicles
- Stronger US exports to Mexico in Computers
- Stronger Mexican imports to US in Apparel.

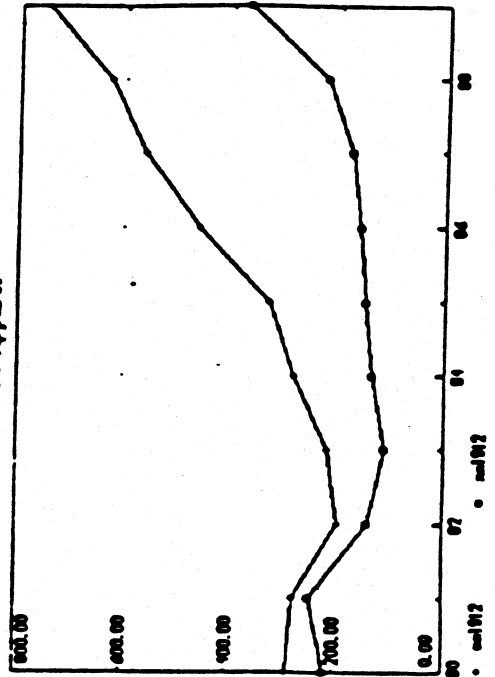
07 Non-metallic minerals



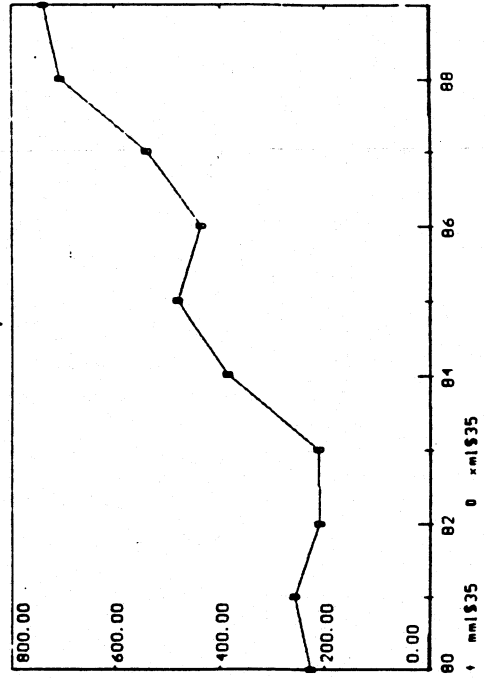
10 Textiles, exc knits



12 Apparel



35 Computers



These "extra" or "add-factor" influences that are intended to represent, however roughly, the removal of non-tariff barriers can be summarized in the following table in exactly the form in which they are applied in the model. They are in millions of 1977 dollars.

	1990	1991	1992	2000
U.S. Exports to Mexico				
1 Agriculture	125	250	375	625
35 Computers	90	180	270	450
43 Motor Vehicles	180	360	540	900
U.S Imports from Mexico				
12 Apparel	100	200	300	500

Perhaps some adjustment should be made for eliminating the Voluntary Export Restraint in Steel, but the amounts are so minute -- and the Mexican steel industry not so highly competitive -- that the adjustment would be scarcely noticeable.

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Table V-1: US Imports from Mexico in millions of current Dollars

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	1178	1206	1325	1409	1368	1412	1953	1765	1583	2038
Iron ore	6	11	9	9	5	6	3	3	7	5
Nonferrous ore	14	37	66	33	18	10	7	7	11	54
Coal	0	0	0	0	0	0	0	1	1	2
Crude Petroleum	6464	6501	8159	8020	6989	7132	3368	3588	2978	4071
Non-metallic minerals	161	206	156	122	149	318	512	153	184	190
Food and Tobacco	297	298	295	334	357	405	491	637	681	710
Textiles, exc knits	36	47	35	39	42	33	54	75	70	77
Knitting	0	1	0	1	2	1	2	3	3	6
Apparel	277	272	194	212	287	337	499	668	806	989
Paper	52	77	90	105	131	146	194	255	320	375
Printing and Publishing	21	20	21	15	17	19	23	22	30	35
Agricultural chemicals	6	9	10	10	7	4	6	14	16	17
Chemicals, exc agric.	182	234	224	295	492	431	316	373	519	582
Petroleum refining	161	347	299	487	837	690	323	196	206	102
Rubber products	2	9	14	34	56	40	81	94	131	135
Plastic products	14	15	16	26	43	96	126	128	188	159
Shoes and leather	122	133	97	93	118	132	136	188	221	254
Lumber	79	82	78	102	107	98	120	156	197	221
Furniture	53	62	62	95	116	159	230	299	432	541
Stone, clay, and glass	125	127	138	215	318	360	393	470	517	513
Ferrous metals	55	50	62	208	289	127	175	221	281	298
Copper	21	39	30	54	40	20	97	142	187	234
Other non-ferrous metals	548	512	569	698	864	926	1013	1212	1530	1953
Metal products	124	146	168	224	289	269	277	350	490	618
Engines and turbines	18	27	23	30	46	66	89	109	140	116
Agricultural machinery	3	3	4	7	7	9	6	11	24	34
Constr, mining equip	48	99	60	47	52	78	106	131	204	219
Metalworking machinery	100	78	21	30	39	24	37	66	101	88
Special industry machinery	16	18	14	25	28	20	22	39	60	16
Misc. non-electrical mach	76	98	84	94	132	144	161	216	268	228
Computers	4	1	1	0	0	1	0	2	2	3
Other office equipment	76	96	119	157	234	264	262	408	555	625
Service industry machinery	7	6	13	12	21	31	73	128	154	174
Commo eq & elect comp	863	956	981	1010	1217	1220	1409	1503	1721	1822
Elec indl apparatus	156	207	200	244	370	354	427	554	681	707
Household appliances	27	35	47	56	60	66	88	136	187	271
Elec lighting & wiring eq	100	128	131	187	253	272	368	481	681	1128
Home TV, radio, phono	83	110	144	426	486	589	590	739	1201	1454
Motor vehicles	171	215	379	653	964	1515	1907	2657	3046	2990
Aerospace	2	14	8	5	7	9	10	13	31	79
Ships, boats	0	0	0	1	1	2	3	4	7	4
Other transp. equip	14	7	1	15	1	2	20	8	16	20
Instruments	111	152	131	156	211	258	332	402	537	639
Misc. manufacturing	96	96	113	146	146	189	240	296	390	418
Scrap, etc	547	863	828	477	547	658	648	840	1021	1342

Table V-1G: US Imports from Mexico in current Dollars

	Annual Growth Rates								
	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	2	10	6	-3	3	38	-10	-10	29
Iron ore	81	-15	-2	-41	2	-42	-3	131	-27
Nonferrous ore	162	78	-50	-45	-45	-26	1	47	389
Coal	0	-75	2200	-100	0	0	9780	30	39
Crude Petroleum	1	26	-2	-13	2	-53	7	-17	37
Non-metallic minerals	28	-24	-22	23	113	61	-70	20	3
Food and Tobacco	1	-1	13	7	13	21	30	7	4
Textiles, exc knits	29	-26	12	8	-20	63	38	-6	10
Knitting	113	-60	311	122	-68	113	92	8	87
Apparel	-2	-29	9	35	17	48	34	21	23
Paper	47	17	17	25	12	33	31	26	17
Printing and Publishing	-6	8	-31	12	15	19	-4	36	18
Agricultural chemicals	35	13	-1	-33	-46	58	148	19	6
Chemicals, exc agric.	29	-4	32	67	-13	-27	18	39	12
Petroleum refining	116	-14	63	72	-18	-53	-39	5	-51
Rubber products	301	43	153	63	-27	100	17	38	3
Plastic products	3	11	63	62	126	31	2	47	-15
Shoes and leather	9	-27	-4	27	12	3	38	18	15
Lumber	4	-4	30	4	-8	23	29	26	13
Furniture	16	1	52	22	37	45	30	44	25
Stone, clay, and glass	2	8	56	48	13	9	20	10	-1
Ferrous metals	-9	23	238	39	-56	38	27	27	6
Copper	87	-23	80	-25	-51	391	47	32	25
Other non-ferrous metals	-7	11	23	24	7	9	20	26	28
Metal products	17	15	34	29	-7	3	27	40	26
Engines and turbines	49	-14	29	55	43	35	23	28	-17
Agricultural machinery	8	31	69	-5	34	-36	95	108	45
Constr, mining equip	105	-39	-22	11	51	35	23	56	7
Metalworking machinery	-22	-73	44	27	-39	58	78	52	-13
Special industry machinery	15	-23	77	15	-30	8	79	56	-73
Misc. non-electrical mach	29	-14	12	40	9	12	34	24	-15
Computers	-68	-27	-64	-25	125	-50	525	36	12
Other office equipment	26	24	32	49	13	-1	56	36	12
Service industry machinery	-7	115	-9	77	48	132	76	20	13
Commo eq & elect comp	11	3	3	21	0	16	7	14	6
Elec indl apparatus	33	-3	22	51	-4	21	30	23	4
Household appliances	32	33	19	6	10	35	54	37	45
Elec lighting & wiring eq	27	3	43	35	8	35	31	42	66
Home TV, radio, phono	33	31	196	14	21	0	25	63	21
Motor vehicles	25	76	72	48	57	26	39	15	-2
Aerospace	487	-46	-37	41	34	10	31	132	154
Ships, boats	291	136	64	78	31	44	66	66	-47
Other transp. equip	-50	-80	999	-92	22	1226	-62	107	24
Instruments	38	-14	19	35	22	29	21	34	19
Misc. manufacturing	-0	17	30	0	29	27	23	32	7
Scrap, etc	58	-4	-42	15	20	-1	30	22	31

Table V-2: US Imports from World in millions of current dollars

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	9518	9229	9017	9705	11050	11503	13413	13002	12761	13252
Iron ore	1139	1303	660	542	674	582	546	503	630	728
Nonferrous ore	918	789	988	604	610	377	356	404	496	697
Coal	31	30	23	43	44	72	80	58	65	97
Crude Petroleum	70173	69879	53399	43335	43538	39084	26927	32929	29536	38664
Non-metallic minerals	975	816	628	596	782	909	1007	653	776	901
Food and Tobacco	11408	11862	10661	11676	13211	13759	13830	14608	15126	15209
Textiles, exc knits	1919	2351	2092	2396	3270	3387	3876	4377	4071	4331
Knitting	433	377	414	526	1042	1423	1615	1762	1434	2963
Apparel	6243	7400	8126	9559	13037	14401	16592	19796	20891	22843
Paper	5292	5626	5310	5644	7373	7456	7950	9404	11001	11874
Printing and Publishing	647	658	692	818	1096	1246	1524	1650	1776	1807
Agricultural chemicals	1008	1032	1071	1239	1455	1346	1201	1199	1566	1712
Chemicals, exc agric.	6676	7506	7274	9009	11711	12387	13043	13978	17094	18718
Petroleum refining	11154	13159	13049	14475	17366	14796	10111	10850	11009	11845
Rubber products	2609	2933	2534	2784	3651	4149	4730	5447	6120	5849
Plastic products	869	1001	1074	1330	1710	1965	2409	2825	3446	3616
Shoes and leather	3037	3481	4040	4759	6087	6655	7270	8371	9578	9837
Lumber	3597	3594	3019	4367	4743	4977	5226	5816	5734	5873
Furniture	1112	1261	1390	1843	2537	3325	4083	4635	4796	5148
Stone, clay, and glass	2305	2530	2443	2917	3909	4384	4949	5536	5918	5774
Ferrous metals	7813	11708	9976	7279	11408	10710	9219	9593	11897	10971
Copper	1450	1167	938	1260	1384	1159	1382	1439	1780	2003
Other non-ferrous metals	9333	8417	6600	8418	10000	9405	12996	9353	11398	12588
Metal products	4433	5078	5210	5349	7111	7876	8561	9729	11123	11451
Engines and turbines	1163	1317	1200	1092	1650	2165	2703	2952	3710	2226
Agricultural machinery	985	908	707	817	1138	1114	1212	1495	1676	2621
Constr, mining equip	2384	3367	2722	2243	3608	4425	5130	5658	6061	5250
Metalworking machinery	2889	3158	2879	2537	3619	4526	5410	5571	6309	6011
Special industry machinery	1956	2162	2160	2291	3076	3459	4444	5147	6015	5721
Misc. non-electrical mach	1942	2377	2377	2411	3294	3634	4211	5137	6024	7774
Computers	442	362	400	408	435	453	364	408	498	604
Other office equipment	1725	2162	2831	4886	8437	8985	11755	14711	17945	21765
Service industry machinery	300	384	391	582	931	1152	1405	1759	2035	2203
Commo eq & elect comp	7084	8343	9422	11410	16655	15248	16725	19925	25358	27203
Elec indl apparatus	1205	1371	1343	1611	2299	2629	2886	3488	4588	3844
Household appliances	1060	1208	1256	1632	2085	2429	2725	2900	3128	3117
Elec lighting & wiring eq	1427	1639	1916	2386	3374	4192	5345	6138	7243	8961
Home TV, radio, phono	4271	5826	5609	6852	9580	11793	12884	12194	12335	12289
Motor vehicles	24998	27149	30508	37131	48162	58557	70954	75290	77487	75315
Aerospace	2759	3791	3432	2783	3832	4919	6101	6177	6674	9872
Ships, boats	153	188	178	252	300	368	406	459	555	553
Other transp. equip	2464	2431	1934	1710	2175	2688	2878	2732	2354	2355
Instruments	5417	6505	6162	6880	8862	10147	12330	13734	15436	15344
Misc. manufacturing	6231	7569	8071	8361	11044	12599	14349	15957	18329	19811
Scrap, etc	7214	7252	7733	7932	9635	10739	11542	12316	13355	16419

Table V-2G: US Imports from World in current dollars
Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	-3	-2	8	14	4	17	-3	-2	4
Iron ore	14	-49	-18	24	-14	-6	-8	25	15
Nonferrous ore	-14	25	-39	1	-38	-6	13	23	41
Coal	-3	-24	89	3	62	12	-28	13	49
Crude Petroleum	-0	-24	-19	0	-10	-31	22	-10	31
Non-metallic minerals	-16	-23	-5	31	16	11	-35	19	16
Food and Tobacco	4	-10	10	13	4	1	6	4	1
Textiles, exc knits	23	-11	14	37	4	14	13	-7	6
Knitting	-13	10	27	98	37	14	9	-19	107
Apparel	19	10	18	36	10	15	19	6	9
Paper	6	-6	6	31	1	7	18	17	8
Printing and Publishing	2	5	18	34	14	22	8	8	2
Agricultural chemicals	2	4	16	17	-7	-11	-0	31	9
Chemicals, exc agric.	12	-3	24	30	6	5	7	22	10
Petroleum refining	18	-1	11	20	-15	-32	7	1	8
Rubber products	12	-14	10	31	14	14	15	12	-4
Plastic products	15	7	24	29	15	23	17	22	5
Shoes and leather	15	16	18	28	9	9	15	14	3
Lumber	-0	-16	45	9	5	5	11	-1	2
Furniture	13	10	33	38	31	23	14	3	7
Stone, clay, and glass	10	-3	19	34	12	13	12	7	-2
Ferrous metals	50	-15	-27	57	-6	-14	4	24	-8
Copper	-20	-20	34	10	-16	19	4	24	13
Other non-ferrous metals	-10	-22	28	19	-6	38	-28	22	10
Metal products	15	3	3	33	11	9	14	14	3
Engines and turbines	13	-9	-9	51	31	25	9	26	-40
Agricultural machinery	-8	-22	15	39	-2	9	23	12	56
Constr, mining equip	41	-19	-18	61	23	16	10	7	-13
Metalworking machinery	9	-9	-12	43	25	20	3	13	-5
Special industry machinery	11	-0	6	34	12	28	16	17	-5
Misc. non-electrical mach	22	-0	1	37	10	16	22	17	29
Computers	-18	10	2	7	4	-20	12	22	21
Other office equipment	25	31	73	73	7	31	25	22	21
Service industry machinery	28	2	49	60	24	22	25	16	8
Commo eq & elect comp	18	13	21	46	-8	10	19	27	7
Elec indl apparatus	14	-2	20	43	14	10	21	32	-16
Household appliances	14	4	30	28	17	12	6	8	-0
Elec lighting & wiring eq	15	17	25	41	24	28	15	18	24
Home TV, radio, phono	36	-4	22	40	23	9	-5	1	-0
Motor vehicles	9	12	22	30	22	21	6	3	-3
Aerospace	37	-9	-19	38	28	24	1	8	48
Ships, boats	23	-5	41	19	23	10	13	21	-0
Other transp. equip	-1	-20	-12	27	24	7	-5	-14	0
Instruments	20	-5	12	29	15	22	11	12	-1
Misc. manufacturing	21	7	4	32	14	14	11	15	8
Scrap, etc	1	7	3	21	11	7	7	8	23

Table V-3: US Exports to Mexico in millions of current dollars

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	1889	1836	779	1564	1531	1201	661	795	1361	1521
Iron ore	17	24	4	2	4	4	3	4	5	10
Nonferrous ore	7	10	10	10	11	9	7	11	8	18
Coal	34	29	27	6	9	18	11	6	14	3
Crude Petroleum	72	62	5	10	21	35	12	3	5	1
Non-metallic minerals	61	58	51	41	45	51	50	54	60	64
Food and Tobacco	613	616	379	410	499	490	443	425	905	1231
Textiles, exc knits	67	83	65	63	93	133	153	189	254	297
Knitting	8	12	5	10	13	15	18	17	24	13
Apparel	211	244	141	107	139	154	173	208	285	490
Paper	346	401	372	320	372	403	408	537	733	892
Printing and Publishing	137	185	141	59	61	69	72	82	106	88
Agricultural chemicals	99	122	121	69	101	91	62	59	45	89
Chemicals, exc agric.	1368	1471	1005	990	1131	1276	1136	1291	1666	1906
Petroleum refining	290	330	828	254	346	509	386	494	428	714
Rubber products	280	513	111	50	68	93	98	134	218	279
Plastic products	109	150	117	110	159	193	199	255	405	495
Shoes and leather	60	59	41	31	43	45	46	60	91	118
Lumber	99	105	61	40	59	77	82	111	177	235
Furniture	39	62	35	34	73	79	81	82	129	217
Stone, clay, and glass	111	139	86	57	99	103	102	129	168	185
Ferrous metals	751	645	266	126	181	196	161	213	363	458
Copper	25	68	21	15	19	46	13	27	47	85
Other non-ferrous metals	444	343	197	128	190	202	173	250	416	652
Metal products	660	829	396	291	352	410	420	520	704	982
Engines and turbines	379	402	257	121	226	233	272	251	320	232
Agricultural machinery	1003	825	362	67	147	260	102	100	151	146
Constr, mining equip	882	1070	505	186	272	326	261	264	374	381
Metalworking machinery	343	559	341	172	211	257	353	355	453	355
Special industry machinery	312	388	339	113	152	199	231	195	281	300
Misc. non-electrical mach	477	650	422	239	283	355	349	390	521	627
Computers	226	254	210	199	341	404	374	450	591	594
Other office equipment	58	76	44	29	41	56	39	44	58	58
Service industry machinery	60	76	51	37	53	73	98	98	147	236
Commo eq & elect comp	555	673	608	672	980	962	1107	1254	1675	2036
Elec indl apparatus	381	505	328	211	309	339	339	363	568	953
Household appliances	98	127	98	69	75	83	74	78	182	237
Elec lighting & wiring eq	229	317	235	256	392	508	586	801	1055	1007
Home TV, radio, phono	270	315	184	133	190	218	210	246	435	385
Motor vehicles	927	1265	754	493	873	1175	1030	1173	1544	2068
Aerospace	505	828	153	205	165	284	170	211	205	473
Ships, boats	29	100	81	22	37	11	6	3	26	12
Other transp. equip	173	184	85	66	63	78	79	66	133	81
Instruments	534	701	489	313	473	597	619	795	1034	945
Misc. manufacturing	129	164	113	104	121	141	121	168	309	347
Scrap, etc	423	426	198	181	247	283	228	290	446	700

Table V-3G: US Exports to Mexico in current dollars
Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	-3	-58	101	-2	-22	-45	20	71	12
Iron ore	43	-84	-39	89	-7	-23	26	27	101
Nonferrous ore	42	-5	-3	15	-22	-14	49	-26	125
Coal	-16	-6	-76	34	113	-41	-42	120	-77
Crude Petroleum	-13	-92	106	101	68	-66	-75	52	-71
Non-metallic minerals	-4	-12	-20	10	12	-1	8	10	6
Food and Tobacco	1	-38	8	22	-2	-10	-4	113	36
Textiles, exc knits	23	-21	-3	47	43	16	23	34	17
Knitting	53	-58	92	30	15	18	-1	37	-48
Apparel	15	-42	-24	30	10	12	21	37	72
Paper	16	-7	-14	16	8	1	31	37	22
Printing and Publishing	35	-24	-59	5	12	5	15	29	-17
Agricultural chemicals	24	-1	-43	46	-10	-31	-6	-24	100
Chemicals, exc agric.	8	-32	-1	14	13	-11	14	29	14
Petroleum refining	14	151	-69	36	47	-24	28	-13	67
Rubber products	83	-78	-55	36	37	5	36	63	28
Plastic products	38	-22	-6	44	22	3	28	59	22
Shoes and leather	-1	-31	-24	38	5	2	31	53	29
Lumber	5	-42	-34	46	31	6	35	60	32
Furniture	58	-44	-1	112	9	3	1	57	68
Stone, clay, and glass	25	-38	-34	75	3	-1	26	30	10
Ferrous metals	-14	-59	-53	44	8	-18	32	71	26
Copper	167	-70	-26	27	140	-72	106	77	80
Other non-ferrous metals	-23	-42	-35	48	6	-14	44	67	57
Metal products	26	-52	-27	21	17	2	24	35	40
Engines and turbines	6	-36	-53	87	3	17	-8	28	-28
Agricultural machinery	-18	-56	-82	119	77	-61	-2	51	-3
Constr, mining equip	21	-53	-63	46	20	-20	1	42	2
Metalworking machinery	63	-39	-49	23	22	37	0	28	-22
Special industry machinery	24	-13	-67	35	31	16	-16	44	7
Misc. non-electrical mach	36	-35	-43	19	25	-2	12	33	20
Computers	12	-17	-5	71	18	-7	20	31	0
Other office equipment	32	-42	-34	39	36	-29	12	31	0
Service industry machinery	26	-32	-29	45	37	35	-0	50	61
Commo eq & elect comp	21	-10	11	46	-2	15	13	34	22
Elec indl apparatus	32	-35	-36	46	10	0	7	56	68
Household appliances	29	-23	-30	9	10	-10	6	132	30
Elec lighting & wiring eq	39	-26	9	53	30	15	37	32	-5
Home TV, radio, phono	16	-41	-28	42	15	-4	17	77	-11
Motor vehicles	36	-40	-35	77	35	-12	14	32	34
Aerospace	64	-82	34	-20	72	-40	25	-3	130
Ships, boats	242	-19	-72	65	-69	-47	-50	773	-54
Other transp. equip	6	-53	-23	-5	24	2	-17	102	-39
Instruments	31	-30	-36	51	26	4	28	30	-9
Misc. manufacturing	27	-31	-8	17	16	-14	39	84	13
Scrap, etc	1	-54	-8	36	15	-20	27	54	57

Table V-4: US Exports to World in millions of current dollars

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	30690	32090	27014	26490	27966	20552	16669	18622	24485	27250
Iron ore	990	671	394	375	503	501	353	329	383	481
Nonferrous ore	290	266	231	113	122	169	224	252	501	766
Coal	4580	5879	6005	4059	4137	4468	3931	3370	4013	4287
Crude Petroleum	743	695	580	375	257	317	157	157	114	89
Non-metallic minerals	1356	1404	1203	1058	794	831	935	1079	1227	1006
Food and Tobacco	12752	13699	11942	11779	11940	10979	12235	13923	17722	18824
Textiles, exc knits	2288	2125	1608	1419	1392	1366	1555	1769	2162	2599
Knitting	197	206	165	149	144	125	138	147	198	212
Apparel	1539	1569	1207	1059	1019	954	1133	1438	1895	2383
Paper	4808	4896	4334	4224	4459	4012	4631	5864	7323	8346
Printing and Publishing	1166	1375	1419	1383	1429	1296	1342	1585	1945	2586
Agricultural chemicals	3122	2694	2438	2295	3346	3030	2244	2574	2961	4025
Chemicals, exc agric.	18369	19265	17951	17827	19722	19105	20489	23586	29017	32063
Petroleum refining	2719	3813	6109	5082	4869	5104	3941	4162	4007	5176
Rubber products	1285	1403	1048	966	1064	981	997	1391	1871	1866
Plastic products	1232	1381	1327	1373	1494	1408	1523	1840	2350	2857
Shoes and leather	551	561	538	493	571	524	571	739	957	1124
Lumber	3658	3018	2835	2823	2688	2664	3017	3958	5333	6062
Furniture	467	629	584	539	551	492	477	568	756	919
Stone, clay, and glass	1654	1809	1600	1530	1626	1493	1464	1758	2170	2522
Ferrous metals	3337	2900	2154	1414	1408	1337	1206	1444	2289	3316
Copper	336	281	225	277	282	207	144	196	350	356
Other non-ferrous metals	7904	5729	3227	3266	3752	3266	3519	4184	8693	7459
Metal products	8062	8906	8376	7608	7687	6767	6319	7262	8543	9155
Engines and turbines	3955	4206	3950	3300	3561	3329	2988	3314	4342	4212
Agricultural machinery	3356	3820	3105	2513	2835	2504	2028	2233	2788	2770
Constr, mining equip	10327	11993	10333	6475	6344	6868	5861	5331	6998	8376
Metalworking machinery	3158	3614	2712	2061	2201	2217	2465	2807	3487	3576
Special industry machinery	3297	3652	3095	2344	2846	2788	2820	3233	4221	4667
Misc. non-electrical mach	4829	5297	4766	4013	4068	3955	3867	4369	5635	7389
Computers	7904	8870	9293	10719	13553	14028	14662	17647	21917	21882
Other office equipment	606	710	616	552	579	630	500	678	842	841
Service industry machinery	1887	2161	2011	1810	1827	1648	1580	1962	2625	3038
Commo eq & elect comp	6524	7295	7771	8171	9455	8387	9363	11330	14543	18834
Elec indl apparatus	2415	2802	2661	2311	2517	2378	2410	2628	3464	4605
Household appliances	1183	1282	1049	946	970	894	886	1119	1546	1521
Elec lighting & wiring eq	1909	2257	2174	2229	2531	2479	2687	3391	4387	4426
Home TV, radio, phono	1502	1458	1118	1023	1175	1200	1425	1760	2466	2624
Motor vehicles	12046	13597	11759	12950	15330	17330	17081	19135	22941	24158
Aerospace	14474	16616	14154	14586	13473	17270	18318	20680	24648	29893
Ships, boats	588	1197	1382	708	202	266	287	330	636	929
Other transp. equip	1093	1174	1737	1523	1663	1616	1410	1235	1443	1689
Instruments	11067	12033	11879	11597	12525	12694	13150	14551	17596	18039
Misc. manufacturing	3471	3278	2653	2601	2336	2208	2619	3387	4540	4566
Scrap, etc	11182	8728	7467	8868	9522	10358	14921	11655	17457	24444

Table V-4G: US Exports to World in current dollars
Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	5	-16	-2	6	-27	-19	12	31	11
Iron ore	-32	-41	-5	34	-0	-30	-7	16	26
Nonferrous ore	-8	-13	-51	9	39	32	12	99	53
Coal	28	2	-32	2	8	-12	-14	19	7
Crude Petroleum	-7	-16	-35	-31	24	-50	-0	-27	-22
Non-metallic minerals	4	-14	-12	-25	5	13	15	14	-18
Food and Tobacco	7	-13	-1	1	-8	11	14	27	6
Textiles, exc knits	-7	-24	-12	-2	-2	14	14	22	20
Knitting	5	-20	-10	-3	-13	10	7	35	7
Apparel	2	-23	-12	-4	-6	19	27	32	26
Paper	2	-11	-3	6	-10	15	27	25	14
Printing and Publishing	18	3	-3	3	-9	4	18	23	33
Agricultural chemicals	-14	-9	-6	46	-9	-26	15	15	36
Chemicals, exc agric.	5	-7	-1	11	-3	7	15	23	10
Petroleum refining	40	60	-17	-4	5	-23	6	-4	29
Rubber products	9	-25	-8	10	-8	2	40	34	-0
Plastic products	12	-4	3	9	-6	8	21	28	22
Shoes and leather	2	-4	-8	16	-8	9	29	29	17
Lumber	-17	-6	-0	-5	-1	13	31	35	14
Furniture	35	-7	-8	2	-11	-3	19	33	22
Stone, clay, and glass	9	-12	-4	6	-8	-2	20	23	16
Ferrous metals	-13	-26	-34	-0	-5	-10	20	59	45
Copper	-16	-20	23	2	-27	-31	37	78	2
Other non-ferrous metals	-28	-44	1	15	-13	8	19	108	-14
Metal products	10	-6	-9	1	-12	-7	15	18	7
Engines and turbines	6	-6	-16	8	-7	-10	11	31	-3
Agricultural machinery	14	-19	-19	13	-12	-19	10	25	-1
Constr, mining equip	16	-14	-37	-2	8	-15	-9	31	20
Metalworking machinery	14	-25	-24	7	1	11	14	24	3
Special industry machinery	11	-15	-24	21	-2	1	15	31	11
Misc. non-electrical mach	10	-10	-16	1	-3	-2	13	29	31
Computers	12	5	15	26	4	5	20	24	-0
Other office equipment	17	-13	-10	5	9	-21	36	24	-0
Service industry machinery	14	-7	-10	1	-10	-4	24	34	16
Commo eq & elect comp	12	7	5	16	-11	12	21	28	30
Elec indl apparatus	16	-5	-13	9	-6	1	9	32	33
Household appliances	8	-18	-10	3	-8	-1	26	38	-2
Elec lighting & wiring eq	18	-4	3	14	-2	8	26	29	1
Home TV, radio, phono	-3	-23	-9	15	2	19	23	40	6
Motor vehicles	13	-14	-10	18	-13	-1	12	20	5
Aerospace	15	-15	3	-8	28	6	13	19	21
Ships, boats	103	15	-49	-71	32	8	15	93	46
Other transp. equip	7	48	-12	9	-3	-13	-12	17	17
Instruments	9	-1	-2	8	1	4	11	21	3
Misc. manufacturing	-6	-19	-2	-10	-5	19	29	34	1
Scrap, etc	-22	-14	19	7	9	44	-22	50	40

Table V-5: US Imports from Mexico in millions of constant 1982 \$

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	1045	1113	1323	1419	1342	1444	1862	1705	1440	1938
Iron ore	6	11	9	10	6	6	4	3	7	5
Nonferrous ore	14	35	66	35	19	11	9	8	11	50
Coal	0	0	0	0	0	0	0	1	1	2
Crude Petroleum	6714	6052	8166	8808	7803	8394	7149	6560	6514	7465
Non-metallic minerals	157	198	156	128	159	363	606	172	178	177
Food and Tobacco	263	275	294	337	350	414	468	615	620	675
Textiles, exc knits	35	45	35	41	45	38	65	84	68	71
Knitting	0	1	0	1	2	1	1	2	2	4
Apparel	287	274	194	216	279	326	458	560	627	746
Paper	54	77	90	106	127	141	178	213	249	283
Printing and Publishing	20	19	21	16	18	22	27	24	29	32
Agricultural chemicals	6	8	10	10	7	4	7	15	16	16
Chemicals, exc agric.	177	225	223	311	526	492	375	415	499	533
Petroleum refining	167	323	299	535	934	812	685	358	451	186
Rubber products	2	10	14	35	54	39	74	79	102	102
Plastic products	14	14	16	28	45	110	149	144	181	148
Shoes and leather	127	134	97	95	114	128	124	157	172	192
Lumber	77	79	79	108	114	112	142	174	190	206
Furniture	53	61	62	96	120	167	221	267	363	448
Stone, clay, and glass	122	122	138	226	339	411	465	527	500	477
Ferrous metals	54	48	62	219	309	145	207	248	271	277
Copper	20	38	30	57	43	22	114	159	181	217
Other non-ferrous metals	534	492	569	736	921	1057	1199	1357	1477	1815
Metal products	121	140	168	236	308	307	327	392	473	575
Engines and turbines	18	27	23	31	52	78	103	130	167	143
Agricultural machinery	3	3	4	8	8	11	7	14	28	43
Constr, mining equip	49	100	61	50	59	93	123	156	243	272
Metalworking machinery	100	78	21	32	44	28	43	80	120	109
Special industry machinery	16	18	14	26	32	24	25	46	72	20
Misc. non-electrical mach	76	98	84	99	149	172	187	258	319	283
Computers	4	1	1	0	0	1	0	2	3	3
Other office equipment	76	96	119	166	266	314	305	489	662	775
Service industry machinery	7	6	13	13	24	37	85	153	183	216
Commo eq & elect comp	864	959	981	1068	1379	1452	1643	1799	2050	2259
Elec indl apparatus	156	208	200	259	420	421	498	663	811	876
Household appliances	27	35	47	56	61	69	85	122	157	224
Elec lighting & wiring eq	97	123	131	197	269	311	435	538	658	1049
Home TV, radio, phono	83	108	144	429	500	620	566	661	1008	1203
Motor vehicles	204	224	379	640	922	1417	1607	2114	2302	2207
Aerospace	2	14	8	5	8	11	12	16	37	98
Ships, boats	0	0	0	1	2	2	3	5	9	5
Other transp. equip	14	7	1	16	1	2	24	9	19	24
Instruments	111	153	131	165	239	307	387	481	640	793
Misc. manufacturing	96	94	113	147	151	199	230	265	327	346

These numbers were derived by deflating the current \$ series by implicit deflators for merchandise imports in the US NIPA

Table V-5G: US Imports from Mexico in constant 1982 \$
 These numbers were derived by deflating the current \$ series
 by implicit deflators for merchandise imports in the US NIPA
 Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	6	19	7	-5	8	29	-8	-16	35
Iron ore	79	-11	3	-40	9	-40	-8	99	-29
Nonferrous ore	159	85	-47	-44	-41	-23	-5	27	370
Coal	0	-74	2320	-100	0	0	9249	12	34
Crude Petroleum	-10	35	8	-11	8	-15	-8	-1	15
Non-metallic minerals	26	-21	-18	24	128	67	-72	4	-1
Food and Tobacco	5	7	14	4	18	13	31	1	9
Textiles, exc knits	27	-23	18	9	-14	69	29	-19	5
Knitting	107	-60	317	112	-68	102	75	-0	82
Apparel	-4	-29	11	29	17	41	22	12	19
Paper	43	16	18	19	11	26	20	17	14
Printing and Publishing	-7	12	-27	13	23	23	-10	18	13
Agricultural chemicals	34	17	4	-32	-43	64	132	3	1
Chemicals, exc agric.	27	-1	39	69	-6	-24	11	20	7
Petroleum refining	94	-7	79	75	-13	-16	-48	26	-59
Rubber products	291	42	157	56	-28	89	7	28	0
Plastic products	2	16	71	64	142	35	-4	26	-19
Shoes and leather	6	-28	-3	21	12	-3	26	9	12
Lumber	2	-0	37	6	-2	27	22	9	8
Furniture	14	3	53	25	40	32	21	36	23
Stone, clay, and glass	1	12	64	50	21	13	13	-5	-5
Ferrous metals	-10	28	255	41	-53	43	20	10	2
Copper	85	-20	89	-24	-48	408	39	13	20
Other non-ferrous metals	-8	16	29	25	15	13	13	9	23
Metal products	16	20	41	30	-0	7	20	21	22
Engines and turbines	50	-14	36	66	51	32	26	28	-14
Agricultural machinery	9	30	79	2	40	-38	100	107	51
Constr, mining equip	106	-39	-18	19	58	32	27	56	12
Metalworking machinery	-22	-73	53	36	-36	55	83	52	-10
Special industry machinery	15	-23	87	23	-26	6	84	55	-72
Misc. non-electrical mach	30	-14	18	50	15	9	38	24	-11
Computers	-68	-27	-62	-20	137	-51	542	35	17
Other office equipment	27	23	40	60	18	-3	60	35	17
Service industry machinery	-7	115	-4	90	56	127	81	19	18
Commo eq & elect comp	11	2	9	29	5	13	10	14	10
Elec indl apparatus	33	-4	29	62	0	18	33	22	8
Household appliances	29	36	20	8	13	23	44	29	43
Elec lighting & wiring eq	26	7	50	37	15	40	24	22	60
Home TV, radio, phono	30	33	198	17	24	-9	17	53	19
Motor vehicles	10	69	69	44	54	13	32	9	-4
Aerospace	488	-46	-33	52	41	8	35	131	164
Ships, boats	292	136	73	91	38	41	71	65	-45
Other transp. equip	-50	-80	1062	-91	28	1199	-61	106	29
Instruments	38	-14	26	45	29	26	24	33	24
Misc. manufacturing	-2	20	31	2	32	16	15	24	6

Table V-6: US Exports to Mexico in millions of constant 1982 dollars
 Derived by using implicit deflators from the US NIPA

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	1676	1693	778	1574	1502	1229	630	767	1238	1447
Iron ore	16	23	4	2	5	5	4	5	5	10
Nonferrous ore	7	10	10	10	12	10	9	12	8	17
Coal	33	27	27	7	9	21	13	7	13	3
Crude Petroleum	74	58	5	11	23	41	25	5	10	2
Non-metallic minerals	59	56	51	43	48	58	60	61	58	59
Food and Tobacco	543	568	379	413	489	502	422	410	824	1170
Textiles, exc knits	66	80	65	67	99	152	182	210	244	272
Knitting	8	12	5	10	13	14	16	15	19	9
Apparel	218	246	141	108	135	149	158	174	222	370
Paper	358	404	372	325	362	390	374	449	570	673
Printing and Publishing	134	178	141	62	65	79	85	92	102	80
Agricultural chemicals	96	117	120	73	108	103	74	65	43	81
Chemicals, exc agric.	1333	1416	1002	1042	1208	1458	1347	1434	1601	1745
Petroleum refining	301	307	829	279	386	599	820	903	936	1310
Rubber products	290	518	111	51	66	90	90	112	170	211
Plastic products	106	144	117	116	169	220	236	286	391	461
Shoes and leather	62	60	41	31	41	43	42	50	71	89
Lumber	97	101	61	42	63	88	97	124	171	218
Furniture	39	61	35	35	75	83	78	74	109	180
Stone, clay, and glass	108	133	87	60	106	117	120	144	162	172
Ferrous metals	731	620	266	133	193	223	190	238	350	426
Copper	25	65	21	16	21	53	15	30	46	79
Other non-ferrous metals	433	330	197	135	203	230	204	279	402	606
Metal products	643	798	397	307	375	468	496	583	680	913
Engines and turbines	379	403	257	128	256	277	317	300	381	288
Agricultural machinery	1004	828	362	71	166	309	119	120	180	182
Constr, mining equip	883	1074	505	197	308	388	304	316	446	472
Metalworking machinery	343	560	341	182	239	306	412	424	540	441
Special industry machinery	313	390	340	119	172	237	269	233	335	371
Misc. non-electrical mach	477	652	422	252	321	422	407	467	620	778
Computers	226	255	210	211	386	480	436	539	704	736
Other office equipment	58	76	44	31	46	66	46	53	69	72
Service industry machinery	60	76	51	39	60	86	114	117	175	292
Commo eq & elect comp	556	676	608	710	1111	1145	1291	1501	1996	2525
Elec indl apparatus	381	506	328	224	350	403	395	435	677	1182
Household appliances	98	124	98	69	78	87	71	70	153	196
Elec lighting & wiring eq	223	305	236	270	418	580	693	896	1019	937
Home TV, radio, phono	270	309	184	134	195	230	202	220	365	319
Motor vehicles	1103	1320	754	483	835	1100	868	933	1167	1527
Aerospace	506	830	153	217	187	338	198	253	245	586
Ships, boats	29	101	81	24	42	13	7	4	31	15
Other transp. equip	173	184	85	70	71	93	92	79	159	101
Instruments	534	703	489	331	536	710	721	951	1232	1171
Misc. manufacturing	129	161	113	104	124	148	116	150	259	287

Table V-6G: US Exports to Mexico in constant 1982 dollars
 Derived by using implicit deflators from the US NIPA
 Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Agric, Forest, Fish	1	-54	102	-5	-18	-49	22	61	17
Iron ore	42	-83	-35	92	-0	-20	19	10	93
Nonferrous ore	40	-1	3	17	-17	-11	41	-36	117
Coal	-17	-3	-75	36	127	-39	-45	90	-78
Crude Petroleum	-22	-91	126	104	77	-39	-78	81	-76
Non-metallic minerals	-5	-8	-16	12	20	2	2	-5	2
Food and Tobacco	5	-33	9	19	3	-16	-3	101	42
Textiles, exc knits	22	-19	2	49	53	20	16	16	12
Knitting	49	-58	95	24	15	12	-10	27	-49
Apparel	13	-43	-23	25	10	6	10	27	67
Paper	13	-8	-13	11	8	-4	20	27	18
Printing and Publishing	33	-21	-56	6	20	9	7	11	-21
Agricultural chemicals	22	3	-40	48	-4	-28	-12	-34	90
Chemicals, exc agric.	6	-29	4	16	21	-8	6	12	9
Petroleum refining	2	170	-66	39	55	37	10	4	40
Rubber products	78	-79	-54	30	36	-0	25	51	24
Plastic products	36	-19	-1	45	30	7	21	37	18
Shoes and leather	-3	-32	-23	32	5	-3	20	42	25
Lumber	4	-39	-31	48	41	10	28	38	27
Furniture	55	-43	-0	117	11	-6	-5	47	66
Stone, clay, and glass	24	-35	-31	78	11	3	20	12	6
Ferrous metals	-15	-57	-50	45	16	-15	25	47	21
Copper	164	-69	-22	29	157	-71	95	52	73
Other non-ferrous metals	-24	-40	-32	50	13	-11	37	44	51
Metal products	24	-50	-23	22	25	6	17	17	34
Engines and turbines	6	-36	-50	100	8	15	-5	27	-25
Agricultural machinery	-18	-56	-80	135	86	-62	1	51	1
Constr, mining equip	22	-53	-61	57	26	-22	4	41	6
Metalworking machinery	63	-39	-47	31	28	35	3	27	-18
Special industry machinery	25	-13	-65	45	37	14	-13	44	11
Misc. non-electrical mach	37	-35	-40	27	32	-4	15	33	25
Computers	13	-18	0	83	24	-9	24	31	5
Other office equipment	32	-42	-30	49	43	-31	15	31	5
Service industry machinery	26	-33	-25	55	44	32	2	49	67
Commo eq & elect comp	22	-10	17	56	3	13	16	33	27
Elec indl apparatus	33	-35	-32	57	15	-2	10	56	75
Household appliances	27	-21	-29	12	12	-18	-1	118	29
Elec lighting & wiring eq	37	-23	14	55	39	19	29	14	-8
Home TV, radio, phono	14	-40	-27	45	18	-12	9	66	-13
Motor vehicles	20	-43	-36	73	32	-21	8	25	31
Aerospace	64	-82	42	-14	81	-42	28	-3	140
Ships, boats	243	-20	-71	76	-68	-48	-49	769	-52
Other transp. equip	7	-54	-18	1	31	-0	-14	101	-37
Instruments	32	-30	-32	62	32	2	32	30	-5
Misc. manufacturing	25	-30	-7	19	19	-21	29	73	11

Table V-7: Implicit Deflators for Merchandise Trade from US NIPA

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Merchandise exports	93	100	100	99	100	95	91	89	93	95
Foods, feeds, and beverage	108	113	100	104	108	95	88	82	100	102
Industrial supplies and m	100	103	100	97	100	96	92	95	104	104
Durable goods	100	103	100	97	100	96	92	96	104	104
Nondurable goods	99	103	100	97	100	96	92	95	104	104
Capital goods, except aut	85	94	100	97	94	89	84	78	78	80
Autos	81	93	100	104	107	109	112	113	116	120
Consumer goods	94	99	100	100	101	100	103	107	111	115
Durable goods	91	98	100	100	97	94	99	102	106	110
Nondurable goods	98	100	100	100	103	104	107	112	116	121
Other	92	100	100	101	104	101	95	95	99	99
Durable goods	92	100	100	101	104	101	93	92	94	93
Nondurable goods	92	100	100	101	104	101	98	100	108	110
Merchandise imports	98	103	100	96	95	93	89	94	96	97
Foods, feeds, and beverage	113	108	100	99	102	98	105	104	110	105
Industrial supplies and m	103	104	100	95	94	87	84	90	104	108
Durable goods	103	104	100	95	94	88	85	89	104	108
Nondurable goods	103	104	100	95	94	88	84	90	104	109
Petroleum and products	96	107	100	91	90	85	47	55	46	55
Capital goods, except aut	100	100	100	95	88	84	86	84	84	81
Autos	84	96	100	102	105	107	119	126	132	135
Consumer goods	99	101	100	99	100	98	106	115	123	126
Durable goods	100	102	100	99	97	95	104	112	119	121
Nondurable goods	97	99	100	98	103	103	109	119	129	132
Other	99	101	100	98	99	97	103	110	119	121
Durable goods	98	101	100	98	98	97	103	110	119	121
Nondurable goods	98	101	100	98	98	97	103	110	119	121

Table V-7G: Implicit Deflators for Merchandise Imports from US NIPA
Annual Growth Rates

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Merchandise exports	7	0	-1	1	-5	-4	-2	5	2
Foods, feeds, and beverag	5	-12	5	3	-11	-8	-7	22	2
Industrial supplies and m	4	-3	-3	3	-5	-4	4	9	0
Durable goods	4	-3	-3	3	-5	-4	4	9	0
Nondurable goods	4	-3	-3	3	-5	-4	4	9	-0
Capital goods, except aut	11	6	-3	-3	-6	-5	-8	-0	3
Autos	14	7	4	3	2	3	1	2	3
Consumer goods	5	1	-0	1	-1	4	4	4	3
Durable goods	7	3	-0	-3	-3	5	3	5	3
Nondurable goods	2	0	-1	4	1	2	5	4	4
Other	9	-0	1	3	-3	-6	0	4	-0
Durable goods	8	0	1	3	-3	-8	-1	2	-1
Nondurable goods	8	0	1	3	-3	-3	2	8	2
Merchandise imports	5	-3	-4	-1	-3	-4	5	3	1
Foods, feeds, and beverag	-4	-8	-1	3	-4	7	-1	6	-4
Industrial supplies and m	1	-4	-5	-1	-7	-3	6	16	4
Durable goods	1	-4	-5	-1	-7	-4	6	16	4
Nondurable goods	1	-3	-5	-1	-7	-4	7	16	5
Petroleum and products	12	-7	-9	-2	-5	-45	16	-16	19
Capital goods, except aut	-0	0	-5	-7	-5	2	-3	0	-4
Autos	14	4	2	2	2	11	6	5	2
Consumer goods	2	-1	-1	1	-1	8	8	7	2
Durable goods	2	-2	-1	-2	-2	10	7	7	1
Nondurable goods	3	1	-2	5	0	6	9	8	3
Other	3	-1	-2	0	-2	7	7	8	2
Durable goods	4	-1	-2	-0	-2	7	7	8	2
Nondurable goods	4	-1	-2	-0	-2	7	7	8	2

CHAPTER VI

IMPORT SHARE FUNCTIONS

Our approach to modeling US-Mexican trade, it will be recalled from Chapter I, is to treat it in a way which can be extended to a multi-country system. More specifically, we first model a given country's imports from the whole world of a particular product as a function of the price of that product in the given country relative to an average of that product's prices in foreign countries. The average is computed from the share of those foreign countries in the imports of the product into the given country. To obtain the bi-lateral trade flows, we then distribute the imports of each country among its suppliers. The present chapter is about making that distribution for the US and Mexico.

The form of the function we shall use is

$$m_j = m_j^o \left(\frac{p_j}{p_w} \right)^{\beta_j} \quad (\text{VI - 1})$$

where

- m_j = share of country j in the imports of the product by the given country
- p_j = price of the product in country j , adjusted for exchange rates
- p_w = world price of the product
- β_j = price elasticity of this demand

If we had such functions for all supplying countries, then there would be a natural definition of the world price, namely, the price that made the shares add up to one. For example, if all the β_j were the same, β , then we could then solve for the world price from

$$p_w^\beta = \sum_j m_j^o p_j^\beta \quad (\text{VI - 3})$$

In the special case of $\beta = -1$, this becomes simply

$$p_w = \frac{1}{\sum_j \frac{m_j^o}{p_j}} \quad (\text{VI - 3})$$

This sort of "default case" suggests an averaging method for calculating world prices when, as in the present case, we do not have anything approaching a complete system of estimates of η for all countries. Unfortunately, it has not been used in the government source from which many of the world prices are taken.

There is a simple, important, and useful theoretical restriction on the values of the β , namely the β should be greater in absolute value (more negative) than the η , the price elasticity of total imports, for the sector in question. This restriction arises from the following consideration. Suppose the Mexican price of a product falls; that fall will make the world price as seen from the US decline; that decline will cause US imports of the product to rise. Imports from Mexico must rise by all or more than all of the amount by which total imports rose, for there would be no reason to increase imports from other countries -- their prices have not fallen - - and indeed, Mexican imports are now cheaper in comparison to those of other countries, so imports from the other countries may now be shifted to Mexico. How this consideration leads to the condition $\beta < \eta < 0$ is shown in the appendix to this chapter.

We may as well admit before going further that we have not even attempted to estimate equations for the US share of Mexican imports. Instead, we have used the default assumption of $\beta = \eta$ for all sectors. The reasons for not even trying are several. First, all the reasons which made estimating equations for total imports nearly impossible would, presumably, make the estimation of reliable equations for shares equally improbable. Secondly, we have not been able to obtain a time series from Mexican sources on the countries of origin of their imports. We have only the series obtained by putting US exports (collected in TSUSA, converted to HS, and then to US SIC) into Mexican sectors and converting from dollars to pesos. It is hardly surprising that the result is that the estimated US exports to Mexico often exceed *total* Mexican imports in a number of sectors. The graphs of the indexes (1985 = 100) of these ratios of US exports to Mexico to total Mexican imports of the corresponding sector were shown by dotted lines in the figures in Chapter III. The variations did not inspire belief that the data were worth analysis. Finally, there is a real question about what the ratio of US price to world price would be for many sectors. It will be recalled that Ten Kate used the US price *as* the world price for 75 percent of the 917 individual prices compared. If the world price *is* the US price, then the ratio is never going to vary. We believe that it is possible to do this analysis in collaboration with Mexican partners, but it will require considerably more effort than the analysis on the US side -- and success may prove elusive.

For the analysis of the Mexican share of US imports, we need four items of data:

- US imports from the world
- US imports from Mexico
- price indexes for US imports from the world
- price indexes for US imports from Mexico

Table VI - 1: Mexican Share of US Imports

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
01 Agriculture, Forestry	12.4	13.1	14.7	14.5	12.4	12.3	14.6	13.6	12.4	15.4
02 Iron ore mining	0.5	0.9	1.4	1.7	0.8	1.0	0.6	0.6	1.1	0.7
03 Nonferrous ore mining	1.5	4.7	6.6	5.5	3.0	2.7	2.1	1.9	2.2	7.7
04 Coal	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.7	2.0	1.8
06 Crude Petroleum	9.2	9.3	15.3	18.5	16.1	18.2	12.5	10.9	10.1	10.5
07 Non-metallic minerals	16.5	25.3	24.9	20.4	19.1	35.0	50.9	23.5	23.8	21.1
09 Food and Tobacco	2.6	2.5	2.8	2.9	2.7	2.9	3.6	4.4	4.5	4.7
10 Textiles, exc knits	1.9	2.0	1.7	1.6	1.3	1.0	1.4	1.7	1.7	1.8
11 Knitting	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2
12 Apparel	4.4	3.7	2.4	2.2	2.2	2.3	3.0	3.4	3.9	4.3
13 Paper	1.0	1.4	1.7	1.9	1.8	2.0	2.4	2.7	2.9	3.2
14 Printing and Publish	3.2	3.0	3.1	1.8	1.5	1.5	1.5	1.3	1.7	2.0
15 Agricultural chemicals	0.6	0.8	0.9	0.8	0.4	0.3	0.5	1.1	1.0	1.0
16 Chemicals, exc agric.	2.7	3.1	3.1	3.3	4.2	3.5	2.4	2.7	3.0	3.1
17 Petroleum refining	1.4	2.6	2.3	3.4	4.8	4.7	3.2	1.8	1.9	0.9
19 Rubber products	0.1	0.3	0.5	1.2	1.5	1.0	1.7	1.7	2.1	2.3
20 Plastic products	1.6	1.5	1.5	2.0	2.5	4.9	5.2	4.5	5.5	4.4
21 Shoes and leather	4.0	3.8	2.4	2.0	1.9	2.0	1.9	2.2	2.3	2.6
22 Lumber	2.2	2.3	2.6	2.3	2.2	2.0	2.3	2.7	3.4	3.8
23 Furniture	4.8	4.9	4.5	5.2	4.6	4.8	5.6	6.4	9.0	10.5
24 Stone, clay, and glass	5.4	5.0	5.6	7.4	8.1	8.2	7.9	8.5	8.7	8.9
25 Ferrous metals	0.7	0.4	0.6	2.9	2.5	1.2	1.9	2.3	2.4	2.7
26 Copper	1.4	3.3	3.2	4.3	2.9	1.7	7.0	9.9	10.5	11.7
27 Other non-ferrous meta	5.9	6.1	8.6	8.3	8.6	9.8	7.8	13.0	13.4	15.5
28 Metal products	2.8	2.9	3.2	4.2	4.1	3.4	3.2	3.6	4.4	5.4
29 Engines and turbines	1.5	2.0	1.9	2.7	2.8	3.0	3.3	3.7	3.8	5.2
30 Agricultural machinery	0.3	0.4	0.6	0.9	0.6	0.8	0.5	0.8	1.4	1.3
31 Constr., mining, oilfi	2.0	3.0	2.2	2.1	1.4	1.8	2.1	2.3	3.4	4.2
32 Metalworking machinery	3.5	2.5	0.7	1.2	1.1	0.5	0.7	1.2	1.6	1.5
33 Special industry machi	0.8	0.8	0.6	1.1	0.9	0.6	0.5	0.7	1.0	0.3
34 Misc. non-electrical m	3.9	4.1	3.5	3.9	4.0	4.0	3.8	4.2	4.4	2.9
35 Computers	0.9	0.3	0.2	0.1	0.1	0.1	0.1	0.4	0.4	0.4
36 Other office equipment	4.4	4.4	4.2	3.2	2.8	2.9	2.2	2.8	3.1	2.9
37 Service industry machi	2.2	1.6	3.3	2.0	2.3	2.7	5.2	7.3	7.5	7.9
38 Communic eq and electr	12.2	11.5	10.4	8.8	7.3	8.0	8.4	7.5	6.8	6.7
39 Elec indl apparatus	12.9	15.1	14.9	15.2	16.1	13.5	14.8	15.9	14.8	18.4
40 Household appliances	2.5	2.9	3.7	3.4	2.9	2.7	3.2	4.7	6.0	8.7
41 Elec lighting & wiring	7.0	7.8	6.8	7.8	7.5	6.5	6.9	7.8	9.4	12.6
42 TV sets, radios, phono	1.9	1.9	2.6	6.2	5.1	5.0	4.6	6.1	9.7	11.8
43 Motor vehicles	0.7	0.8	1.2	1.8	2.0	2.6	2.7	3.5	3.9	4.0
44 Aerospace	0.1	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.8
45 Ships, boats	0.0	0.1	0.3	0.3	0.5	0.5	0.7	1.0	1.3	0.7
46 Other transportation e	0.6	0.3	0.1	0.9	0.1	0.1	0.7	0.3	0.7	0.8
47 Instruments	2.0	2.3	2.1	2.3	2.4	2.5	2.7	2.9	3.5	4.2
48 Misc. manufacturing	1.5	1.3	1.4	1.8	1.3	1.5	1.7	1.9	2.1	2.1

Source: U.S. Department of Commerce and Informum

The source for the first and second, the COMPRO system of the US Department of Commerce, has been described in the previous chapter. The imports from Mexico were put through the same process of aggregation, comparison, and linking as described previously for imports from the world. The resulting ratios of imports from Mexico to imports from the world are shown in Table VI - 1.

The source for the third body of data, world prices, is a combination of Bureau of Labor Statistics (BLS) import price indexes (used where available) and series on domestic prices of foreign countries collected by Inforum from various foreign sources. These series were extended from 1988 to 1989 by assigning to each the 1988-89 growth of the deflator of one of the ten components of merchandise imports in the quarterly NIPA. For the last body of data, the Mexican prices, we used indexes of Mexican domestic producer prices obtained by CIMAT from the Bank of Mexico. This is a bank of monthly price data for a thousand or so items or groups of items beginning in 1981 (but with 1980 = 100) and extending into early 1990. Its subtotals matched fairly closely the Mexican sectors, so an annual bank of Mexican prices by MIMEX sectors for 1980 to 1989 could be established. These series were then converted to dollars and then to LIFT sectors. The conversion to LIFT sectors was done using the weights obtained from the bridge matrix between US imports from Mexico in LIFT sectors and the same imports in MIMEX sectors. This bridge matrix was obtained by assigning each of the 3-digit SIC import lines to a LIFT sector and to a MIMEX sector. (In a few cases, a 3-digit sector had to be split on the basis of 4-digit data among two or more sectors.) The result, lest one get lost in all the conversions, is a bank of annual time series for 1980-89 on Mexican producer prices in dollars in LIFT sectors.

It proved quite important, in estimating equation (1), to allow for a year's lag in response to price. A time trend term was also tried but was retained in only a few sectors. The general form estimated was, therefore,

$$\log m(t) = b_1 + b_2 \log p(t) + b_3 \log p(t-1) + b_4 t$$

where m is the Mexican share of imports of some sector, $p(t)$ is the Mexican price relative to the world price (as seen from the US), and t is a time variable equal to 0 in 1970. The total elasticity is the sum $b_1 + b_2$. Because the Mexican price data went back only to 1980, the estimation period could cover only 1981 - 1989.

All equations were estimated both with and without the time term. It was retained only where it made the total elasticity more negative. In other words, we were out to find effects of prices; if we found bigger ones by allowing for a time trend, fine. If the time trend came in and stole the show from our price variables, we threw him out without so much as a glance at his statistical significance. This procedure may seem inappropriate to one steeped in statistical theory. We are eager, however, not to underestimate the impact of the FTA simply because we relied on estimates based on very noisy series in which the price effects could not be distinguished from the time trend.

The resulting elasticities are shown in Table VI - 2. The first column shows the coefficient on the current relative price; the second, the coefficient on the lagged relative price. The third column shows their sum, to total elasticity; the fourth gives the values of η from the previous chapter, and the last gives the elasticity actually assumed and used in the modeling. The total elasticity was negative for 35 out of the 45 sectors. Where it was not, a value of zero or a small negative value was assumed. Where the estimate was decided negative, it was used as estimated or rounded slightly in the negative direction. If we err, we want it to be on the side of overstating the importance of prices and, hence, of the effects of an FTA.

In the balance of this chapter, we show the graphs of the fits of these equations together the numerical display of the regression results. In the graphs, note that the vertical scale is logarithmic. The line marked by the squares shows the actual data, while the line marked by pluses shows the values predicted by the regression. In the numerical display of regression results, most terms are self-explanatory. SEE is the standard error of estimate not adjusted for degrees of freedom, RBSQ is "R bar square," the coefficient of multiple determination adjusted for degrees of freedom, DW is the Durbin-Watson statistic. In the variable names, a [1] at the end indicates a one period lag. "Mexval" has nothing particularly to do with "Mexico" but stands for "Marginal Explanatory Value"; it shows the percent by which the SEE would increase if a particular variable were dropped. Since the form of the equation is double-logarithmic, the regression coefficients (in the Reg-Coef) column show the elasticities or, for the time trend, the percent change per year due to the trend. The "Elas" column is best ignored.

Sectors in which Mexico accounted for more than 2 percent of US imports are shown first with graphs. The remaining sectors are then shown without graphs. We have included the regressions with the nonsensical positive price elasticities because the graphs are interesting. To make it easy to spot these regressions, however, we have marked by hand an X through the "predicted" line on these graphs. Unfortunately, a few of the best fits get X'ed.

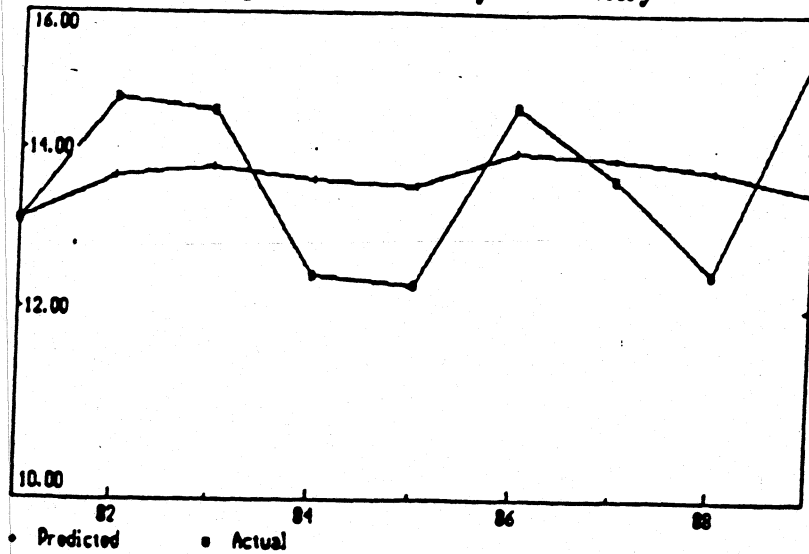
One disturbing pattern frequently seen in the graphs is a rise in the actual value in 1989 while the predicted value falls or fails to rise as rapidly as the actual did. Since this pattern often produces a crossing of the two curves between 1987 and 1989. Perhaps there are longer lags than we have allowed, but we are terribly short on observations so we are hesitant to loose another at the beginning by adding a second lagged value of the relative price. (To do so would reduce the degrees of freedom from 6 to 4 for most equations.) Perhaps Mexican export prices rose less than domestic prices. Perhaps our extension of the world prices by the rather aggregate indexes from the quarterly NIPA introduced a discontinuity in the meaning of the world price. It will be interesting to see whether the Mexican share continues its climb in 1990 in the absence of measurable improvement in price competitiveness.

One particularly exceptional graph is the one for 38 Communication equipment and electronic components. It shows an erosion of nearly half of the Mexican share over the decade. This sector is heavily involved in maquiladora work. Apparently the US-Mexican teams are losing out to Asian producers. The price statistics, however, were unable to identify the cause; the total elasticity estimated is practically zero. The fit is due entirely to the time trend.

Table VI - 2: Price Elasticities for Share of Imports from Mexico in US Imports

	Current	Lagged 1	Total	η	Assumed
01 Agric., Forest, Fish	-0.09	0.00	-0.09	-0.25	-0.30
02 Iron ore mining	0.12	0.46	0.58	-0.50	-0.50
03 Nonferrous ore mining	0.00	1.00	1.00	0.00	0.00
04 Coal	10.00	1.19	11.19	-1.00	-1.00
06 Crude Petroleum		-0.98	-0.98	0.00	-1.00
07 Non-metallic minerals	0.19	0.32	0.51	-1.40	-1.40
09 Food and Tobacco	-0.84	-0.80	-1.64	-0.80	-1.70
10 Textiles, exc knits	-0.06	-0.07	-0.13	-1.50	-1.50
11 Knitting	0.98	-1.94	-0.96	-2.90	-2.90
12 Apparel		-0.40	-0.40	-1.00	-1.00
13 Paper	-0.48	-0.68	-1.16	-0.60	-1.20
14 Printing and Publishing	0.31	0.61	0.92	-1.60	-1.60
15 Agricultural chemicals	0.20	-0.11	0.09	-1.00	-1.00
16 Chemicals, exc agric.		-0.53	-0.53	-1.20	-1.20
17 Petroleum refining		-0.44	-0.44	-0.60	-0.60
19 Rubber products	-0.74	-1.49	-2.23	-0.50	-2.20
20 Plastic products	-1.14	-1.10	-2.24	-1.80	-2.30
21 Shoes and leather	0.84	0.19	1.03	-0.40	-0.50
22 Lumber	-0.03	-0.22	-0.25	-1.00	-1.00
23 Furniture		-0.63	-0.63	-1.00	-1.00
24 Stone, clay, and glass	-0.25	-0.53	-0.78	-2.40	-2.40
25 Ferrous metals	-0.80	-2.80	-3.60	-1.40	-3.60
26 Copper	2.73	0.90	3.63	-0.00	-0.50
27 Other non-ferrous metals		0.10	0.10	-1.90	-1.90
28 Metal products	-0.06	-0.58	-0.64	-2.40	-2.40
29 Engines and turbines	-0.54	-0.91	-1.45	-2.40	-2.40
30 Agricultural machinery	-0.34	-1.53	-1.87	-1.90	-1.90
31 Constr., mining, oilfield eq	-0.49	-0.71	-1.20	-2.90	-2.90
32 Metalworking machinery	1.33	-1.94	-0.61	-1.80	-1.80
33 Special industry machinery	1.07	-0.66	0.41	-1.40	-1.40
34 Misc. non-electrical mach		-0.27	-0.27	-3.40	-3.40
35 Computers	0.21	-1.86	-1.65	-1.00	-1.70
36 Other office equipment		-0.41	-0.41	-0.90	-0.90
37 Service industry machinery	-2.55	-0.76	-3.31	-1.60	-3.30
38 Commo eq & electronic compo.	-0.13	0.11	-0.02	-2.00	-2.00
39 Elec incl apparatus		-0.06	-0.06	-1.60	-1.60
40 Household appliances	-0.45	-0.67	-1.12	-1.50	-1.50
41 Elec lighting & wiring eq, &		-0.32	-0.32	-2.00	-2.00
42 TV sets, radios, phonographs	-0.47	-1.98	-2.45	-1.00	-2.50
43 Motor vehicles	-0.62	-0.60	-1.22	-1.10	-1.30
44 Aerospace	0.75	-1.08	-0.33	-2.80	-2.80
45 Ships, boats	-1.84	-1.64	-3.48	-2.60	-3.50
46 Other transportation equipme	-0.93	-2.09	-3.02	-1.60	-3.00
47 Instruments	-0.23	-0.68	-0.91	-1.00	-1.00
48 Misc. manufacturing	-0.49	-0.67	-1.16	-1.00	-1.20

01 Agriculture, Forestry and Fishery

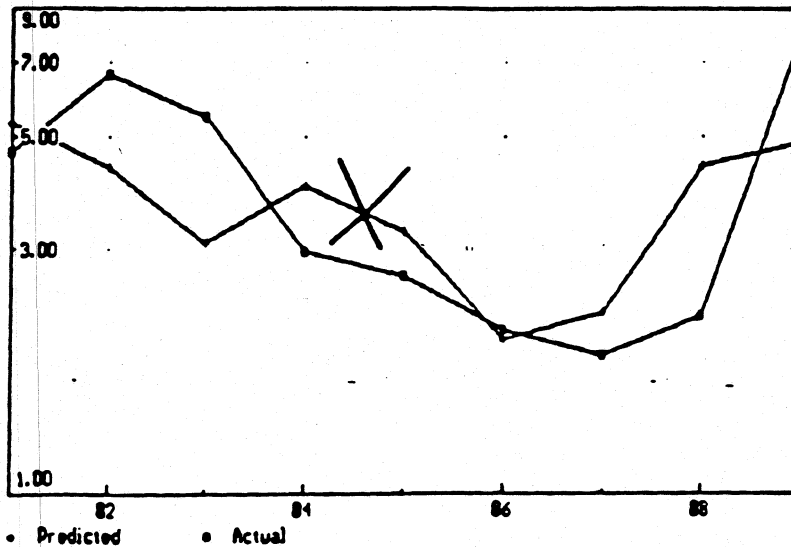


01 Agriculture, Forestry and Fishery

SEE = 0.08 RSO = 0.0501 RHO = 0.01 Obser = 9 from 1981.000
 SEE+1 = 0.08 RBSQ = -0.266 DW = 1.97 DeFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharam01	-	-	-	-	-	2.61
1 intercept	2.39549	35.7	2.246	0.92	0.000	1.00
2 relpri01	-0.08569	2.2	-0.514	0.00	-0.205	-0.07
3 time	0.00246	0.3	0.196	0.08	0.078	85.00

03 Nonferrous ore mining

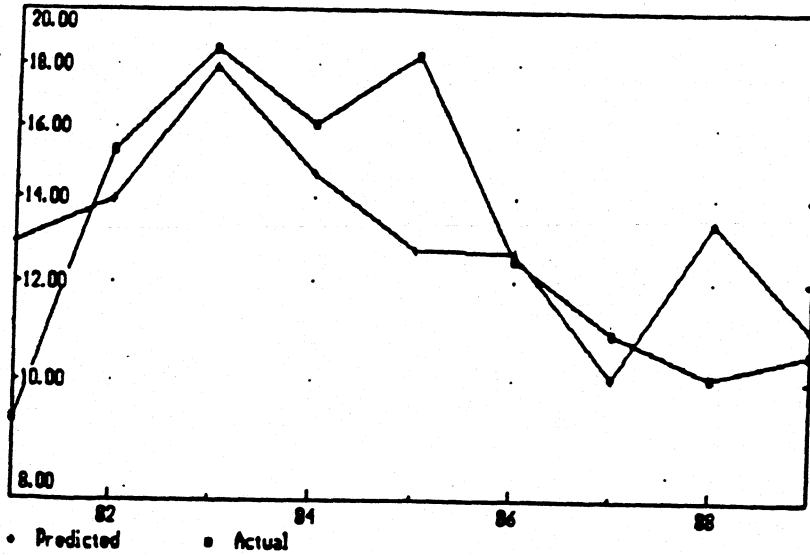


03 Nonferrous ore mining

SEE = 0.39 RSO = 0.4022 RHO = -0.00 Obser = 9 from 1981.000
 SEE+1 = 0.39 RBSQ = 0.2029 DW = 2.01 DeFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharam03	-	-	-	-	-	1.27
1 intercept	1.66765	155.7	5.764	1.32	0.000	1.00
2 relpri03	0.00351	0.0	0.006	-0.00	0.002	-0.41
3 relpri03[1]	1.00460	23.8	1.787	-0.32	0.633	-0.40

06 Crude Petroleum

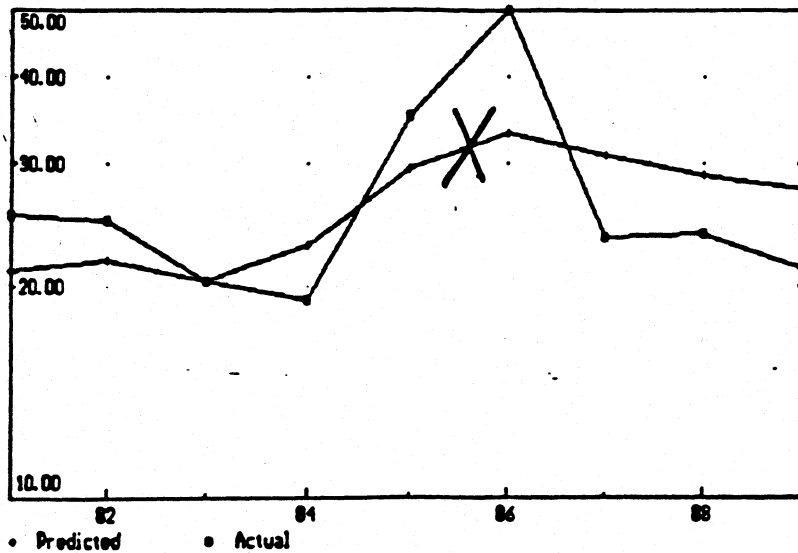


06 Crude Petroleum

SEE = 0.20 RSQ = 0.3879 RHO = 0.14 Obser = 9 from 1981.000
 SEE+1 = 0.20 RBSQ = 0.1839 DW = 1.72 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare06	-	-	-	-	-	2.57
1 intercept	-4.43027	3.6	-0.659	-1.72	-0.000	1.00
2 relpri06[1]	-0.97593	19.5	-1.603	-0.13	-1.346	0.34
3 time	0.08624	9.0	1.060	2.85	0.890	85.00

07 Non-metallic minerals

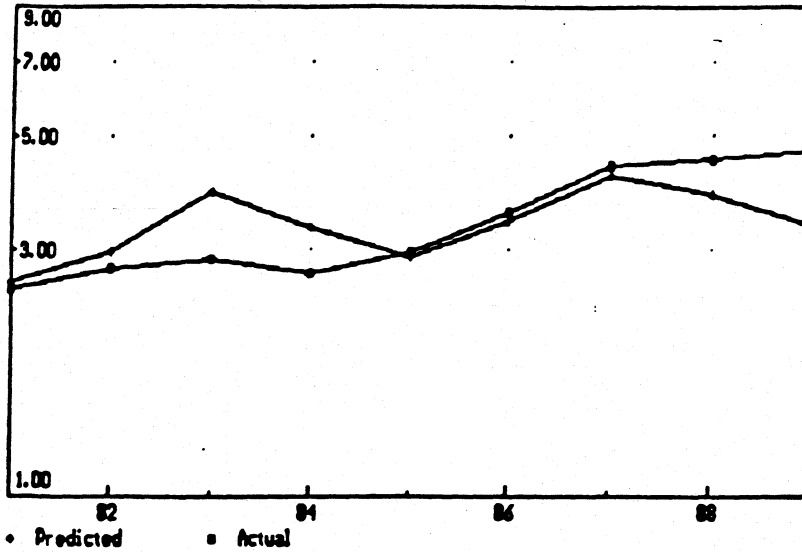


07 Non-metallic minerals

SEE = 0.23 RSQ = 0.3636 RHO = 0.23 Obser = 9 from 1981.000
 SEE+1 = 0.23 RBSQ = 0.1514 DW = 1.54 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare07	-	-	-	-	-	3.25
1 intercept	2.99695	594.4	16.832	0.92	0.000	1.00
2 relpri07	0.18815	1.7	0.459	0.03	0.222	0.55
3 relpri07[1]	0.31952	6.1	0.866	0.05	0.420	0.48

09 Food and Tobacco

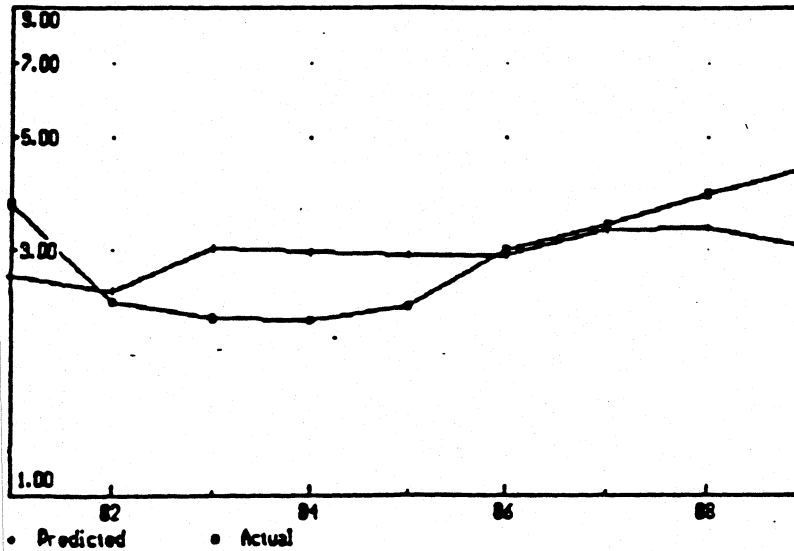


09 Food and Tobacco

SEE = 0.18 RSQ = 0.3986 RHO = 0.72 Obser = 9 from 1981.000
 SEE+1 = 0.13 RBSQ = 0.1982 DW = 0.57 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare09						1.21
1 intercept	1.12982	469.6	13.735	0.94	0.000	1.00
2 relpri09	-0.83596	15.7	-1.424	0.03	-0.451	-0.05
3 relpri09[1]	-0.79815	14.6	-1.369	0.03	-0.434	-0.04

12 Apparel

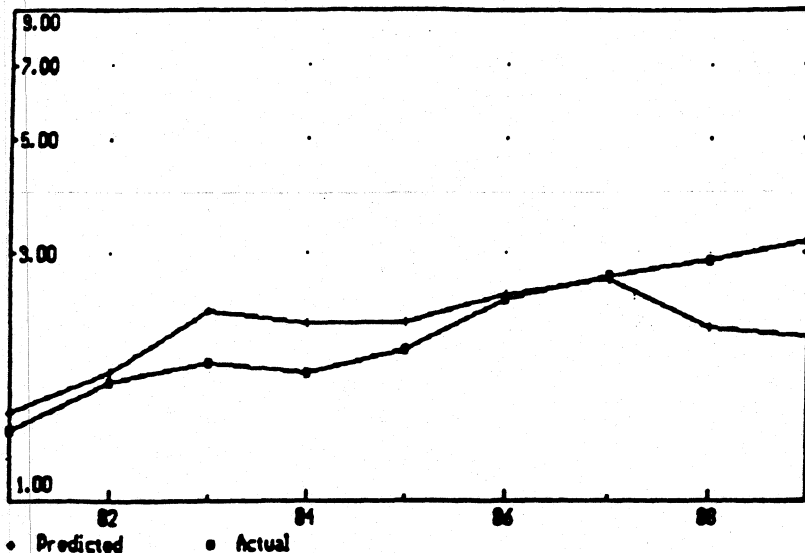


12 Apparel

SEE = 0.23 RSQ = 0.1146 RHO = 0.66 Obser = 9 from 1981.000
 SEE+1 = 0.20 RBSQ = -0.0119 DW = 0.67 DoFree = 7 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare12						1.08
1 intercept	0.98462	192.5	7.273	0.91	0.000	1.00
2 relpri12[1]	-0.39901	6.3	-0.952	0.09	-0.338	-0.25

13 Paper

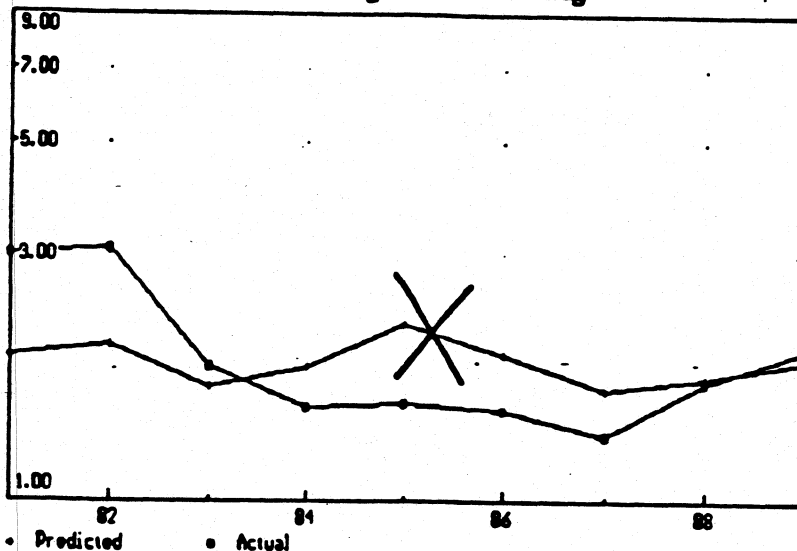


13 Paper

SSE = 0.21 RSQ = 0.3987 RHO = 0.81 Obser = 9 from 1981.000
 SSE+1 = 0.14 RBSQ = 0.1983 DW = 0.38 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem13						0.76
1 intercept	0.42024	31.8	2.105	0.56	0.000	1.00
2 relpri13	-0.48377	5.6	-0.832	0.20	-0.283	-0.31
3 relpri13[1]	-0.68330	14.7	-1.376	0.25	-0.469	-0.27

14 Printing and Publishing

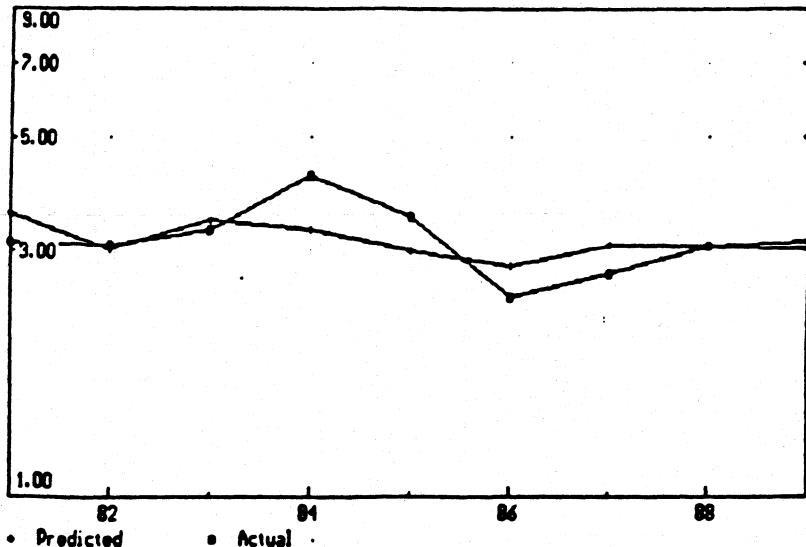


14 Printing and Publishing

SSE = 0.27 RSQ = 0.0968 RHO = 0.80 Obser = 9 from 1981.000
 SSE+1 = 0.21 RBSQ = -0.2042 DW = 0.41 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem14						0.61
1 intercept	0.57255	112.8	4.601	0.93	0.000	1.00
2 relpri14	0.31013	1.2	0.380	0.02	0.149	0.05
3 relpri14[1]	0.61095	4.6	0.749	0.05	0.293	0.05

16 Chemicals, exc agric.

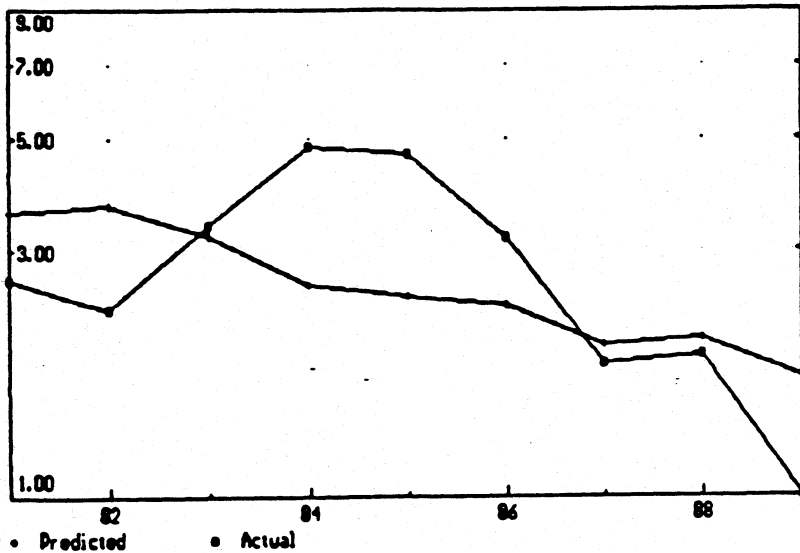


16 Chemicals, exc agric.

SEE = 0.13 RSQ = 0.2516 RHO = 0.20 Obser = 9 from 1981.000
 SEE+1 = 0.13 RBSQ = 0.0022 DW = 1.61 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 mshareml6	-	-	-	-	-	1.14
1 intercept	2.72663	19.5	1.600	2.40	0.000	1.00
2 relpril6[1]	-0.52725	10.3	-1.143	-0.05	-0.404	0.11
3 time	-0.01804	6.6	-0.902	-1.35	-0.319	85.00

17 Petroleum refining

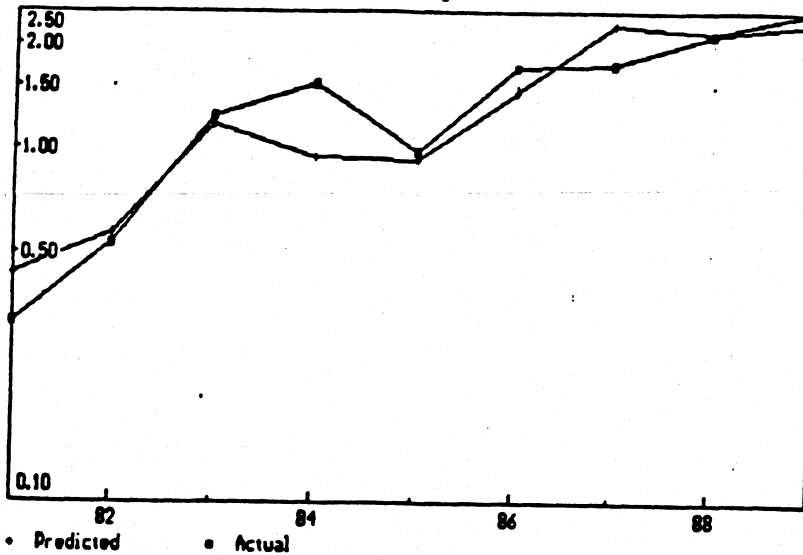


17 Petroleum refining

SEE = 0.44 RSQ = 0.2612 RHO = 0.63 Obser = 9 from 1981.000
 SEE+1 = 0.37 RBSQ = 0.1557 DW = 0.75 DoFree = 7 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 mshareml7	-	-	-	-	-	0.93
1 intercept	1.27497	101.6	4.630	1.37	0.000	1.00
2 relpril7[1]	-0.44420	16.3	-1.573	-0.37	-0.511	0.78

19 Rubber products

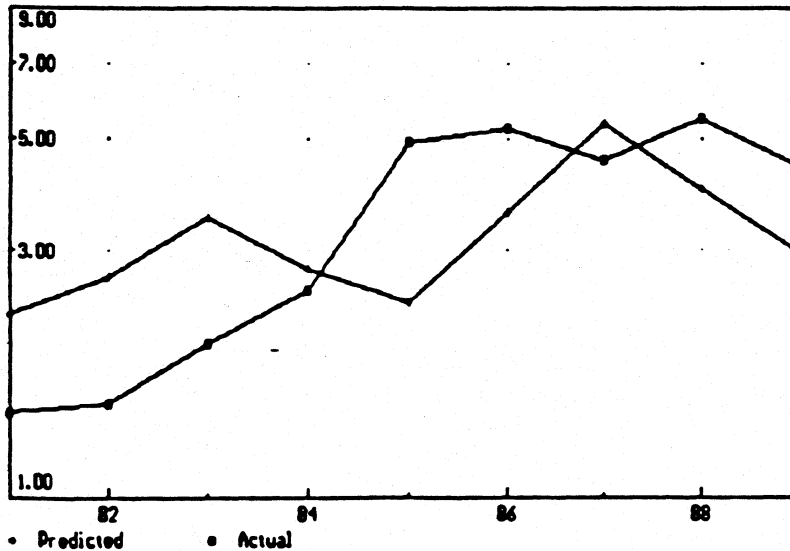


19 Rubber products

SEE = 0.22 RSQ = 0.8717 RHO = 0.19 Obser = 9 from 1981.000
 SEE+1 = 0.22 RBSQ = 0.7947 DW = 1.62 DoFree = 5 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem19	-	-	-	-	-	0.17
1 intercept	-19.23753	174.5	-5.715	-113.75	-0.000	1.00
2 relpri19	-0.73716	7.8	-0.900	-0.10	-0.151	0.02
3 relpri19[1]	-1.49478	28.9	-1.819	-0.19	-0.307	0.02
4 time	0.22890	176.8	5.773	115.05	0.946	85.00

20 Plastic products

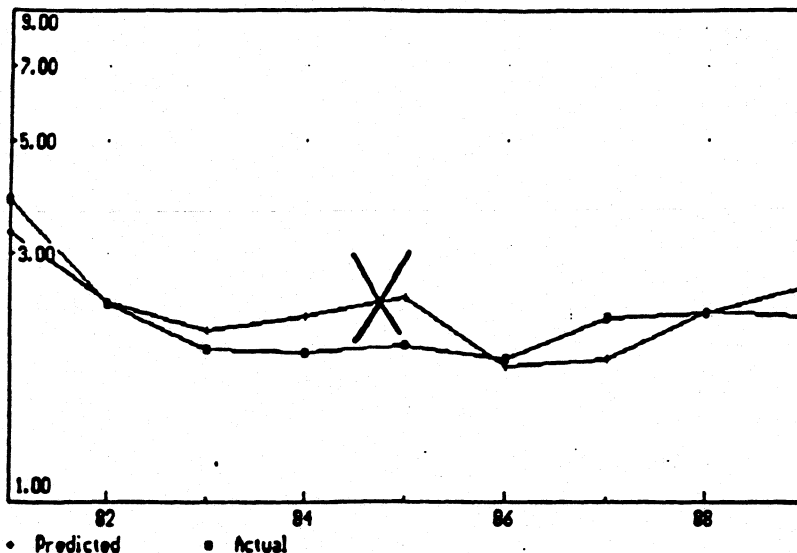


20 Plastic products

SEE = 0.45 RSQ = 0.2519 RHO = 0.56 Obser = 9 from 1981.000
 SEE+1 = 0.39 RBSQ = 0.0025 DW = 0.88 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem20	-	-	-	-	-	1.15
1 intercept	1.02085	128.5	5.032	0.89	0.000	1.00
2 relpri20	-1.14296	7.3	-0.950	0.06	-0.339	-0.06
3 relpri20[1]	-1.09875	6.8	-0.918	0.05	-0.327	-0.05

21 Shoes and leather

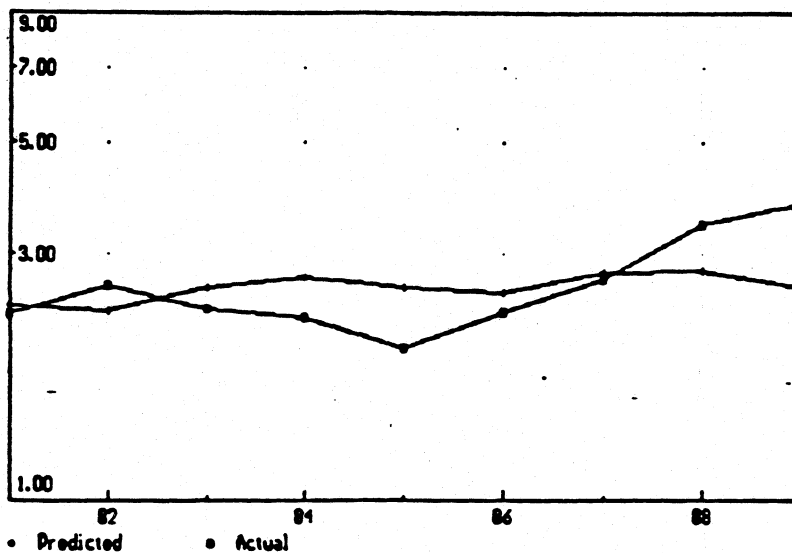


21 Shoes and leather

SEE = 0.13 RSQ = 0.6228 RHO = 0.41 Obser = 9 from 1981.000
 SEE+1 = 0.12 RBSQ = 0.4971 DW = 1.18 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare21						0.83
1 intercept	1.06636	371.4	11.284	1.29	0.000	1.00
2 relpri21	0.83887	48.9	2.703	-0.24	0.715	-0.24
3 relpri21[1]	0.19274	3.7	0.671	-0.05	0.178	-0.21

22 Lumber

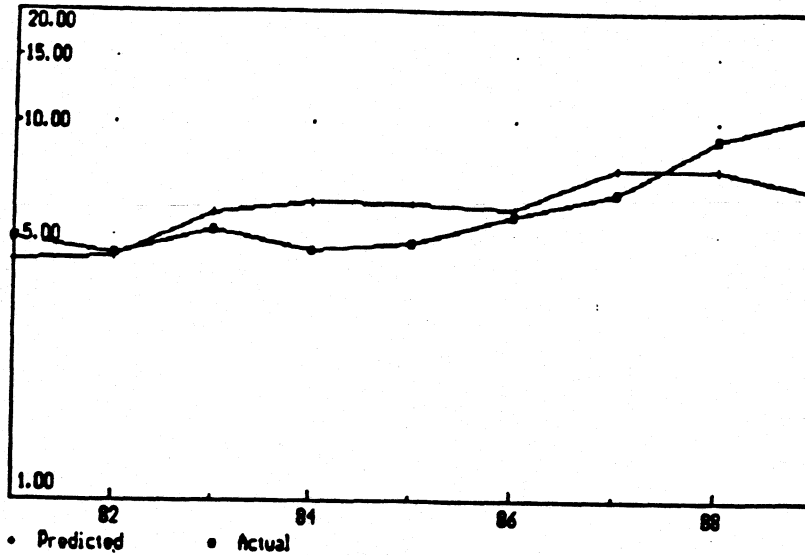


22 Lumber

SEE = 0.19 RSQ = 0.0900 RHO = 0.69 Obser = 9 from 1981.000
 SEE+1 = 0.15 RBSQ = -0.2134 DW = 0.62 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare22						0.94
1 intercept	0.86309	152.4	5.678	0.91	0.000	1.00
2 relpri22	-0.02757	0.0	-0.073	0.01	-0.032	-0.36
3 relpri22[1]	-0.22288	3.6	-0.659	0.07	-0.285	-0.32

23 Furniture

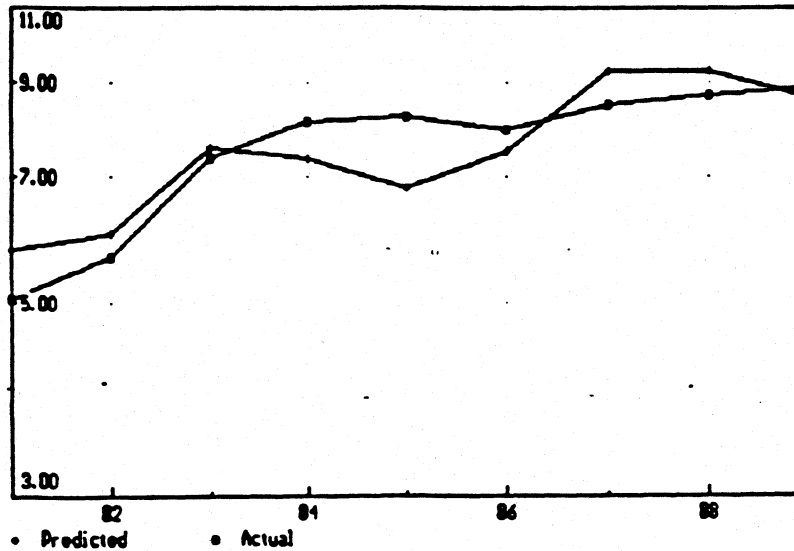


23 Furniture

SSE = 0.22 RSQ = 0.4179 RHO = 0.65 Obser = 9 from 1981.000
 SSE+1 = 0.19 RBSQ = 0.3348 DW = 0.70 DoFree = 7 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare23	-	-	-	-	-	1.77
1 intercept	1.45504	248.2	8.824	0.82	0.000	1.00
2 relpri23[1]	-0.62538	31.1	-2.242	0.18	-0.646	-0.51

24 Stone, clay, and glass

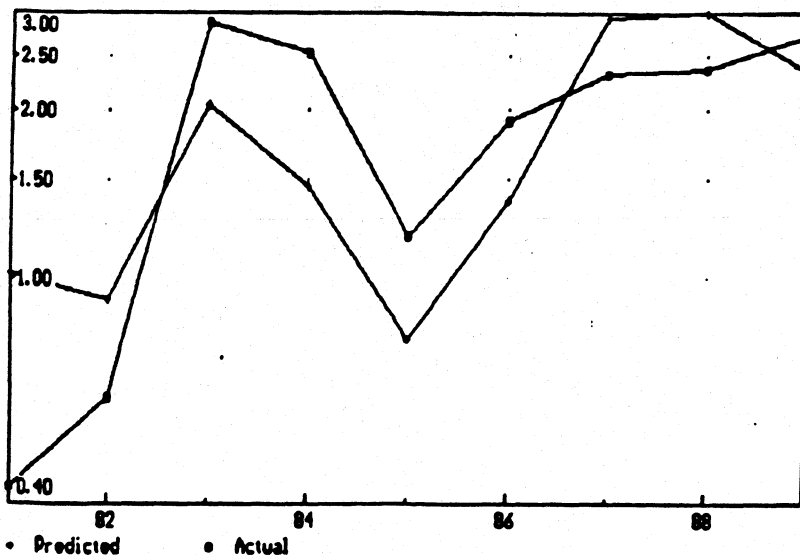


24 Stone, clay, and glass

SSE = 0.10 RSQ = 0.7399 RHO = 0.54 Obser = 9 from 1981.000
 SSE+1 = 0.09 RBSQ = 0.6532 DW = 0.91 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare24	-	-	-	-	-	2.01
1 intercept	1.77863	892.3	24.182	0.88	0.000	1.00
2 relpri24	-0.25412	9.8	-1.113	0.04	-0.294	-0.34
3 relpri24[1]	-0.53470	41.6	-2.457	0.07	-0.648	-0.28

25 Ferrous metals

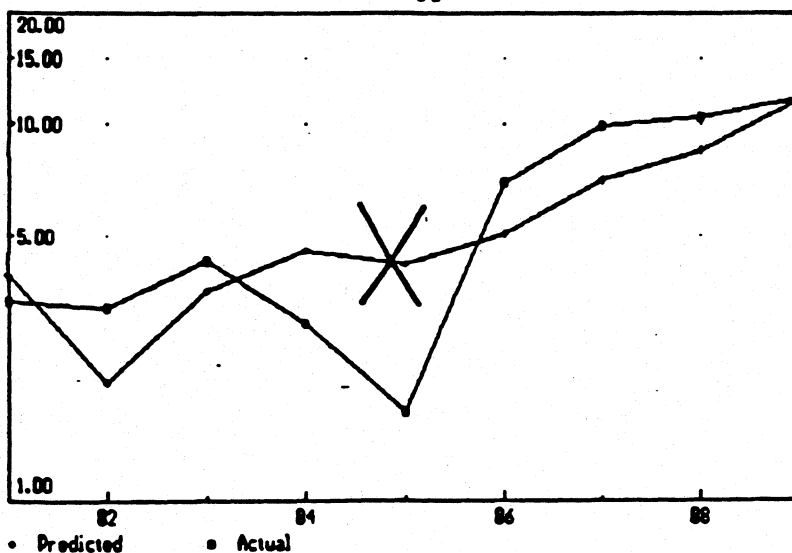


25 Ferrous metals

SSE = 0.44 RSQ = 0.5413 RHO = 0.62 Obser = 9 from 1981.000
 SSE+1 = 0.42 RBSQ = 0.3885 DW = 0.76 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharen25						0.46
1 intercept	0.11674	2.0	0.495	0.25	0.000	1.00
2 relpri25	-0.80096	3.5	-0.650	0.21	-0.192	-0.12
3 relpri25[1]	-2.80065	33.9	-2.182	0.54	-0.645	-0.09

26 Copper

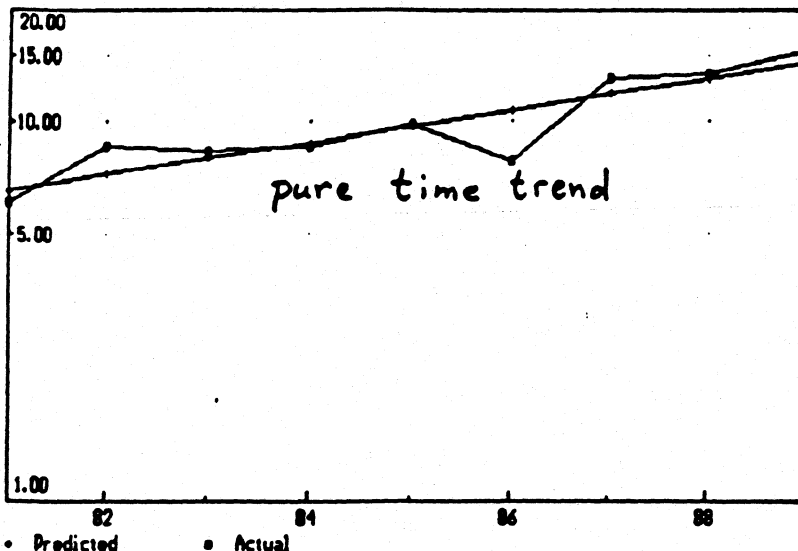


26 Copper

SSE = 0.41 RSQ = 0.5803 RHO = 0.15 Obser = 9 from 1981.000
 SSE+1 = 0.41 RBSQ = 0.4404 DW = 1.71 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharen26						1.61
1 intercept	1.05670	95.1	4.103	0.66	0.000	1.00
2 relpri26	2.73435	33.2	2.157	0.28	0.654	0.16
3 relpri26[1]	0.89599	3.1	0.614	0.07	0.186	0.12

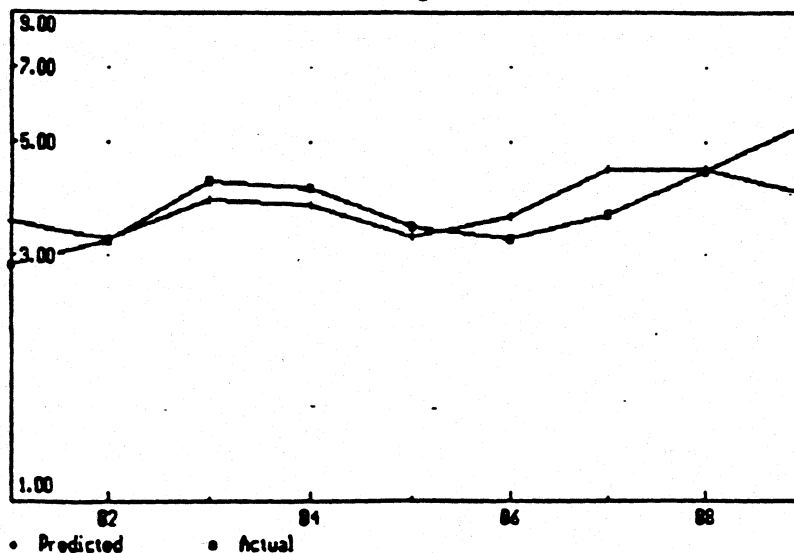
27 Other non-ferrous metals



27 Other non-ferrous metals						
Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharem27	-	-	-	-	-	2.27
1 intercept	-6.03685	72.0	-3.702	-2.65	-0.000	1.00
2 time	0.09778	117.1	5.099	3.65	0.888	85.00

SSE = 0.13 RSQ = 0.7879 RHO = -0.20 Obser = 9 from 1981.000
 SSE+1 = 0.13 RBSQ = 0.7576 DW = 2.40 DoFree = 7 to 1989.000

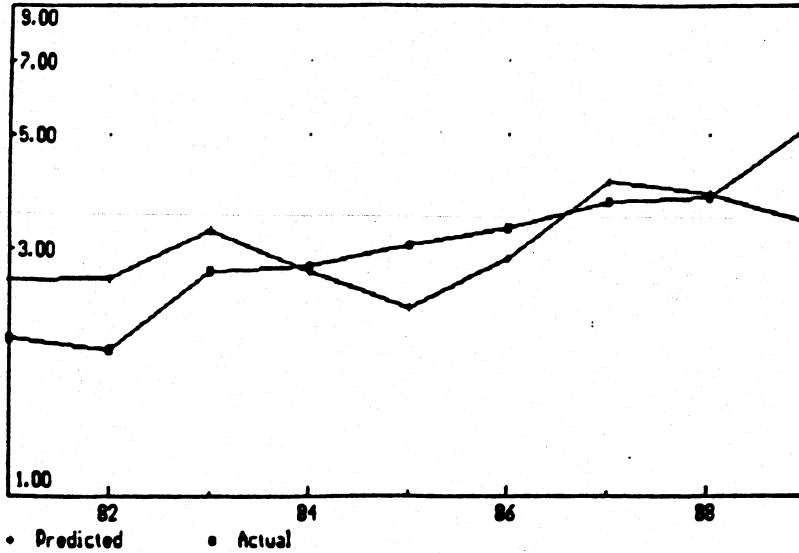
28 Metal products



28 Metal products						
Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharem28	-	-	-	-	-	1.32
1 intercept	1.26145	593.4	16.806	0.95	0.000	1.00
2 relpri28	-0.06308	0.3	-0.175	0.01	-0.062	-0.12
3 relpri28[1]	-0.58170	19.1	-1.585	0.04	-0.564	-0.09

SSE = 0.15 RSQ = 0.3479 RHO = 0.46 Obser = 9 from 1981.000
 SSE+1 = 0.15 RBSQ = 0.1305 DW = 1.07 DoFree = 6 to 1989.000

29 Engines and turbines

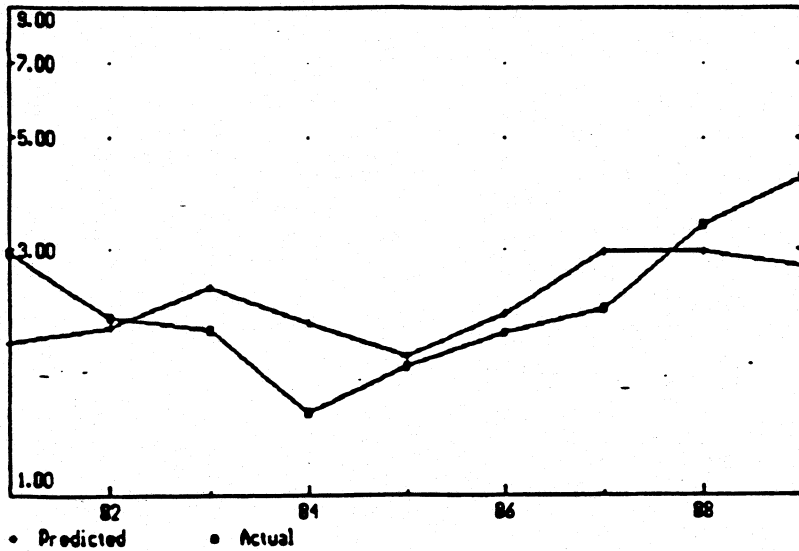


29 Engines and turbines

SEE = 0.23 RSQ = 0.3668 RHO = 0.59 Obser = 9 from 1981.000
 SEE+1 = 0.21 RBSQ = 0.1557 DW = 0.82 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare29						1.11
1 intercept	1.04915	337.0	10.419	0.95	0.000	1.00
2 relpri29	-0.53952	5.5	-0.827	0.02	-0.278	-0.04
3 relpri29[1]	-0.91296	15.1	-1.397	0.03	-0.470	-0.04

31 Constr. mining, oilfield eq

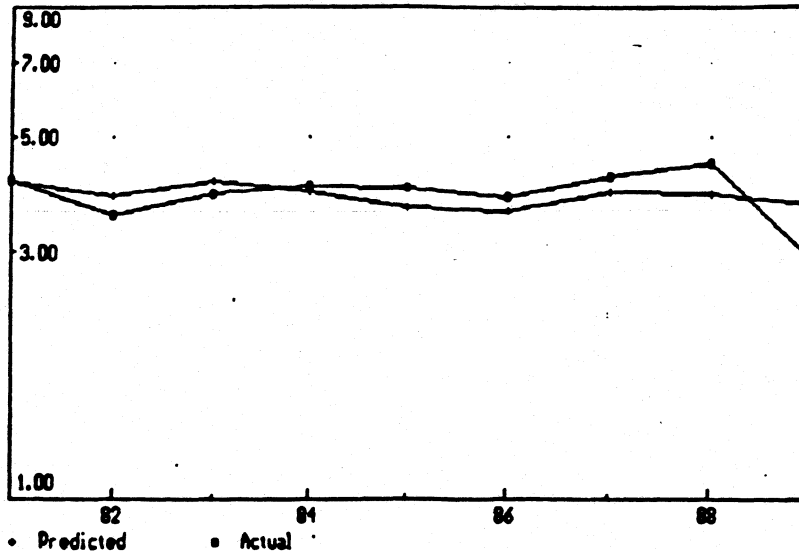


31 Constr., mining, oilfield eq

SEE = 0.26 RSQ = 0.2858 RHO = 0.51 Obser = 9 from 1981.000
 SEE+1 = 0.25 RBSQ = 0.0477 DW = 0.97 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare31						0.86
1 intercept	0.74292	147.8	5.553	0.86	0.000	1.00
2 relpri31	-0.49084	3.9	-0.694	0.06	-0.260	-0.11
3 relpri31[1]	-0.71190	8.1	-1.006	0.07	-0.377	-0.09

34 Misc. non-electrical mach

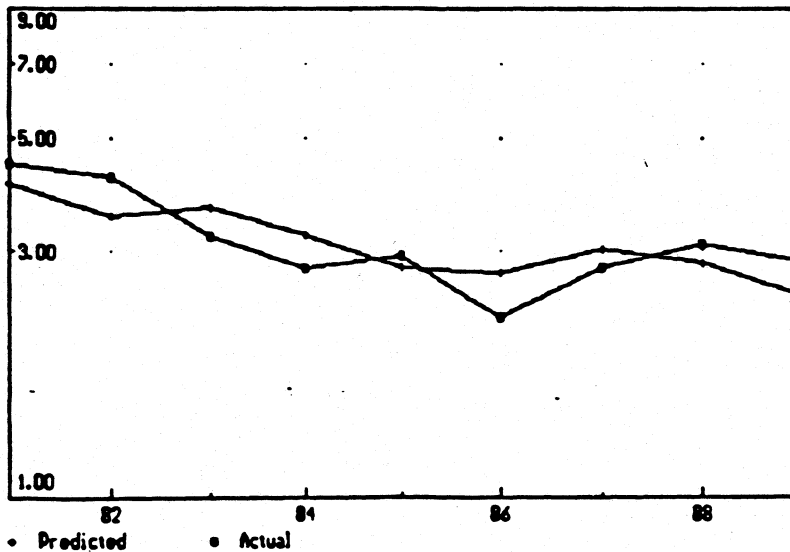


34 Misc. non-electrical mach

SKE = 0.10 RSQ = 0.1509 RHO = 0.19 Obser = 9 from 1981.000
 SKE+1 = 0.11 RBSQ = -0.1321 DW = 1.62 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 mshare34	-	-	-	-	-	1.35
1 intercept	3.06702	22.6	1.737	2.27	0.000	1.00
2 relpri34[1]	-0.27023	6.0	-0.864	0.01	-0.411	-0.07
3 time	-0.02042	7.6	-0.976	-1.29	-0.465	85.00

36 Other office equipment

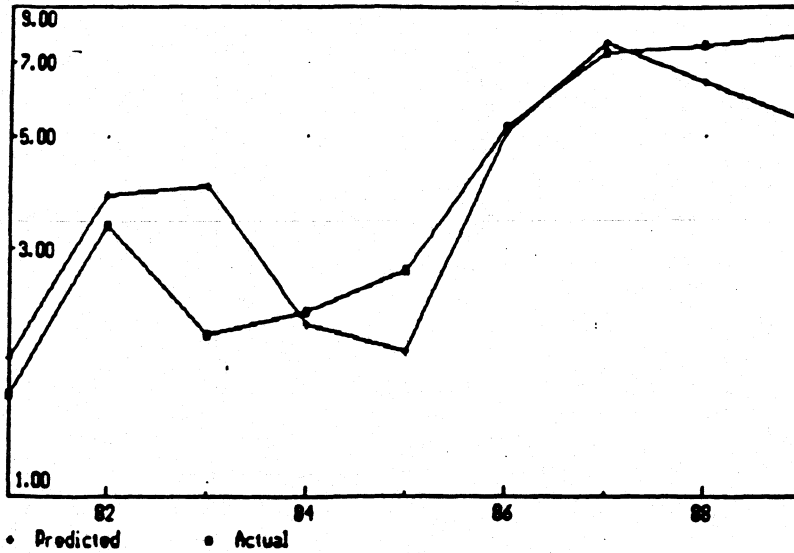


36 Other office equipment

SKE = 0.13 RSQ = 0.5697 RHO = 0.19 Obser = 9 from 1981.000
 SKE+1 = 0.13 RBSQ = 0.4263 DW = 1.62 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 mshare36	-	-	-	-	-	1.13
1 intercept	7.68128	63.1	3.156	6.78	0.000	1.00
2 relpri36[1]	-0.41346	12.0	-1.234	0.04	-0.458	-0.10
3 time	-0.07750	48.3	-2.683	-5.81	-0.996	85.00

37 Service industry machinery

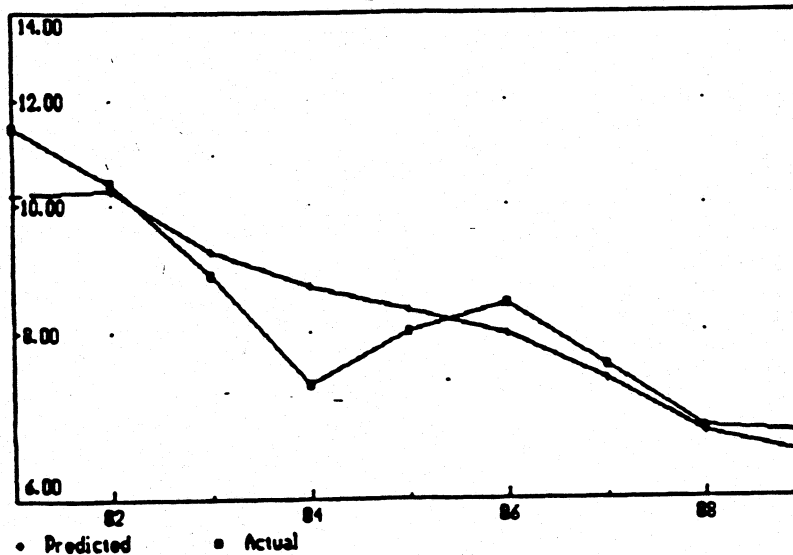


37 Service industry machinery

SEE = 0.30 RSQ = 0.7400 RHO = 0.32 Obser = 9 from 1981.000
 SEE+1 = 0.29 RBSQ = 0.6534 DW = 1.37 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Klas	Beta	Mean
0 mshare37						1.32
1 intercept	0.96566	180.7	6.425	0.73	0.000	1.00
2 relpri37	-2.54755	69.1	-3.339	0.22	-0.751	-0.11
3 relpri37[1]	-0.75927	7.9	-0.995	0.05	-0.224	-0.09

38 Communic eq and electronic comp

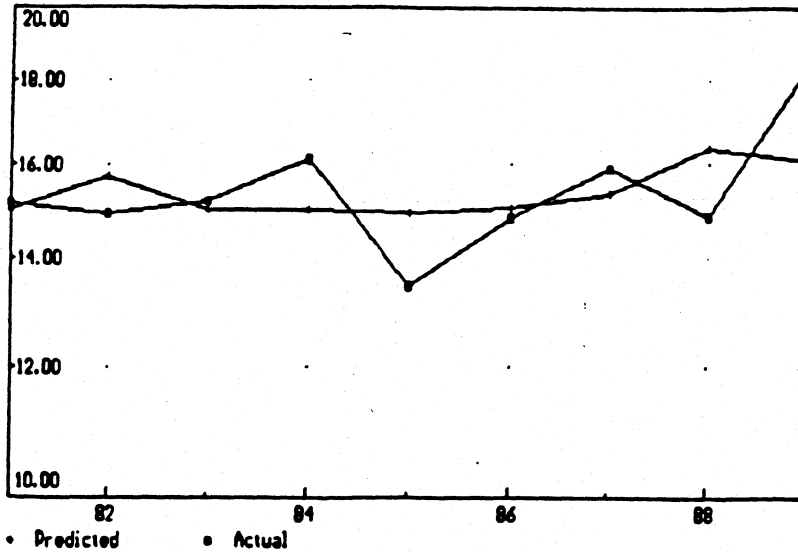


38 Communic eq and electronic comp

SEE = 0.08 RSQ = 0.8106 RHO = 0.43 Obser = 9 from 1981.000
 SEE+1 = 0.07 RBSQ = 0.6970 DW = 1.15 DoFree = 5 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Klas	Beta	Mean
0 mshare38						2.11
1 intercept	7.32399	35.9	2.058	3.47	0.000	1.00
2 relpri38	-0.13076	2.2	-0.475	0.02	-0.204	-0.39
3 relpri38[1]	0.10841	1.3	0.363	-0.02	0.176	-0.32
4 time	-0.06152	18.3	-1.413	-2.48	-0.913	85.00

39 Elec indl apparatus

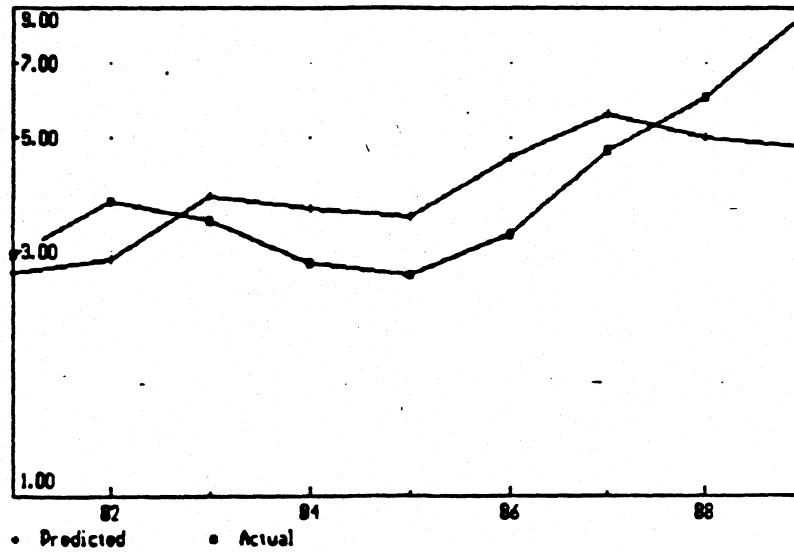


39 Electrical industrial apparatus

SEE = 0.07 RSQ = 0.1652 RHO = -0.29 Obser = 9 from 1981.000
 SEE+1 = 0.06 RBSQ = 0.0459 DW = 2.58 DoFree = 7 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare39	-	-	-	-	-	2.73
1 intercept	2.70648	2844.6	77.861	0.99	0.000	1.00
2 relpri39[1]	-0.05586	9.4	-1.177	0.01	-0.406	-0.45

40 Household appliances

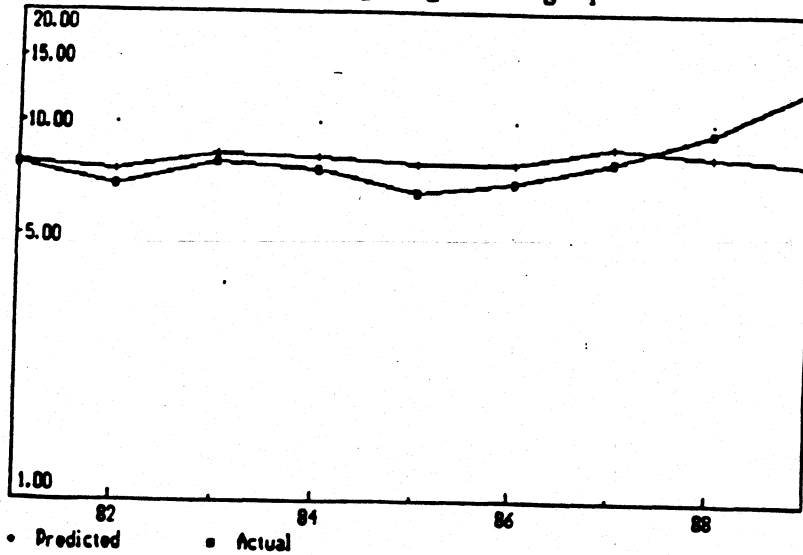


40 Household appliances

SEE = 0.29 RSQ = 0.3966 RHO = 0.65 Obser = 9 from 1981.000
 SEE+1 = 0.24 RBSQ = 0.1955 DW = 0.70 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 mshare40	-	-	-	-	-	1.37
1 intercept	1.08746	152.6	5.681	0.79	0.000	1.00
2 relpri40	-0.45005	3.9	-0.691	0.09	-0.277	-0.29
3 relpri40[1]	-0.66681	8.8	-1.050	0.11	-0.421	-0.23

41 Elec lighting & wiring eq

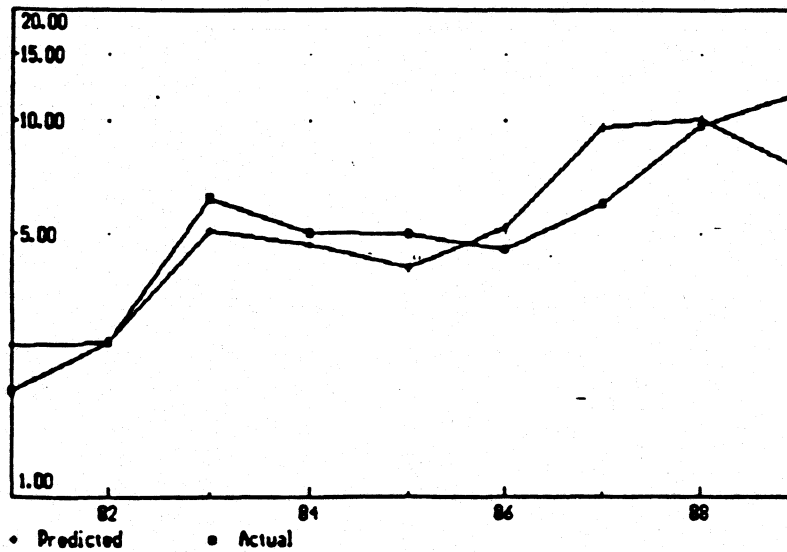


41 Elec lighting & wiring eq

SKE = 0.19 RSQ = 0.0394 RHO = 0.70 Obser = 9 from 1981.000
 SSE+1 = 0.15 RBSQ = -0.0978 DW = 0.60 DoFree = 7 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem41						2.08
1 intercept	2.05440	866.0	25.420	0.99	0.000	1.00
2 relpri41[1]	-0.31609	2.0	-0.536	0.01	-0.199	-0.07

42 TV sets, radios, phonographs

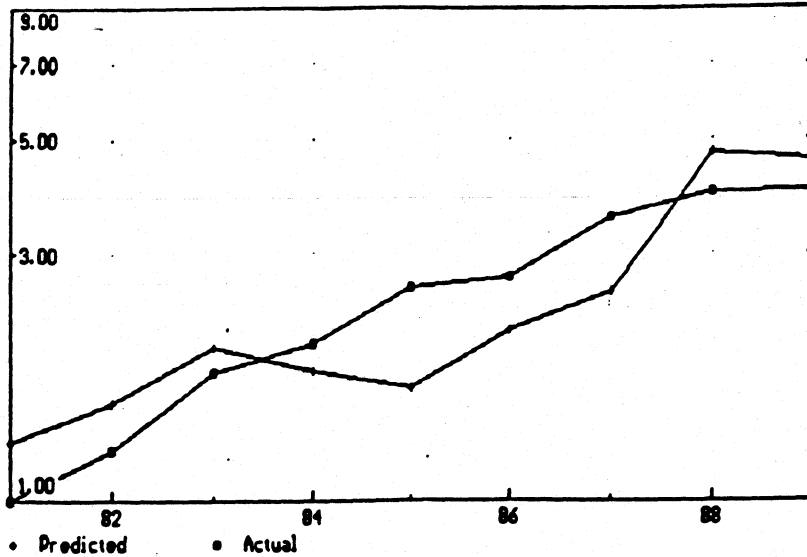


42 TV sets, radios, phonographs

SKE = 0.26 RSQ = 0.7721 RHO = 0.34 Obser = 9 from 1981.000
 SSE+1 = 0.26 RBSQ = -0.6962 DW = 1.31 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem42						1.63
1 intercept	0.94757	111.6	4.568	0.58	0.000	1.00
2 relpri42	-0.47406	3.4	-0.648	0.09	-0.170	-0.32
3 relpri42[1]	-1.98453	54.3	-2.880	0.33	-0.756	-0.27

43 Motor vehicles

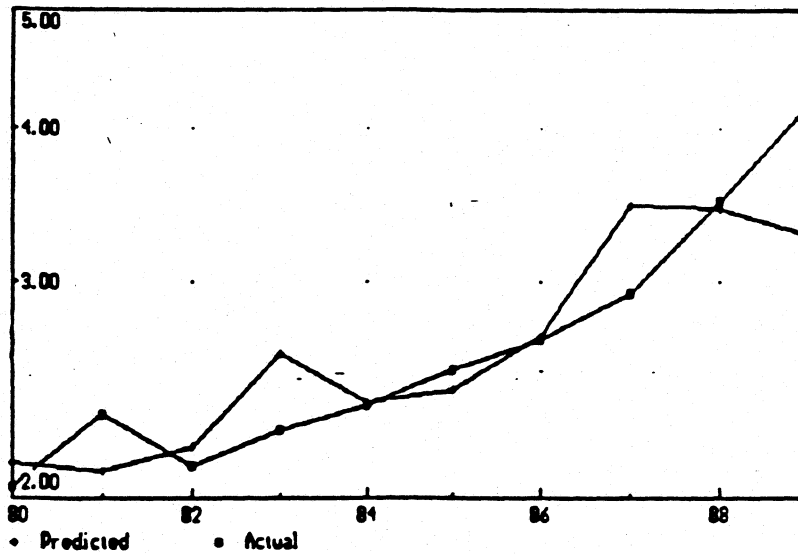


43 Motor vehicles

SKE = 0.29 RSQ = 0.6957 RHO = 0.60 Obser = 9 from 1981.000
 SSE+1 = 0.26 RBSQ = 0.5943 DW = 0.79 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharem43						0.80
1 intercept	0.35065	31.3	2.083	0.44	0.000	1.00
2 relpri43	-0.61894	36.6	-2.278	0.30	-0.529	-0.39
3 relpri43[1]	-0.59695	36.6	-2.279	0.26	-0.529	-0.34

47 Instruments

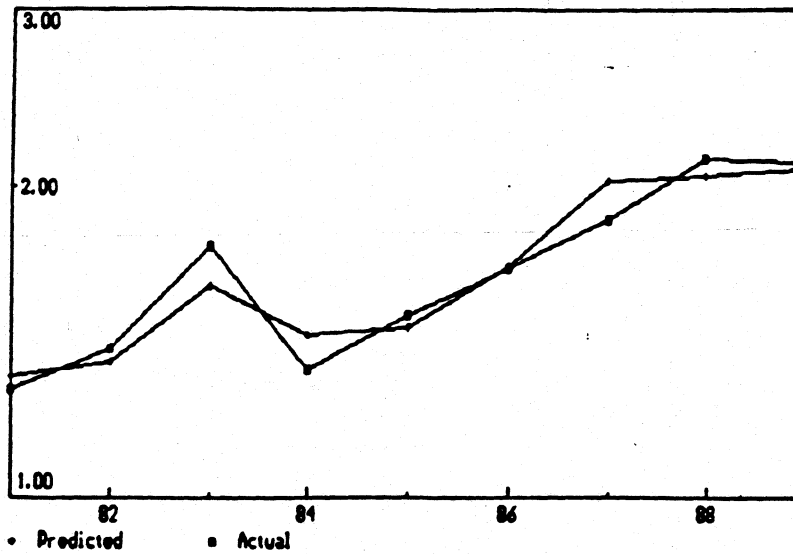


47 Instruments

SKE = 0.12 RSQ = 0.6857 RHO = 0.33 Obser = 9 from 1981.000
 SSE+1 = 0.12 RBSQ = 0.5810 DW = 1.34 DoFree = 6 to 1989.000

Variable name	Reg-Coef	Maxval	t-value	Elas	Beta	Mean
0 msharem47						1.00
1 intercept	0.77214	286.6	9.147	0.78	0.000	1.00
2 relpri47	-0.22820	3.9	-0.689	0.06	-0.214	-0.28
3 relpri47[1]	-0.68337	33.1	-2.153	0.16	-0.668	-0.23

48 Misc. manufacturing



		48 Misc. manufacturing											
SKE	=	0.05	RSQ	=	0.9137	RHO	=	-0.36	Obser	=	9	from	1981.000
SKE+1	=	0.05	RBSQ	=	0.8849	DW	=	2.72	DoFree	=	6	to	1989.000
Variable name		Reg-Coeff		Maxval		t-value		Elas		Beta		Mean	
0 mshare48												0.49	
1 intercept		0.37807		489.1		14.221		0.76		0.000		1.00	
2 relpri48		-0.48646		77.4		-3.590		0.12		-0.487		-0.12	
3 relpri48[1]		-0.67448		113.1		-4.610		0.12		-0.626		-0.08	
		02 Iron ore mining											
SKE	=	0.33	RSQ	=	0.0526	RHO	=	0.22	Obser	=	9	from	1981.000
SKE+1	=	0.33	RBSQ	=	-0.2632	DW	=	1.56	DoFree	=	6	to	1989.000
Variable name		Reg-Coeff		Maxval		t-value		Elas		Beta		Mean	
0 mshare02												-0.08	
1 intercept		-0.19257		4.2		-0.717		2.44		-0.000		1.00	
2 relpri02		0.12383		0.2		0.139		-0.36		0.057		0.23	
3 relpri02[1]		0.45986		2.1		0.508		-1.07		0.208		0.18	
		04 Coal											
SKE	=	1.85	RSQ	=	0.4009	RHO	=	0.00	Obser	=	9	from	1981.000
SKE+1	=	1.85	RBSQ	=	-0.2012	DW	=	1.99	DoFree	=	6	to	1989.000
Variable name		Reg-Coeff		Maxval		t-value		Elas		Beta		Mean	
0 mshare04												-1.69	
1 intercept		-2.08268		47.5		-2.656		1.23		-0.000		1.00	
2 relpri04		9.99815		27.3		1.928		-0.21		0.617		0.04	
3 relpri04[1]		1.18706		0.4		0.228		-0.02		0.073		0.03	
		10 Textiles, exc knits											
SKE	=	0.20	RSQ	=	0.0045	RHO	=	0.58	Obser	=	9	from	1981.000
SKE+1	=	0.18	RBSQ	=	-0.3273	DW	=	0.84	DoFree	=	6	to	1989.000
Variable name		Reg-Coeff		Maxval		t-value		Elas		Beta		Mean	
0 mshare10												0.44	
1 intercept		0.42004		65.9		3.242		0.96		0.000		1.00	
2 relpri10		-0.05655		0.1		-0.096		0.02		-0.040		-0.15	
3 relpri10[1]		-0.06880		0.1		-0.111		0.02		-0.046		-0.11	
		11 Knitting											
SKE	=	0.37	RSQ	=	0.5354	RHO	=	-0.30	Obser	=	9	from	1981.000
SKE+1	=	0.34	RBSQ	=	0.3806	DW	=	2.60	DoFree	=	6	to	1989.000
Variable name		Reg-Coeff		Maxval		t-value		Elas		Beta		Mean	
0 mshare11												-2.00	
1 intercept		-2.15297		293.5		-9.323		1.08		-0.000		1.00	
2 relpri11		0.97568		12.8		1.278		0.12		0.398		-0.24	
3 relpri11[1]		-1.93636		46.6		-2.627		-0.19		-0.818		-0.20	

15 Agricultural chemicals

SEE = 0.47 RSQ = 0.0059 RHO = 0.52 Obser = 9 from 1981.000
 SEE+1 = 0.41 RBSQ = -0.3255 DW = 0.95 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem15	-	-	-	-	-	-0.36
1 intercept	-0.30938	3.2	-0.628	0.87	-0.000	1.00
2 relpri15	0.20450	0.3	0.184	0.26	0.086	-0.45
3 relpri15[1]	-0.10978	0.1	-0.121	-0.13	-0.056	-0.41

30 Agricultural machinery

SEE = 0.34 RSQ = 0.3611 RHO = 0.14 Obser = 9 from 1981.000
 SEE+1 = 0.34 RBSQ = 0.1481 DW = 1.72 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem30	-	-	-	-	-	-0.30
1 intercept	-0.39136	47.0	-2.638	1.29	-0.000	1.00
2 relpri30	-0.33533	1.1	-0.358	-0.06	-0.122	-0.06
3 relpri30[1]	-1.53460	20.4	-1.641	-0.23	-0.556	-0.04

32 Metalworking machinery

SEE = 0.29 RSQ = 0.5983 RHO = 0.43 Obser = 9 from 1981.000
 SEE+1 = 0.29 RBSQ = 0.4644 DW = 1.13 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem32	-	-	-	-	-	0.09
1 intercept	0.06736	1.9	0.478	0.72	0.000	1.00
2 relpri32	1.32542	30.2	2.043	-2.05	0.646	-0.14
3 relpri32[1]	-1.94449	56.9	-2.960	2.33	-0.936	-0.11

33 Special industry machinery

SEE = 0.34 RSQ = 0.2548 RHO = 0.14 Obser = 9 from 1981.000
 SEE+1 = 0.35 RBSQ = 0.0063 DW = 1.73 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem33	-	-	-	-	-	-0.38
1 intercept	-0.28417	20.8	-1.659	0.74	-0.000	1.00
2 relpri33	1.07481	15.8	1.429	0.49	0.666	-0.17
3 relpri33[1]	-0.66312	6.1	-0.865	-0.23	-0.403	-0.13

35 Computers

SEE = 0.78 RSQ = 0.0645 RHO = 0.52 Obser = 9 from 1981.000
 SEE+1 = 0.69 RBSQ = -0.2473 DW = 0.95 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem35	-	-	-	-	-	-1.72
1 intercept	-1.71714	142.1	-5.401	1.00	-0.000	1.00
2 relpri35	0.20564	0.0	0.072	-0.00	0.028	0.01
3 relpri35[1]	-1.86043	3.3	-0.634	0.00	-0.251	0.00

44 Aerospace

SEE = 0.46 RSQ = 0.1815 RHO = 0.60 Obser = 9 from 1981.000
 SEE+1 = 0.41 RBSQ = -0.0914 DW = 0.80 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem44	-	-	-	-	-	-1.32
1 intercept	-1.33982	153.1	-5.695	1.02	-0.000	1.00
2 relpri44	0.74948	4.5	0.745	0.08	0.295	-0.13
3 relpri44[1]	-1.07825	9.4	-1.089	-0.09	-0.431	-0.11

45 Ships, boats

SEE = 0.32 RSQ = 0.7890 RHO = -0.05 Obser = 9 from 1981.000
 SEE+1 = 0.32 RBSQ = 0.7186 DW = 2.10 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem45	-	-	-	-	-	-0.74
1 intercept	-1.39217	212.1	-7.241	1.89	-0.000	1.00
2 relpri45	-1.83617	49.4	-2.718	-0.50	-0.553	-0.20
3 relpri45[1]	-1.63745	43.3	-2.515	-0.39	-0.512	-0.17

46 Other transportation equipment

SEE = 0.95 RSQ = 0.2598 RHO = -0.23 Obser = 9 from 1981.000
 SEE+1 = 0.90 RBSQ = 0.0131 DW = 2.46 DoFree = 6 to 1989.000

Variable name	Reg-Coeff	Maxval	t-value	Elas	Beta	Mean
0 msharem46	-	-	-	-	-	-1.33
1 intercept	-1.95394	64.9	-3.213	1.47	-0.000	1.00
2 relpri46	-0.92620	1.7	-0.449	-0.16	-0.174	-0.23
3 relpri46[1]	-2.08651	9.0	-1.063	-0.31	-0.412	-0.20

APPENDIX

A RELATION BETWEEN THE ELASTICITY OF TOTAL IMPORTS WITH RESPECT TO WORLD PRICE AND THE SHARE ELASTICITIES

As was noted in the text, when the price of a Mexican good decreases, the world price of that good as seen from the US, being an average of all national prices, decreases and causes US imports to increase. All or more than all of that increase should come from Mexico. "All" because no one else's prices have fallen so there is no reason to increase imports from them; "more than all" because Mexico, with its lower price, may now take away some of the market of the other suppliers. The form of function we have used does not guarantee that this relation will hold for just any values of the parameters. It is, however, guaranteed if the share elasticity β is a larger negative number than the sectoral import elasticity η . To demonstrate this relation, first write the total import as

$$M = A \left(\frac{p_w}{p_d} \right)^\eta \quad (\text{VI - 4})$$

where p_w is the world price, p_d is the unchanging domestic price, which we may as well assume to be 1.0, A is a constant, and η is the sectoral import elasticity. The imports from Mexico, m , are then

$$m = A \left(\frac{p_w}{p_d} \right)^\eta m_o \left(\frac{p_m}{p_w} \right)^\beta \quad (\text{VI - 5})$$

The world price is then defined to satisfy the requirement that the shares add up to 1 at all prices. We shall use the assumption that all the share elasticities are the same, namely β , while the prices in all other countries remain 1.0. Then the condition that the shares add up to 1.0 is

$$m_o \left(\frac{p_m}{p_w} \right)^\beta + (1 - m_o) \left(\frac{1}{p_w} \right)^\beta = 1 \quad (\text{VI - 6})$$

which serves to define the world price.

Because increasing p_m decreases m and M , what we want to require is that

$$\frac{dM}{dp_m} > \frac{dm}{dp_m} \quad (\text{VI - 7})$$

Taking the derivatives and substituting in (7) and simplifying a great deal finally brings us to the condition

$$\eta - \beta > m_o \left(\frac{P_m}{P_w} \right)^\beta (\eta - \beta) \quad (\text{VI - 8})$$

If $\eta - \beta$ were < 0 , the dividing both sides of (8) by $(\eta - \beta)$ would give

$$1 < m_o \left(\frac{P_m}{P_w} \right)^\beta \quad (\text{VI - 9})$$

which is impossible, since the expression on the right is Mexico's share and the world price has been defined in such a way that it is always less than 1.

Hence the desired condition holds if and only if $\eta - \beta > 0$, or, better expressed, $\beta < \eta < 0$. In words, the import share elasticity must be a larger negative number than the sectoral import elasticity.

CHAPTER VII

RESULTS FROM THE LINKED MODELS

The two multisectoral macroeconomic models LIFT and MIMEX are linked, it will be recalled from earlier chapters, through imports and prices. In this chapter, we report the results of three linked simulations with the two models. Before entering into these results, it may be well to review both the mechanics which had to be developed for this linking and the "Free Trade" scenarios which were used.

First a base case with no FTA had to be developed as a point of comparison. This step actually involved substantial work, because the Mexican prices had to be built into the World price which affects imports in the U.S. model, and U.S. prices had to be built into the World price as seen from Mexico. The two models must be run iteratively, first LIFT then MIMEX, then LIFT again and so on. Iterations back and forth between the two models were made until a base solution was found which did not change on further iteration. It was important to be certain that this solution was totally insensitive to further iteration so that all of the changes we observed in response to the FTA scenarios would be due to the scenarios, not to just making one further iteration.

Then an FTA scenario was calculated. The reduction in U.S. tariffs automatically (as a result of the integration of Mexico into the system) affected World prices in the LIFT model and stimulated total imports in each sector. These increases then had to be converted into increases in imports from Mexico in LIFT sectors, then converted from LIFT sectors and 1977 dollars to MIMEX sectors and 1980 pesos, then added to the final demands of MIMEX, and MIMEX then rerun. This run of MIMEX incorporated the effects of U.S. tariff reductions on Mexico's exports. It also included the impacts of the Mexican tariff reductions on imports from the U.S.. The new Mexican import series (in 1980 pesos in MIMEX sectors) were then converted into imports from the U.S. (in 1977 dollars in LIFT sectors) and compared with the same series for the base case. The difference then became an "add" factor for the LIFT export equations. LIFT was then rerun with these "add" factors, and the process repeated until convergence was reached. In practice, it was sufficient to run three iterations of each model. The output from the trade share functions after the third iteration was the same as the output after the second.

In this iterative process, the add factors which represent the removal of non-tariff barriers appear explicitly in the input stream of the importing country. The effects on the exporting country are then calculated by the trade share functions and added to the exports of the other country. The add factor for U.S. imports of Apparel required further treatment. Since most Mexican imports of Apparel from the United States are cut pieces for the in-bond assembly plants, they do not appear in the Mexican import statistics. Consequently when we put an add factor on U.S. imports of Apparel from Mexico, MIMEX did not generate the demand for the cut pieces from the U.S. Apparel industry. That demand must be added to U.S. exports to Mexico, but it does not appear as an import in MIMEX.

Besides the base, we have run two free-trade-agreement scenarios. The first we call "Tariffs Only" (TO) and the second, "Tariffs and Barriers" (TAB) where we have also introduced the "add factors" to represent the removal of non-tariff barriers, as they were developed and summarized in Chapter V. The results are presented in detail in Appendix A to this chapter. Graphs of U.S.-Mexican trade, described in LIFT sectors and 1977 dollars, follow in Appendix B. Here we will first examine the aggregates and then look at some of the industrial detail.

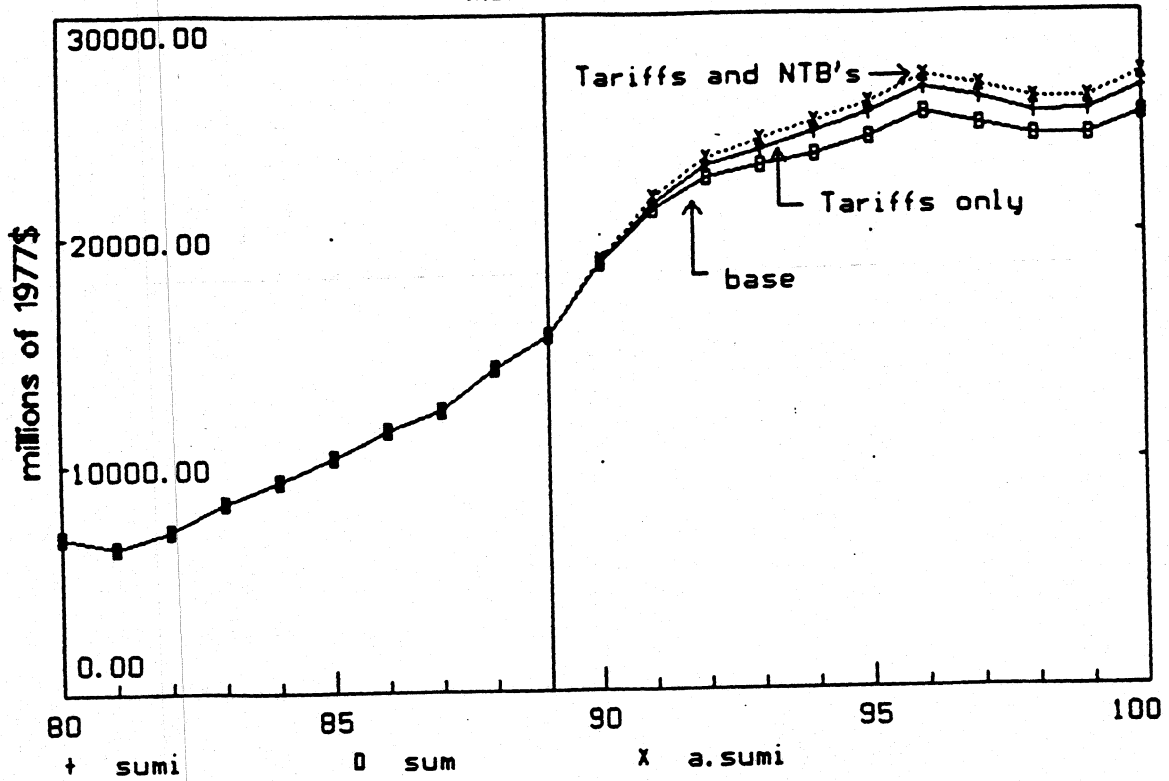
The first pair of tables shows U.S. exports to Mexico (pages A-1 to A-4) and Mexican exports to the U.S (pages A-4 to A-7). Both tables are in LIFT sectors and 1977 dollars, so they are directly comparable. The two summary graphs are shown on the facing page. While the tables show several years, we will concentrate here on 1995. Under TO, U.S. exports were up by 3.1 billion. (1977 dollars will be understood, unless otherwise noted.) Under TAB, they were up even further to \$5.0 billion. Mexico's exports to the U.S. increased less, only \$1.1 billion under TO and \$1.6 under TAB (page A - 7). This asymmetry is not surprising, for the high tariffs and most of the barriers were mostly on the Mexican side.

Total U.S. exports increased more than exports to Mexico. They were up by \$3.4 billion under TO and \$5.5 under TAB (page A - 30). This extra boost to exports comes about because the reduction of tariffs with Mexico lowers cost of production in the U.S., which then competes more effectively in other foreign markets. On the other hand, total U.S. imports increase by \$0.6 billion under TO and \$1.2 billion under TAB (page A - 30), less than the corresponding increase in imports from Mexico -- \$1.1 and \$1.6, respectively. Clearly, there has been trade diversion from other suppliers. Around forty percent of the rise in imports from Mexico has been diverted from third countries, a proportion which seems plausible enough, given our assumptions.

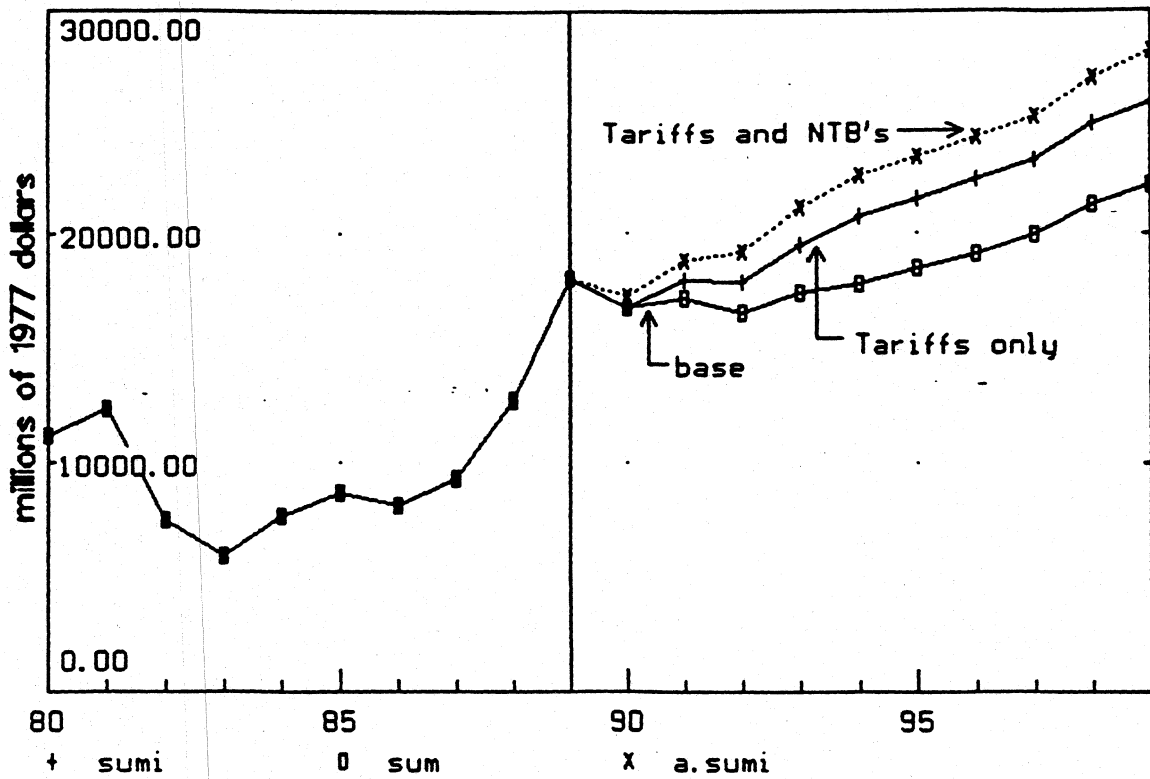
Mexico's total exports rose by almost exactly the increase in its exports to the U.S.. These aggregate results are shown on page A - 8 in 10 millions of 1980 pesos. Ten millions of 1980 pesos can be roughly converted to millions of 1977 dollars by dividing by 2.9. Using this conversion, we find that Mexico's total exports rose by \$1.1 billion and \$1.6 billion under TO and TAB, respectively, the same as its exports to the U.S.. Its total imports, however, rose much less than did its imports from the U.S.. Under TO, the rise was \$1.6 billion for the total in the MIMEX model (page A - 8) versus \$3.1 billion for imports from the U.S. (page A - 4). Under TAB, the total rose \$3.2 billion in MIMEX versus \$5.0 billion from the United States.

It is tempting to say that this excess of the expansion of U.S. exports to Mexico over the expansion of Mexican total imports shows perfectly reasonable trade diversion, given the assumption that Mexico eliminates its fairly substantial tariffs for the U.S. but for no one else. We must, however, remind the reader that the trade share functions for Mexico were specified with parameter values which imply no trade diversion. We cannot, therefore, now invoke trade diversion to explain why the change in tariffs produces twice as large an effect on U.S. exports to Mexico as on total Mexican imports. Another explanation of the disparity might seem to be that MIMEX imports do not include maquiladora inputs. Unfortunately, this explanation is also inappropriate, for we have applied the percentage increase in Mexican imports, augmented by the change in the US share, only to the portion of U.S. exports to Mexico not used as maquiladora

Total Trade Mexico to USA



Total Trade USA to Mexico



inputs. As stated in Chapter I, we believe that the source of the disparity lies in differences in Mexican import statistics and U.S. export statistics. Until this problem can be resolved, we can only say that we believe that the present numbers offer the appropriate percentage changes in each country.

The difference between the TO and TAB scenarios poses no such disparity problem; it is the same for Mexican imports as for U.S. exports, \$1.9 billion in LIFT versus \$1.6 in MIMEX, with \$.3 extra of U.S. Apparel exports as cut pieces which appear in LIFT but not in MIMEX, because of the difference in the accounting definitions.

The effects on total GNP or GDP are quite different in the two economies. The U.S. is operating at a high level of employment in 1995 in the base scenario. The stimulus of the excess of exports over imports, \$2.8 billion under TO and \$4.3 billion under TAB (page A - 30), runs into some of the stabilizing factors in LIFT, as described in Chapter I. Interest rates go up a tenth of a percentage point and residential construction suffers; the savings rate rises slightly and consumers cut back spending, not because they don't have money but because they prefer to save. The net result is that, with a \$2.8 billion increase in net exports under TO in 1995, GNP rises only \$1.7 billion, \$0.6 billion having been cut out of Personal consumption, another \$0.6 out of Residential Construction while \$0.2 billion was added to investment in equipment.

For Mexico, the FTA is a mixed blessing. By 1995, exports are up approximately 3 percent under TO and 4.4 percent under TAB. Imports, however, are up 10 percent under TO and 20 percent under TAB (page A - 8). The FTA was particularly hard on Mexico in 1991 - 1993 when the competition from imports first hit. By 1995, the economy is recovering and investment is slightly above its no-FTA level. Mexican consumers are also richer because of lower prices on imports, so their consumption expenditure is up. Despite these favorable effects, the direct negative impact of the increased imports leads to a minuscule reduction in GDP, less than a tenth of one percent under TO and half of that under TAB. The FTA is not the immediate solution of Mexico's unemployment problem. Employment actually falls by 0.04 percent under TO and by nearly 0.5 percent under TAB. These mild negative effects, while perhaps disappointing, should not be surprising. After all, the substantial tariffs and non-tariff barriers have been there to safeguard jobs in inefficient industries. A more extensive scenario might introduce increased labor productivity in the formerly competitive industries so that they might compete more effectively with the foreign products.

The graphs in Appendix B show the effects of the FTA where they are largest, in the U.S. - Mexican trade. Perusal of the graphs shows that TO and TAB are generally almost indistinguishable except in the industry directly affected by the add-factors. Many of these graphs also show a pattern visible in the total trade: Mexican exports to the United States grow strongly to 1993 and then stagnate, while U.S. exports to Mexico grow modestly or even fall at first but then grow steadily out to 2000. This pattern is produced by the peso having fallen faster in 1990 than prices in MIMEX rose, thus creating -- at least in the model -- a good market for Mexican goods in the United States. Thus, this pattern is a product of the price side of the MIMEX model, a new and previously untried part. No great credence, therefore, should be

placed in this pattern. Fortunately, it affects base and alternatives equally, so the main conclusions of the study are independent of it.

These graphs also give a clear impression of the add factors used to represent the removal of non-tariff barriers in Agriculture, Apparel, Computers, and Automobiles. The add factor for Mexican Agricultural imports brings those imports, after three years, back up to the levels of 1980 and 1981 before the imposition of the last round of licensing constraints. The add factor on U.S. imports of Apparel from Mexico approximately doubles the rate of growth of those imports. The Computer add factor keeps going the rapid rise of the last two years. The same is true of the automobile add factor. Thus, the add factors all seem well within the range of the possible.

In looking at the winners and losers in employment by industry, a clear pattern emerges for the United States. Industries which, like Chemicals, Rubber and plastic products, Metal products, and all of the machinery sectors, are in a position to export to Mexico, win. Those that have been protected by tariffs from effective competition from Mexico, such as Apparel, lose. Construction and its suppliers, including Furniture, lose. The service sectors -- in particular, Trade and Eating and drinking establishments -- lose. One should not cry much over these "lost jobs". They do not represent people put out of work at fast food stores. Rather they represent the people who might otherwise have had such jobs making a career building automobiles or machinery.

In Mexico, on the other hand, the winners are Apparel, Leather and footwear, Textiles, Trade, the Services, and Construction and its suppliers such as Glass. The losers are in Agriculture and Machinery. Most other industries experience employment changes of less than 500 jobs.

In general, one may say that the FTA in either form strengthens the economy of the United States. In aggregate, the tariffs are much more important than the non-tariff barriers as we have expressed them. Under TAB, employment in the U.S. Apparel industry is down 6 thousand jobs, about one percent of employment in that industry. But employment in Metal products is up by over twice as many jobs as employment in Apparel is down. Apparel is virtually the only direct loser. Even Textiles are up. The Mexican situation is less decisively positive, but exposure to the competition from the U.S. does not cripple its long-protected industries nor lead to dire macroeconomic consequences in the first few years of difficult adjustment. Beyond those years, the long-run positive impacts of competition on productivity should become important. They have not been considered in the scenarios run here. An FTA seems unlikely to make a great deal of difference quickly. Gradually, over decades, it may be the route to prosperity in Mexico and the reduction of immigration problems in the United States. The initial impacts as we have studied them here, however, are modest but already beneficial to the United States and to the consumers in Mexico.

Contents of Appendix A to Chapter 7

TRADE	
U.S. Exports to Mexico	1
U.S. Imports from Mexico	4
RESULTS FROM MIMEX	8
Aggregates	8
Output	10
Exports	15
Imports	20
Employment	25
RESULTS FROM LIFT	30
Gross national product accounts	30
Deflators	32
Output	33
Exports	38
Imports	39
Employment	47

CHAPTER VII - APPENDIX A

Line 1: Base Scenario
 Line 2: FTA Scenario: Tariff Removal only
 Line 3: FTA Scenario: Removal of Tariffs and Non-tariff Barriers
 FTA scenarios are shown as deviations from the base values

US Exports to Mexico
 millions of 1977 dollars

	1989	1990	1991	1993	1995	2000
01 Agriculture, Forestry	729.1	726.6	726.5	760.9	801.6	962.2
	0.0	0.0	10.4	28.5	36.0	45.2
	0.0	125.4	261.9	452.0	518.7	675.2
02 Iron ore mining	5.7	5.1	6.0	5.6	5.4	5.8
	0.0	0.0	-0.0	-0.1	-0.0	-0.0
	0.0	-0.0	-0.1	-0.1	0.1	0.0
03 Nonferrous ore mining	17.4	17.2	16.8	16.0	15.9	17.8
	0.0	-0.0	0.4	0.9	1.2	1.4
	0.0	-0.0	0.3	0.9	1.4	1.6
04 Coal	4.4	4.3	5.0	5.0	5.3	6.7
	0.0	0.0	0.1	0.3	0.4	0.5
	0.0	-0.0	0.0	0.2	0.5	0.6
07 Non-metallic minerals	29.9	30.3	34.4	37.3	39.9	52.7
	0.0	0.0	0.8	2.0	3.0	4.1
	0.0	-0.3	0.2	1.7	3.6	4.4
09 Food and Tobacco	983.1	931.4	898.6	897.4	908.6	1064.4
	0.0	-0.0	23.1	61.6	78.6	94.4
	0.0	1.9	27.8	69.3	86.6	106.6
10 Textiles, exc knits	234.9	241.2	241.4	253.6	281.2	409.1
	0.0	0.0	19.6	54.5	77.9	113.0
	0.0	2.2	24.0	63.3	87.3	126.8
11 Knitting	7.8	7.3	7.1	7.2	7.5	9.8
	0.0	0.0	0.6	1.7	2.3	3.0
	0.0	0.2	0.9	2.4	3.1	4.1
12 Apparel	517.3	481.1	469.8	477.5	496.4	645.8
	0.0	0.0	0.0	0.1	0.2	0.2
	0.0	53.2	106.4	186.3	209.1	266.2
13 Paper	556.3	591.7	618.9	680.0	731.9	926.5
	0.0	0.7	4.6	11.7	16.0	21.1
	0.0	0.0	3.1	12.0	19.4	24.4
14 Printing and Publishing	73.0	69.5	67.9	68.8	71.3	91.6
	0.0	0.0	1.1	3.2	3.6	5.0
	0.0	0.0	1.2	3.5	4.2	6.0
15 Agricultural chemicals	113.2	118.4	113.6	126.0	137.9	177.8
	0.0	0.0	0.8	2.7	3.9	5.2
	0.0	-0.7	-1.1	-1.0	-0.1	-0.4
16 Chemicals, exc agric.	1123.0	1184.6	1158.2	1212.3	1290.5	1692.8
	0.0	0.0	54.5	145.0	201.2	267.1
	0.0	1.5	57.5	155.3	215.6	288.7

OUTPUT
in 10 million 1980 pesos

	1989	1990	1991	1993	1995	2000
01 Crops	30403	32036	33258	34657	36296	40650
	0	0	-4	-65	3	-0
	0	-383	-808	-1310	-1318	-1751
02 Livestock	24681	26342	27572	29356	31308	36359
	0	0	3	-30	23	39
	0	-48	-120	-159	-56	-73
03 Forestry	3214	3460	3958	4199	4441	5529
	0	0	-10	-43	-28	-24
	0	-21	-60	-81	-13	-58
04 Fishing and hunting	2585	2779	2923	3183	3467	4217
	0	0	3	3	10	12
	0	-6	-12	-15	-6	-7
05 Coal	1338	1418	1528	1488	1473	1509
	0	0	-12	-39	-29	-32
	0	-11	-36	-55	-28	-46
06 Crude oil and gas	14532	15346	15986	16657	17659	20825
	0	1	26	18	82	87
	0	-30	-45	5	139	97
07 Ferrous mining	1006	1048	1189	1165	1152	1272
	0	0	-4	-14	-4	2
	0	-9	-24	-25	10	-3
08 Non-ferrous mining	9761	10172	10405	10184	10239	11149
	0	-0	-40	-151	-86	-62
	0	-35	-119	-193	-43	-83
09 Stone, sand, gravel, clay	2702	2878	3678	3883	4098	4959
	0	0	-6	-36	3	16
	0	-24	-67	-63	62	20
10 Oth. non-metal minerals	1403	1506	1665	1767	1892	2258
	0	0	1	-6	4	2
	0	-9	-21	-27	-5	-23
11 Meat and milk products	28086	30378	32001	34778	37849	46106
	0	0	3	-38	20	39
	0	-21	-72	-79	42	73
12 Prepared fruits and vegetabl	2387	2567	2635	2851	3089	3727
	0	0	18	38	61	55
	0	-2	11	34	62	55
13 Wheat milling	7294	7642	7834	8108	8432	9263
	0	0	3	-3	10	12
	0	-5	-14	-12	14	18
14 Corn milling	10107	10562	10876	11353	11901	13362
	0	0	1	-8	6	10
	0	-5	-17	-17	13	20
15 Coffee	3529	3655	3767	4006	4291	5122
	0	0	0	-2	2	3
	0	-1	-4	-5	3	4

	1989	1990	1991	1993	1995	2000
16 Sugar	4812	5045	5181	5365	5607	6309
	0	0	6	7	21	20
	0	-3	-6	3	27	26
17 Fats and oils	5230	5567	5805	6179	6603	7731
	0	0	-1	-12	-1	-2
	0	-5	-17	-22	1	-0
18 Food for animals	2163	2202	2203	2162	2143	2118
	0	0	-0	-4	-0	1
	0	-4	-10	-12	-4	-5
19 Other food products	8144	8678	8948	9506	10133	11760
	0	0	3	-6	12	12
	0	-6	-17	-19	14	16
20 Alcoholic beverages	3106	3270	3340	3456	3592	3931
	0	0	3	2	11	10
	0	-2	-5	-2	12	13
21 Beer and malt	4825	5047	5168	5360	5599	6288
	0	0	12	23	41	38
	0	-3	2	19	44	43
22 Soft drinks and flavorings	4881	5008	5055	5095	5159	5321
	0	0	1	-2	4	5
	0	-2	-7	-6	6	9
23 Tobacco products	1996	2036	2045	2040	2046	2068
	0	0	1	-1	2	2
	0	-1	-3	-2	3	4
24 Cotton, wool, syn. textiles	10545	11225	11874	12506	13238	15461
	0	0	42	91	134	135
	0	63	139	309	367	370
25 Jute, rough textiles	918	947	972	965	975	996
	0	0	-2	-8	-6	-8
	0	-5	-13	-19	-14	-20
26 Fabricated textile products	3391	3645	3844	4059	4326	5091
	0	0	0	-5	4	5
	0	-2	-8	-4	18	17
27 Apparel	11752	12601	14050	15047	15982	19997
	0	0	212	609	839	982
	0	352	878	1994	2290	2692
28 Leather and footwear	7035	7363	8089	8614	9122	11192
	0	0	32	50	76	130
	0	5	34	115	153	180
29 Lumber, plywood	5214	5591	6749	7072	7530	9221
	0	1	-19	-84	-33	-20
	0	-37	-110	-116	52	-8
30 Other wood products	5467	6000	6562	7008	7555	9183
	0	0	3	-13	21	25
	0	-14	-37	-26	57	41

	1989	1990	1991	1993	1995	2000
31 Paper and paperboard	10327	10891	11756	12407	13313	15963
	0	16	-1	-59	-19	-17
	0	-9	-67	-87	28	-18
32 Printing	5925	6281	6608	6885	7249	8291
	0	0	-0	-12	11	19
	0	-12	-32	-31	20	12
33 Petroleum refining	9703	10296	10795	11135	11577	12805
	0	0	-9	-41	-11	-4
	0	-23	-64	-68	12	-12
34 Basic petrochemicals	6697	7186	7667	8536	9595	12884
	0	0	-27	-90	-88	-128
	0	-8	-55	-88	-52	-115
35 Basic inorganic chemicals	4530	4764	5030	5337	5748	6867
	0	0	-18	-60	-46	-56
	0	-8	-42	-67	-31	-59
36 Pesticides and fertilizers	1836	1970	2070	2223	2400	2864
	0	0	-1	-8	-3	-4
	0	-23	-48	-77	-76	-109
37 Plastic resins, syn. fibre	8542	9413	10337	11698	13165	17615
	0	0	-53	-159	-191	-285
	0	17	-37	-61	-44	-143
38 Medicinal products	5058	5298	5510	5591	5832	6403
	0	0	-5	-18	-11	-11
	0	-2	-16	-23	0	-5
39 Cleaning and toilet prep.	6816	7868	8758	10169	11719	15805
	0	0	2	-10	16	28
	0	-6	-24	-19	41	56
40 Other chemicals	7843	8501	9001	9713	10555	13138
	0	0	-7	-49	-5	-1
	0	-30	-82	-101	3	-43
41 Rubber products	4606	4999	5504	5816	6221	7777
	0	0	-8	-39	-30	-42
	0	-32	-81	-127	-71	-133
42 Plastic products	5621	6050	6499	6994	7565	9064
	0	0	-37	-117	-137	-183
	0	-6	-58	-116	-107	-170
43 Glass	2816	3027	3132	3327	3579	4293
	0	0	31	58	89	68
	0	-9	8	39	86	51
44 Cement	4393	4783	6170	6875	7530	10070
	0	0	4	-27	51	77
	0	-38	-93	-74	179	84
45 Ceramics	8430	8838	10350	10655	11187	13408
	0	0	-5	-74	-1	-8
	0	-50	-126	-120	106	2

	1989	1990	1991	1993	1995	2000
46 Steel	19674	20712	23768	23628	24137	27797
	0	1	-93	-324	-87	16
	0	-191	-512	-561	74	-105
47 Non-ferrous metals	5873	6594	7138	7465	7953	10045
	0	-0	-21	-73	13	64
	0	-49	-128	-150	18	-4
48 Metal furniture	1216	1273	1476	1498	1509	1691
	0	0	-2	-10	-0	5
	0	-7	-18	-17	23	8
49 Structural metal products	1645	1707	2064	2028	2028	2243
	0	0	-11	-37	-19	-11
	0	-16	-47	-51	9	-10
50 Fabricated metal products	7585	7982	8659	8909	9306	10963
	0	0	-96	-277	-287	-317
	0	-42	-196	-332	-248	-354
51 Non-electrical machinery.	8119	9679	10036	9318	8623	8209
	0	-5	-466	-1176	-1335	-1321
	0	-293	-1071	-2056	-2178	-2510
52 Electrical machinery	3602	3873	4443	4526	4654	5410
	0	0	-64	-174	-162	-156
	0	-29	-131	-200	-109	-159
53 Household appliances	1673	1784	1912	1898	1923	2208
	0	0	-4	-15	-2	4
	0	-7	-22	-21	13	6
54 Electronic equipment	4884	5120	5290	5159	5112	4996
	0	-1	94	203	305	130
	0	-11	57	208	331	133
55 Other electrical equip	2762	3212	3306	3462	3592	4181
	0	0	-27	-81	-79	-89
	0	-13	-60	-96	-62	-99
56 Automobiles	14367	15336	17419	18223	19802	26446
	0	1	2	-52	103	160
	0	-599	-1223	-2022	-1869	-2479
57 Autoparts	8916	9619	10100	10495	11384	13609
	0	0	-142	-384	-439	-506
	0	-125	-382	-685	-676	-805
58 Other transportation equip	2330	2746	2923	2998	3030	3172
	0	0	-43	-112	-82	-66
	0	-20	-92	-134	-53	-72
59 Misc. manufacturing	6564	7164	7605	7989	8357	9572
	0	0	-88	-270	-308	-405
	0	-20	-145	-280	-256	-419
60 Construction	62355	64919	83634	85909	88518	102381
	0	5	-187	-892	27	386
	0	-588	-1622	-1493	1428	553

	1989	1990	1991	1993	1995	2000
61 Electricity	12195	12864	13842	14660	15587	18505
	0	1	-17	-72	-30	-31
	0	-33	-99	-122	1	-63
62 Trade	155645	164291	178696	188011	198608	232785
	0	4	-109	-642	-14	212
	0	-404	-1152	-1165	599	33
63 Restaurants and hotels	20694	22091	23249	24679	26376	31389
	0	0	-1	-29	17	29
	0	-21	-67	-66	48	36
64 Transportation	43390	46323	50386	53298	56580	66452
	0	1	-32	-182	2	62
	0	-112	-328	-348	168	36
65 Communication	6897	7459	8044	8828	9677	12028
	0	0	-1	-12	6	13
	0	-9	-27	-29	18	11
66 Financial services	17846	18745	19916	21228	22668	26853
	0	0	-5	-34	6	22
	0	-26	-73	-83	26	-7
67 Rental	47150	49514	52386	56251	59753	69444
	0	0	-20	-75	-19	-5
	0	-19	-82	-85	66	34
68 Professional services	11882	12689	13964	15028	16267	20335
	0	0	-8	-49	4	22
	0	-41	-110	-128	17	-41
69 Educational services	30057	31696	33169	35784	38624	46305
	0	0	5	7	35	59
	0	-0	-7	16	81	111
70 Medical services	24190	25668	27033	28795	31045	36993
	0	0	-2	-7	10	15
	0	-2	-22	-7	66	66
71 Amusements	5451	5733	6002	6209	6551	7927
	0	0	1	-4	14	23
	0	-6	-19	-11	34	34
72 Other services	32219	34292	36446	38747	41576	52470
	0	1	-7	-70	18	49
	0	-41	-130	-122	105	80
73 Government	20667	20667	20667	20667	20667	20667
	0	0	0	0	0	0
	0	0	0	0	0	0
74 Net tourism	136	219	276	342	416	608
	0	0	0	-1	2	3
	0	-1	-2	-2	4	6

EXPORTS
in 10 million 1980 pesos

	1989	1990	1991	1993	1995	2000
01 Crops	1483	1579	1571	1664	1766	1939
	0	0	8	18	29	32
	0	1	8	19	32	36
02 Livestock	588	617	641	704	773	911
	0	0	2	4	6	7
	0	0	2	5	7	8
03 Forestry	12	12	11	9	8	5
	0	0	0	0	0	0
	0	0	0	0	0	0
04 Fishing and hunting	12	12	12	12	12	13
	0	0	2	5	7	8
	0	1	3	6	9	10
05 Coal	24	24	24	24	23	23
	0	0	0	0	0	0
	0	-0	0	0	0	0
06 Crude oil and gas	4659	4801	4849	4947	5047	5306
	0	0	41	98	131	141
	0	1	42	100	133	143
07 Ferrous mining	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
08 Non-ferrous mining	1894	1861	1735	1674	1615	1439
	0	0	1	1	2	2
	0	-0	-0	-0	1	0
09 Stone, sand, gravel, clay	32	33	33	32	33	35
	0	0	0	0	0	0
	0	0	0	0	0	0
10 Oth. non-metal minerals	607	621	642	679	716	822
	0	0	3	8	10	10
	0	0	3	8	11	11
11 Meat and milk products	52	59	60	68	78	110
	0	0	1	3	4	4
	0	-0	1	3	4	3
12 Prepared fruits and vegetabl	371	406	383	419	457	557
	0	0	16	39	59	54
	0	-1	14	37	58	51
13 Wheat milling	24	27	27	30	33	43
	0	0	1	3	4	4
	0	-0	1	3	4	4
14 Corn milling	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
15 Coffee	1403	1411	1437	1524	1635	1995
	0	0	0	-0	0	0
	0	-0	-0	-1	-0	-0

	1989	1990	1991	1993	1995	2000
16 Sugar	343	372	403	473	555	827
	0	0	4	10	15	14
	0	0	4	11	15	14
17 Fats and oils	5	5	5	7	9	20
	0	0	1	3	4	3
	0	-0	1	3	4	3
19 Other food products	988	1037	1023	1067	1117	1228
	0	0	4	8	14	13
	0	-1	2	7	13	11
20 Alcoholic beverages	121	126	119	121	123	126
	0	0	3	6	10	9
	0	-0	2	6	10	9
21 Beer and malt	452	489	530	622	730	1089
	0	0	10	24	35	33
	0	0	10	25	36	33
22 Soft drinks and flavorings	8	8	8	9	10	13
	0	0	0	1	1	1
	0	-0	0	1	2	1
23 Tobacco products	21	18	15	11	7	3
	0	0	0	1	1	1
	0	0	0	1	1	1
24 Cotton, wool, syn. textiles	837	863	892	941	983	1073
	0	0	8	21	30	29
	0	-0	7	21	29	29
25 Jute, rough textiles	36	33	30	24	19	11
	0	0	0	0	0	0
	0	0	0	0	0	0
26 Fabricated textile products	88	105	106	126	141	193
	0	0	2	6	8	8
	0	-0	2	5	8	8
27 Apparel	402	483	470	510	547	633
	0	0	181	517	761	842
	0	330	818	1629	2007	2425
28 Leather and footwear	182	216	192	210	222	257
	0	0	10	25	36	39
	0	-0	9	23	35	38
29 Lumber, plywood	28	34	27	28	28	28
	0	-0	1	1	2	3
	0	-0	1	1	2	2
30 Other wood products	422	467	432	462	488	556
	0	-0	2	1	4	6
	0	-0	1	-1	3	4
31 Paper and paperboard	402	421	434	496	573	759
	0	11	14	16	18	18
	0	11	14	15	18	18

	1989	1990	1991	1993	1995	2000
32 Printing	129	129	116	108	100	81
	0	0	0	0	1	1
	0	-0	0	0	1	1
33 Petroleum refining	2156	2492	2512	2649	2781	3103
	0	-0	0	-0	1	1
	0	-0	-1	-1	1	-0
34 Basic petrochemicals	696	727	671	725	786	999
	0	0	0	-1	1	1
	0	-0	-1	-2	0	-1
35 Basic inorganic chemicals	518	533	545	591	639	779
	0	0	17	44	65	73
	0	0	18	46	65	75
36 Pesticides and fertilizers	95	97	92	91	91	91
	0	0	0	0	0	0
	0	0	0	0	0	0
37 Plastic resins, syn. fibre	1210	1311	1420	1667	1956	2918
	0	0	4	12	17	19
	0	0	5	12	17	19
38 Medicinal products	470	490	493	507	533	601
	0	0	2	3	8	8
	0	-1	0	1	6	4
39 Cleaning and toilet prep.	47	50	52	59	68	91
	0	0	2	6	8	9
	0	0	2	6	8	9
40 Other chemicals	537	581	630	739	867	1294
	0	0	1	3	4	4
	0	0	1	3	4	4
41 Rubber products	331	359	389	456	535	799
	0	0	13	34	43	42
	0	0	14	37	45	44
42 Plastic products	40	43	36	41	48	64
	0	0	0	1	2	3
	0	0	1	1	2	3
43 Glass	337	389	342	393	450	583
	0	0	28	65	89	76
	0	-1	27	62	87	71
44 Cement	196	215	168	199	228	297
	0	0	16	36	49	43
	0	-1	15	34	48	39
45 Ceramics	181	182	167	167	169	181
	0	0	24	56	75	64
	0	-0	24	55	75	65
46 Steel	1454	1544	1639	1848	2084	2813
	0	0	49	129	173	191
	0	0	49	130	176	192

	1989	1990	1991	1993	1995	2000
47 Non-ferrous metals	164	249	229	315	427	1009
	0	-0	70	189	277	353
	0	1	75	196	285	368
48 Metal furniture	37	37	34	39	44	64
	0	0	0	-0	0	0
	0	-0	-0	-0	-0	-0
49 Structural metal products	84	105	81	93	101	133
	0	0	0	-0	1	1
	0	-0	0	-0	1	1
50 Fabricated metal products	296	303	252	293	349	556
	0	0	1	1	3	7
	0	0	2	3	6	7
51 Non-electrical machinery.	1458	1671	1581	1647	1718	2067
	0	-8	33	93	122	118
	0	-9	33	92	121	116
52 Electrical machinery	308	348	340	403	460	643
	0	0	2	7	7	12
	0	-0	4	10	9	14
53 Household appliances	201	269	263	327	394	672
	0	0	-1	-2	1	3
	0	-0	-2	-3	1	0
54 Electronic equipment	813	824	825	832	841	863
	0	-1	155	414	587	494
	0	0	152	434	598	510
55 Other electrical equip	436	536	443	508	538	670
	0	-0	38	105	147	156
	0	0	38	109	152	161
56 Automobiles	846	1265	1301	1620	2228	3627
	0	0	33	82	142	171
	0	0	34	84	147	167
57 Autoparts	3502	4180	4573	5255	6379	8745
	0	0	25	62	105	127
	0	0	26	65	110	130
58 Other transportation equip	132	134	134	132	130	138
	0	0	0	0	0	1
	0	-0	0	1	1	2
59 Misc. manufacturing	853	995	808	916	998	1212
	0	-0	36	89	131	135
	0	-2	33	83	127	126
61 Electricity	46	40	34	26	20	10
	0	0	0	0	0	0
	0	0	0	0	0	0
62 Trade	30831	31716	32524	34475	36513	41785
	0	0	0	0	0	0
	0	0	0	0	0	0

	1989	1990	1991	1993	1995	2000
63 Restaurants and hotels	4178	4496	4817	5644	6621	9613
	0	0	0	0	0	0
	0	0	0	0	0	0
64 Transportation	2003	1970	1937	1874	1813	1669
	0	0	0	0	0	0
	0	0	0	0	0	0
65 Communication	807	849	888	988	1100	1412
	0	0	0	0	0	0
	0	0	0	0	0	0
66 Financial services	1359	1401	1443	1532	1627	1891
	0	0	0	0	0	0
	0	0	0	0	0	0
68 Professional services	76	91	108	156	223	549
	0	0	0	0	0	0
	0	0	0	0	0	0
71 Amusements	116	126	142	237	393	1161
	0	0	0	0	0	0
	0	0	0	0	0	0
72 Other services	464	530	673	1217	2086	7347
	0	0	0	0	0	0
	0	0	0	0	0	0

IMPORTS
in 10 million 1980 pesos

	1989	1990	1991	1993	1995	2000
01 Crops	2406	2397	2422	2538	2676	3210
	0	0	20	56	69	86
	0	343	708	1214	1387	1808
02 Livestock	185	183	187	190	194	216
	0	0	1	2	2	3
	0	28	58	98	111	145
03 Forestry	403	404	449	486	520	681
	0	0	3	7	11	16
	0	5	12	28	39	49
04 Fishing and hunting	10	10	11	12	12	14
	0	0	0	0	0	0
	0	5	10	16	18	24
05 Coal	327	325	381	388	408	520
	0	0	3	10	13	20
	0	-2	-1	9	19	24
06 Crude oil and gas	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
07 Ferrous mining	31	27	32	31	29	32
	0	0	-0	-0	-0	-0
	0	-0	-1	-0	0	0
08 Non-ferrous mining	410	402	414	395	392	440
	0	-0	6	13	19	23
	0	-0	5	14	23	28
09 Stone, sand, gravel, clay	76	77	99	107	113	140
	0	0	1	1	3	4
	0	-1	-1	1	5	4
10 Oth. non-metal minerals	208	203	227	248	268	358
	0	0	2	6	7	10
	0	-1	0	5	7	10
11 Meat and milk products	861	795	817	786	776	831
	0	0	6	17	17	18
	0	2	10	24	24	28
12 Prepared fruits and vegetabl	39	37	39	38	39	46
	0	-0	1	2	3	3
	0	0	1	3	3	4
13 Wheat milling	1	0	1	1	1	1
	0	0	0	0	-0	-0
	0	0	0	0	0	0
14 Corn milling	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
15 Coffee	1	1	1	1	1	1
	0	0	0	0	0	0
	0	0	0	0	0	0

	1989	1990	1991	1993	1995	2000
16 Sugar	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0
17 Fats and oils	247 0 0	236 0 1	227 3 5	225 9 11	232 10 12	271 12 15
18 Food for animals	18 0 0	16 0 0	16 1 1	15 1 2	14 1 2	16 2 2
19 Other food products	202 0 0	177 -0 1	190 3 5	184 8 10	183 9 11	208 10 13
20 Alcoholic beverages	44 0 0	42 0 0	48 1 1	48 2 2	50 2 3	56 2 3
21 Beer and malt	19 0 0	18 0 0	21 0 0	22 1 1	23 1 1	28 1 2
22 Soft drinks and flavorings	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0
23 Tobacco products	0 0 0	0 0 0	0 0 0	0 0 0	0 -0 0	0 0 0
24 Cotton, wool, syn. textiles	165 0 0	167 0 2	187 9 13	195 24 31	214 32 39	292 41 50
25 Jute, rough textiles	45 0 0	40 0 -0	42 2 2	44 4 5	43 5 5	62 7 7
26 Fabricated textile products	46 0 0	43 0 0	47 4 4	46 9 10	49 12 13	62 15 16
27 Apparel	216 0 0	199 0 5	198 14 24	198 37 58	203 50 72	255 60 87
28 Leather and footwear	44 0 0	41 0 0	43 3 3	43 6 7	44 9 9	55 11 12
29 Lumber, plywood	214 0 0	210 0 -1	253 7 5	270 19 20	298 29 34	415 41 46
30 Other wood products	22 0 0	23 0 -0	25 1 1	27 4 4	30 5 5	41 7 7

	1989	1990	1991	1993	1995	2000
31 Paper and paperboard	1191	1262	1346	1477	1586	1991
	0	2	9	22	30	40
	0	0	5	23	40	48
32 Printing	237	219	242	237	238	279
	0	0	0	3	1	2
	0	0	1	4	3	5
33 Petroleum refining	2280	2353	2486	2563	2662	3059
	0	0	1	0	6	11
	0	-4	-9	-3	13	13
34 Basic petrochemicals	1992	2200	2320	2608	2933	3955
	0	0	-2	-9	-6	-11
	0	-2	-9	-6	6	-3
35 Basic inorganic chemicals	1064	1093	1126	1156	1172	1359
	0	0	31	77	97	109
	0	0	31	82	105	119
36 Pesticides and fertilizers	77	80	86	94	103	133
	0	0	0	1	1	2
	0	-1	-1	-2	-2	-2
37 Plastic resins, syn. fibre	1304	1371	1505	1579	1760	2477
	0	0	61	160	228	312
	0	5	70	184	259	356
38 Medicinal products	351	365	348	364	379	427
	0	0	6	17	20	22
	0	1	8	20	23	27
39 Cleaning and toilet prep.	29	30	33	38	41	55
	0	0	2	6	9	12
	0	0	2	7	9	13
40 Other chemicals	1144	1048	1353	1328	1344	1496
	0	0	-4	-4	-11	-10
	0	-1	-6	-1	-3	0
41 Rubber products	194	160	181	193	235	344
	0	0	14	40	63	89
	0	-0	13	39	62	89
42 Plastic products	295	329	368	398	425	609
	0	0	38	109	152	210
	0	1	40	113	157	222
43 Glass	73	69	70	73	75	97
	0	0	4	12	15	18
	0	0	5	12	16	20
44 Cement	11	12	16	19	20	29
	0	0	0	0	1	1
	0	-0	-0	0	1	1
45 Ceramics	144	162	199	248	285	412
	0	0	15	49	70	96
	0	-0	14	51	78	108

	1989	1990	1991	1993	1995	2000
46 Steel	1421	1208	1665	1599	1582	1562
	0	0	11	32	41	48
	0	-9	-8	26	60	57
47 Non-ferrous metals	901	784	890	840	851	1001
	0	-0	42	105	136	163
	0	-4	36	104	144	171
48 Metal furniture	1	1	2	2	2	2
	0	0	0	0	0	0
	0	-0	0	0	0	0
49 Structural metal products	77	67	86	82	84	100
	0	0	3	8	11	13
	0	-1	2	7	13	14
50 Fabricated metal products	957	894	1080	1082	1163	1465
	0	0	71	185	249	304
	0	-2	68	190	266	323
51 Non-electrical machinery.	6892	5660	7025	6625	6733	7282
	0	-3	425	1037	1306	1328
	0	178	793	1764	2208	2408
52 Electrical machinery	761	631	917	866	883	1064
	0	0	52	127	161	183
	0	-3	47	132	182	202
53 Household appliances	30	22	26	22	20	20
	0	0	2	4	4	4
	0	-0	2	4	5	4
54 Electronic equipment	923	780	835	832	863	1088
	0	-0	96	260	354	398
	0	0	98	273	369	423
55 Other electrical equip	857	677	830	828	884	1032
	0	-0	65	171	228	252
	0	-1	65	177	243	270
56 Automobiles	238	206	230	211	213	259
	0	0	11	25	33	39
	0	529	1068	1937	2157	2687
57 Autoparts	3233	3230	3555	3512	3816	4686
	0	0	142	362	493	589
	0	-35	76	273	422	523
58 Other transportation equip	1426	1024	1411	1140	1016	970
	0	0	34	74	79	77
	0	-4	27	80	99	92
59 Misc. manufacturing	1693	1669	1910	1900	2015	2682
	0	0	132	338	456	590
	0	0	133	356	493	635
61 Electricity	31	33	35	37	39	47
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	0	-0

	1989	1990	1991	1993	1995	2000
62 Trade	16	17	18	19	20	24
	0	0	-0	-0	-0	0
	0	-0	-0	-0	0	0
63 Restaurants and hotels	37	40	42	44	47	56
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
64 Transportation	2099	2241	2437	2578	2737	3215
	0	0	-2	-9	0	3
	0	-5	-16	-17	8	2
65 Communication	173	188	202	222	243	302
	0	0	-0	-0	0	0
	0	-0	-1	-1	0	0
66 Financial services	1517	1594	1693	1805	1927	2283
	0	0	-0	-3	1	2
	0	-2	-6	-7	2	-1
68 Professional services	2	2	2	3	3	4
	0	0	-0	-0	0	0
	0	-0	-0	-0	0	-0
71 Amusements	11	12	12	13	13	16
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
72 Other services	184	195	208	221	237	299
	0	0	-0	-0	0	0
	0	-0	-1	-1	1	0

**EMPLOYMENT
in thousands**

	1989	1990	1991	1993	1995	2000
01 Crops	5351	5282	5364	5767	5979	6548
	0	0	-0	-8	-7	-1
	0	-47	-67	-147	-218	-278
02 Livestock	790	843	884	945	1012	1190
	0	0	0	-1	1	1
	0	-2	-4	-5	-2	-2
03 Forestry	109	113	116	136	149	177
	0	0	-0	-1	-1	-1
	0	-1	-1	-2	-1	-2
04 Fishing and hunting	73	79	83	93	102	126
	0	0	0	0	0	0
	0	-0	-0	-0	-0	-0
05 Coal	25	26	31	31	31	32
	0	0	-0	-1	-1	-1
	0	-0	-1	-1	-1	-1
06 Crude oil and gas	46	51	54	60	68	93
	0	0	0	0	0	0
	0	-0	-0	0	1	0
07 Ferrous mining	8	8	10	11	11	11
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	-0	-0
08 Non-ferrous mining	92	96	96	91	87	83
	0	0	-0	-1	-1	-1
	0	-0	-1	-2	-0	-1
09 Stone, sand, gravel, clay	115	128	158	178	190	220
	0	0	-0	-1	0	-0
	0	-1	-2	-3	2	-1
10 Oth. non-metal minerals	21	23	23	26	29	34
	0	0	0	-0	0	0
	0	-0	-0	-0	-0	-0
11 Meat and milk products	87	88	89	95	99	107
	0	0	0	-0	0	0
	0	-0	-0	-0	-0	0
12 Prepared fruits and vegetabl	26	27	27	27	27	26
	0	0	0	0	1	0
	0	-0	0	0	1	0
13 Wheat milling	117	122	123	124	126	129
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
14 Corn milling	73	73	72	72	70	65
	0	0	0	-0	0	0
	0	-0	-0	-0	-0	0
15 Coffee	18	18	19	20	21	24
	0	0	0	-0	0	0
	0	0	-0	-0	-0	0

	1989	1990	1991	1993	1995	2000
16 Sugar	80	83	83	88	92	103
	0	0	0	0	0	0
	0	-0	-0	0	0	0
17 Fats and oils	21	23	23	25	26	28
	0	0	-0	-0	0	-0
	0	-0	-0	-0	-0	-0
18 Food for animals	14	13	13	12	12	10
	0	0	0	-0	0	0
	0	-0	-0	-0	-0	-0
19 Other food products	74	76	77	81	83	90
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
20 Alcoholic beverages	8	8	7	7	7	5
	0	0	0	0	0	0
	0	-0	0	-0	0	0
21 Beer and malt	24	25	25	25	25	24
	0	0	0	0	0	0
	0	-0	0	0	0	0
22 Soft drinks and flavorings	86	86	87	87	85	80
	0	0	0	0	0	0
	0	-0	-0	-0	-0	0
23 Tobacco products	19	20	22	22	23	26
	0	0	0	0	0	0
	0	0	-0	-0	0	0
24 Cotton, wool, syn. textiles	120	126	135	145	150	164
	0	0	0	1	1	1
	0	0	1	3	4	4
25 Jute, rough textiles	11	11	12	11	11	10
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	-0	-0
26 Fabricated textile products	42	42	43	45	45	46
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
27 Apparel	121	137	137	157	164	186
	0	0	1	5	9	9
	0	2	5	16	23	25
28 Leather and footwear	124	133	142	154	159	175
	0	0	0	1	2	2
	0	0	0	2	3	2
29 Lumber, plywood	81	87	100	101	105	119
	0	0	-0	-1	-0	-0
	0	-1	-2	-2	1	0
30 Other wood products	64	73	82	77	78	84
	0	0	0	-0	0	0
	0	-0	-1	-0	1	0

	1989	1990	1991	1993	1995	2000
31 Paper and paperboard	54	56	57	58	57	56
	0	0	0	-0	-0	-0
	0	-0	-0	-0	0	-0
32 Printing	77	80	83	86	88	92
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
33 Petroleum refining	46	53	56	60	64	75
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	-0	-0
34 Basic petrochemicals	26	27	30	44	46	57
	0	0	0	0	-0	-1
	0	0	0	0	-0	-1
35 Basic inorganic chemicals	21	23	23	24	23	22
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	-0	-0
36 Pesticides and fertilizers	12	12	12	12	12	11
	0	0	0	-0	-0	-0
	0	-0	-0	-0	-0	-0
37 Plastic resins, syn. fibre	39	41	47	49	51	56
	0	0	-0	-1	-1	-1
	0	0	-0	-0	-0	-1
38 Medicinal products	40	41	39	39	37	34
	0	0	-0	-0	-0	-0
	0	-0	-0	-0	-0	-0
39 Cleaning and toilet prep.	32	37	35	43	48	56
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
40 Other chemicals	45	48	52	54	56	63
	0	0	-0	-0	-0	-0
	0	-0	-0	-1	-0	-0
41 Rubber products	31	32	34	37	38	39
	0	0	-0	-0	-0	-0
	0	-0	-0	-1	-1	-1
42 Plastic products	52	55	57	60	60	58
	0	0	-0	-1	-1	-1
	0	-0	-0	-1	-1	-1
43 Glass	24	26	25	25	25	25
	0	0	0	0	1	0
	0	-0	0	0	1	0
44 Cement	24	28	34	39	42	52
	0	0	0	-0	0	0
	0	-0	-0	-0	1	0
45 Ceramics	144	154	180	190	202	249
	0	0	-0	-1	0	-0
	0	-1	-2	-2	2	-0

	1989	1990	1991	1993	1995	2000
46 Steel	78	88	93	105	105	99
	0	0	-0	-0	-0	-1
	0	-0	-1	-2	-1	-2
47 Non-ferrous metals	28	32	35	39	40	44
	0	0	-0	-0	-0	0
	0	-0	-0	-1	-0	-0
48 Metal furniture	16	18	18	20	21	20
	0	0	-0	-0	0	-0
	0	-0	-0	-0	0	-0
49 Structural metal products	24	25	29	30	29	29
	0	0	-0	-0	-0	-0
	0	-0	-1	-1	-0	-0
50 Fabricated metal products	87	90	97	100	100	105
	0	0	-1	-3	-3	-3
	0	-0	-2	-3	-3	-4
51 Non-electrical machinery.	82	96	101	97	87	71
	0	-0	-4	-10	-12	-12
	0	-2	-9	-19	-21	-22
52 Electrical machinery	44	50	57	61	63	74
	0	0	-1	-2	-2	-2
	0	-0	-1	-3	-2	-3
53 Household appliances	19	19	20	20	20	20
	0	0	-0	-0	-0	0
	0	-0	-0	-0	0	0
54 Electronic equipment	58	55	55	53	48	38
	0	-0	1	2	3	1
	0	-0	1	2	3	1
55 Other electrical equip	30	35	34	36	36	36
	0	0	-0	-1	-1	-1
	0	-0	-1	-1	-1	-1
56 Automobiles	54	60	66	70	72	86
	0	0	0	-0	0	0
	0	-2	-4	-7	-7	-9
57 Autoparts	94	104	112	113	118	131
	0	0	-1	-4	-5	-5
	0	-1	-3	-7	-7	-8
58 Other transportation equip	62	73	82	81	84	99
	0	0	-1	-4	-3	-2
	0	-1	-3	-4	-1	-2
59 Misc. manufacturing	64	76	83	91	99	123
	0	0	-1	-3	-3	-5
	0	-0	-1	-3	-3	-6
60 Construction	2124	2282	2863	3085	3266	3857
	0	0	-5	-28	3	8
	0	-18	-50	-54	43	6

	1989	1990	1991	1993	1995	2000
61 Electricity	108	110	113	118	119	120
	0	0	-0	-0	-0	-0
	0	-0	-1	-1	-0	-1
62 Trade	2883	3110	3377	3618	3860	4588
	0	0	-2	-10	2	1
	0	-6	-19	-23	9	-6
63 Restaurants and hotels	509	542	557	625	672	802
	0	0	-0	-1	0	0
	0	-0	-1	-1	0	0
64 Transportation	938	1031	1069	1168	1238	1370
	0	0	-0	-1	2	-2
	0	-1	-4	-7	-0	-5
65 Communication	102	99	100	100	96	82
	0	0	-0	-0	0	0
	0	-0	-0	-0	-0	0
66 Financial services	289	292	304	314	321	338
	0	0	-0	-0	-0	0
	0	-0	-1	-1	-0	-0
67 Rental	251	252	273	282	299	363
	0	0	-0	-1	-0	1
	0	-0	-1	-0	1	2
68 Professional services	211	231	254	280	308	394
	0	0	-0	-1	0	0
	0	-1	-2	-2	0	-1
69 Educational services	2074	2310	2479	2664	2927	3671
	0	0	0	1	4	5
	0	-0	-1	2	9	10
70 Medical services	624	660	668	730	786	931
	0	0	-0	-0	0	0
	0	-0	-0	-0	1	2
71 Amusements	66	66	69	71	73	82
	0	0	0	-0	0	0
	0	-0	-0	-0	0	0
72 Other services	2751	2867	3013	3123	3278	3934
	0	0	-1	-7	1	5
	0	-4	-12	-9	9	8
73 Government	992	971	951	932	913	868
	0	0	0	0	0	0
	0	0	0	0	0	0

LIFT RESULTS

Line 1: Base
 Line 2: FTA Scenario: Tariff Removal only
 Line 3: FTA Scenario: Removal of Tariffs and NTB's

FTA scenarios are shown in deviations from base scenario.

GNP COMPONENTS
 billions of 1977 dollars

	1989	1990	1991	1993	1995	2000
GNP, billions of 1977\$	2710.4	2747.0	2795.7	2882.6	2971.7	3244.6
	0.0	0.0	0.9	1.8	1.7	3.6
	0.0	0.2	1.8	2.8	2.8	5.4
Personal consumption expenditure	1809.4	1852.3	1881.6	1927.0	1974.5	2081.2
	0.0	0.0	0.0	-0.5	-0.6	-0.4
	0.0	0.0	-0.1	-0.9	-0.9	-0.8
Residential construction, total	116.6	113.3	114.9	124.4	127.5	132.9
	0.0	0.0	-0.1	-0.3	-0.6	-0.4
	0.0	0.0	-0.1	-0.5	-0.9	-0.6
Non-residential construction,	75.3	75.8	80.9	88.6	91.6	100.8
	0.0	0.0	0.1	0.1	0.0	0.0
	0.0	0.0	0.2	0.2	0.0	0.1
Producers' durable equipment	237.9	242.4	257.3	266.1	285.2	334.2
	0.0	0.0	0.2	0.4	0.2	0.2
	0.0	0.0	0.6	0.7	0.2	0.4
Inventory change, total	18.0	13.0	16.0	16.2	16.3	17.3
	0.0	0.0	0.1	0.1	0.0	0.1
	0.0	0.0	0.2	0.2	0.0	0.1
Exports, total	370.3	386.5	404.7	444.7	489.4	608.3
	0.0	0.0	0.8	2.3	3.4	3.9
	0.0	0.4	1.7	4.1	5.5	6.2
merchandise	205.9	221.8	234.0	265.0	297.3	383.9
	0.0	0.0	0.8	2.1	3.0	3.8
	0.0	0.4	1.7	3.8	4.9	6.0
Imports, total	435.5	460.1	477.5	500.4	527.4	574.1
	0.0	0.0	0.2	0.5	0.6	-0.3
	0.0	0.2	0.6	1.1	1.2	-0.1
merchandise	335.9	354.1	363.4	375.7	391.4	432.9
	0.0	0.0	0.2	0.6	0.8	1.3
	0.0	0.3	0.7	1.2	1.5	2.2
Federal government	216.2	212.5	201.4	189.4	177.3	181.6
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
State and local government	302.1	311.3	316.4	326.7	337.4	362.3
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

GNP COMPONENTS billions of current\$

	1989	1990	1991	1993	1995	2000
Gross National Product	5247.4	5520.6	5863.2	6543.5	7214.8	9164.5
	0.0	0.0	2.3	9.1	16.6	29.7
	0.0	0.2	4.1	14.6	24.8	42.4
Personal consumption expenditure	3498.5	3696.2	3928.3	4354.2	4781.1	5874.7
	0.0	0.0	0.2	2.2	6.4	14.3
	0.0	0.0	0.4	3.5	9.8	20.2
Residential construction	235.5	238.7	253.4	300.5	332.4	402.3
	0.0	0.0	-0.1	-0.3	-0.9	-0.1
	0.0	0.0	-0.2	-0.5	-1.2	-0.1
Non-residential construction	152.3	159.8	178.0	213.4	238.3	304.1
	0.0	0.0	0.2	0.6	0.6	1.0
	0.0	0.0	0.4	1.0	0.8	1.4
Producers' durable equipment	374.5	389.4	427.0	472.3	530.8	682.5
	0.0	0.0	0.4	0.8	0.7	1.5
	0.0	-0.0	0.9	1.4	1.1	2.3
Exports	633.8	674.8	736.0	867.6	1014.0	1457.0
	0.0	0.0	1.4	4.5	7.5	10.9
	0.0	0.6	2.9	7.9	12.0	16.8
Merchandise	322.8	357.1	391.7	474.0	561.1	807.3
	0.0	0.0	1.3	3.9	6.1	9.3
	0.0	0.7	2.7	6.9	9.8	14.7
Imports	671.3	731.0	797.0	912.9	1036.0	1333.8
	0.0	0.0	0.1	0.2	0.3	-3.0
	0.0	0.4	0.7	1.3	1.6	-2.9
Merchandise	482.3	525.1	565.8	638.9	712.8	902.9
	0.0	0.0	0.1	0.3	0.7	1.9
	0.0	0.4	0.8	1.5	2.2	4.3
Federal government	412.9	422.4	423.9	443.1	453.1	557.5
	0.0	0.0	-0.0	0.4	0.7	1.2
	0.0	-0.0	-0.0	0.7	1.0	1.8
State and local government	613.3	663.1	701.2	791.6	884.8	1109.7
	0.0	0.0	-0.1	0.4	1.1	2.4
	0.0	-0.0	-0.1	0.8	1.6	3.4
FINANCIAL SERIES						
Federal surplus or deficit, NIP	-166.1	-165.0	-148.4	-120.3	-86.2	58.4
	0.0	0.0	0.7	1.3	0.9	3.3
	0.0	0.1	1.3	1.8	1.3	4.7
Social insurance funds	53.6	59.0	67.4	83.2	103.9	187.8
	0.0	0.0	0.1	0.3	0.3	0.8
	0.0	0.0	0.2	0.4	0.4	1.0
Other funds	-219.7	-224.0	-215.8	-203.4	-190.1	-129.4
	0.0	0.0	0.6	1.0	0.5	2.6
	0.0	0.1	1.1	1.3	0.9	3.7

	1989	1990	1991	1993	1995	2000
GNP implicit price deflator	193.6	201.0	209.7	227.0	242.8	282.5
	0.0	0.0	0.0	0.2	0.4	0.5
	0.0	0.0	0.0	0.3	0.6	0.8
PCE deflator	193.4	199.5	208.8	226.0	242.1	282.3
	0.0	0.0	0.0	0.1	0.4	0.7
	0.0	0.0	0.0	0.2	0.7	1.0
Residential construction	202.0	210.6	220.5	241.5	260.8	302.8
	0.0	0.0	0.0	0.4	0.5	0.9
	0.0	0.0	0.0	0.6	0.8	1.3
Nonresidential construction	202.3	210.9	220.2	240.9	260.2	301.5
	0.0	0.0	0.0	0.3	0.6	0.8
	0.0	0.0	0.0	0.5	0.9	1.2
Producers' durable equipmen	157.4	160.6	165.9	177.5	186.1	204.2
	0.0	0.0	0.0	0.0	0.1	0.3
	0.0	0.0	0.0	0.0	0.2	0.5
Merchandise exports	156.8	161.0	167.4	178.9	188.7	210.3
	0.0	0.0	0.0	0.0	0.2	0.3
	0.0	0.0	0.0	0.0	0.2	0.5
Merchandise imports	143.6	148.3	155.7	170.1	182.1	208.6
	0.0	0.0	-0.1	-0.2	-0.2	-0.2
	0.0	0.0	-0.1	-0.2	-0.1	-0.1
Govt, federal defense	180.0	183.9	191.9	207.1	221.8	255.0
	0.0	0.0	0.0	0.0	0.3	0.5
	0.0	0.0	0.0	0.1	0.5	0.8
nondefense	202.5	211.6	218.9	234.3	247.9	284.4
	0.0	0.0	0.0	0.2	0.3	0.7
	0.0	0.0	0.0	0.4	0.5	0.9
Index of avg hourly compensati	204.3	214.2	225.1	246.5	268.4	322.1
	0.0	0.0	-0.0	0.1	0.3	0.6
	0.0	0.0	-0.0	0.2	0.5	0.9
Money supply, M2, billions	3129.7	3326.6	3504.1	3868.8	4199.4	5154.8
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
Commercial paper rate, 6 month	8.8	8.7	8.1	7.8	7.4	7.1
	0.0	0.0	-0.0	0.1	0.1	0.1
	0.0	-0.0	-0.0	0.1	0.1	0.1
Residential mortgage interest r	9.8	9.6	9.7	9.1	8.8	8.8
	0.0	0.0	0.0	0.0	0.1	0.0
	0.0	0.0	0.0	0.1	0.1	0.1
3 month Treasury bill rate	8.1	7.7	7.0	6.6	6.3	6.1
	0.0	0.0	0.0	0.1	0.1	0.1
	0.0	0.0	0.0	0.1	0.2	0.1
10 year Treasury bond rate	8.5	8.5	8.6	8.0	7.6	7.7
	0.0	0.0	0.0	0.0	0.1	0.0
	0.0	0.0	0.0	0.1	0.1	0.1
AAA corporate bond rate	9.2	9.5	9.6	9.0	8.6	8.4
	0.0	0.0	0.0	0.0	0.1	0.0
	0.0	-0.0	0.0	0.1	0.1	0.1

LIFT RESULTS

EMPLOYMENT
(in thousands)

	1989	1990	1991	1993	1995	2000
Employment in Lift sectors	102145.5	103759.2	105319.5	108040.6	110504.3	116917.1
	0.0	-0.0	18.1	33.1	29.3	43.7
	0.1	0.7	32.3	51.7	44.5	63.2
+ Domestic servants	1635.0	1670.0	1674.0	1682.0	1690.0	1710.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
= Jobs, priv. sector, total	103780.5	105429.2	106993.5	109722.6	112194.3	118627.1
	0.0	-0.0	18.1	33.1	29.3	43.7
	0.1	0.7	32.3	51.7	44.5	63.2
+ Fed. govt, defense civil.	960.0	950.0	904.0	812.0	720.0	720.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
+ Federal govt, non-defense	1176.7	1165.0	1165.0	1165.0	1165.0	1200.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
+ State & local govt, educ.	7765.0	7825.0	7860.0	7930.0	8000.0	8300.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
+ State & loc govt, non-educ.	6350.0	6400.0	6460.0	6580.0	6700.0	6900.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
+ Federal govt enterprises	1039.2	1049.2	1059.3	1079.5	1099.6	1150.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
+ State & local govt enterp.	887.5	897.7	907.9	928.4	948.8	1000.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
= Total civilian jobs	121958.9	123716.1	125349.7	128217.5	130827.7	137897.1
	0.0	-0.0	18.1	33.1	29.3	43.7
	0.1	0.7	32.3	51.7	44.5	63.2
- Multiple job holders	4700.0	5000.0	5000.0	5000.0	5000.0	5000.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
= Employed civilians	117258.9	118716.1	120349.7	123217.5	125827.7	132897.1
	0.0	-0.0	18.1	33.1	29.3	43.7
	0.1	0.7	32.3	51.7	44.5	63.2
Civilian labor force	123870.0	125140.0	126420.0	128970.0	131520.0	139080.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
Number of unemployed	6611.1	6423.9	6070.3	5752.5	5692.3	6182.9
	0.0	0.0	-18.1	-33.1	-29.3	-43.7
	-0.1	-0.7	-32.3	-51.7	-44.5	-63.2
Unemployment rate, percent	5.3	5.1	4.8	4.5	4.3	4.4
	0.0	0.0	-0.0	-0.0	-0.0	-0.0
	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0

Output
millions of 1977 dollars

	1989	1990	1991	1993	1995	2000
1 Agriculture	155360.0	157040.0	160010.0	168360.0	176220.0	190700.0
	0.0	0.0	20.0	30.0	10.0	0.0
	0.0	160.0	360.0	600.0	660.0	850.0
2 Iron mining	2388.6	2495.1	2535.1	2529.1	2493.2	2451.6
	0.0	0.0	1.4	2.5	2.1	1.5
	0.0	0.2	2.4	4.1	3.4	2.5
3 Non ferrous metals	3493.9	3577.3	3648.8	3735.7	3825.7	4111.5
	0.0	0.0	4.0	9.6	11.3	12.5
	0.0	0.0	5.3	11.7	13.1	14.3
4 Coal mining	23108.0	23669.0	24009.0	24846.0	25689.0	27857.0
	0.0	0.0	8.0	16.0	16.0	18.0
	0.0	0.0	13.0	24.0	22.0	25.0
5 Natural gas	14188.0	14541.0	14818.0	15455.0	16073.0	17640.0
	0.0	1.0	5.0	11.0	14.0	21.0
	0.0	2.0	12.0	19.0	24.0	34.0
6 Petroleum	30433.0	28011.0	27994.0	28168.0	28172.0	28122.0
	0.0	0.0	8.0	13.0	12.0	17.0
	0.0	0.0	14.0	18.0	17.0	24.0
7 Non metallic mining	8155.2	8230.8	8473.8	9045.7	9372.7	10188.0
	0.0	0.0	5.7	10.1	7.9	15.0
	0.0	0.6	8.3	12.6	9.6	18.0
8 Construction	138270.0	139160.0	143280.0	152460.0	157680.0	170940.0
	0.0	0.0	30.0	-10.0	-170.0	-80.0
	0.0	10.0	60.0	-40.0	-240.0	-120.0
9 Food and tobacco	264560.0	269630.0	271720.0	280390.0	288180.0	303510.0
	0.0	0.0	20.0	0.0	-20.0	-60.0
	0.0	10.0	50.0	50.0	60.0	30.0
10 Textiles	38574.0	39437.0	40629.0	43014.0	45062.0	50383.0
	0.0	0.0	25.0	55.0	59.0	85.0
	0.0	-56.0	4.0	14.0	5.0	15.0
11 Knitting	10493.0	10541.0	10779.0	10978.0	11130.0	11545.0
	0.0	0.0	1.0	-2.0	-6.0	-5.0
	0.0	-10.0	-4.0	-13.0	-18.0	-20.0
12 Apparel	45199.0	46435.0	47537.0	49465.0	50773.0	54334.0
	0.0	0.0	-21.0	-69.0	-119.0	-173.0
	0.0	-159.0	-104.0	-227.0	-305.0	-421.0
13 Paper	71041.0	72696.0	74549.0	77506.0	79903.0	86814.0
	0.0	1.0	29.0	48.0	42.0	49.0
	0.0	1.0	38.0	53.0	46.0	49.0
14 Printing	83988.0	85915.0	87151.0	90234.0	93297.0	101970.0
	0.0	0.0	14.0	18.0	7.0	10.0
	0.0	2.0	26.0	22.0	8.0	20.0
15 Fertilizers, pesticides	12917.0	13218.0	13466.0	14105.0	14576.0	15510.0
	0.0	0.0	2.0	5.0	4.0	2.0
	0.0	7.0	16.0	27.0	28.0	30.0
16 Chemicals	146590.0	150730.0	155330.0	165520.0	172990.0	193050.0
	0.0	0.0	130.0	290.0	330.0	430.0
	0.0	0.0	170.0	320.0	340.0	430.0

	1989	1990	1991	1993	1995	2000
17 Petroleum refining	100300.0	100820.0	101490.0	103690.0	105510.0	109860.0
	0.0	0.0	30.0	40.0	30.0	50.0
	0.0	0.0	40.0	60.0	50.0	70.0
18 Fuel Oil	19167.0	18728.0	18646.0	18648.0	18519.0	17629.0
	0.0	0.0	5.0	7.0	5.0	5.0
	0.0	0.0	9.0	11.0	9.0	8.0
19 Rubber	17146.0	17680.0	17985.0	18610.0	19373.0	21400.0
	0.0	0.0	17.0	42.0	63.0	96.0
	0.0	4.0	29.0	58.0	78.0	115.0
20 Plastic	50851.0	53150.0	55646.0	60733.0	65464.0	79456.0
	0.0	0.0	111.0	292.0	381.0	551.0
	0.0	8.0	144.0	334.0	416.0	601.0
21 Shoes	4512.3	4441.2	4615.9	4246.0	4106.3	3988.9
	0.0	0.0	3.5	5.9	3.9	-4.1
	0.0	-1.3	3.3	3.0	-2.3	-15.3
22 Lumber	50257.0	51047.0	53070.0	57141.0	59663.0	66669.0
	0.0	1.0	11.0	2.0	-52.0	-30.0
	0.0	0.0	8.0	-32.0	-105.0	-76.0
23 Furniture	23161.0	23667.0	24858.0	25583.0	26654.0	29620.0
	0.0	0.0	5.0	-2.0	-12.0	-4.0
	0.0	-1.0	11.0	-9.0	-19.0	-10.0
24 Stone, clay, glass	34823.0	35347.0	36840.0	39754.0	41704.0	46721.0
	0.0	0.0	37.0	72.0	59.0	140.0
	0.0	6.0	55.0	83.0	60.0	159.0
25 Ferrous metals	45574.0	44765.0	45776.0	45866.0	45631.0	46825.0
	0.0	0.0	65.0	121.0	104.0	116.0
	0.0	16.0	118.0	197.0	169.0	187.0
26 Copper	7521.3	7291.0	7397.8	7519.6	7678.2	8270.1
	0.0	0.0	20.8	49.7	57.8	66.9
	0.0	1.1	27.9	60.3	68.0	77.5
27 Other nonferrous metals	33945.0	34223.0	35951.0	38481.0	40878.0	48483.0
	0.0	0.0	56.0	125.0	133.0	146.0
	0.0	4.0	78.0	157.0	159.0	173.0
28 Metal products	105190.0	107820.0	112820.0	120180.0	126540.0	144420.0
	0.0	0.0	130.0	280.0	300.0	410.0
	0.0	20.0	220.0	390.0	400.0	540.0
29 Engines and turbines	9616.3	9277.8	9686.9	10964.0	12513.0	16854.0
	0.0	0.0	18.6	47.0	58.0	62.0
	0.0	3.3	29.5	67.0	80.0	85.0
30 Agricultural machinery	7643.9	8041.1	9295.1	10473.0	11168.0	11807.0
	0.0	0.1	8.3	19.0	19.0	21.0
	0.0	22.5	62.7	102.0	76.0	80.0
31 Const, mining, oilfield equi	12286.0	12836.0	13642.0	15132.0	17090.0	21672.0
	0.0	0.0	32.0	72.0	85.0	80.0
	0.0	-5.0	36.0	76.0	89.0	81.0
32 Metalworking machinery	14972.0	15044.0	16117.0	16697.0	18137.0	22195.0
	0.0	0.0	59.0	131.0	128.0	138.0
	0.0	7.0	101.0	183.0	155.0	171.0

	1989	1990	1991	1993	1995	2000
33 Special ind machinery	9704.8	9465.1	10040.0	10214.0	10880.0	12197.0
	0.0	0.0	27.0	65.0	71.0	81.0
	0.0	-8.0	30.0	69.0	71.0	83.0
34 Non-electr machinery	37337.0	38809.0	41356.0	44246.0	48189.0	58944.0
	0.0	0.0	125.0	283.0	325.0	402.0
	0.0	1.0	164.0	335.0	369.0	455.0
35 Computers	60717.0	62492.0	66175.0	73139.0	83238.0	110190.0
	0.0	0.0	118.0	289.0	337.0	440.0
	0.0	93.0	344.0	670.0	742.0	960.0
36 Office equipment	4074.6	3528.8	3740.4	3882.7	4349.6	4441.6
	0.0	-0.1	2.0	0.6	-6.6	-12.8
	0.0	-0.7	3.8	1.2	-8.2	-15.8
37 Service industry machinery	16327.0	16332.0	17122.0	17756.0	18671.0	20955.0
	0.0	0.0	17.0	32.0	28.0	41.0
	0.0	3.0	29.0	42.0	35.0	53.0
38 Communic equipment	87032.0	86332.0	90869.0	98565.0	110580.0	151220.0
	0.0	0.0	186.0	476.0	580.0	630.0
	0.0	8.0	249.0	554.0	630.0	660.0
39 Electrical appliances	21921.0	22022.0	23178.0	23875.0	26158.0	32572.0
	0.0	-1.0	85.0	205.0	264.0	370.0
	0.0	-1.0	100.0	226.0	289.0	394.0
40 Household appliances	11976.0	11737.0	12187.0	13026.0	13831.0	16040.0
	0.0	0.0	1.0	1.0	-3.0	-10.0
	0.0	0.0	2.0	1.0	-6.0	-15.0
41 Electric lighting and wiri	21689.0	21864.0	22940.0	23942.0	26012.0	31446.0
	0.0	0.0	23.0	51.0	59.0	62.0
	0.0	5.0	38.0	70.0	79.0	84.0
42 TVs radios phonographs	9308.2	9789.4	8899.3	8970.8	9526.3	10392.0
	0.0	-0.1	0.5	-25.8	-61.8	-102.0
	0.0	0.3	1.4	-27.1	-68.7	-116.0
43 Motor vehicles	119730.0	123420.0	125510.0	128320.0	134790.0	154880.0
	0.0	0.0	20.0	20.0	-50.0	-160.0
	0.0	220.0	500.0	860.0	840.0	930.0
44 Aerospace	54955.0	56007.0	55551.0	54761.0	53355.0	63949.0
	0.0	0.0	27.0	45.0	21.0	-2.0
	0.0	-2.0	35.0	49.0	12.0	-20.0
45 Ships boats	8656.4	9032.3	9019.4	8707.1	8465.1	9521.6
	0.0	-0.4	2.5	-2.3	-11.1	-8.0
	0.0	0.9	6.3	-2.1	-15.4	-10.8
46 Other transportation equip	5942.7	6264.6	6014.7	6028.9	6326.3	7474.5
	0.0	-0.2	6.5	6.6	-1.0	-0.2
	0.0	-0.5	9.3	5.6	-5.2	-4.2
47 Instruments	40654.0	41636.0	43558.0	45488.0	49114.0	59017.0
	0.0	0.0	42.0	90.0	96.0	122.0
	0.0	-3.0	53.0	93.0	96.0	119.0
48 Misc manufacturing	19658.0	19653.0	20268.0	21061.0	21772.0	23839.0
	0.0	0.0	12.0	17.0	13.0	21.0
	0.0	-2.0	11.0	9.0	3.0	6.0

	1989	1990	1991	1993	1995	2000
49 Railroads	27849.0	28556.0	29157.0	30335.0	31470.0	34472.0
	0.0	0.0	10.0	15.0	9.0	7.0
	0.0	2.0	18.0	23.0	14.0	12.0
50 Trucking	73024.0	75087.0	76900.0	80778.0	84697.0	95067.0
	0.0	0.0	20.0	30.0	16.0	26.0
	0.0	4.0	38.0	46.0	28.0	44.0
51 Water transport	21115.0	22182.0	22733.0	24211.0	25779.0	30133.0
	0.0	0.0	6.0	12.0	11.0	9.0
	0.0	3.0	14.0	23.0	20.0	19.0
52 Air transport	53849.0	55817.0	57831.0	62064.0	66466.0	79911.0
	0.0	1.0	9.0	13.0	10.0	12.0
	0.0	0.0	12.0	12.0	6.0	7.0
53 Pipeline	3907.3	4003.5	4095.4	4311.7	4527.4	5095.7
	0.0	0.0	0.7	1.3	1.2	1.9
	0.0	0.2	1.5	2.1	1.9	3.0
54 Transportation services	5774.3	6030.3	6293.5	6843.4	7420.1	9012.5
	0.0	0.1	1.0	1.5	0.9	1.7
	0.0	0.2	1.8	2.0	1.2	2.1
55 Communication services	139320.0	143410.0	147900.0	157830.0	168110.0	196260.0
	0.0	0.0	20.0	40.0	20.0	50.0
	0.0	0.0	40.0	50.0	30.0	60.0
56 Electric utilities	83967.0	86361.0	88293.0	92029.0	95461.0	104860.0
	0.0	0.0	21.0	40.0	27.0	40.0
	0.0	4.0	37.0	57.0	35.0	60.0
57 Gas utilities	37363.0	38458.0	39591.0	41320.0	43138.0	47772.0
	0.0	0.0	18.0	33.0	37.0	62.0
	0.0	6.0	38.0	54.0	61.0	96.0
58 Water and sanitation	15206.0	15616.0	15874.0	16571.0	17103.0	18498.0
	0.0	0.0	3.0	5.0	-3.0	2.0
	0.0	0.0	6.0	8.0	-6.0	2.0
59 Wholesale trade	301090.0	310860.0	321250.0	339730.0	359430.0	411130.0
	0.0	0.0	120.0	210.0	160.0	220.0
	0.0	30.0	270.0	380.0	300.0	410.0
60 Retail trade	276020.0	282890.0	287870.0	295640.0	303920.0	323190.0
	0.0	0.0	10.0	-30.0	-50.0	-10.0
	0.0	0.0	10.0	-90.0	-90.0	-50.0
61 Eating and drinking	107760.0	110720.0	112970.0	116690.0	120220.0	128720.0
	0.0	0.0	0.0	-20.0	-50.0	-40.0
	0.0	0.0	10.0	-30.0	-50.0	-40.0
62 Finance and insurance	213920.0	220020.0	224100.0	232520.0	241140.0	265890.0
	0.0	0.0	-10.0	-20.0	-40.0	-50.0
	0.0	10.0	-10.0	-20.0	-60.0	-80.0
63 Real estate	191270.0	194820.0	198770.0	208570.0	216670.0	237890.0
	0.0	0.0	20.0	-10.0	-80.0	-40.0
	0.0	10.0	40.0	-10.0	-80.0	-30.0
64 Owner occupied housing	169850.0	173300.0	178100.0	182370.0	185910.0	190580.0
	0.0	0.0	-20.0	-160.0	-260.0	-240.0
	0.0	0.0	-20.0	-230.0	-330.0	-310.0

	1989	1990	1991	1993	1995	2000
65 Hotels	61214.0	62817.0	64026.0	66086.0	68197.0	73472.0
	0.0	0.0	1.0	-14.0	-27.0	-17.0
	0.0	2.0	3.0	-27.0	-39.0	-29.0
66 Business services	327810.0	337830.0	347520.0	369170.0	390970.0	452480.0
	0.0	0.0	80.0	140.0	90.0	170.0
	0.0	20.0	150.0	200.0	130.0	230.0
67 Auto repairs	72510.0	74552.0	76384.0	79258.0	82645.0	91482.0
	0.0	0.0	13.0	16.0	10.0	25.0
	0.0	5.0	33.0	34.0	27.0	51.0
68 Movies and amusements	51511.0	53623.0	55137.0	58154.0	60872.0	66607.0
	1.0	0.0	-5.0	-4.0	-27.0	-15.0
	1.0	2.0	-6.0	-15.0	-42.0	-30.0
69 Medicine education npo	275530.0	282110.0	288070.0	296990.0	305940.0	327420.0
	0.0	0.0	0.0	-40.0	-80.0	-20.0
	0.0	0.0	10.0	-90.0	-120.0	-60.0
70 Govt enterprises	34092.0	36279.0	36699.0	37383.0	38015.0	39390.0
	0.0	0.0	9.0	10.0	1.0	13.0
	0.0	1.0	17.0	12.0	0.0	17.0
75 Rest of world	16276.0	4140.8	-2643.0	-15383.0	-26264.0	-26541.0
	0.0	0.0	43.3	238.0	565.0	1764.0
	0.0	7.2	80.2	384.0	856.0	2567.0
76 Government industry	257660.0	258550.0	258730.0	259100.0	259480.0	266560.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

Exports
 millions of 1977 dollars

	1989	1990	1991	1993	1995	2000
1 Agriculture	18793.0	19506.0	20043.0	21541.0	23118.0	27083.0
	0.0	0.0	10.0	27.0	32.0	36.0
	0.0	125.0	261.0	451.0	516.0	667.0
2 Iron mining	283.6	281.4	283.2	287.4	289.2	290.7
	0.0	0.0	0.0	-0.1	-0.0	-0.1
	0.0	0.0	-0.1	-0.1	-0.0	-0.2
3 Non-ferrous mining	610.0	622.5	628.8	642.8	654.5	680.6
	0.0	0.0	0.4	0.8	1.1	1.1
	0.0	0.0	0.3	0.9	1.2	1.0
4 Coal mining	3499.6	3583.5	3613.9	3715.4	3845.7	4231.6
	0.0	0.0	0.0	0.1	0.0	-0.9
	0.0	0.0	-0.1	-0.1	-0.1	-1.5
6 Petroleum	61.5	68.7	68.7	68.7	68.7	68.7
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
7 Non-metallic mining	449.1	464.9	479.0	516.3	552.2	656.2
	0.0	0.0	0.8	1.9	2.9	3.8
	0.0	-0.3	0.1	1.7	3.5	4.0
8 Construction	44.7	45.1	46.1	50.0	54.0	64.3
	0.0	0.0	0.0	0.0	-0.0	-0.0
	0.0	0.0	0.0	-0.0	-0.0	-0.0
9 Food and tobacco	12796.0	13660.0	13954.0	15965.0	17480.0	20578.0
	0.0	0.0	23.0	60.0	71.0	68.0
	0.0	2.0	27.0	66.0	77.0	74.0
10 Textiles	3226.5	3307.7	3429.0	3769.7	4048.6	4732.0
	0.0	0.0	19.3	53.5	75.2	106.9
	0.0	2.3	23.4	61.5	83.0	117.9
11 Knitting	141.1	151.3	153.8	166.4	173.4	195.2
	0.0	0.0	0.6	1.7	2.2	2.8
	0.0	0.2	0.9	2.3	3.0	3.7
12 Apparel	2583.0	2995.9	3232.5	3876.1	4119.7	5075.6
	0.0	0.0	-0.1	-1.1	-3.6	-12.5
	0.0	53.7	107.1	187.1	206.6	252.6
13 Paper	4489.8	4782.0	5108.9	5733.0	6094.7	7158.8
	0.0	0.7	4.4	10.2	11.5	10.1
	0.0	0.0	2.7	9.5	12.3	8.3
14 Printing	1136.6	1202.7	1250.4	1410.6	1539.9	1890.0
	0.0	0.0	1.1	3.1	3.0	3.1
	0.0	0.0	1.2	3.2	3.2	3.5
15 Fertilizers, pesticides	1740.6	1875.3	1925.3	2109.8	2217.5	2468.4
	0.0	0.0	0.7	2.3	2.8	2.2
	0.0	-0.7	-1.4	-1.9	-2.3	-5.3
16 Chemicals	15465.0	17093.0	17772.0	21248.0	23272.0	28391.0
	0.0	0.0	54.0	141.0	189.0	224.0
	0.0	1.0	56.0	147.0	194.0	222.0

	1989	1990	1991	1993	1995	2000
17 Petroleum refining	4270.9	4363.6	4469.7	4739.8	4976.1	5634.1
	0.0	0.0	1.0	1.8	3.7	4.1
	0.0	-1.2	-1.8	0.5	5.1	4.0
18 Fuel Oil	58.7	58.6	58.5	58.3	58.0	57.5
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
19 Rubber	1139.2	1274.2	1279.8	1446.5	1616.4	2096.3
	0.0	0.0	12.3	35.7	58.4	90.5
	0.0	-0.4	11.5	34.4	57.3	89.5
20 Plastic	2536.4	3165.8	3299.1	4495.5	4986.6	6958.8
	0.0	0.0	72.2	212.7	305.7	450.4
	0.0	0.9	74.1	216.3	308.5	457.8
21 Shoes	585.7	581.9	577.3	582.0	597.1	624.4
	0.0	0.0	3.6	8.9	11.8	14.7
	0.0	0.1	3.8	9.6	12.3	15.3
22 Lumber	2687.9	3166.3	3773.5	4623.4	5433.2	7753.0
	0.0	0.0	7.4	28.8	42.6	39.8
	0.0	-0.7	5.0	26.6	41.6	32.0
23 Furniture	691.3	785.7	921.2	1253.8	1475.7	2229.8
	0.0	0.0	2.7	11.7	19.2	22.3
	0.0	-0.1	2.5	11.7	19.6	21.9
24 Stone, clay, glass	1995.2	2198.2	2291.4	2693.7	2970.8	3546.6
	0.0	0.0	20.3	66.3	99.1	151.3
	0.0	-0.2	20.1	68.6	105.2	159.9
25 Ferrous metals	973.3	978.2	990.0	740.5	367.4	300.8
	0.0	0.0	5.3	14.6	19.1	23.2
	0.0	-2.1	1.4	13.3	23.1	25.2
26 Copper	549.1	544.3	534.2	525.0	504.2	453.2
	0.0	0.0	3.9	10.0	13.2	17.0
	0.0	-0.3	3.5	9.8	13.6	17.3
27 Other nonferrous metals	6978.2	7166.0	7451.4	7951.4	8376.0	9608.7
	0.0	0.0	18.1	46.4	60.9	75.0
	0.0	-1.4	15.8	45.5	62.3	74.7
28 Metal products	6228.6	7221.8	8467.8	10521.0	12006.0	16095.0
	0.0	0.0	63.6	176.0	251.0	336.0
	0.0	-2.6	59.8	178.0	260.0	338.0
29 Engines and turbines	2473.6	2643.4	2773.7	3468.5	4261.6	6529.0
	0.0	0.0	11.7	32.3	46.1	52.2
	0.0	-0.5	11.0	33.3	49.4	53.6
30 Agricultural machinery	947.5	1083.5	1143.9	1201.1	1363.7	1700.2
	0.0	0.0	4.9	13.0	18.5	22.5
	0.0	-0.2	4.5	13.4	19.8	23.1
31 Const, mining, oilfield eq	2631.4	3152.9	3115.6	3587.3	5154.1	8524.9
	0.0	0.0	19.3	53.9	78.7	65.8
	0.0	-0.8	18.1	55.8	85.8	66.0
32 Metalworking machinery	1534.0	1609.3	1685.4	1876.1	2121.9	2823.5
	0.0	0.0	16.6	44.3	62.2	77.7
	0.0	-0.6	16.0	45.1	65.4	80.1

	1989	1990	1991	1993	1995	2000
33 Spec ind machinery	1571.9	1638.0	1728.1	1881.5	2052.5	2156.6
	0.0	0.0	12.2	32.7	46.8	59.5
	0.0	-0.5	11.4	32.7	48.7	60.7
34 Non-electr machinery	6149.1	6683.2	7076.9	8214.2	9593.3	12992.0
	0.0	-0.1	62.2	166.3	235.6	300.0
	0.0	-2.5	58.4	166.2	245.7	307.0
35 Computers	21398.0	22455.0	23562.0	26379.0	30340.0	40195.0
	0.0	-1.0	66.0	177.0	251.0	328.0
	0.0	77.0	221.0	460.0	577.0	733.0
36 Office equipment	613.3	690.0	739.5	828.3	924.7	1209.1
	0.0	0.0	0.0	-0.1	-0.3	-1.5
	0.0	0.0	0.0	-0.1	-0.5	-2.1
37 Service industry machinery	1449.4	1534.0	1590.2	1767.1	1975.1	2517.4
	0.0	0.0	10.0	26.5	36.8	46.1
	0.0	-0.3	9.5	26.4	38.0	46.6
38 Communic equipment	21052.0	22981.0	25438.0	29745.0	35363.0	51192.0
	0.0	0.0	101.0	287.0	400.0	477.0
	0.0	1.0	104.0	292.0	400.0	460.0
39 Electrical appliances	3518.8	3878.0	4199.1	4657.0	5577.7	8238.1
	0.0	0.0	52.9	144.6	211.9	306.4
	0.0	-1.8	49.9	146.9	224.7	315.3
40 Household appliances	1406.6	1420.7	1511.7	1717.5	1933.7	2631.1
	0.0	0.0	1.2	3.1	3.3	0.3
	0.0	0.0	1.3	3.0	2.3	-2.1
41 Elec lighting and wiring	3971.9	4097.5	4371.7	4863.8	5699.2	7904.9
	0.0	0.0	16.9	47.9	69.7	86.9
	0.0	-0.2	16.8	48.8	71.8	87.5
42 TVs radios phonographs	2656.2	2732.1	2824.3	3162.2	3502.9	4459.1
	0.0	0.0	12.0	34.6	49.6	64.0
	0.0	0.0	12.3	35.1	49.9	64.4
43 Motor vehicles	13461.0	14940.0	15782.0	17690.0	20045.0	25746.0
	0.0	0.0	9.0	22.0	26.0	10.0
	0.0	190.0	390.0	713.0	791.0	956.0
44 Aerospace	16220.0	17558.0	18306.0	20130.0	21885.0	27390.0
	0.0	-1.0	15.0	28.0	20.0	4.0
	0.0	-2.0	14.0	28.0	18.0	-7.0
45 Ships boats	393.6	413.3	419.5	398.8	428.1	472.7
	0.0	0.0	0.0	0.0	-0.1	-0.8
	0.0	0.0	0.0	0.0	-0.1	-1.1
46 Other transportation equip	932.8	941.7	980.4	1053.9	1146.1	1389.5
	0.0	0.0	2.0	4.4	5.1	6.0
	0.0	-0.2	1.7	4.7	5.9	6.7
47 Instruments	6793.9	7350.5	7668.8	8444.2	9692.9	12880.0
	0.0	0.1	25.8	68.9	96.4	129.0
	0.0	0.2	25.9	70.8	99.7	130.0
48 Misc manufacturing	2690.5	2897.8	2943.0	3175.5	3387.2	4039.9
	0.0	0.1	13.9	37.1	51.2	70.1
	0.0	0.1	13.9	37.9	52.3	70.8

	1989	1990	1991	1993	1995	2000
49 Railroads	3831.1	4296.9	4610.0	5291.4	5962.8	7742.6
	0.0	0.0	0.0	-0.2	-1.6	-9.0
	0.0	0.0	0.1	-0.3	-2.7	-12.7
50 Trucking	2612.9	2896.9	3115.7	3652.7	4203.8	5643.4
	0.0	0.0	0.0	-0.1	-1.2	-6.6
	0.0	0.1	0.1	-0.2	-2.0	-9.3
51 Water transport	5475.4	5962.3	6276.9	7014.7	7779.8	9842.4
	0.0	0.0	0.1	-0.1	-1.8	-9.8
	0.0	0.0	0.1	-0.3	-3.0	-13.8
52 Air transport	7562.3	8015.9	8465.1	9558.2	10518.0	13286.0
	0.0	0.0	0.0	-0.1	-1.0	-6.0
	0.0	0.0	0.0	-0.2	-1.0	-8.0
53 Pipeline	95.3	97.4	99.6	103.5	107.0	114.4
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
54 Transportation services	614.8	584.0	587.2	611.9	640.1	709.6
	0.0	0.0	0.0	0.0	0.0	0.1
	0.0	0.0	0.0	0.0	0.0	0.1
55 Communication services	2660.2	2656.0	2716.5	3002.3	3311.1	4163.8
	0.0	0.0	0.0	0.0	-0.6	-3.3
	0.0	0.0	0.0	-0.1	-1.0	-4.6
56 Electric utilities	117.7	113.5	112.0	113.6	117.9	132.6
	0.0	0.0	0.0	0.0	0.0	-0.0
	0.0	0.0	0.0	0.0	-0.0	-0.0
57 Gas utilities	253.2	315.3	362.1	452.2	531.2	711.8
	0.0	0.0	0.0	-0.0	-0.1	-0.8
	0.0	0.0	0.0	-0.0	-0.2	-1.1
58 Water and sanitation	13.1	13.8	14.3	15.7	17.1	20.9
	0.0	0.0	0.0	-0.0	-0.0	-0.0
	0.0	0.0	0.0	-0.0	-0.0	-0.0
59 Wholesale trade	19844.0	21992.0	23633.0	27684.0	31845.0	42748.0
	0.0	0.0	0.0	-1.0	-9.0	-52.0
	0.0	1.0	0.0	-1.0	-16.0	-73.0
61 Eating and drinking	153.8	150.5	152.7	162.8	173.9	202.7
	0.0	0.0	0.0	0.0	-0.0	-0.1
	0.0	0.0	0.0	0.0	-0.0	-0.1
62 Finance and insurance	9095.8	9824.7	10378.0	11671.0	12988.0	16472.0
	0.0	0.0	0.0	0.0	-3.0	-15.0
	0.0	0.0	0.0	0.0	-4.0	-21.0
63 Real estate	6892.2	7023.2	7237.5	7943.4	8725.5	10824.0
	0.0	0.0	0.0	-0.1	-1.5	-8.0
	0.0	0.0	0.1	-0.2	-2.4	-12.0
65 Hotels	52.7	52.8	53.7	58.4	63.3	76.1
	0.0	0.0	0.0	0.0	-0.0	-0.0
	0.0	0.0	0.0	-0.0	-0.0	-0.1
66 Business services	6426.8	6471.8	6619.9	7157.5	7766.7	9398.3
	0.0	0.0	0.0	-0.1	-1.0	-5.5
	0.0	0.0	0.1	-0.2	-1.7	-7.8

	1989	1990	1991	1993	1995	2000
67 Auto repairs	5.2	5.4	5.5	5.9	6.3	7.4
	0.0	0.0	0.0	0.0	0.0	-0.0
	0.0	0.0	0.0	0.0	-0.0	-0.0
68 Movies and amusements	995.9	969.4	978.0	1045.3	1128.3	1352.1
	0.0	0.0	0.0	0.0	-0.1	-0.6
	0.0	0.0	0.0	0.0	-0.2	-0.9
69 Medicine education npo	200.0	205.6	217.8	249.5	287.6	383.4
	0.0	0.0	0.0	-0.0	-0.0	-0.0
	0.0	0.0	0.0	-0.0	-0.0	-0.1
70 Govt enterprises	351.8	356.1	365.9	395.9	428.2	512.8
	0.0	0.0	0.0	0.0	-0.1	-0.3
	0.0	0.0	0.0	-0.0	-0.1	-0.4
75 Rest of world	92716.0	87949.0	89754.0	87990.0	89319.0	92367.0
	0.0	1.0	33.0	202.0	464.0	262.0
	0.0	-3.0	58.0	336.0	676.0	350.0
76 Government industry	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

Imports
millions of 1977 dollars

	1989	1990	1991	1993	1995	2000
1 Agriculture	8000.0	8274.0	8494.3	9062.7	9662.8	10823.0
	0.0	0.1	1.8	4.2	5.4	8.0
	0.0	4.3	10.2	17.3	21.1	28.0
2 Iron mining	570.0	416.8	427.1	413.7	404.5	418.0
	0.0	0.0	2.0	3.8	3.6	4.3
	0.0	0.5	3.6	6.1	5.7	6.8
3 Non-ferrous mining	560.0	505.4	522.4	547.9	575.3	666.2
	0.0	0.0	1.3	3.1	3.6	4.0
	0.0	0.1	1.8	3.8	4.2	4.6
4 Coal mining	101.7	98.8	96.7	99.1	105.4	122.3
	0.0	0.0	0.0	0.1	0.2	0.3
	0.0	0.0	0.1	0.2	0.2	0.5
6 Petroleum	23229.0	25680.0	26076.0	27093.0	28017.0	30298.0
	0.0	0.0	5.0	7.0	7.0	9.0
	0.0	1.0	8.0	10.0	10.0	13.0
7 Non-metallic mining	634.6	636.9	613.9	544.1	545.0	587.2
	0.0	0.0	0.1	0.8	1.5	2.0
	0.0	-0.0	0.1	0.9	1.7	2.4
9 Food and tobacco	13852.0	13663.0	13734.0	14058.0	14549.0	16288.0
	0.0	0.0	1.0	1.0	7.0	12.0
	0.0	1.0	3.0	5.0	13.0	21.0
10 Textiles	2880.0	3081.8	3307.0	3582.4	3779.8	4400.3
	0.0	0.0	2.4	5.5	6.6	12.4
	0.0	-2.3	-1.9	-2.1	-1.5	3.9
11 Knitting	150.0	139.3	137.6	139.4	140.7	157.8
	0.0	0.0	0.0	0.0	0.0	0.1
	0.0	-0.0	-0.0	-0.0	0.0	0.1
12 Apparel	17150.0	18487.0	19313.0	20250.0	21259.0	24126.0
	0.0	0.0	23.0	50.0	83.0	126.0
	0.0	202.0	230.0	393.0	463.0	614.0
13 Paper	6350.0	6307.8	6370.2	6714.0	7111.0	7937.1
	0.0	0.1	2.8	5.9	8.9	16.5
	0.0	0.5	4.1	7.5	12.3	22.3
14 Printing	961.0	938.3	959.0	973.8	1036.0	1199.8
	0.0	0.0	0.3	0.8	1.8	4.0
	0.0	0.1	0.5	1.1	2.8	5.7
15 Fertilizers, pesticides	594.5	585.2	584.5	639.5	721.9	888.2
	0.0	0.0	0.2	0.4	0.8	1.8
	0.0	0.7	1.7	3.0	4.1	6.8
16 Chemicals	16250.0	16335.0	16354.0	17347.0	18462.0	21704.0
	0.0	1.0	21.0	56.0	78.0	115.0
	0.0	3.0	28.0	64.0	91.0	136.0
17 Petroleum refining	6816.1	7167.7	7283.5	7460.7	7619.3	8048.4
	0.0	0.0	1.7	3.1	3.5	6.5
	0.0	0.7	3.3	4.8	5.4	9.5
18 Fuel Oil	6748.6	7386.6	7500.0	7531.0	7539.0	7412.1
	0.0	0.0	2.0	3.6	5.0	8.3
	0.0	0.8	4.1	6.0	8.5	13.1

	1989	1990	1991	1993	1995	2000
19 Rubber	3025.0	3034.7	3208.1	3411.5	3695.0	4403.8
	0.0	0.1	3.4	5.4	4.9	7.3
	0.0	3.2	10.7	15.8	15.4	20.6
20 Plastic	3350.0	3333.3	3511.7	3661.1	3834.2	4236.0
	0.0	0.0	2.5	5.7	6.8	12.0
	0.0	0.6	4.6	9.3	11.5	19.3
21 Shoes	7350.0	7772.4	7980.9	8854.8	9479.0	10872.0
	0.0	0.0	-0.1	-1.6	0.1	13.0
	0.0	-0.1	-0.3	-3.5	0.3	18.0
22 Lumber	3842.4	3639.3	3828.6	4355.5	4795.5	5635.1
	0.0	0.0	1.3	-0.7	-3.5	10.4
	0.0	0.2	1.5	-3.7	-6.3	12.4
23 Furniture	3018.2	3067.4	3250.8	3448.2	3736.1	4385.4
	0.0	0.0	0.7	-1.5	-3.0	1.6
	0.0	-0.3	2.3	-1.8	-2.3	3.9
24 Stone, clay, glass	3499.7	3508.9	3490.4	3646.6	3742.7	3930.0
	0.0	0.0	6.2	20.5	29.1	37.7
	0.0	0.5	7.7	21.7	31.6	42.9
25 Ferrous metals	8109.0	8134.7	8073.7	7813.7	7806.1	7924.9
	0.0	0.0	3.1	8.4	15.8	24.9
	0.0	0.3	4.4	8.7	19.4	30.6
26 Copper	966.0	1003.7	1042.6	1124.4	1211.8	1457.2
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
27 Other nonferrous metals	5944.6	6531.6	6586.5	6952.6	7417.9	8673.7
	0.0	0.0	11.3	27.8	36.4	57.3
	0.0	2.0	17.8	36.0	45.0	71.0
28 Metal products	6230.0	5908.3	5779.6	5926.7	6227.9	6993.6
	0.0	0.0	5.7	7.9	8.1	25.3
	0.0	2.9	12.6	16.7	18.6	43.5
29 Engines and turbines	4100.0	4836.0	4797.7	4731.9	4593.0	4273.8
	0.0	0.0	3.6	5.5	4.8	8.9
	0.0	2.3	9.2	11.8	9.2	14.1
30 Agricultural machinery	1730.0	1721.3	1873.2	2080.4	2082.1	1983.6
	0.0	0.0	0.7	0.7	-0.4	1.9
	0.0	4.5	11.0	14.5	7.1	9.1
31 Const, mining, oilfield eq	2460.0	2204.4	2111.0	2075.1	2001.5	1971.5
	0.0	0.0	0.1	-0.3	-0.5	1.1
	0.0	0.0	0.1	-0.6	-0.9	1.2
32 Metalworking machinery	3680.0	3828.9	3859.4	3697.3	3621.9	3489.7
	0.0	0.0	6.4	11.5	8.5	9.4
	0.0	1.2	12.1	17.2	10.3	11.5
33 Spec ind machinery	3800.0	4033.3	4062.0	3934.2	3855.5	3728.6
	0.0	0.1	5.2	9.6	5.1	6.6
	0.0	-2.5	6.5	10.6	3.8	6.7
34 Non-electr machinery	5190.0	4973.5	4830.9	4674.6	4522.3	4237.4
	0.0	0.0	8.1	14.2	14.1	19.5
	0.0	0.5	12.4	17.9	15.3	21.8

	1989	1990	1991	1993	1995	2000
35 Computers	11480.0	12593.0	13086.0	13890.0	15080.0	18394.0
	0.0	0.0	10.0	21.0	16.0	22.0
	0.0	4.0	24.0	41.0	31.0	43.0
36 Office equipment	8950.0	9582.6	9797.0	9880.8	9886.7	11155.0
	0.0	-0.1	4.0	7.4	4.9	14.0
	0.0	-0.9	6.9	8.4	4.3	16.0
37 Service industry machinery	1431.0	1458.3	1512.3	1498.0	1517.7	1539.1
	0.0	0.0	0.9	0.6	-0.3	1.7
	0.0	0.3	2.2	1.5	0.6	3.2
38 Communic equipment	30850.0	33567.0	33981.0	34571.0	35672.0	41112.0
	0.0	0.0	24.0	53.0	64.0	116.0
	0.0	2.0	42.0	79.0	95.0	172.0
39 Electrical appliances	5490.2	5732.4	6056.3	6640.1	7108.5	8558.7
	0.0	-0.1	16.8	32.8	24.2	40.1
	0.0	0.9	26.2	44.3	32.2	55.9
40 Household appliances	3040.0	3607.2	3815.5	3946.4	4100.7	4638.8
	0.0	0.0	-0.5	-1.4	-1.2	3.3
	0.0	-0.2	0.2	-0.9	0.4	6.9
41 Elec lighting and wiring	4610.0	4936.7	4869.6	5393.0	5508.3	6019.0
	0.0	0.0	1.9	6.1	16.2	34.5
	0.0	1.5	5.7	11.2	22.4	45.1
42 TVs radios phonographs	18130.0	18963.0	20181.0	20683.0	21260.0	23702.0
	0.0	0.0	27.0	108.0	183.0	251.0
	0.0	4.0	32.0	121.0	208.0	285.0
43 Motor vehicles	48100.0	51687.0	54298.0	56066.0	60039.0	64137.0
	0.0	-1.0	27.0	49.0	72.0	128.0
	0.0	22.0	89.0	133.0	175.0	263.0
44 Aerospace	5400.1	5181.0	5223.3	4981.4	4772.0	4776.2
	0.0	0.0	-0.1	0.8	4.3	9.5
	0.0	-0.2	-0.3	1.4	6.7	13.8
45 Ships boats	577.0	572.0	555.6	542.6	553.8	750.9
	0.0	-0.0	0.1	-0.1	-0.5	0.3
	0.0	0.0	0.3	-0.2	-0.6	0.5
46 Other transportation equip	1613.0	2002.0	1865.6	1828.8	1793.8	1796.6
	0.0	0.0	1.2	0.6	-0.7	1.4
	0.0	-0.1	2.0	0.3	-1.4	1.6
47 Instruments	10510.0	11369.0	12008.0	12493.0	12975.0	14718.0
	0.0	0.0	8.0	16.0	19.0	37.0
	0.0	-1.0	12.0	18.0	22.0	45.0
48 Misc manufacturing	14575.0	15654.0	16063.0	16441.0	16996.0	18310.0
	0.0	0.0	6.0	17.0	36.0	57.0
	0.0	0.0	6.0	12.0	37.0	63.0
49 Railroads	217.7	216.4	219.3	228.2	235.5	252.4
	0.0	0.0	-0.1	-0.3	-0.4	-0.6
	0.0	-0.1	-0.3	-0.6	-0.7	-1.1
51 Water transport	-2938.0	-3113.6	-3200.2	-3312.6	-3459.3	-3850.1
	0.0	0.0	-2.6	-5.9	-8.0	-13.1
	0.0	-1.7	-7.0	-12.3	-15.1	-23.1

	1989	1990	1991	1993	1995	2000
52 Air transport	5410.4	5702.1	5855.3	6067.2	6332.3	7032.7
	0.0	0.0	4.0	9.1	12.4	20.3
	0.0	2.6	10.8	19.1	23.6	35.9
56 Electric utilities	436.5	426.6	435.8	467.1	491.1	546.0
	0.0	0.0	-0.6	-1.3	-1.7	-2.8
	0.0	-0.4	-1.5	-2.6	-3.2	-5.0
57 Gas utilities	1993.5	1862.5	1873.3	1991.8	2055.7	2177.2
	0.0	0.0	-4.2	-9.4	-12.6	-20.9
	0.0	-2.7	-11.1	-19.5	-24.1	-36.9
59 Wholesale trade	-14804.0	-15601.0	-16001.0	-16530.0	-17212.0	-19024.0
	0.0	0.0	-12.0	-27.0	-36.0	-59.0
	0.0	-8.0	-31.0	-55.0	-68.0	-104.0
62 Finance and insurance	7709.3	7921.0	8155.5	8640.1	9115.9	10299.0
	0.0	0.0	-0.6	-1.5	-2.1	-3.0
	0.0	-0.4	-1.7	-3.2	-3.9	-6.0
66 Business services	118.6	116.4	119.0	127.6	134.4	149.9
	0.0	0.0	-0.1	-0.3	-0.4	-0.7
	0.0	-0.1	-0.4	-0.7	-0.8	-1.3
67 Auto repairs	15.6	15.6	16.0	17.0	17.9	20.0
	0.0	0.0	-0.0	-0.0	-0.0	-0.1
	0.0	-0.0	-0.0	-0.1	-0.1	-0.1
68 Movies and amusements	59.3	59.9	61.4	65.1	68.4	76.5
	0.0	0.0	-0.0	-0.1	-0.1	-0.1
	0.0	-0.0	-0.1	-0.1	-0.2	-0.3
75 Rest of world	54551.0	61476.0	69662.0	79639.0	90439.0	90786.0
	0.0	0.0	-11.0	-37.0	-101.0	-1501.0
	0.0	-10.0	-23.0	-48.0	-179.0	-2215.0

LIFT RESULTS

Line 1: Base
 Line 2: FTA Scenario: Tariff Removal only
 Line 3: FTA Scenario: Removal of Tariffs and NTB's

FTA scenarios are shown in deviations from base scenario.

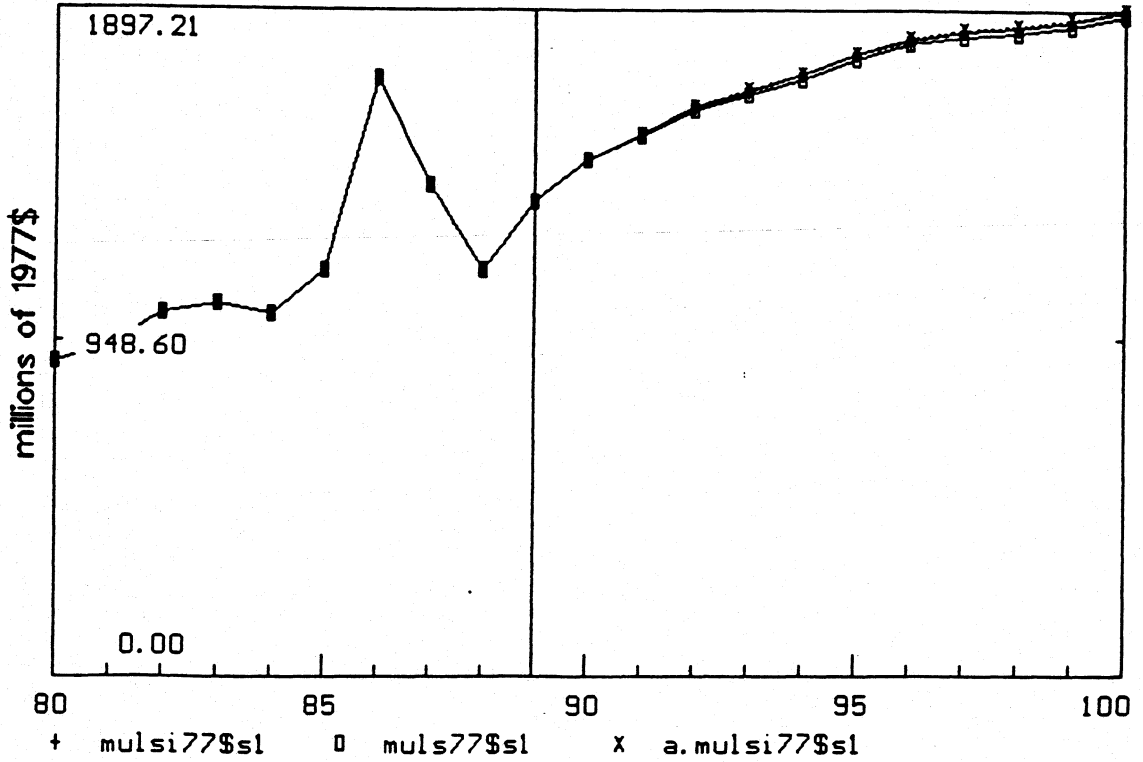
	Employment in thousands					
	1989	1990	1991	1993	1995	2000
1 Agriculture	3035.9	2943.9	2861.7	2826.8	2798.0	2649.5
	0.0	0.0	0.1	0.4	0.5	0.2
	0.0	0.1	1.9	9.1	10.6	11.7
2 Crude Oil	412.2	410.8	423.5	452.5	478.9	548.0
	0.0	0.0	0.1	0.1	-0.1	0.1
	0.0	0.0	0.2	0.2	-0.1	0.2
3 Mining	334.9	336.6	333.9	332.8	330.0	321.0
	0.0	0.0	0.2	0.3	0.3	0.5
	0.0	0.0	0.3	0.4	0.4	0.7
4 Construction	6721.6	6805.7	7031.1	7594.1	7976.0	8692.8
	0.0	0.0	1.6	-0.8	-8.6	-5.2
	0.0	0.4	2.9	-2.0	-12.8	-7.2
5 Food, tobacco	1697.1	1685.5	1659.5	1621.6	1584.9	1475.0
	0.0	0.0	0.1	0.1	0.0	-0.2
	0.0	0.1	0.2	0.3	0.4	0.2
6 Textiles	492.7	487.8	482.2	474.4	464.3	434.7
	0.0	0.0	0.1	0.5	0.7	0.8
	0.0	-0.3	-0.4	0.1	0.2	0.2
7 Knitting	236.5	236.3	235.2	228.3	219.6	198.8
	0.0	0.0	0.0	-0.1	-0.1	-0.1
	0.0	-0.2	-0.1	-0.3	-0.3	-0.3
8 Apparel	1080.1	1073.4	1070.4	1053.1	1026.9	955.1
	0.0	0.0	-0.3	-1.2	-2.2	-2.9
	0.0	-2.3	-2.9	-4.4	-5.9	-7.2
9 Paper	697.3	692.8	690.8	682.2	666.8	632.4
	0.0	0.0	0.2	0.4	0.4	0.4
	0.0	0.0	0.2	0.4	0.5	0.4
10 Printing	1804.5	1887.2	1906.5	1938.0	1971.1	2063.5
	0.0	0.0	0.2	0.3	0.2	0.4
	0.0	0.1	0.4	0.4	0.3	0.5
11 Fertilizers, pesticides	54.1	53.7	53.6	53.3	52.4	48.6
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.1	0.1	0.1
12 Chemicals	1066.2	1086.2	1090.5	1105.6	1110.4	1107.5
	0.0	0.0	0.4	1.6	2.3	2.4
	0.0	0.0	0.4	1.8	2.5	2.5
13 Petroleum refining	164.4	163.1	160.7	156.9	153.2	143.4
	0.0	0.0	0.0	0.0	0.1	0.1
	0.0	0.0	0.0	0.1	0.1	0.1
14 Rubber, plastic prods.	869.6	876.9	881.8	890.3	895.7	912.8
	0.0	0.0	0.8	3.0	4.7	5.7
	0.0	0.1	1.2	3.7	5.3	6.3

	1989	1990	1991	1993	1995	2000
15 Footwear leather	138.1	135.6	137.4	125.1	117.8	107.9
	0.0	0.0	0.1	0.2	0.2	-0.1
	0.0	-0.0	0.1	0.1	0.0	-0.4
16 Lumber	812.4	804.9	813.3	847.3	855.8	876.7
	0.0	0.0	0.1	0.1	-0.5	-0.4
	0.0	0.0	0.1	-0.3	-1.2	-1.0
17 Furniture	558.4	558.5	569.1	564.2	563.6	565.6
	0.0	0.0	0.1	-0.1	-0.2	-0.0
	0.0	-0.0	0.2	-0.2	-0.4	-0.1
18 Stone, clay, glass	615.8	619.8	634.3	673.1	695.2	742.0
	0.0	0.0	0.4	1.0	1.2	2.0
	0.0	0.1	0.6	1.3	1.2	2.3
19 Iron steel	507.0	494.5	492.7	488.4	477.0	464.0
	0.0	0.0	0.4	1.1	1.2	1.0
	0.0	0.1	0.8	1.8	2.0	1.7
20 Non ferrous metasl	339.2	336.0	341.4	354.5	365.9	404.3
	0.0	0.0	0.4	1.1	1.4	1.3
	0.0	0.0	0.5	1.4	1.7	1.6
21 Metal products	1586.1	1626.7	1681.9	1777.1	1843.1	2007.5
	0.0	0.0	1.3	3.5	4.6	5.4
	0.0	0.2	2.2	5.1	6.1	7.1
22 Engines turbines	97.3	95.8	96.0	98.8	106.8	132.2
	0.0	0.0	0.1	0.2	0.5	0.5
	0.0	0.0	0.1	0.3	0.7	0.7
23 Agricultural machinery	99.1	97.7	102.5	105.1	103.3	92.6
	0.0	0.0	0.1	0.1	0.1	0.1
	0.0	0.1	0.4	0.7	0.5	0.4
25 Metalworking machinery	357.4	367.4	387.4	403.7	438.9	538.8
	0.0	-0.0	1.0	2.8	3.3	3.2
	0.0	0.1	1.8	4.1	4.0	4.0
27 Special ind machinery	174.4	172.9	174.2	173.0	174.3	176.0
	0.0	0.0	0.1	0.4	0.5	1.1
	0.0	-0.1	0.1	0.4	0.5	1.1
28 Misc non-elect mach	852.3	883.6	923.4	974.5	1045.0	1216.5
	0.0	0.0	1.7	5.2	6.9	7.1
	0.0	0.0	2.2	6.1	7.8	7.9
29 Computers	463.3	448.6	426.4	391.0	371.5	314.7
	0.0	-0.0	0.4	1.1	1.4	1.0
	0.0	0.3	1.4	2.9	3.1	2.4
30 Service industry mach	208.5	208.2	214.1	217.6	223.4	236.6
	0.0	0.0	0.2	0.4	0.3	0.4
	0.0	0.0	0.3	0.5	0.4	0.6
31 Communications mach	1165.1	1110.3	1094.5	1083.3	1106.5	1203.1
	0.0	0.0	1.9	5.0	5.8	5.0
	0.0	0.0	2.6	5.9	6.3	5.3
32 Electric appliances	416.1	421.2	422.1	425.7	446.1	509.4
	0.0	0.0	0.5	2.3	4.7	5.1
	0.0	0.0	0.6	2.6	5.2	5.3
33 Hhld appliances	130.4	125.1	122.4	119.4	117.3	111.0
	0.0	0.0	0.0	0.0	-0.0	-0.1
	0.0	0.0	0.0	0.0	-0.0	-0.1

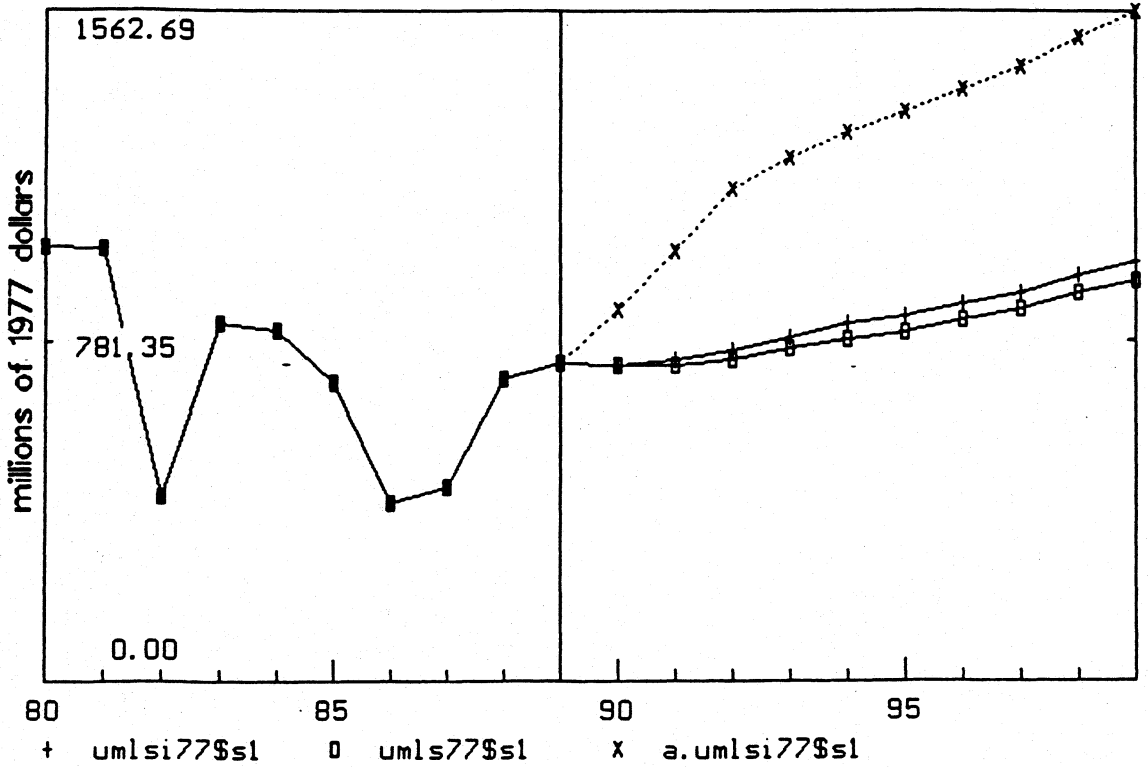
	1989	1990	1991	1993	1995	2000
34 Elect lighting wiring	379.2	376.5	380.5	386.5	402.5	443.5
	0.0	0.0	0.2	0.6	1.0	0.9
	0.0	0.0	0.3	0.9	1.3	1.2
35 TVsets radio phonograph	73.9	71.8	66.5	56.9	49.4	35.7
	0.0	0.0	0.0	-0.0	-0.1	-0.3
	0.0	0.0	0.0	-0.0	-0.1	-0.4
36 Motor vehicles	834.0	823.8	812.8	788.3	786.4	801.8
	0.0	-0.0	0.1	-0.0	-0.2	-0.7
	0.0	0.8	2.3	4.9	5.0	4.9
37 Aerospace	946.5	964.5	954.7	932.3	898.8	1046.6
	0.0	0.0	0.5	0.8	0.4	-0.1
	0.0	0.0	0.6	0.9	0.2	-0.4
38 Ships boats	180.4	178.6	175.1	165.6	156.9	149.0
	0.0	-0.0	0.0	-0.0	-0.1	-0.1
	0.0	0.0	0.1	-0.0	-0.1	-0.1
39 Other transp equip	85.1	86.1	82.2	79.0	78.6	80.3
	0.0	-0.0	0.1	0.1	-0.0	-0.0
	0.0	-0.0	0.1	0.0	-0.0	-0.0
40 Instruments	619.2	617.7	616.2	600.1	601.2	606.5
	0.0	0.0	0.3	1.0	1.3	1.2
	0.0	-0.0	0.4	1.0	1.3	1.2
41 Mism manufacturing	391.4	381.7	374.7	368.4	364.4	357.7
	0.0	0.0	0.1	0.3	0.3	0.3
	0.0	-0.0	0.1	0.2	0.1	0.1
42 Railroads	324.1	325.2	322.8	314.8	304.4	275.4
	0.0	0.0	0.1	0.1	0.1	0.1
	0.0	0.0	0.1	0.2	0.2	0.1
43 Air transport	680.5	703.5	725.5	766.9	806.3	912.4
	0.0	0.0	0.1	0.1	0.2	0.1
	0.0	-0.0	0.1	0.1	0.1	0.1
44 Trucking	3014.3	3080.5	3138.5	3248.4	3365.5	3685.3
	0.0	0.0	0.4	0.8	0.9	1.0
	0.0	0.1	0.8	1.4	1.4	1.7
45 Communications	1413.3	1405.6	1387.4	1357.7	1331.6	1261.1
	0.0	0.0	0.0	0.2	0.3	0.3
	0.0	0.0	0.0	0.3	0.4	0.4
46 Electric utilities	728.2	744.8	754.5	768.7	780.0	810.3
	0.0	0.0	0.1	0.2	0.3	0.3
	0.0	0.0	0.2	0.4	0.4	0.5
47 Gas, water, sanitation	365.3	371.5	376.8	388.0	400.9	439.1
	0.0	0.0	0.1	0.1	0.1	0.2
	0.0	0.0	0.2	0.2	0.2	0.4
48 W&R Trade	27815.0	28481.0	29045.0	29921.0	30788.0	33019.0
	0.0	0.0	2.0	0.0	-1.0	3.0
	0.0	0.0	4.0	0.0	1.0	5.0
49 Finance, insurance	5691.0	5804.0	5865.0	5994.5	6124.3	6505.5
	0.0	0.0	-0.1	-0.3	-0.9	-1.2
	0.0	0.1	-0.1	-0.5	-1.5	-1.8
50 Real estate	1747.2	1770.3	1797.4	1874.6	1951.0	2094.3
	0.0	0.0	0.1	0.0	-0.6	-0.4
	0.1	0.1	0.3	0.0	-0.6	-0.2

	1989	1990	1991	1993	1995	2000
51 Hotels	4062.7	4132.1	4190.1	4270.1	4346.0	4555.2
	0.0	0.0	0.0	-1.1	-1.8	-0.9
	0.0	0.1	0.2	-1.9	-2.4	-1.5
52 Business services	9609.7	9876.7	10122.0	10535.0	10852.0	11937.0
	0.0	0.0	2.0	4.0	4.0	6.0
	0.0	0.4	4.0	6.0	5.0	8.0
53 Auto repair	1276.9	1321.4	1360.2	1422.1	1489.5	1664.8
	0.0	0.0	0.2	0.2	0.2	0.5
	0.0	0.0	0.5	0.6	0.5	1.0
54 Movies, amusements	1418.9	1454.5	1472.7	1498.1	1505.5	1475.8
	0.0	0.0	-0.2	-0.2	-0.6	-0.3
	0.0	0.1	-0.2	-0.4	-1.0	-0.6
55 Medicine, educ, npo	13301.0	13541.0	13784.0	14072.0	14341.0	14879.0
	0.0	0.0	0.0	-3.0	-4.0	-1.0
	0.0	0.0	0.0	-5.0	-6.0	-3.0

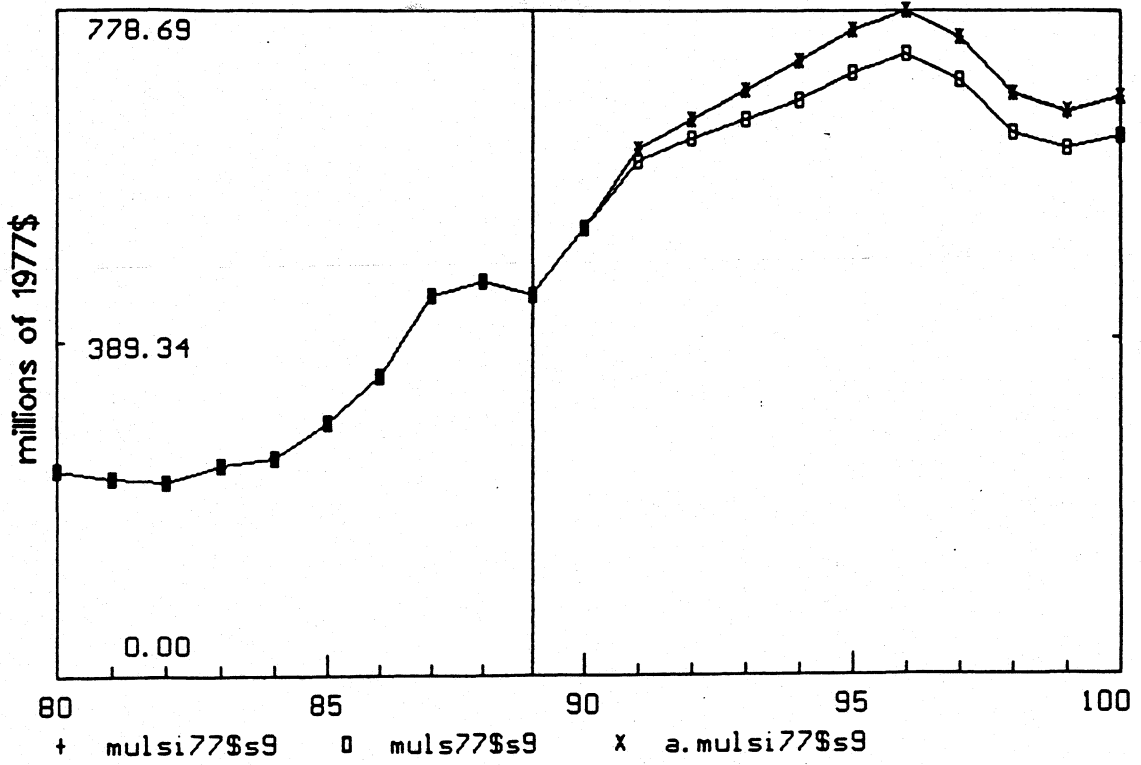
01 Agriculture, Forestry and Fishery
Mexico to USA



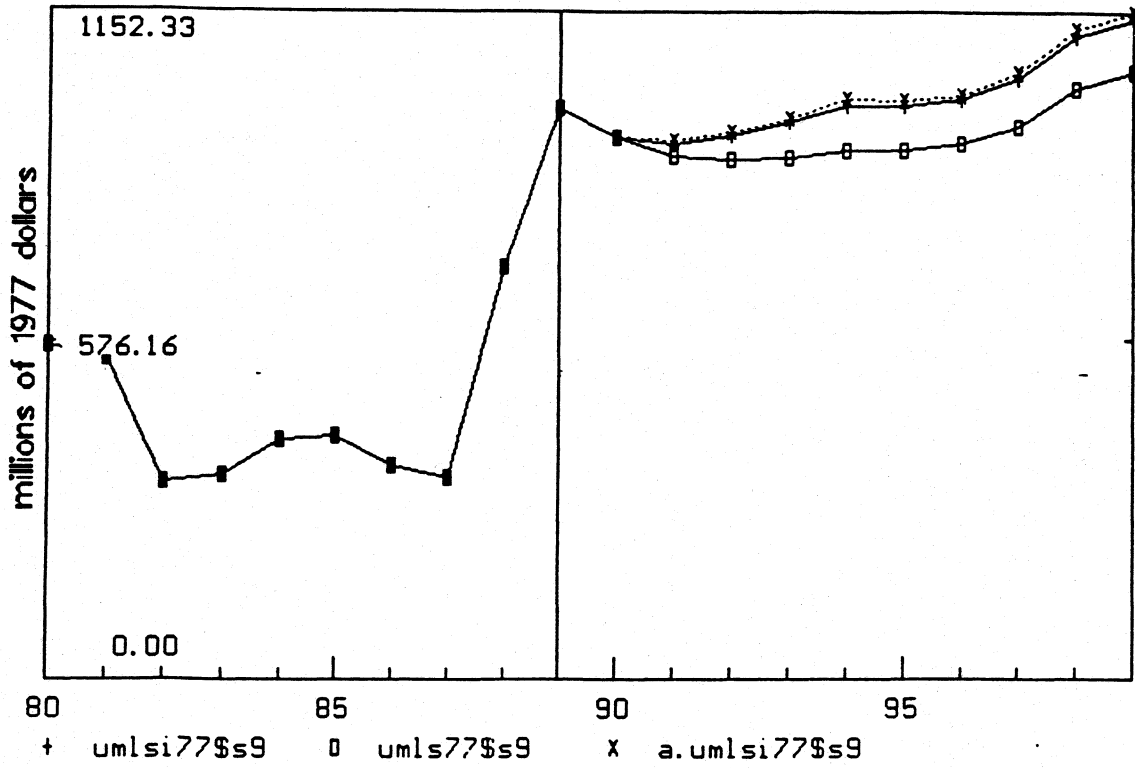
01 Agriculture, Forestry and Fishery
USA to Mexico



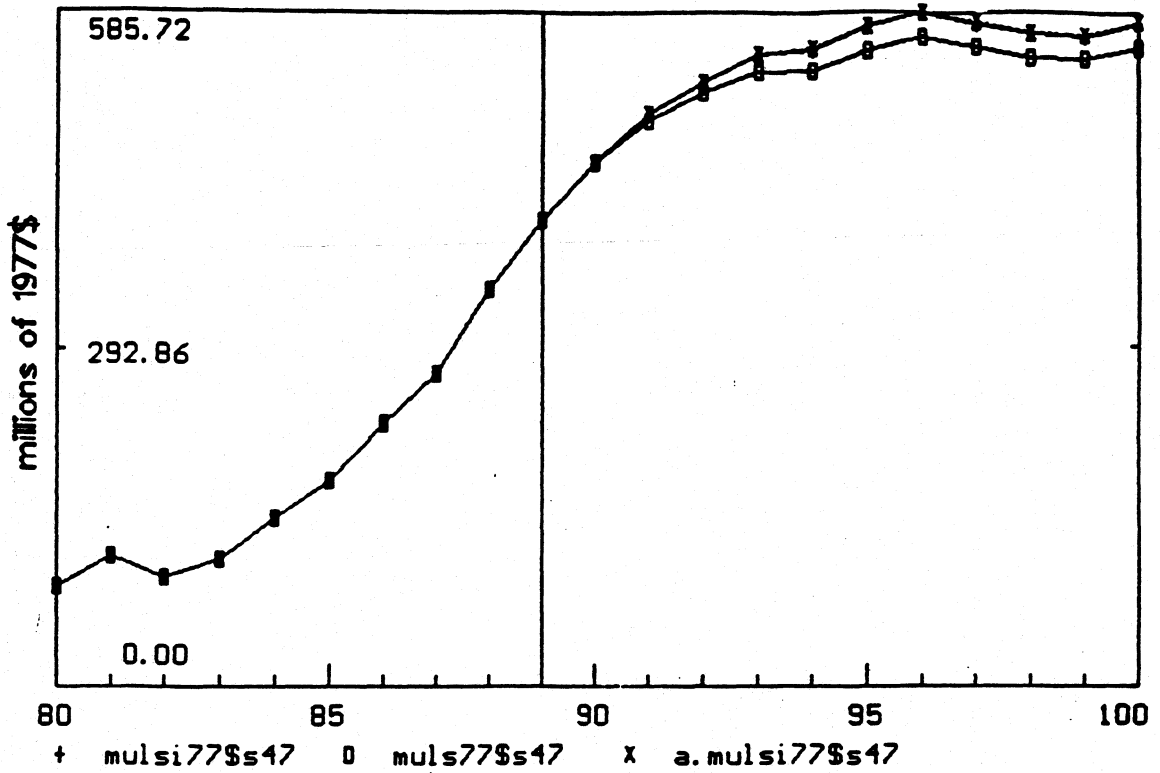
09 Food and Tobacco
Mexico to USA



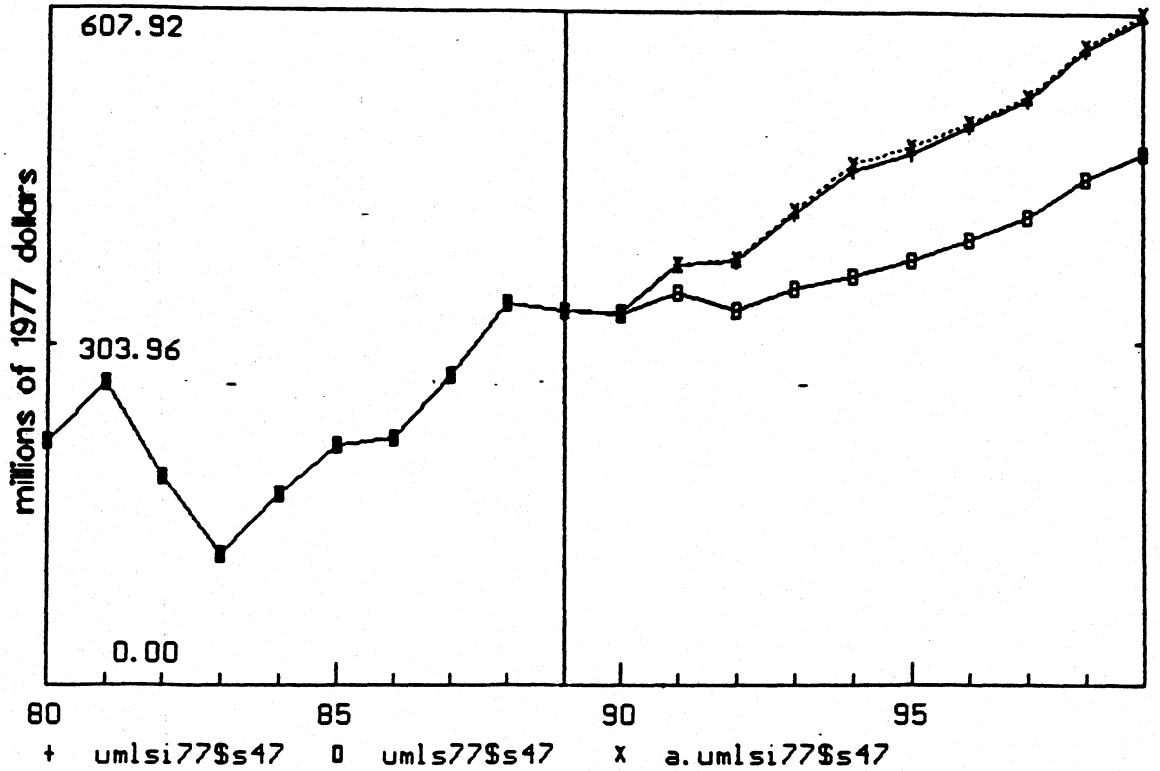
09 Food and Tobacco
USA to Mexico



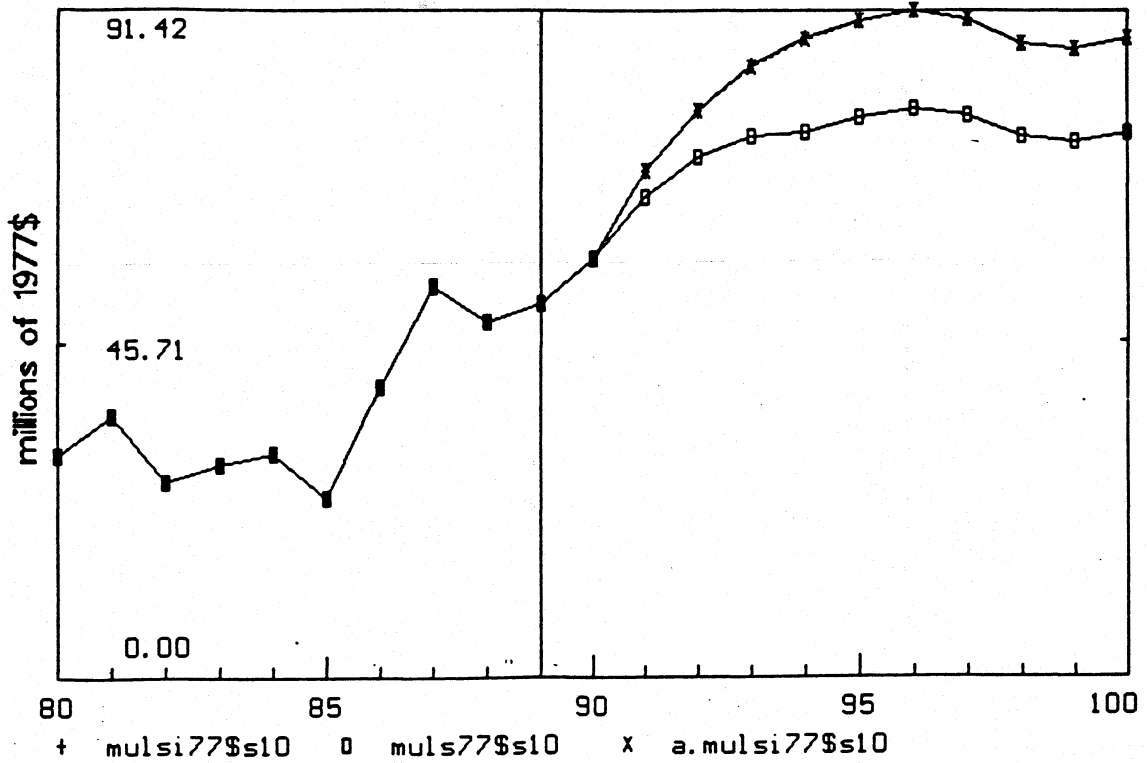
47 Instruments
Mexico to USA



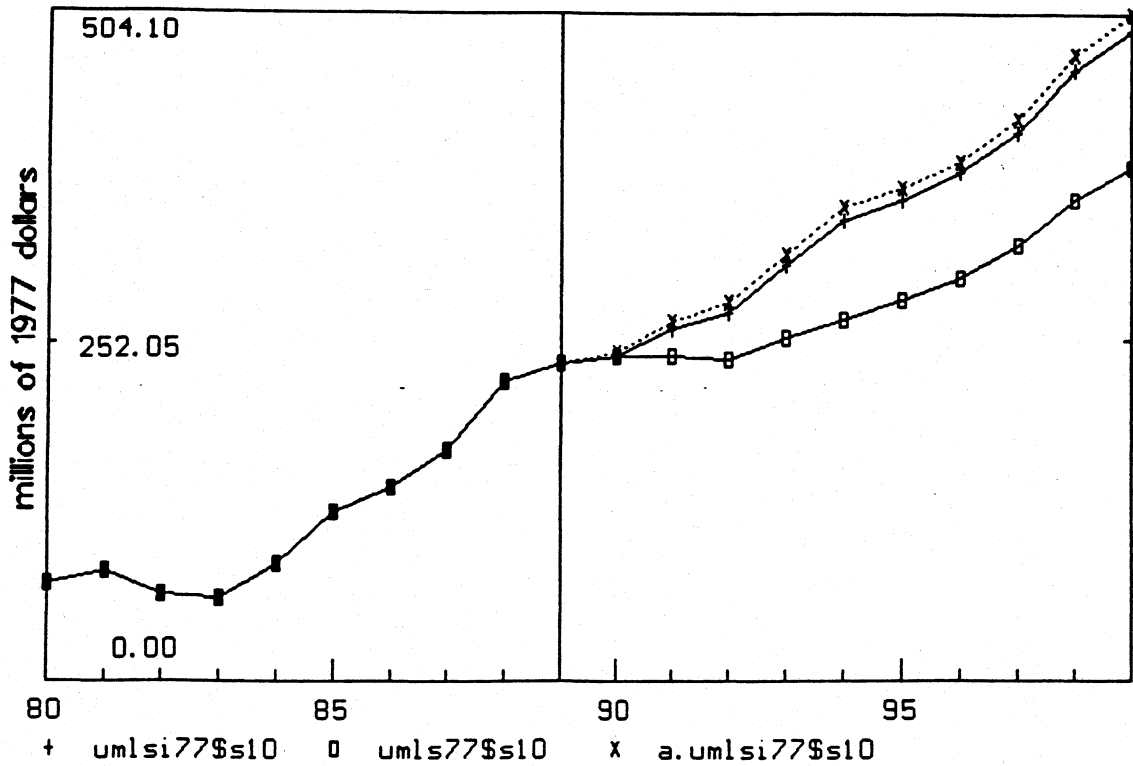
47 Instruments
USA to Mexico



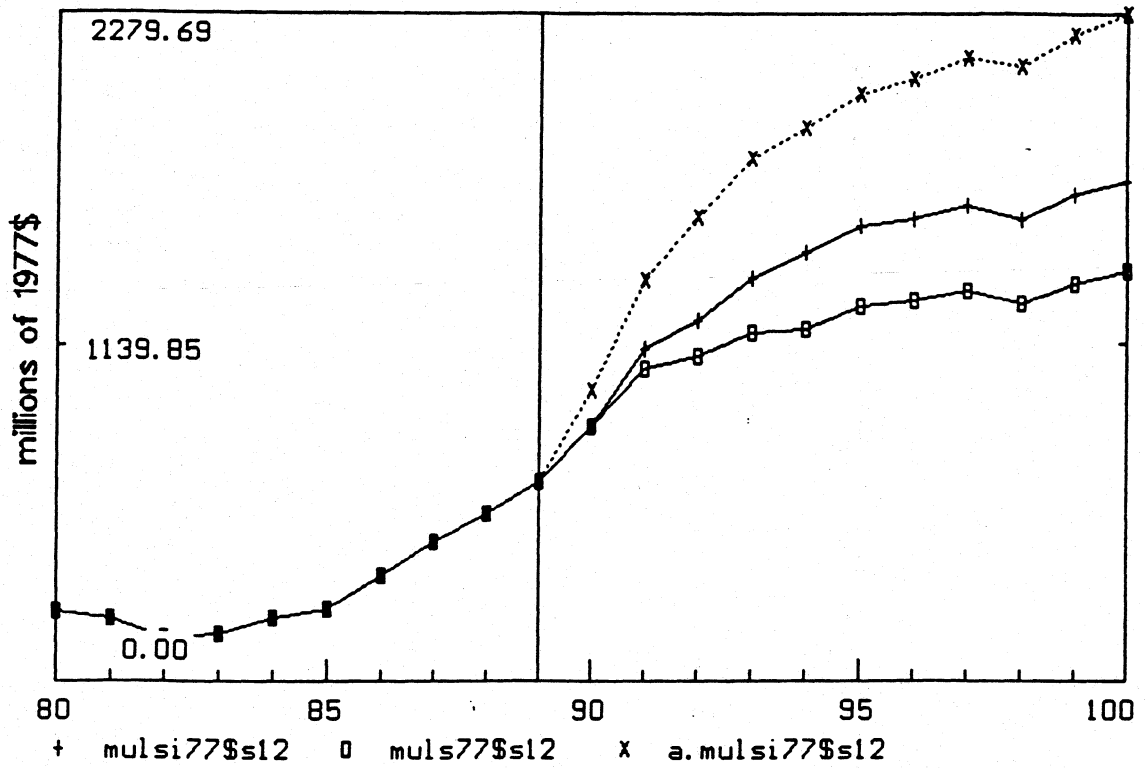
10 Textiles, exc knits
Mexico to USA



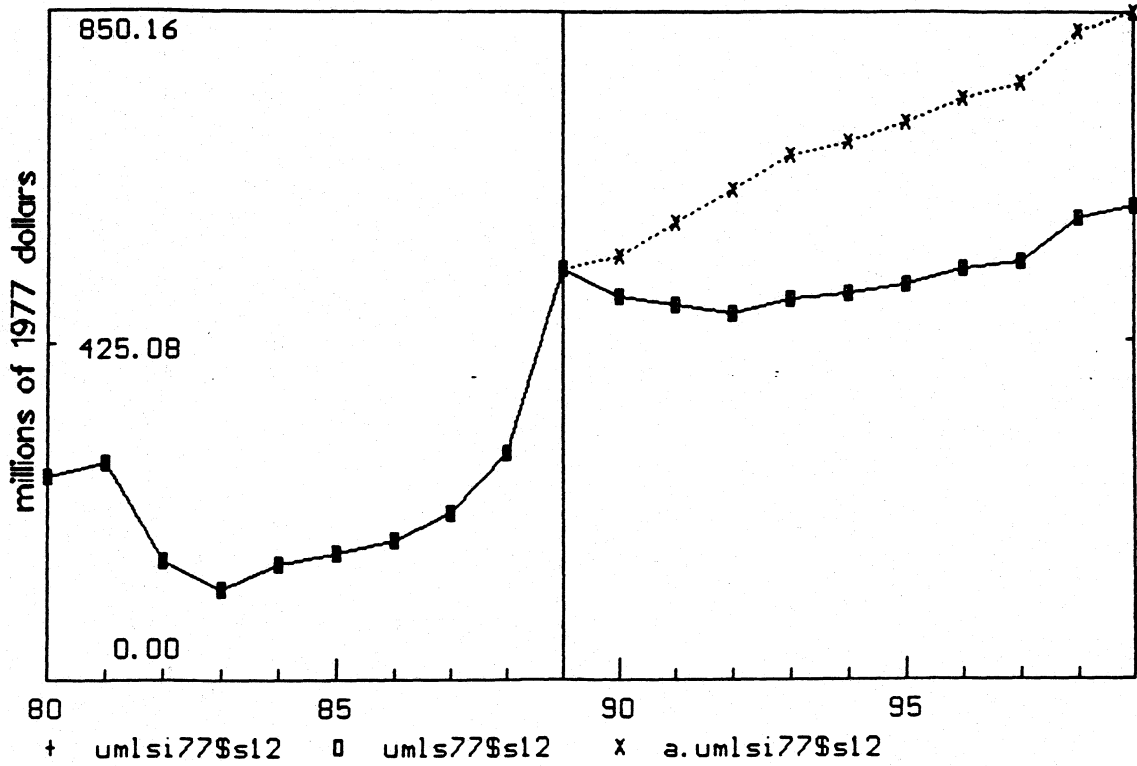
10 Textiles, exc knits
USA to Mexico



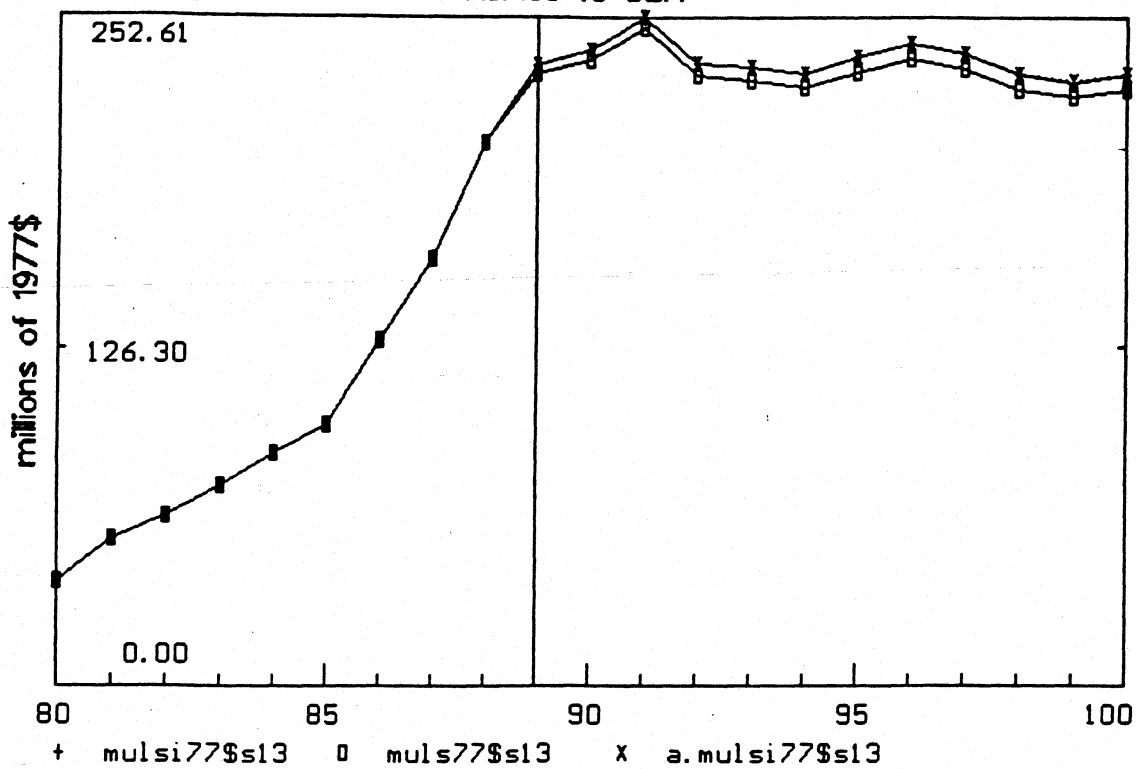
12 Apparel
Mexico to USA



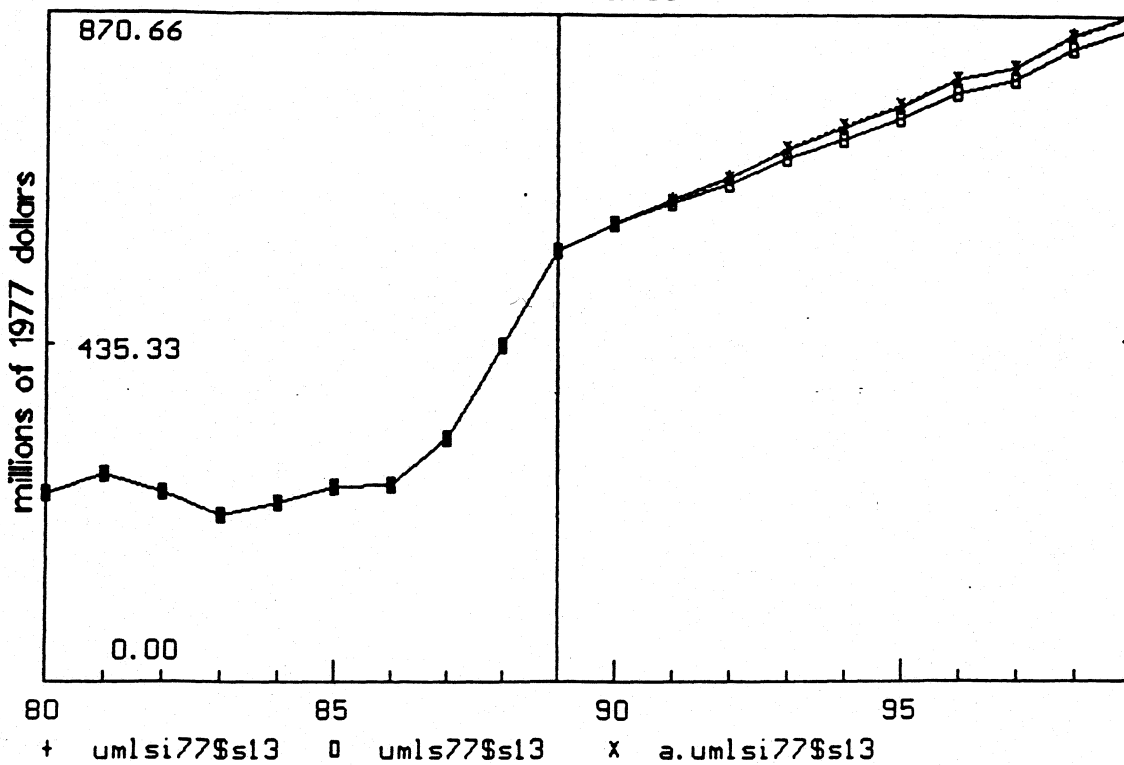
12 Apparel
USA to Mexico



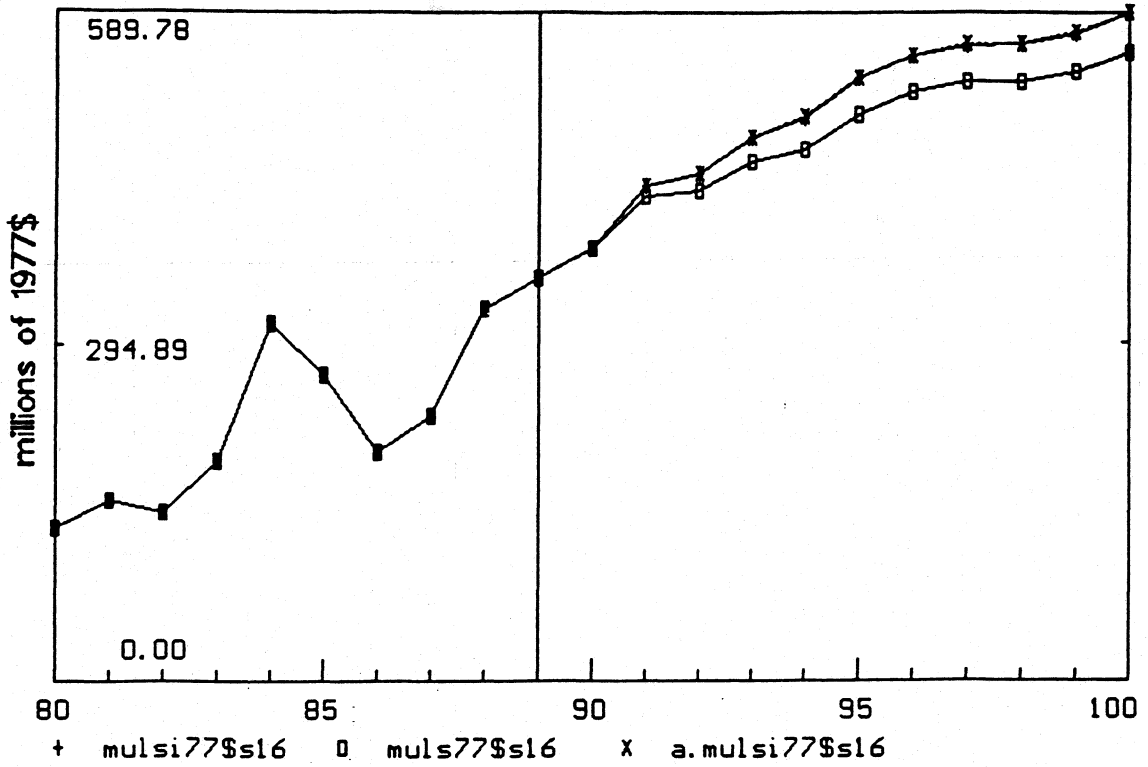
13 Paper
Mexico to USA



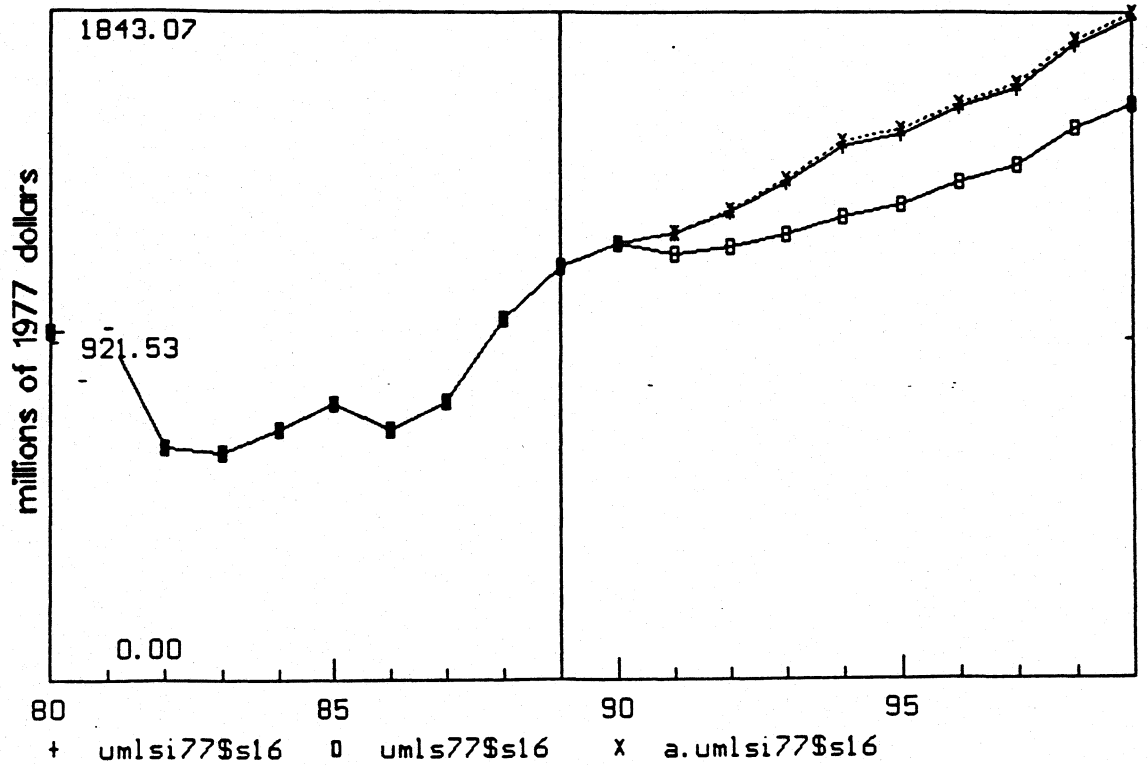
13 Paper
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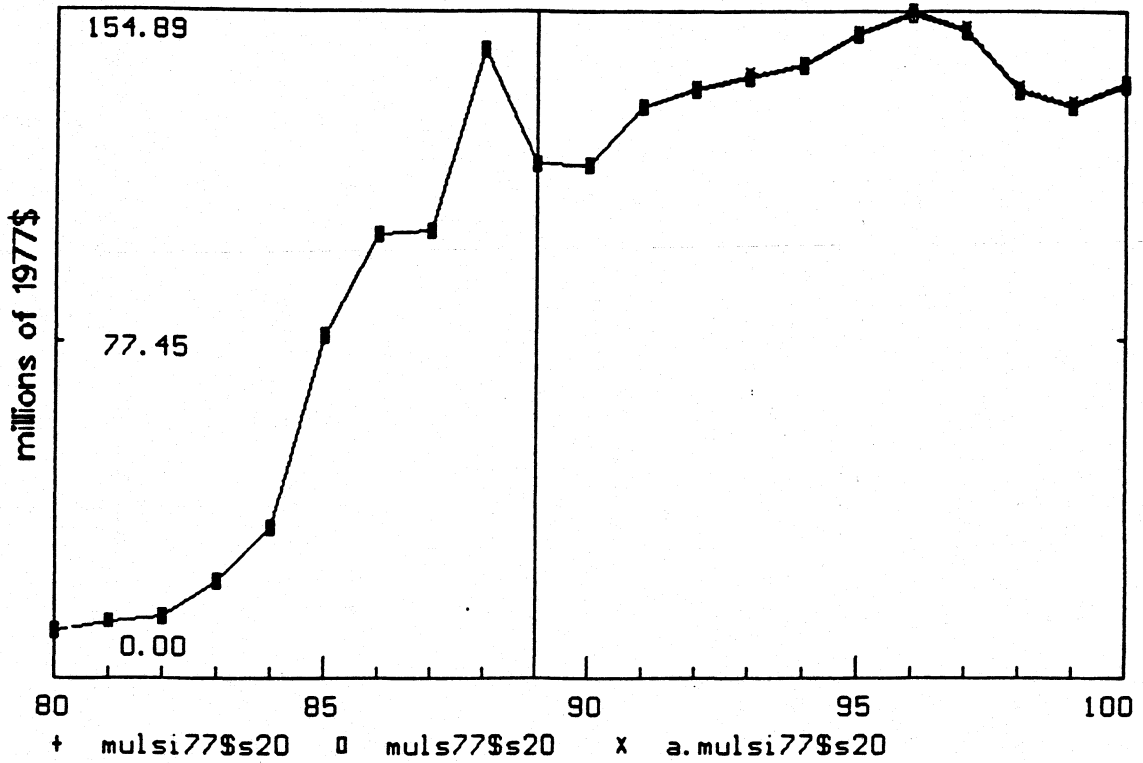
16 Chemicals, exc agric.
Mexico to USA



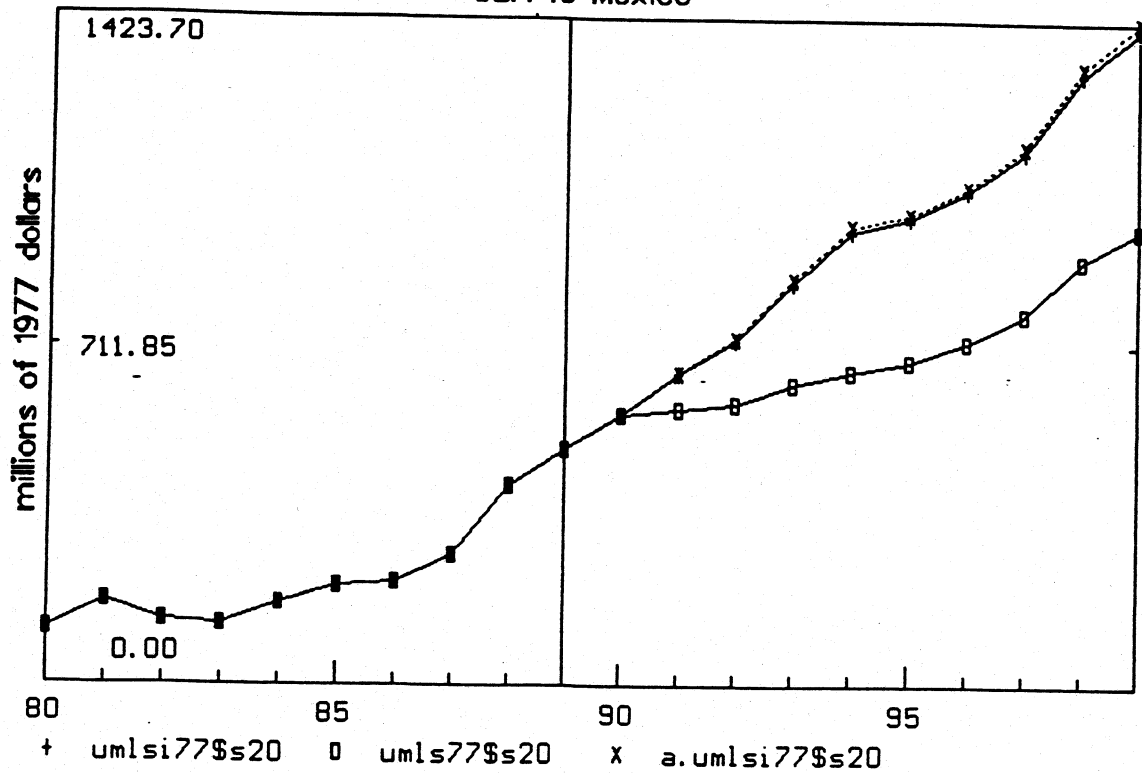
16 Chemicals, exc agric.
USA to Mexico



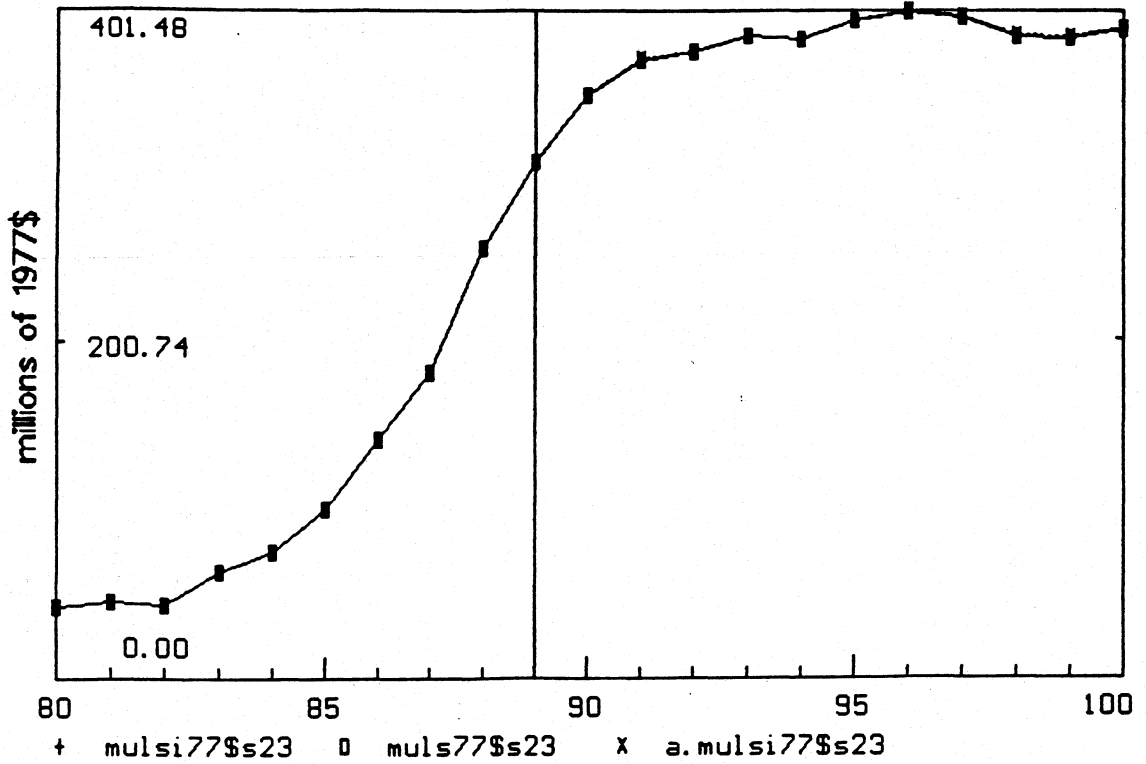
20 Plastic products
Mexico to USA



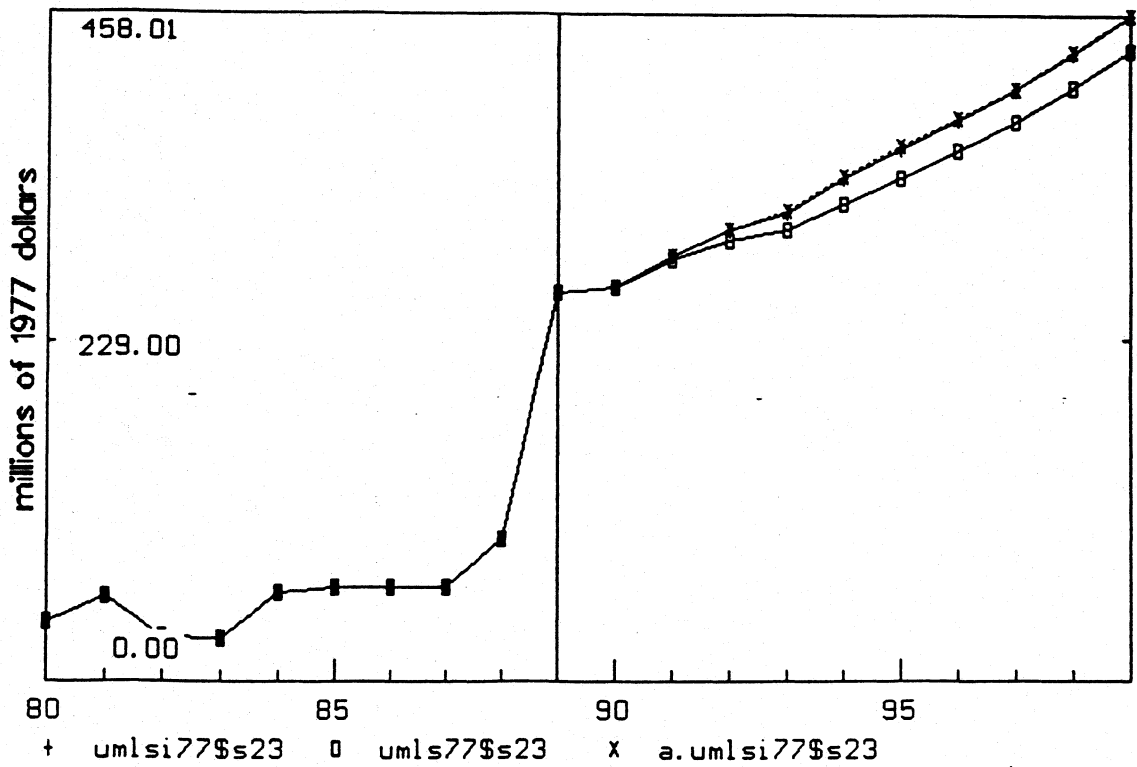
20 Plastic products
USA to Mexico



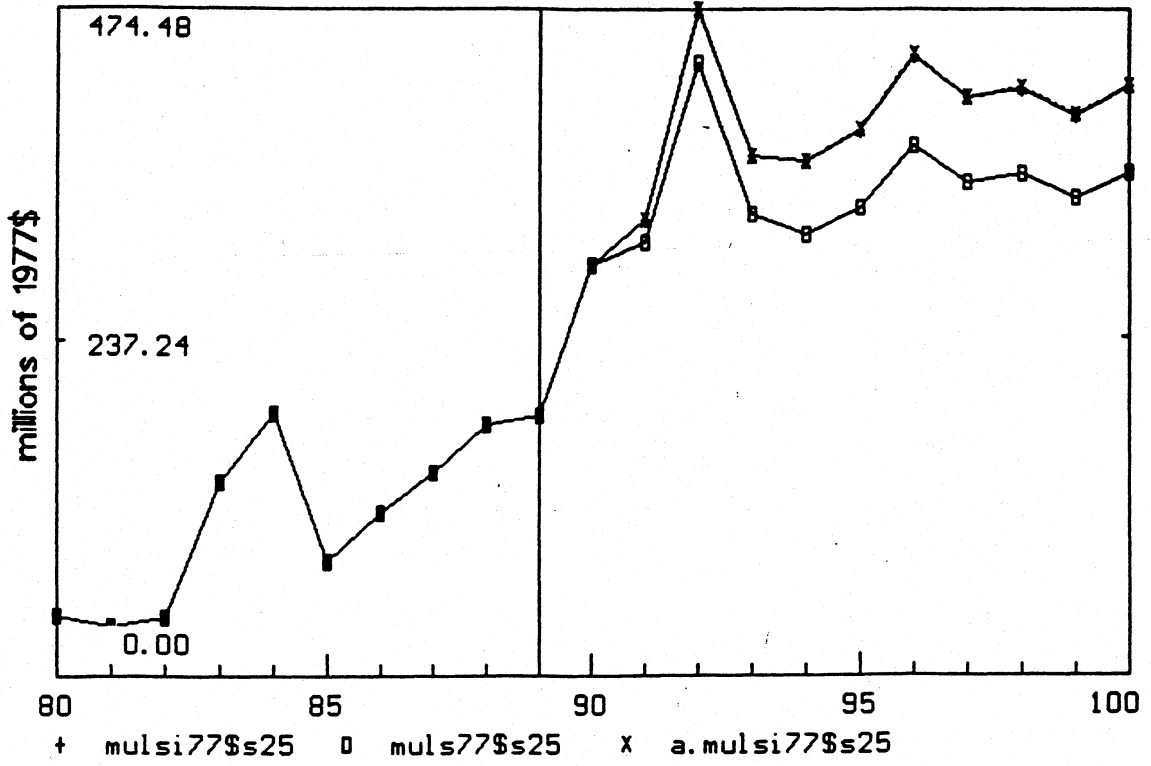
23 Furniture
Mexico to USA



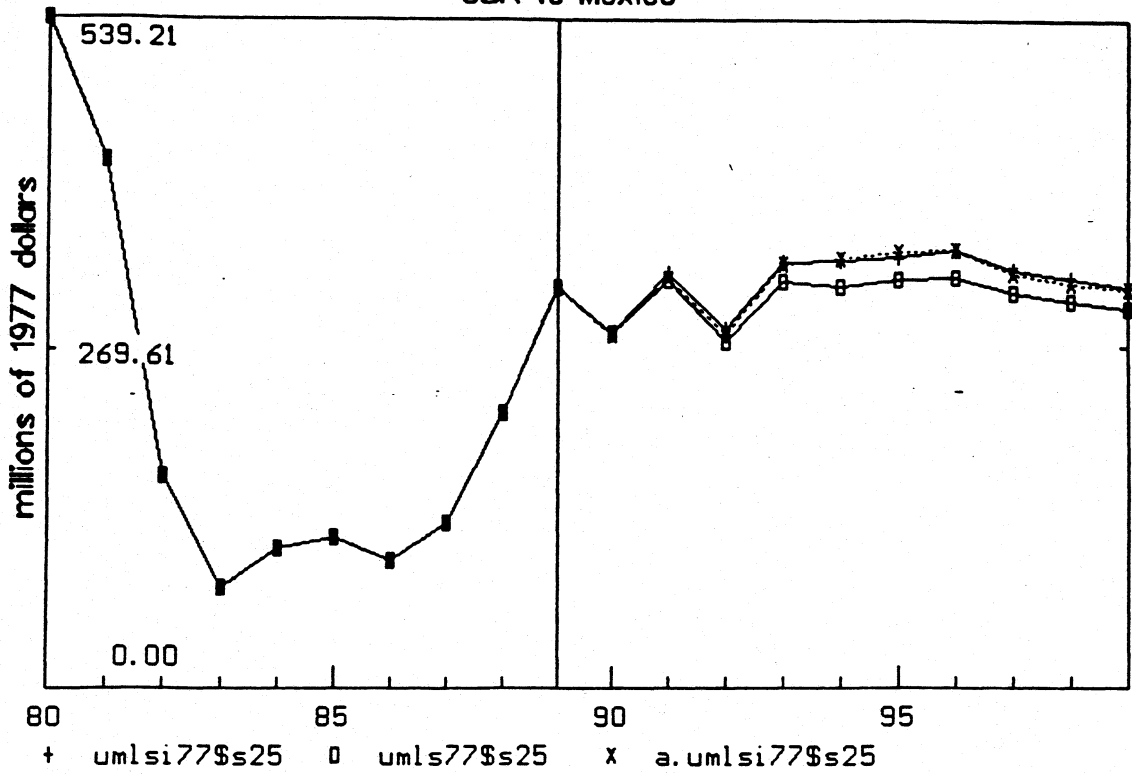
23 Furniture
USA to Mexico



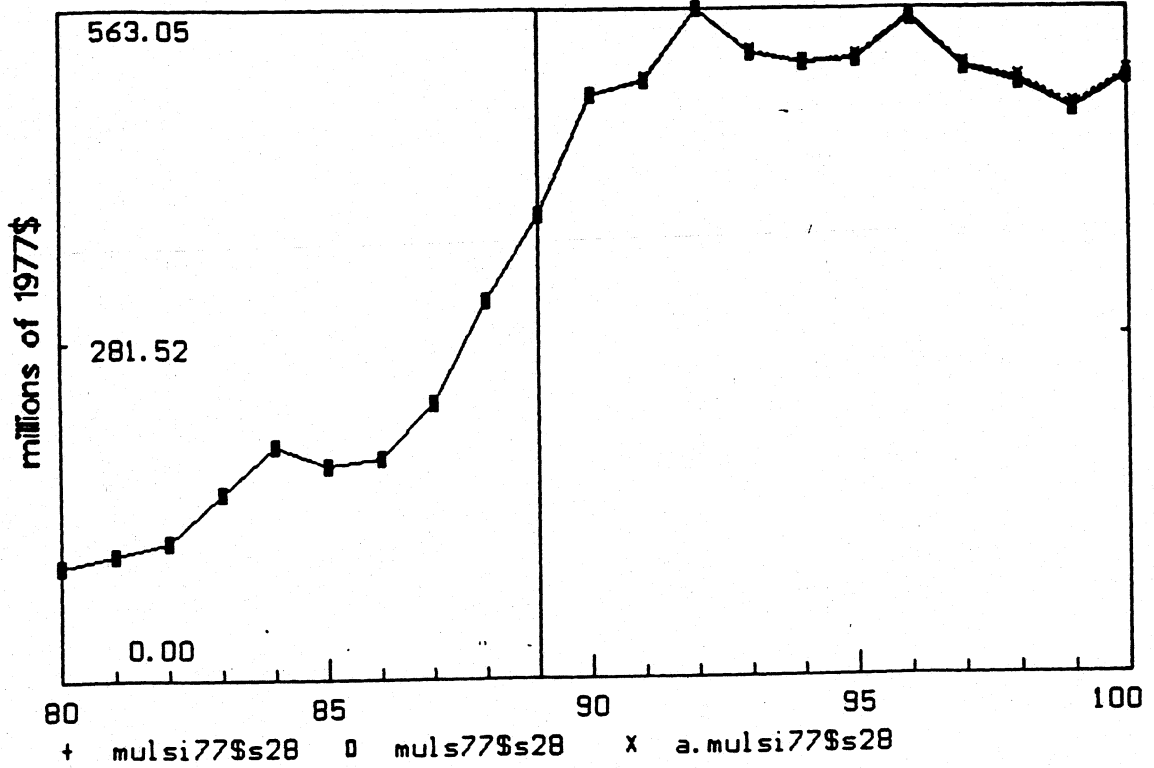
25 Ferrous metals
Mexico to USA



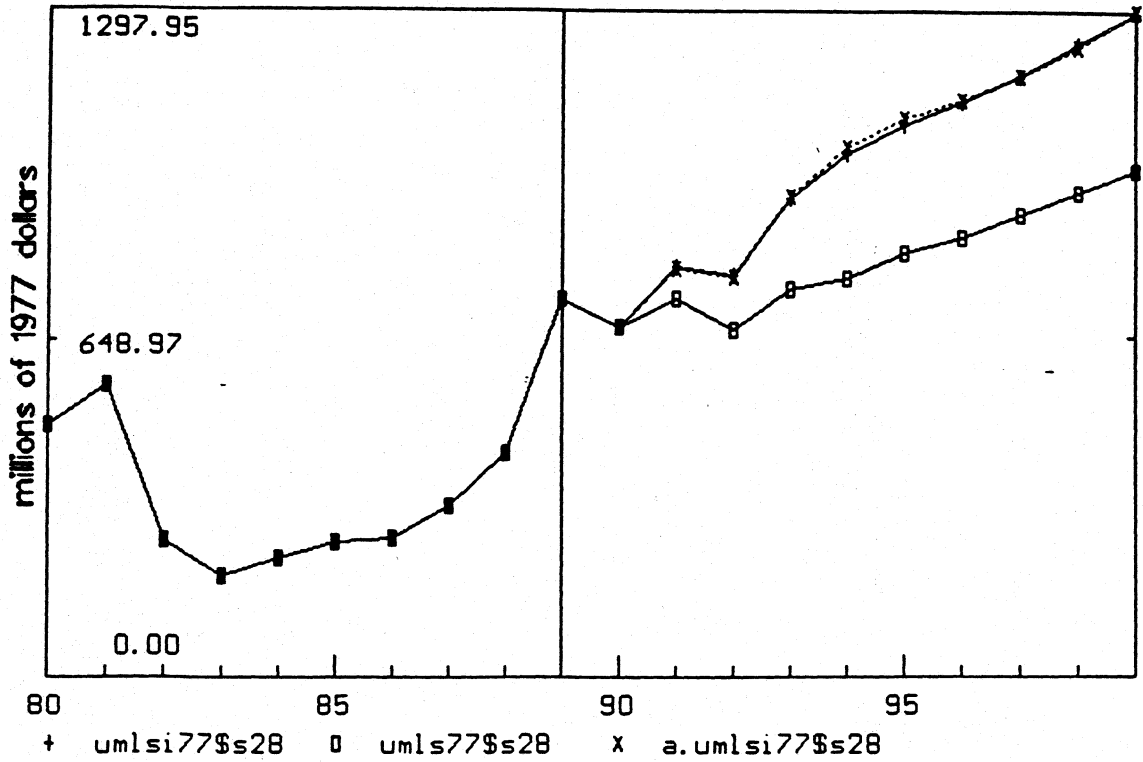
25 Ferrous metals
USA to Mexico



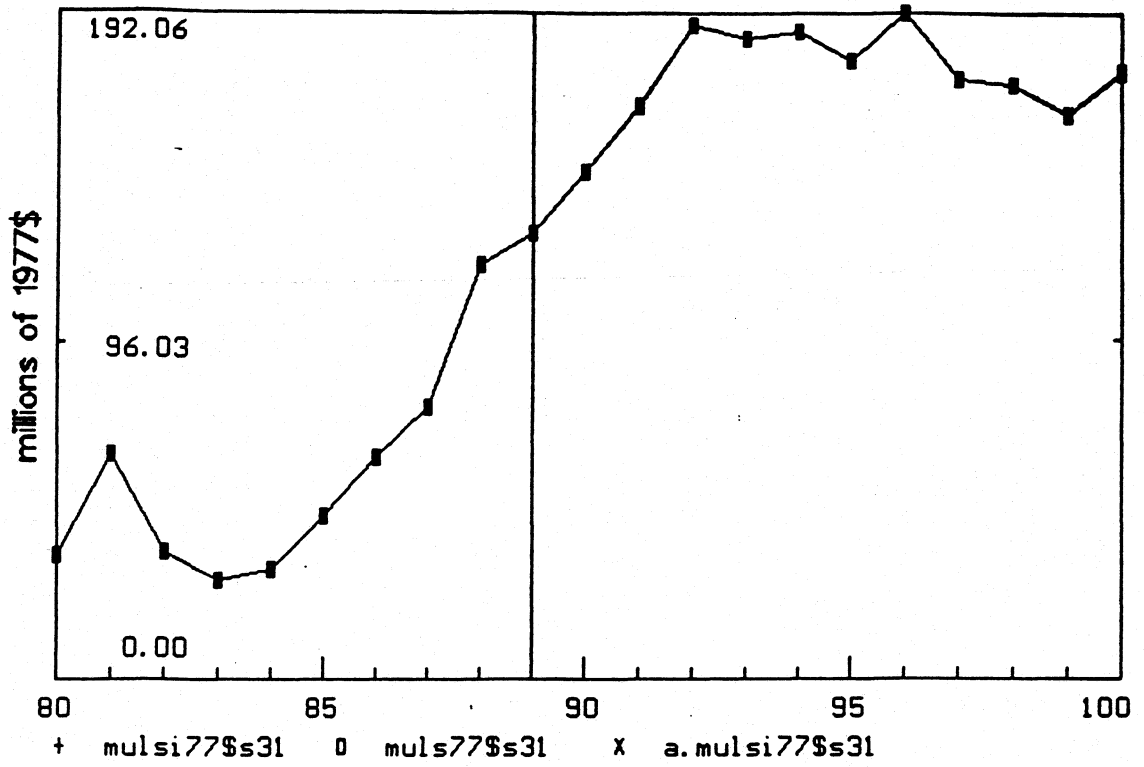
28 Metal products
Mexico to USA



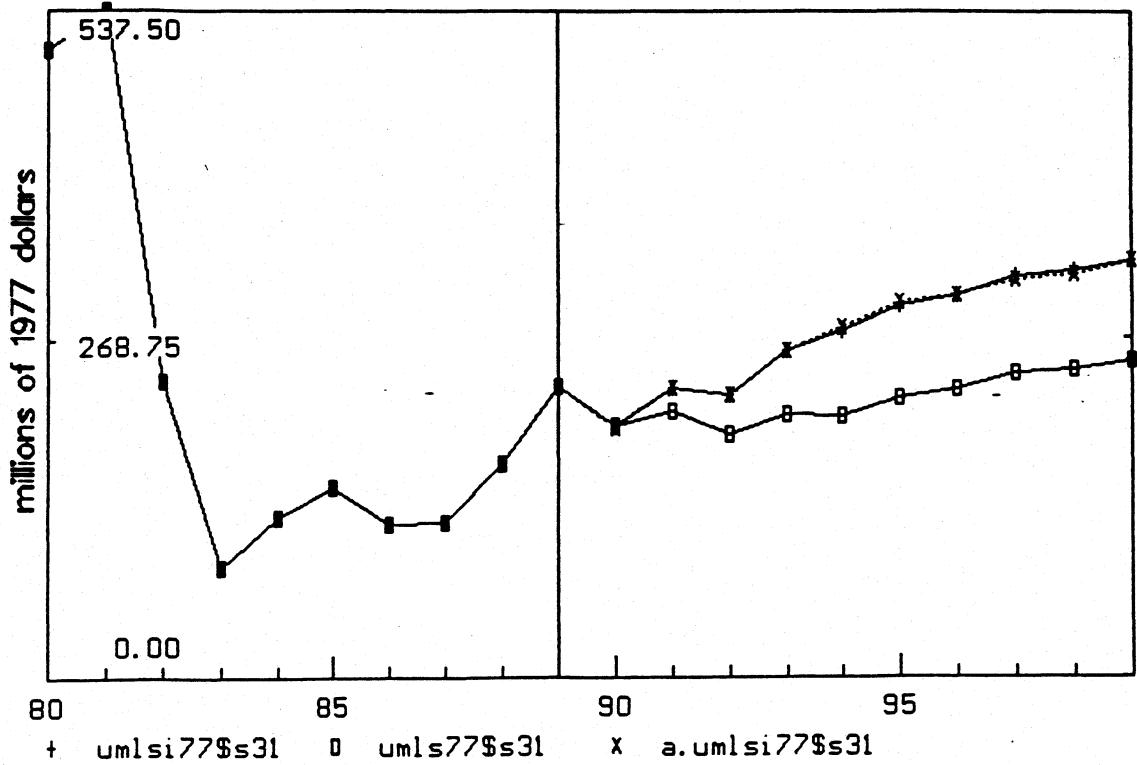
28 Metal products
USA to Mexico



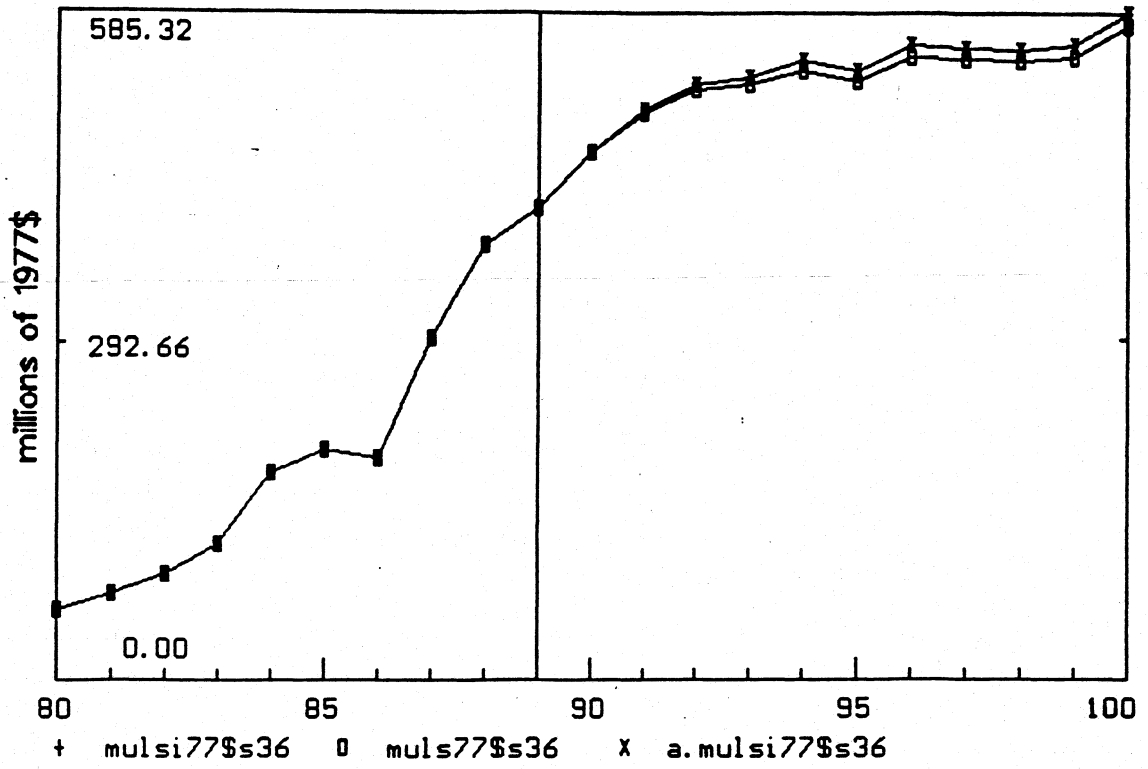
31 Constr., mining, oilfield eq
Mexico to USA



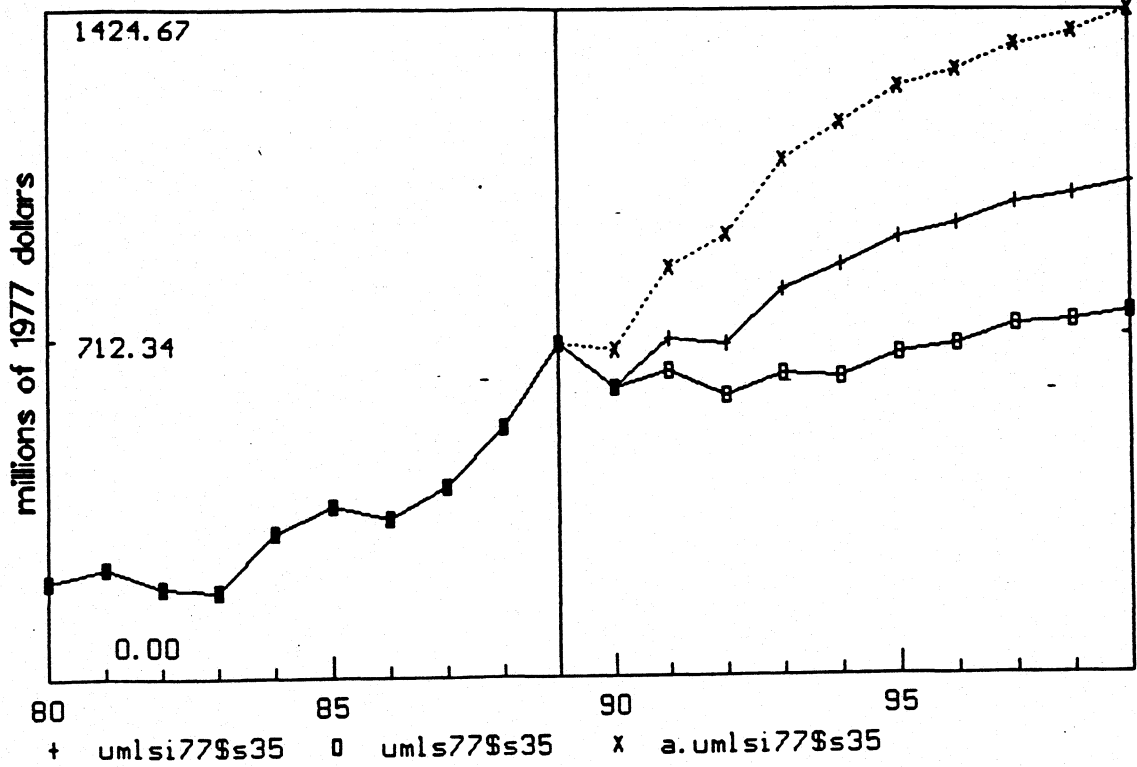
31 Constr., mining, oilfield eq
USA to Mexico



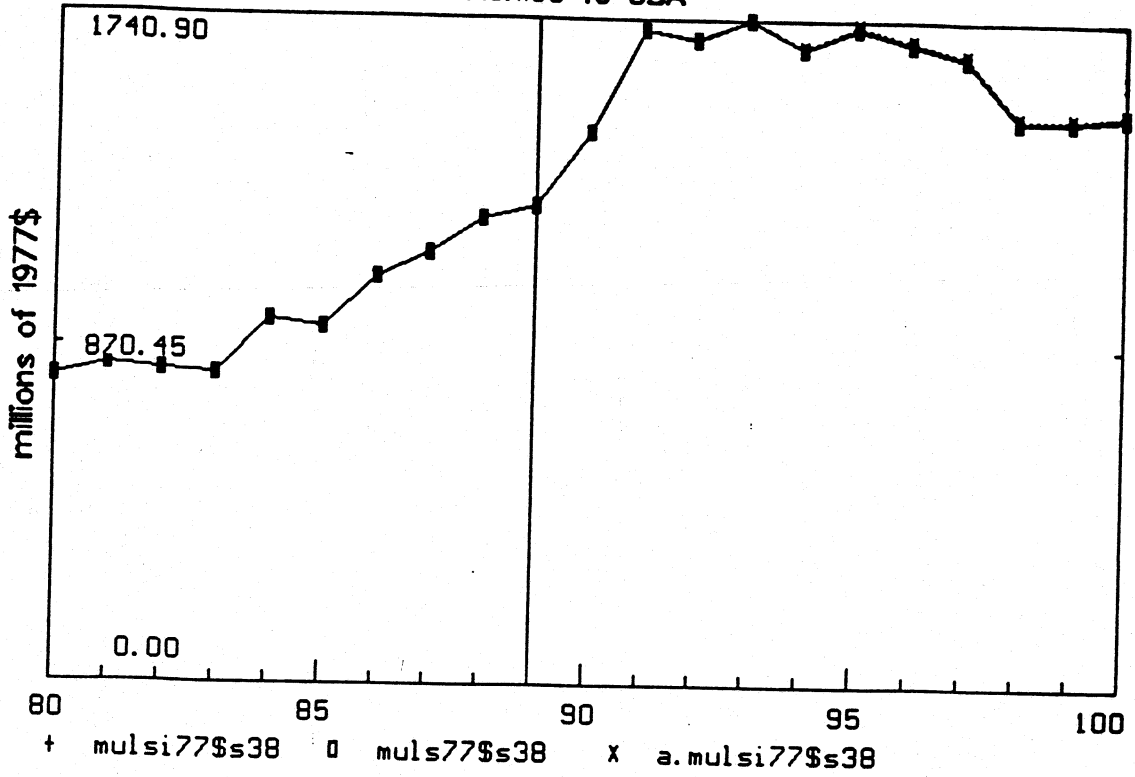
36 Other office equipment Mexico to USA



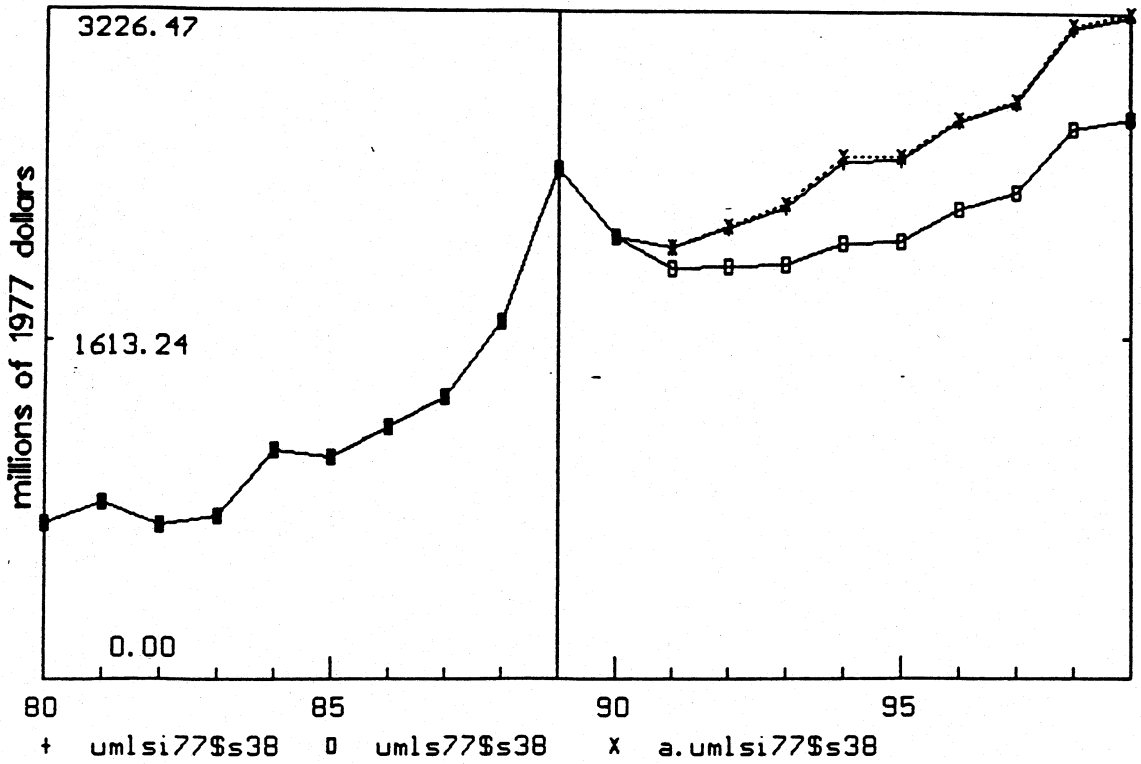
35 Computers USA to Mexico



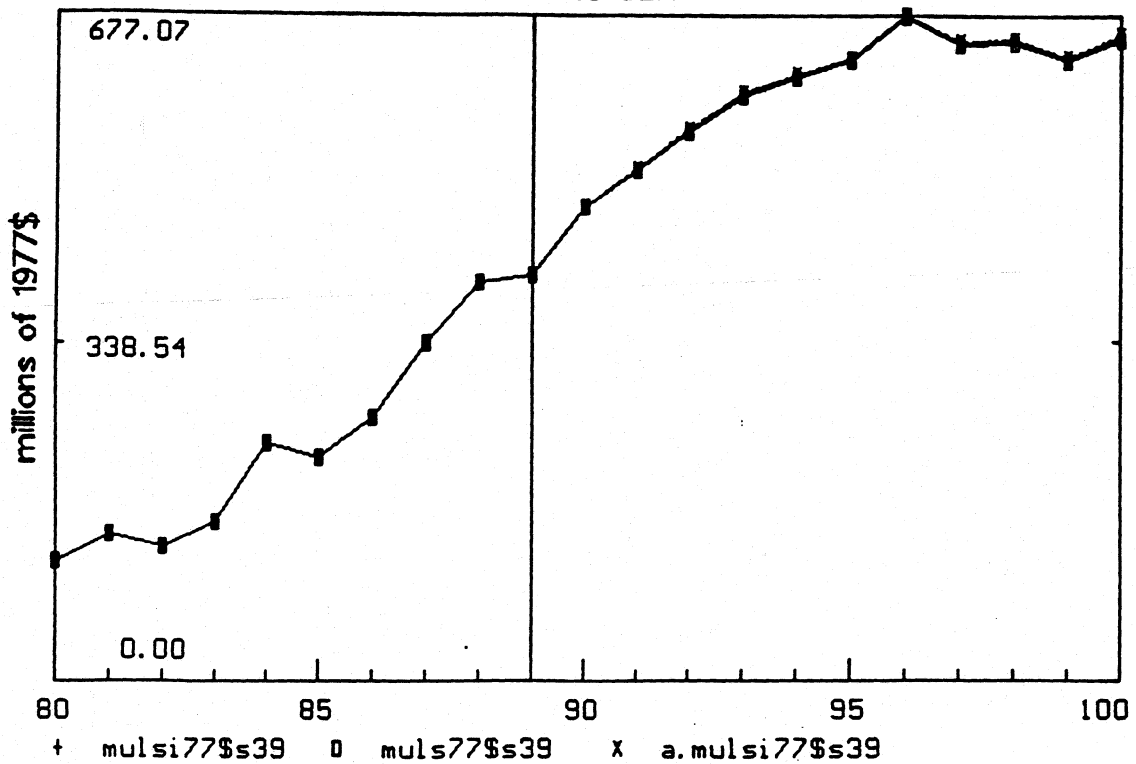
38 Communic eq and electronic comp
Mexico to USA



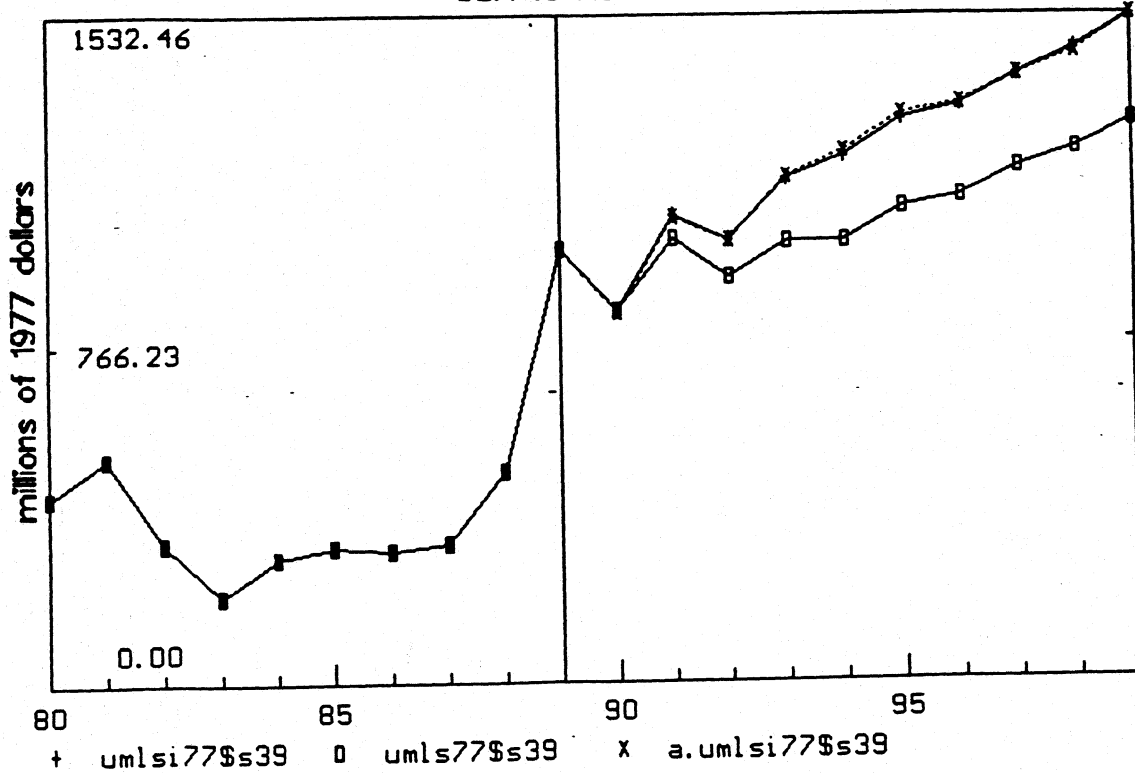
38 Communic eq and electronic comp
USA to Mexico



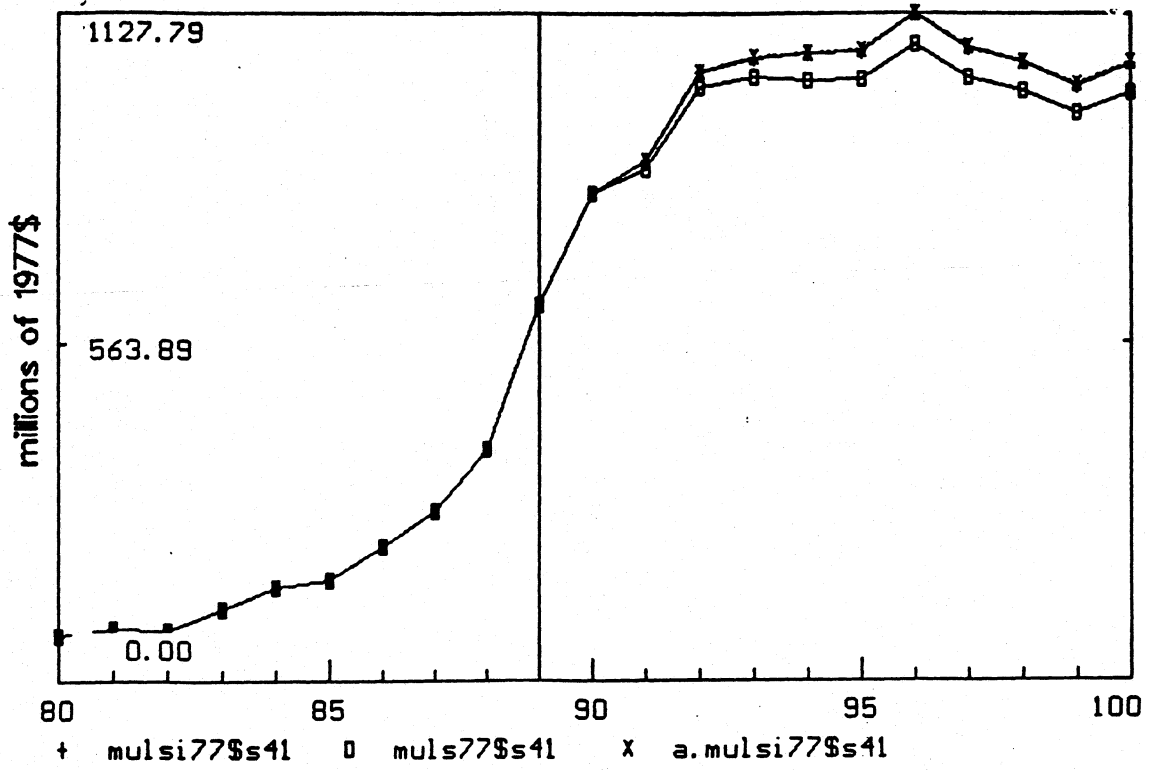
39 Elec indl apparatus
Mexico to USA



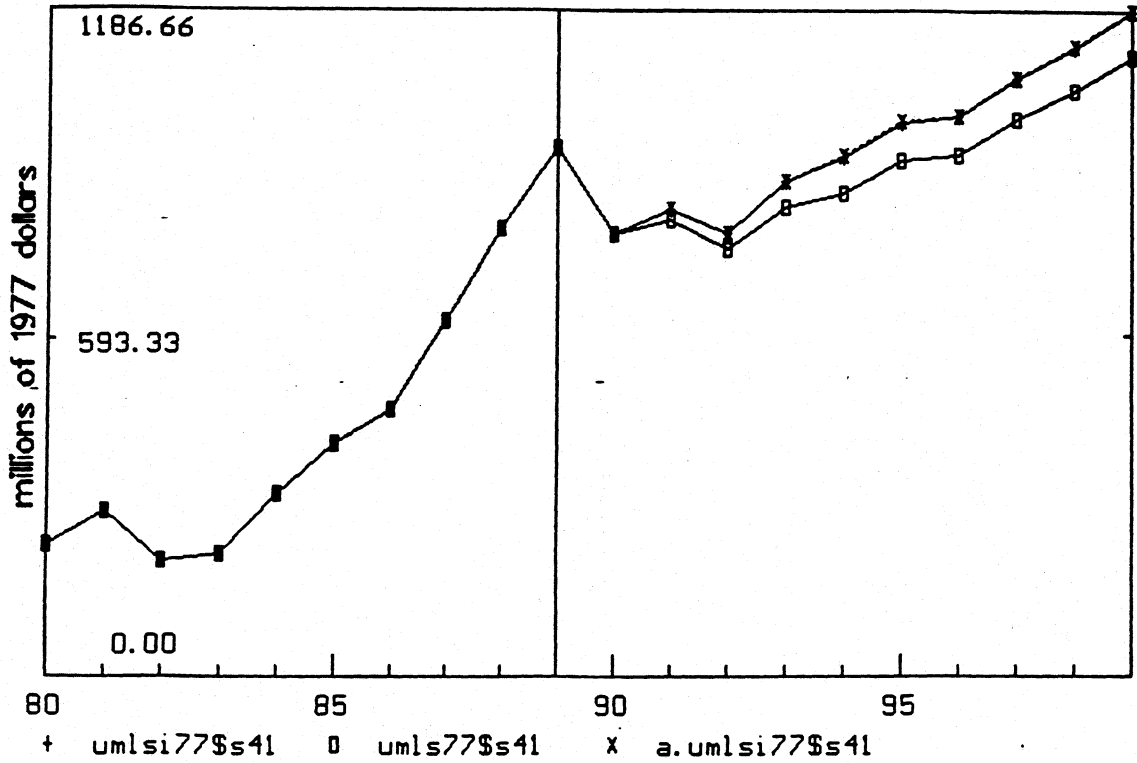
39 Elec indl apparatus
USA to Mexico



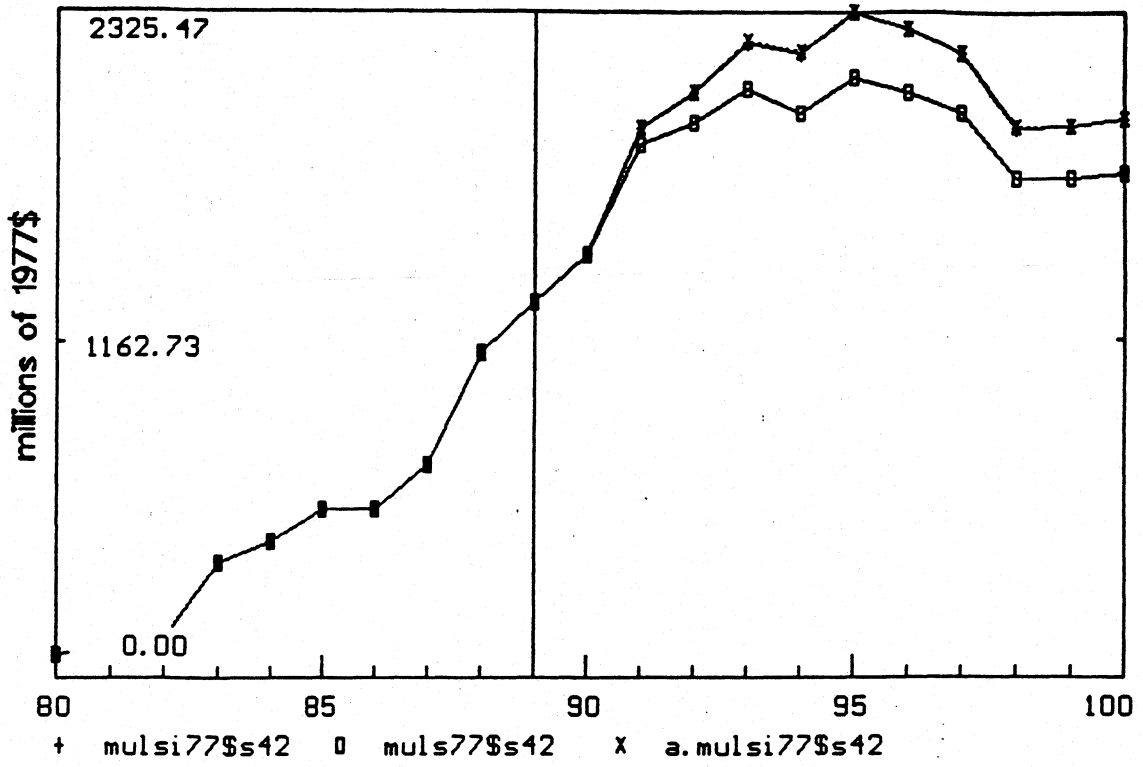
41 Elec lighting & wiring eq. & nec
Mexico to USA



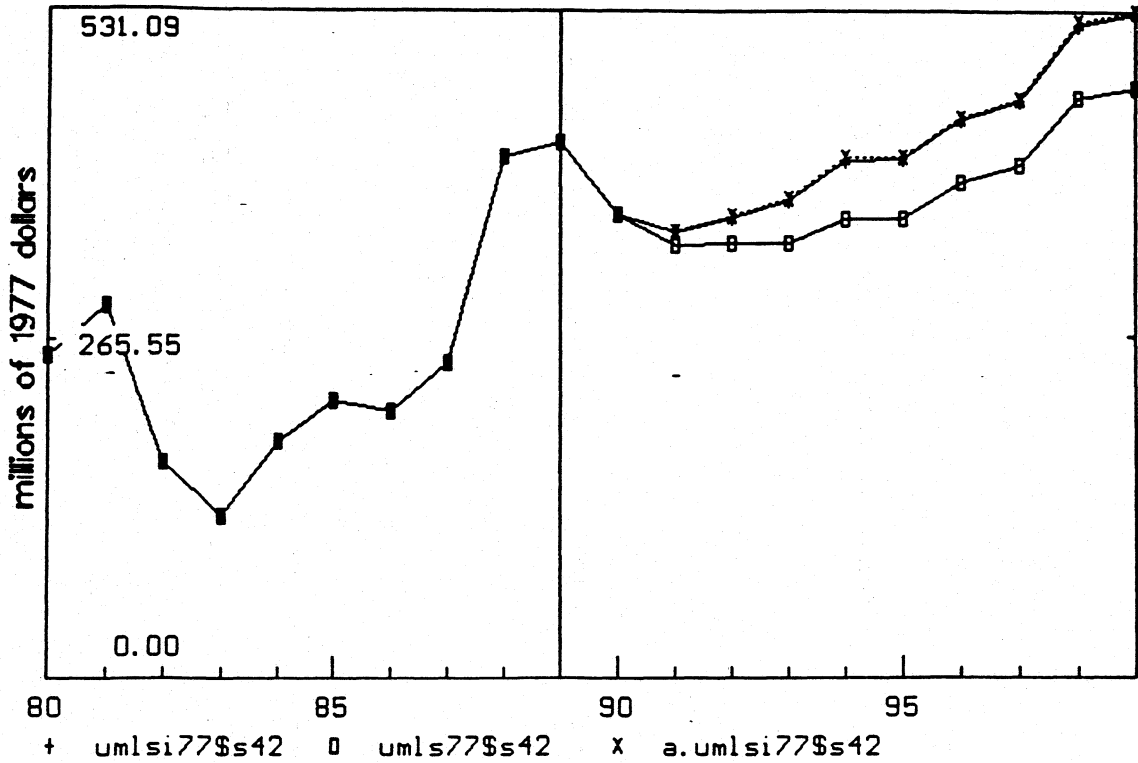
41 Elec lighting & wiring eq. & nec
USA to Mexico



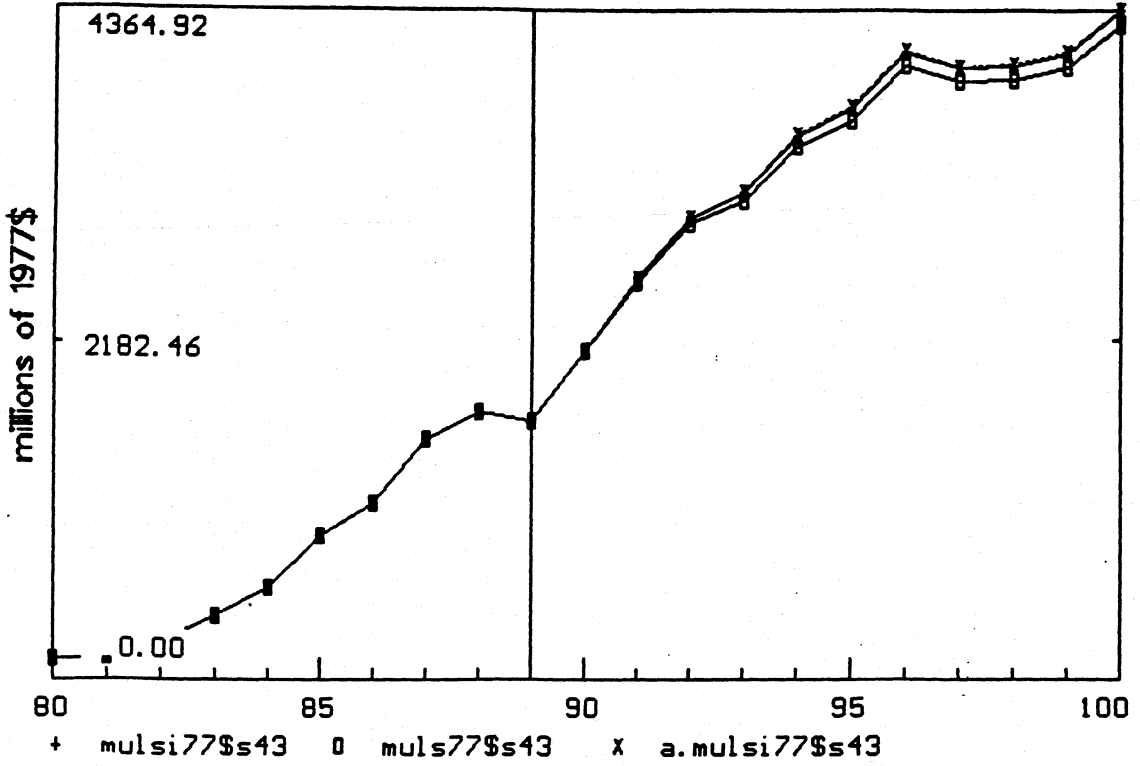
42 TV sets, radios, phonographs
Mexico to USA



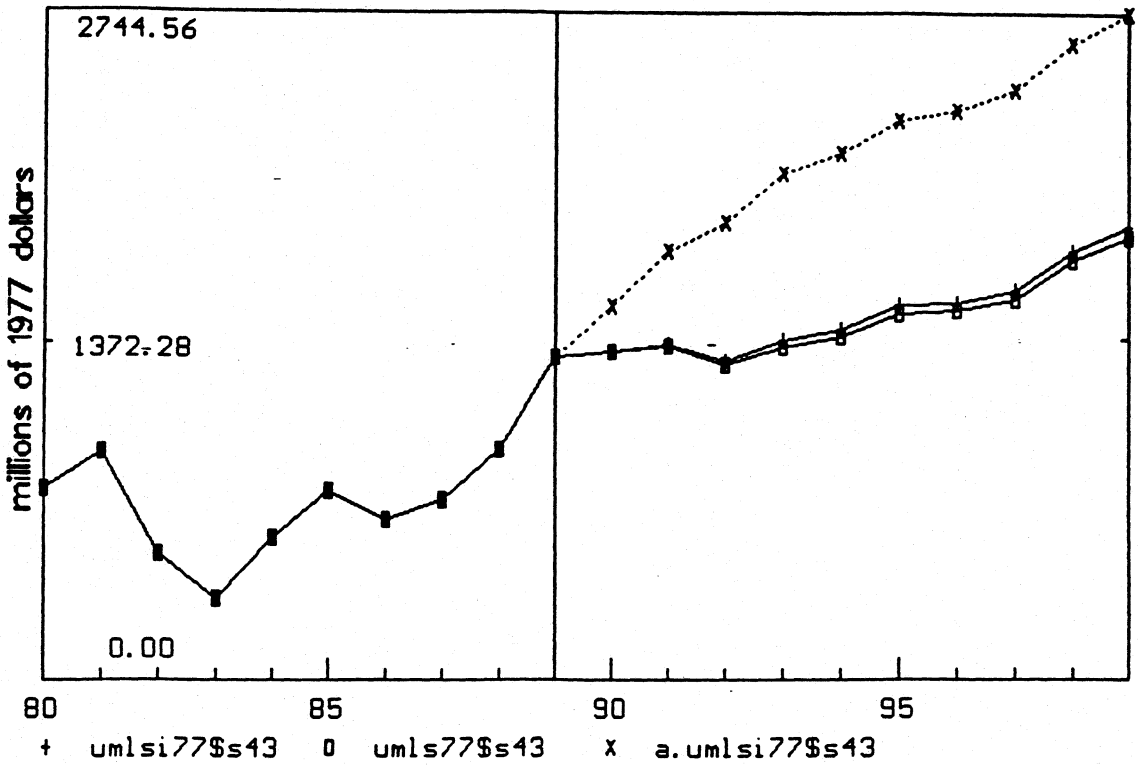
42 TV sets, radios, phonographs
USA to Mexico



43 Motor vehicles
Mexico to USA



43 Motor vehicles
USA to Mexico



CHAPTER VIII

EFFECTS ON INDIVIDUAL STATES

(Revised version, 1991 February 18)

The implications for non-agricultural private employment by industry by state of any run of the LIFT model can be computed with a group of state allocation models. We will describe the nature of the allocation models and present results for state totals. The detailed results by industry for all states are on the diskettes which accompany this report.

The basic data for these models comes from only two sources: (1) LIFT employment by industry and (2) the establishment data Employment and Earning (EE) tape of the Bureau of Labor Statistics. The coverage of the EE tape varies considerably from state to state, but roughly it can be counted on for employment by most of the 20 two-digit manufacturing industries, and for very variable coverage of the mining, trade, utilities, and service sectors.

Our strategy is to relate employment in a state's export industries to national employment in the corresponding industries and then to relate employment in the remaining industries to employment in those export base industries. "Export" here refers to export from the state. The manufacturing and mining industries were always among the base industries. In a few states, finance was also counted as an export industry. All others were local.

The form of the regression function for the export industries was

$$\log(\text{semp}_i) = b_1 + b_2 \log(\text{nemp}_i) + b_3 \text{time}$$

where semp_i and nemp_i are state and national employment, respectively, in corresponding industries. A similar equation was used for local industries but with total state employment in the export industries replacing national employment, or being used with it, as a regressor. Each state model required some degree of hand crafting to adjust the sector definitions and the beginning dates of the regression to conform with the availability of data for the state. In a few cases, hand intervention was necessary to get reasonable coefficients.

Summary results are shown for total non-agricultural private employment in each state in the tables labeled "Unscaled Results" in Appendix A of this Chapter. This table shows three lines for each state. First is its total employment in the base. The second and third show the percentage by which that employment changes in the TO and TAB scenarios, respectively. The diskettes accompanying this report contain data banks and software with which detailed reports can be generated for each state. These tables differ slightly from those in the original version of this report because of revision of the state models.

Only the District of Colombia, Hawaii, and Rhode Island have ever-so-slightly negative effects. States with an increase of more than .08 of one percent under TO are: Alabama,

Arizona, Idaho, Indiana, Kansas, Louisiana, Michigan, Nevada, New Hampshire, Ohio, Oklahoma, Oregon, South Dakota, Utah, West Virginia, and Wisconsin. In most of them, agriculture is important. States with gains of under 0.02 percent include Maine, New Jersey, New York, Vermont and Virginia. Generally, and without wishing to tread on any toes, they appear to be states which have not participated strongly in recent economic growth and therefore do not claim their proportional share of the growth under the FTA.

There is, however, a problem in the consistency of these results with the national totals. Namely, if the state results are summed across all states, they show a gain more than twice as large as the gain shown by the national model. This discrepancy can be seen by comparing the "Total State Models" panel at the bottom of page VII - A - 3 with the "Total Lift" panel just below it. Industry-by-industry checking showed that the gain in manufacturing and mining was almost exactly the same in the sum of the state models as in the national model. The discrepancies were in the other sectors. And here arises an interesting theoretical problem. For each individual state in isolation, it is quite plausible that an increase in its mining and manufacturing base leads to an increase in employment in its local industry as well. In the nation as a whole, however, the stimulus of the increase in employment in manufacturing is attenuated by a crowding out of other industry. The difference is, essentially, that the labor force of an individual state is quite flexible; workers can move in or out relatively easily. For the nation as a whole, however, the labor force is much more fixed. Thus we find that what makes sense for each of the states separately does not sum to something sensible for the nation as a whole.

To adjust for this problem, we present also a set of tables with results scaled to match national totals. The results were scaled to the LIFT totals at the level of 1-digit industries: Mining, Manufacturing, Construction, Trade, Utilities, Transportation, Services, and Government. This scaling increased slightly the employment shown for the base in each state because the LIFT employment includes self-employed people and unpaid family workers, not included in the EE data. Each alternative scenario then underwent a similar scaling to the national totals for that scenario. The results are shown on pages 4 to 6 of the appendix. In this table, the "Total State Models" and "Total Lift" are identical to within rounding error. Nearly all of the positive effects are smaller in the scaled tables, and some of the states which were near zero effect have become negative. This negative effect is simply a result of being in a tighter economy, stimulated by growth in industries in which these states do not participate strongly.

CHAPTER VIII - APPENDIX

UNSCALED, NON-AGRICULTURAL, PRIVATE EMPLOYMENT BY STATE

Line 1: Base; employment in thousands of jobs
 Line 2: FTA Scenario TO; deviation in percent from Base
 Line 3: FTA Scenario TAB; deviation in percent from Base

	1989	1990	1991	1992	1995	2000
Alabama	1273.50	1301.93	1327.35	1350.43	1413.26	1545.83
	0.00	-0.00	0.03	0.05	0.08	0.10
	0.00	-0.01	0.03	0.06	0.08	0.09
Alaska	158.40	165.05	171.93	179.19	201.41	243.52
	0.00	0.00	0.02	0.03	0.02	0.05
	0.00	0.00	0.04	0.04	0.02	0.07
Arizona	1211.10	1280.04	1338.99	1398.55	1569.46	1934.64
	0.00	0.00	0.04	0.07	0.10	0.12
	0.00	0.00	0.06	0.09	0.11	0.12
Arkansas	737.50	750.39	763.49	775.15	807.09	869.67
	0.00	-0.00	0.02	0.04	0.06	0.07
	0.00	0.00	0.04	0.06	0.08	0.09
California	10519.50	10688.86	10953.31	11221.99	12039.66	13560.63
	0.00	-0.00	0.03	0.04	0.06	0.07
	0.00	-0.00	0.04	0.06	0.07	0.07
Colorado	1200.90	1237.94	1266.60	1292.11	1355.36	1456.73
	0.00	-0.00	0.03	0.03	0.03	0.05
	0.00	0.01	0.06	0.07	0.07	0.08
Connecticut	1470.70	1503.74	1531.55	1556.94	1622.17	1740.53
	0.00	-0.00	0.02	0.03	0.04	0.08
	0.00	0.00	0.03	0.04	0.05	0.09
Delaware	295.30	298.74	302.45	306.39	317.85	341.63
	0.00	-0.00	0.02	0.03	0.05	0.06
	0.00	0.00	0.04	0.05	0.07	0.08
District of Columbia	405.10	408.55	411.25	413.47	417.01	425.00
	0.00	0.00	0.01	0.00	-0.01	0.01
	0.00	0.00	0.01	0.01	-0.00	0.01
Florida	4470.70	4564.41	4718.51	4877.03	5358.68	6344.32
	0.00	-0.00	0.03	0.04	0.05	0.05
	0.00	-0.00	0.05	0.07	0.06	0.06
Georgia	2432.60	2514.51	2576.03	2631.66	2784.47	3104.72
	0.00	-0.00	0.03	0.03	0.05	0.06
	0.00	-0.01	0.03	0.05	0.05	0.06
Hawaii	403.30	407.49	412.36	417.09	428.07	448.91
	0.00	0.00	0.01	0.00	-0.01	0.01
	0.00	0.00	0.02	0.01	-0.00	0.01
Idaho	289.20	294.10	297.66	300.42	306.88	320.11
	0.00	-0.00	0.04	0.06	0.11	0.13
	0.00	0.01	0.09	0.12	0.17	0.18
Illinois	4440.90	4455.14	4486.46	4508.04	4558.02	4652.51
	0.00	-0.00	0.03	0.04	0.06	0.07
	0.00	0.00	0.04	0.06	0.09	0.09
Indiana	2108.80	2114.30	2131.66	2145.89	2189.28	2293.31
	0.00	-0.00	0.03	0.06	0.11	0.11
	0.00	0.01	0.07	0.12	0.18	0.18

	1989	1990	1991	1992	1995	2000
Iowa	983.10	991.99	1000.79	1007.28	1023.63	1056.25
	0.00	-0.00	0.02	0.03	0.05	0.06
	0.00	0.01	0.04	0.06	0.07	0.08
Kansas	856.60	886.15	918.36	952.78	1082.52	1393.57
	0.00	-0.00	0.04	0.07	0.14	0.12
	0.00	0.01	0.07	0.14	0.21	0.19
Kentucky	1181.00	1202.72	1223.53	1242.58	1296.91	1393.72
	0.00	-0.00	0.03	0.05	0.08	0.10
	0.00	0.00	0.06	0.10	0.13	0.15
Louisiana	1203.90	1212.38	1226.29	1237.27	1260.91	1312.96
	0.00	-0.00	0.03	0.03	0.04	0.06
	0.00	-0.01	0.03	0.05	0.04	0.05
Maine	449.00	460.80	471.24	479.82	502.65	547.29
	0.00	-0.00	0.02	0.02	0.02	0.02
	0.00	-0.00	0.03	0.03	0.02	0.02
Maryland	1738.70	1764.29	1792.70	1820.25	1882.47	1990.60
	0.00	-0.00	0.02	0.02	0.00	0.02
	0.00	0.00	0.03	0.03	0.01	0.03
Massachusetts	2709.10	2759.42	2804.05	2844.20	2953.74	3146.25
	0.00	-0.00	0.02	0.03	0.03	0.04
	0.00	0.00	0.04	0.05	0.05	0.05
Michigan	3277.30	3320.07	3362.19	3391.76	3484.88	3680.14
	0.00	-0.00	0.04	0.05	0.09	0.10
	0.00	0.02	0.09	0.15	0.21	0.21
Minnesota	1763.60	1796.10	1823.54	1847.11	1911.88	2031.10
	0.00	-0.00	0.03	0.04	0.06	0.07
	0.00	0.00	0.05	0.07	0.09	0.09
Mississippi	721.10	729.82	741.35	750.27	776.88	832.89
	0.00	-0.00	0.03	0.04	0.07	0.08
	0.00	-0.02	0.03	0.06	0.07	0.08
Missouri	1949.40	1970.30	1990.49	2007.52	2052.00	2148.96
	0.00	-0.00	0.02	0.03	0.05	0.05
	0.00	0.00	0.05	0.07	0.08	0.09
Montana	220.40	224.04	228.43	234.03	257.54	328.58
	0.00	-0.00	0.04	0.07	0.13	0.11
	0.00	0.01	0.07	0.13	0.19	0.18
Nebraska	565.20	572.62	579.65	585.48	602.94	634.30
	0.00	-0.00	0.02	0.03	0.06	0.07
	0.00	0.00	0.04	0.06	0.09	0.09
Nevada	511.50	422.29	408.91	422.41	522.31	803.36
	0.00	0.00	0.03	0.07	0.12	0.18
	0.00	-0.01	0.03	0.07	0.09	0.17
New Hampshire	456.90	474.25	492.58	509.31	558.49	651.28
	0.00	-0.00	0.05	0.07	0.12	0.15
	0.00	0.00	0.07	0.11	0.15	0.17
New Jersey	3151.00	3208.94	3266.48	3320.79	3460.16	3700.58
	0.00	-0.00	0.01	0.02	0.02	0.03
	0.00	-0.00	0.02	0.03	0.02	0.03
New Mexico	415.90	431.79	445.99	459.83	499.16	575.65
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	-0.01	0.02	0.03	0.03	0.04
New York	6818.00	6855.03	6894.28	6925.07	6992.56	7125.18
	0.00	-0.00	0.02	0.02	0.03	0.03
	0.00	-0.00	0.02	0.03	0.03	0.03
North Carolina	2594.50	2652.45	2715.80	2776.73	2957.21	3322.12
	0.00	-0.00	0.02	0.04	0.06	0.07
	0.00	-0.01	0.02	0.04	0.05	0.06

	1989	1990	1991	1992	1995	2000
North Dakota	194.70	199.77	205.88	212.96	238.63	288.77
	0.00	-0.00	0.02	0.03	0.05	0.05
	0.00	0.01	0.05	0.10	0.15	0.16
Ohio	4111.50	4130.47	4168.77	4205.46	4328.26	4612.98
	0.00	-0.00	0.04	0.05	0.09	0.09
	0.00	0.01	0.08	0.12	0.16	0.15
Oklahoma	899.80	911.56	929.39	943.45	986.72	1079.02
	0.00	-0.00	0.05	0.08	0.15	0.18
	0.00	0.00	0.09	0.13	0.19	0.22
Oregon	991.50	1004.71	1033.44	1069.19	1194.80	1527.13
	0.00	-0.00	0.07	0.13	0.26	0.31
	0.00	0.01	0.11	0.20	0.30	0.36
Pennsylvania	4417.80	4438.47	4467.92	4492.55	4541.52	4638.68
	0.00	-0.00	0.02	0.03	0.03	0.04
	0.00	-0.00	0.03	0.04	0.04	0.05
Rhode Island	402.10	407.18	411.56	415.30	421.88	438.30
	0.00	0.00	0.01	0.00	-0.00	0.02
	0.00	0.00	0.02	0.01	-0.01	0.01
South carolina	1231.50	1365.33	1389.09	1414.05	1488.13	1632.07
	0.00	-0.00	0.02	0.03	0.05	0.08
	0.00	-0.01	0.02	0.04	0.05	0.07
South Dakota	213.60	204.82	210.48	218.28	249.60	325.84
	0.00	-0.00	0.05	0.09	0.17	0.17
	0.00	0.01	0.08	0.14	0.23	0.22
Tennessee	1818.90	1831.52	1847.27	1859.75	1885.11	1951.73
	0.00	-0.00	0.02	0.03	0.04	0.05
	0.00	-0.00	0.03	0.04	0.04	0.06
Texas	5587.40	5760.95	5933.40	6086.02	6498.19	7236.63
	0.00	-0.00	0.03	0.03	0.04	0.06
	0.00	0.00	0.04	0.05	0.06	0.07
Utah	578.10	598.98	621.13	642.60	707.31	837.48
	0.00	-0.00	0.03	0.05	0.09	0.11
	0.00	-0.00	0.05	0.07	0.11	0.14
Vermont	216.90	223.04	229.53	236.29	256.69	295.07
	0.00	-0.00	0.01	0.01	-0.01	0.01
	0.00	0.00	0.02	0.01	-0.01	0.01
Virginia	2300.50	2358.99	2418.78	2478.55	2637.82	2932.50
	0.00	-0.00	0.02	0.02	0.00	0.02
	0.00	-0.00	0.02	0.03	0.00	0.02
Washington	1666.00	1728.66	1790.72	1856.42	2084.74	2647.32
	0.00	-0.00	0.02	0.03	0.06	0.05
	0.00	0.01	0.05	0.08	0.11	0.10
West Virginia	487.60	488.67	491.51	494.01	496.37	502.77
	0.00	-0.00	0.03	0.05	0.08	0.09
	0.00	0.00	0.05	0.08	0.10	0.12
Wisconsin	1895.70	1922.90	1953.97	1981.89	2063.11	2221.42
	0.00	-0.00	0.03	0.05	0.10	0.11
	0.00	0.01	0.06	0.09	0.13	0.13
Wyoming	138.60	143.04	148.48	154.62	175.42	222.84
	0.00	-0.00	0.04	0.06	0.07	0.09
	0.00	-0.00	0.06	0.08	0.08	0.11
Total State Models	90135.91	91639.67	93327.56	94950.23	99701.79	109347.38
	0.00	-0.00	0.03	0.04	0.06	0.07
	0.00	0.00	0.04	0.06	0.08	0.09
Total Lift	99109.56	100815.33	102457.78	103948.25	107706.27	114267.59
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.03	0.04	0.04	0.05

SCALED, NON-AGRICULTURAL, PRIVATE EMPLOYMENT BY STATE

Line 1: Base; employment in thousands of jobs
 Line 2: FTA Scenario TO; deviation in percent from Base
 Line 3: FTA Scenario TAB; deviation in percent from Base

	1989	1990	1991	1992	1995	2000
Alabama	1394.00	1425.85	1450.54	1471.51	1520.34	1613.44
	0.00	-0.00	0.02	0.04	0.06	0.07
	0.00	-0.01	0.02	0.04	0.05	0.05
Alaska	176.04	183.38	190.46	197.77	219.00	255.55
	0.00	0.00	0.02	0.01	-0.01	0.02
	0.00	0.00	0.03	0.02	-0.01	0.03
Arizona	1339.75	1416.28	1478.37	1539.75	1704.87	2033.05
	0.00	0.00	0.03	0.05	0.07	0.08
	0.00	0.00	0.04	0.06	0.07	0.08
Arkansas	804.76	819.13	831.57	841.86	865.14	903.70
	0.00	0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.03	0.04	0.04	0.06
California	11583.78	11778.97	12046.02	12309.48	13036.51	14205.79
	0.00	-0.00	0.02	0.02	0.02	0.03
	0.00	-0.00	0.03	0.03	0.02	0.03
Colorado	1323.30	1364.37	1393.16	1417.22	1466.42	1523.18
	0.00	-0.00	0.02	0.01	0.00	0.02
	0.00	0.01	0.04	0.04	0.03	0.05
Connecticut	1613.53	1650.54	1678.05	1701.80	1751.87	1822.82
	0.00	-0.00	0.01	0.01	0.01	0.05
	0.00	0.00	0.02	0.01	0.01	0.05
Delaware	325.05	329.00	332.38	335.74	343.77	357.83
	0.00	0.00	0.01	0.02	0.02	0.03
	0.00	0.00	0.02	0.03	0.03	0.04
District of Columbia	450.12	454.03	455.73	456.32	451.69	440.25
	0.00	0.00	-0.00	-0.02	-0.04	-0.03
	0.00	0.00	-0.00	-0.02	-0.04	-0.03
Florida	4958.37	5070.49	5231.82	5392.90	5844.21	6671.62
	0.00	-0.00	0.02	0.02	0.01	0.01
	0.00	-0.00	0.03	0.04	0.01	0.01
Georgia	2673.89	2765.27	2827.67	2881.43	3012.33	3260.28
	0.00	-0.00	0.02	0.02	0.02	0.03
	0.00	-0.01	0.02	0.02	0.01	0.02
Hawaii	449.68	453.98	458.03	461.66	467.04	472.94
	0.00	0.00	-0.00	-0.02	-0.05	-0.03
	0.00	0.00	0.00	-0.02	-0.05	-0.03
Idaho	317.71	323.23	326.33	328.28	330.70	333.88
	0.00	-0.00	0.03	0.05	0.09	0.10
	0.00	0.01	0.08	0.10	0.14	0.15
Illinois	4874.58	4893.90	4918.13	4928.01	4917.36	4857.60
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.03	0.04	0.05	0.05
Indiana	2305.25	2313.72	2328.29	2337.68	2355.88	2395.50
	0.00	-0.00	0.02	0.04	0.08	0.09
	0.00	0.01	0.06	0.09	0.14	0.14
Iowa	1075.32	1085.30	1092.17	1095.65	1097.39	1093.83
	0.00	0.00	0.01	0.01	0.02	0.03
	0.00	0.01	0.03	0.03	0.04	0.04

	1989	1990	1991	1992	1995	2000
Kansas	940.17	973.43	1006.72	1041.31	1166.37	1445.98
	0.00	-0.00	0.03	0.06	0.11	0.09
	0.00	0.01	0.06	0.11	0.17	0.16
Kentucky	1295.70	1319.76	1339.66	1356.64	1397.55	1454.68
	0.00	-0.00	0.02	0.04	0.06	0.07
	0.00	0.00	0.05	0.07	0.10	0.11
Louisiana	1332.29	1341.79	1353.79	1361.50	1368.24	1376.74
	0.00	-0.00	0.02	0.02	0.01	0.02
	0.00	-0.01	0.02	0.02	0.00	0.01
Maine	494.06	507.27	517.72	525.82	544.01	573.86
	0.00	0.00	0.01	0.00	-0.01	-0.01
	0.00	0.00	0.01	0.00	-0.02	-0.02
Maryland	1935.12	1965.29	1993.17	2018.53	2060.94	2109.22
	0.00	0.00	0.01	-0.00	-0.03	-0.01
	0.00	0.00	0.01	-0.00	-0.04	-0.02
Massachusetts	2973.99	3030.84	3073.90	3109.63	3185.46	3276.76
	0.00	-0.00	0.01	0.01	0.00	0.01
	0.00	0.00	0.02	0.02	0.01	0.01
Michigan	3573.40	3621.21	3659.17	3680.76	3730.61	3812.40
	0.00	-0.00	0.03	0.04	0.07	0.08
	0.00	0.02	0.08	0.12	0.17	0.18
Minnesota	1933.03	1969.28	1994.86	2014.59	2056.19	2111.34
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.04	0.04	0.05	0.05
Mississippi	786.19	796.13	806.86	814.12	832.03	865.52
	0.00	-0.00	0.02	0.03	0.05	0.06
	0.00	-0.02	0.02	0.03	0.04	0.04
Missouri	2140.94	2165.84	2183.93	2196.74	2216.74	2248.29
	0.00	-0.00	0.01	0.02	0.02	0.02
	0.00	0.00	0.03	0.04	0.04	0.05
Montana	243.30	247.40	251.49	256.61	277.54	339.18
	0.00	-0.00	0.03	0.06	0.10	0.08
	0.00	0.01	0.06	0.10	0.16	0.14
Nebraska	621.64	630.18	636.47	640.84	650.85	662.20
	0.00	-0.00	0.01	0.02	0.03	0.04
	0.00	0.00	0.02	0.03	0.05	0.05
Nevada	572.20	472.24	455.32	468.11	567.12	829.86
	0.00	0.00	0.02	0.05	0.08	0.15
	0.00	-0.01	0.02	0.04	0.04	0.12
New Hampshire	501.72	521.53	541.03	558.38	605.66	686.53
	0.00	-0.00	0.04	0.06	0.09	0.12
	0.00	0.00	0.06	0.08	0.10	0.13
New Jersey	3467.56	3533.68	3590.27	3640.62	3745.80	3880.57
	0.00	0.00	0.01	0.00	-0.02	-0.01
	0.00	-0.00	0.01	0.00	-0.02	-0.01
New Mexico	461.50	479.66	494.35	508.04	543.65	605.69
	0.00	0.00	0.01	0.01	-0.00	0.01
	0.00	-0.01	0.01	0.00	-0.01	0.00
New York	7513.30	7558.35	7586.11	7598.94	7570.70	7458.14
	0.00	0.00	0.01	0.01	-0.01	-0.00
	0.00	-0.00	0.01	0.01	-0.01	-0.01
North Carolina	2835.67	2900.95	2964.69	3023.91	3182.61	3471.98
	0.00	0.00	0.02	0.02	0.03	0.04
	0.00	-0.01	0.01	0.02	0.01	0.02

	1989	1990	1991	1992	1995	2000
North Dakota	215.37	221.07	227.22	234.17	258.18	299.90
	0.00	0.00	0.01	0.02	0.02	0.02
	0.00	0.01	0.04	0.08	0.11	0.12
Ohio	4494.41	4517.69	4550.00	4577.04	4646.96	4787.95
	0.00	-0.00	0.03	0.04	0.06	0.06
	0.00	0.01	0.06	0.09	0.12	0.12
Oklahoma	987.34	1000.14	1016.92	1028.76	1060.35	1120.47
	0.00	-0.00	0.04	0.07	0.12	0.15
	0.00	0.00	0.07	0.10	0.16	0.18
Oregon	1087.11	1101.03	1129.43	1164.54	1282.28	1582.03
	0.00	-0.00	0.06	0.12	0.23	0.28
	0.00	0.01	0.09	0.17	0.27	0.33
Pennsylvania	4849.37	4875.58	4897.94	4911.01	4898.29	4839.92
	0.00	-0.00	0.01	0.01	0.01	0.01
	0.00	-0.00	0.01	0.01	0.00	0.01
Rhode Island	439.83	445.21	448.65	451.15	450.82	451.68
	0.00	0.00	0.00	-0.01	-0.03	-0.01
	0.00	0.00	0.01	-0.02	-0.05	-0.02
South carolna	1350.18	1489.28	1512.00	1535.46	1597.04	1700.91
	0.00	0.00	0.01	0.02	0.03	0.05
	0.00	-0.01	0.01	0.02	0.02	0.04
South Dakota	235.06	225.41	230.88	238.52	268.36	337.21
	0.00	-0.00	0.04	0.07	0.14	0.14
	0.00	0.01	0.07	0.12	0.19	0.19
Tennessee	1990.34	2005.01	2017.97	2026.17	2028.30	2038.40
	0.00	-0.00	0.01	0.01	0.01	0.02
	0.00	-0.00	0.02	0.02	0.01	0.02
Texas	6157.38	6352.96	6528.55	6675.95	7030.94	7575.09
	0.00	0.00	0.02	0.01	0.01	0.03
	0.00	0.00	0.03	0.03	0.02	0.03
Utah	635.94	659.43	682.38	703.84	764.46	877.61
	0.00	0.00	0.02	0.03	0.06	0.09
	0.00	-0.00	0.03	0.05	0.08	0.10
Vermont	239.61	246.51	253.18	259.98	278.77	309.55
	0.00	0.00	0.00	-0.01	-0.04	-0.02
	0.00	0.00	0.00	-0.02	-0.06	-0.04
Virginia	2548.34	2614.20	2674.91	2733.66	2870.63	3083.33
	0.00	0.00	0.01	-0.00	-0.03	-0.01
	0.00	-0.00	0.01	-0.00	-0.04	-0.02
Washington	1833.95	1904.14	1967.47	2032.45	2247.54	2750.33
	0.00	-0.00	0.01	0.02	0.03	0.02
	0.00	0.01	0.03	0.05	0.07	0.07
West Virginia	535.97	537.09	538.88	539.99	535.03	523.46
	0.00	0.00	0.02	0.04	0.05	0.07
	0.00	0.00	0.04	0.06	0.07	0.08
Wisconsin	2068.31	2099.09	2128.31	2152.31	2210.60	2306.14
	0.00	0.00	0.02	0.04	0.07	0.08
	0.00	0.01	0.04	0.06	0.10	0.10
Wyoming	154.16	159.23	164.86	171.08	191.13	233.47
	0.00	0.00	0.03	0.04	0.04	0.06
	0.00	-0.00	0.05	0.05	0.04	0.08
Total State Models	99109.57	100815.34	102457.79	103948.23	107706.28	114267.62
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.03	0.04	0.04	0.05
Total Lift	99109.56	100815.33	102457.78	103948.25	107706.27	114267.59
	0.00	-0.00	0.02	0.02	0.03	0.04
	0.00	0.00	0.03	0.04	0.04	0.05

	1989	1990	1991	1992	1995	2000
Electrical Machinery	269.6	266.2	269.7	276.3	303.6	376.5
	0.0	0.0	0.3	0.7	1.4	1.4
	0.0	0.0	0.5	0.9	1.6	1.5
Communication Eq.	32.1	176.4	178.8	183.3	201.1	248.5
	0.0	0.0	0.3	0.5	0.9	0.9
	0.0	0.0	0.4	0.6	1.0	1.0
Electrical Apparatus	12.4	26.0	26.6	27.2	30.2	37.8
	0.0	0.0	0.0	0.1	0.3	0.4
	0.0	0.0	0.0	0.2	0.3	0.4
Household appliances	4.3	3.8	3.6	3.4	3.2	2.8
	0.0	0.0	0.0	0.0	-0.0	-0.0
	0.0	0.0	0.0	0.0	-0.0	-0.0
Electri Lighting Eq.	23.9	44.6	46.2	48.5	56.8	77.1
	0.0	0.0	0.0	0.1	0.2	0.2
	0.0	0.0	0.1	0.1	0.2	0.3
Household Audio Eq.	15.6	15.4	14.6	13.8	12.2	10.4
	0.0	0.0	0.0	-0.0	-0.0	-0.1
	0.0	0.0	0.0	-0.0	-0.0	-0.1
Transportation Equip.	304.0	307.8	302.0	295.9	273.7	304.0
	0.0	-0.0	0.2	0.1	0.1	-0.1
	0.0	0.0	0.3	0.4	0.3	0.1
Motor Vehicles	34.7	33.4	32.3	31.1	29.5	29.0
	0.0	-0.0	0.0	-0.0	-0.0	-0.0
	0.0	0.0	0.1	0.2	0.2	0.2
Aerospace	166.2	250.4	246.5	242.5	223.5	254.5
	0.0	0.0	0.2	0.1	0.1	-0.0
	0.0	0.0	0.2	0.2	0.1	-0.1
Ships	14.5	14.2	13.6	13.0	11.0	10.0
	0.0	-0.0	0.0	-0.0	-0.0	-0.0
	0.0	0.0	0.0	-0.0	-0.0	-0.0
Other Trans. Eq.	9.4	9.8	9.5	9.4	9.7	10.6
	0.0	-0.0	0.0	0.0	-0.0	-0.0
	0.0	-0.0	0.0	0.0	-0.0	-0.0
Instruments	239.8	256.1	264.8	268.8	290.5	342.5
	0.0	0.0	0.2	0.4	0.8	0.9
	0.0	-0.0	0.2	0.4	0.8	0.9
Misc. Manufacturing	37.5	37.1	37.0	37.2	38.7	41.7
	0.0	0.0	0.0	0.0	0.0	0.1
	0.0	-0.0	0.0	0.0	0.0	0.0
Utilities	599.5	614.9	625.1	633.4	657.4	703.9
	0.0	-0.0	0.1	0.3	0.5	0.4
	0.0	-0.0	0.2	0.4	0.5	0.5
Railroads	18.3	17.6	16.8	16.0	13.9	11.3
	0.0	-0.0	0.0	0.0	0.0	0.0
	0.0	-0.0	0.0	0.0	0.0	0.0
Communications	151.1	155.2	155.7	155.3	151.3	142.3
	0.0	-0.0	0.0	0.1	0.2	0.2
	0.0	-0.0	0.1	0.2	0.2	0.2

	1989	1990	1991	1992	1995	2000
Electrical, Gas, Water, San.	84.8	86.7	88.4	90.0	94.9	103.6
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
Other	345.3	355.5	364.2	372.1	397.3	446.7
	0.0	-0.0	0.1	0.1	0.2	0.3
	0.0	0.0	0.1	0.2	0.3	0.3
Trade	2968.4	3080.2	3175.1	3256.7	3496.6	3963.8
	0.0	0.0	0.6	0.8	1.4	2.0
	0.0	-0.0	1.0	1.2	1.8	2.2
Finance, Insur, Real Estate	836.3	852.0	858.0	864.6	890.7	930.4
	0.0	0.0	-0.0	-0.2	-0.3	-0.3
	0.0	0.0	0.0	-0.2	-0.4	-0.4
Finance and Insurance	632.5	645.4	647.2	647.7	651.2	658.4
	0.0	0.0	-0.0	-0.2	-0.2	-0.2
	0.0	0.0	-0.0	-0.2	-0.3	-0.3
Real Estate	203.8	206.5	210.9	216.9	239.5	272.0
	0.0	0.0	0.0	-0.0	-0.1	-0.1
	0.0	0.0	0.0	0.0	-0.1	-0.0
Services	3271.5	3366.0	3463.6	3560.3	3845.3	4455.8
	0.0	-0.0	0.9	1.5	2.7	3.5
	0.0	-0.0	1.4	2.4	3.5	3.9
Movies and Recreation	250.6	250.2	252.7	257.8	268.4	278.9
	0.0	0.0	-0.0	-0.1	-0.1	-0.1
	0.0	0.0	-0.0	0.0	0.0	0.0
Other Services	3020.9	3115.8	3210.8	3302.5	3577.0	4176.9
	0.0	-0.0	1.0	1.5	2.8	3.6
	0.0	-0.0	1.5	2.4	3.5	3.9
Total Government	2002.1	2002.8	2005.1	2010.0	2033.8	2093.1
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
Total Federal Government	357.1	356.9	357.6	359.0	364.8	378.3
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
State and Local Gov't	1645.1	1645.9	1647.5	1651.0	1669.1	1714.7
	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0

CHAPTER IX

SOME OCCUPATIONAL IMPACTS

In the preceding chapters, we have described the scenarios produced with the US and Mexican models to examine free merchandise trade between the US and Mexico. Here, we examine the occupational implications of the removal of tariff and non-tariff barriers in these scenarios.

The occupational impacts have been calculated with an occupation-by-industry matrix prepared by the Bureau of Labor Statistics. The matrix we are using has a 1982 base matrix and a projected 1995 matrix. We have extrapolated the occupation-by-industry matrix to the year 2000. To calculate the differences in occupational requirements for each alternate scenario, we simply take the differences, by industry sector, between employment under the Base scenario and employment under the alternative scenario and multiply these differences by the matrix for 1995 and for 2000.

The first page of the appendix to this chapter shows a summary of the differences, by occupational category, between employment under the Base scenario and employment under each of the two alternative scenarios. The following pages present the detailed table for TAB, which includes both tariff reductions and the removal of non-tariff barriers to trade.

The Base forecast is one in which the economy is at full employment. The two FTA outlooks maintain full employment, but with a slight shift in the composition of economic activity. The modest changes in occupational needs reflect this difference in the mix of activity.

The most striking result is how very little change would occur for most occupations under a FTA. Most changes are negligible; we have noticed no change greater than 0.6 percent of the base levels in either direction.

In both FTA alternatives, our outlook shows a slight increase in exports, principally in durable goods (especially in machinery) and in agriculture. In terms of occupations, these changes show up as increases in the numbers of engineers, the metalworking and machine building occupations, and farmers.

The main negative impact of free trade is found in the Apparel industry as a result of the removal of non-tariff barriers, which results in a loss of 2,960 jobs for sewers and stitchers. This amount is a reduction of 0.43 percent of the workers in this occupational category. The other noticeable loss of jobs (4,620 in 1995) is found among the construction craftsmen. It is small relative to total employment in these trades, a reduction of 0.11 percent from the Base level. It results from the slight shift in the composition of economic activity. That is, in a full-employment economy, the slight growth in exports can occur only if a slight amount of activity is squeezed out elsewhere. In our runs, that "crowding out" occurred in the construction and, to an even lesser degree, the service sectors.

Chapter IX - Appendix

Differences in Occupational Requirements: Base versus TO

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Total, all occupations	29.02	43.75	0.02	0.03
Professional, technical, and related workers	4.73	6.81	0.02	0.03
Managers, officials, and proprietors	2.35	3.87	0.02	0.03
Sales workers	0.33	1.45	0.00	0.01
Clerical workers	3.59	5.95	0.01	0.02
Craft and related workers	3.11	6.04	0.02	0.04
Operatives	14.57	15.73	0.10	0.10
Service workers	-1.46	1.32	-0.01	0.01
Laborers, except farm	1.42	2.41	0.02	0.03
Farmers and farm workers	0.38	0.16	0.02	0.01

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Total, all occupations	43.72	64.19	0.03	0.05
Professional, technical, and related workers	6.23	8.66	0.03	0.04
Managers, officials, and proprietors	2.88	4.94	0.02	0.04
Sales workers	0.67	2.21	0.01	0.02
Clerical workers	4.34	7.38	0.02	0.03
Craft and related workers	3.62	8.06	0.02	0.05
Operatives	16.91	17.92	0.11	0.12
Service workers	-1.94	1.47	-0.01	0.01
Laborers, except farm	2.88	4.53	0.04	0.06
Farmers and farm workers	8.10	9.03	0.38	0.44
Total, all occupations	43.72	64.19	0.03	0.05

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Professional, technical, and related workers	6.23	8.66	0.03	0.04
Engineers	2.86	2.87	0.17	0.16
Aero-astronautic engineers	0.03	0.01	0.04	0.01
Chemical engineers	0.10	0.11	0.13	0.14
Civil engineers	0.03	0.10	0.01	0.04
Electrical engineers	1.05	0.97	0.23	0.20
Industrial engineers	0.60	0.57	0.31	0.28
Mechanical engineers	0.64	0.69	0.21	0.21
Metallurgical engineers	0.04	0.04	0.20	0.19
Mining engineers	0.00	0.01	0.05	0.10
Nuclear engineers	0.00	0.00	0.02	0.04
Petroleum engineers	0.00	0.01	0.00	0.05
All other engineers	0.37	0.36	0.14	0.13
Life and physical scientists	0.23	0.28	0.07	0.08
Agricultural scientists	0.02	0.02	0.06	0.07
Biological scientists	0.03	0.03	0.04	0.05
Chemists	0.14	0.15	0.14	0.14
Geologists	0.01	0.03	0.02	0.05
Medical scientists	0.00	0.01	0.04	0.06
Physicists	0.02	0.02	0.08	0.09
All other life and physical scientists	0.02	0.02	0.04	0.04
Mathematical specialists	0.02	0.03	0.04	0.04
Actuaries	-0.00	0.00	-0.00	0.01
Mathematicians	0.01	0.01	0.06	0.06
Statisticians	0.01	0.01	0.05	0.06
All other mathematical specialists	0.00	0.00	0.02	0.03
Engineering and science technicians	2.02	2.15	0.13	0.13
Broadcast technicians	0.00	0.00	0.02	0.02
Civil engineering technicians	0.02	0.04	0.03	0.06
Drafters	0.41	0.50	0.13	0.14
Electrical and electronic technicians	0.81	0.78	0.15	0.13
Estimators and drafters, utilities	0.00	0.01	0.04	0.05
Industrial engineering technicians	0.08	0.08	0.26	0.24
Mechanical engineering technicians	0.19	0.19	0.30	0.27
Surveyors	0.01	0.04	0.02	0.05
All other engineering and science technicians	0.48	0.51	0.10	0.10
Medical workers, except technicians	-0.73	-0.23	-0.02	-0.01
Chiropractors	-0.01	-0.01	-0.03	-0.02
Dentists	-0.07	-0.04	-0.03	-0.02
Dietitians	-0.02	-0.01	-0.03	-0.02
Nurses, registered	-0.48	-0.20	-0.03	-0.01
Optometrists	-0.01	-0.01	-0.03	-0.02
Pharmacists	-0.02	0.02	-0.01	0.01
Physicians	-0.19	-0.10	-0.03	-0.02
Podiatrists	-0.01	-0.00	-0.03	-0.02
Therapists	-0.08	-0.04	-0.03	-0.01
Respiratory therapists	-0.02	-0.01	-0.03	-0.02
Manual arts, music, recreational therapists	-0.01	-0.00	-0.03	-0.02
Occupational therapists	-0.01	-0.01	-0.03	-0.01
Physical therapists	-0.02	-0.01	-0.03	-0.02
Speech pathologists and audiologists	-0.01	-0.00	-0.02	-0.01
All other therapists	-0.01	-0.01	-0.03	-0.01
Veterinarians	0.14	0.16	0.33	0.39
Health technologists and technicians	-0.26	-0.13	-0.03	-0.02
Clinical laboratory technologists and technicians	-0.09	-0.05	-0.03	-0.02
Biochemistry technologists and technicians	-0.01	-0.00	-0.03	-0.02
Blood bank technology specialists	-0.01	-0.00	-0.03	-0.02
Cytotechnologists	-0.00	-0.00	-0.03	-0.02
Histologic technologists	-0.00	-0.00	-0.03	-0.02
Medical laboratory technicians	-0.02	-0.01	-0.03	-0.02
Medical laboratory technologists	-0.04	-0.02	-0.03	-0.02
Microbiology technologists	-0.00	-0.00	-0.03	-0.02
Dental hygienists	-0.03	-0.02	-0.03	-0.02
Dietetic technicians	-0.01	-0.00	-0.03	-0.02
EEG technologists	-0.00	-0.00	-0.03	-0.02
EKG technicians	-0.01	-0.00	-0.03	-0.02
Emergency medical technicians	0.00	0.00	0.04	0.04
Health record technicians	-0.01	-0.00	-0.03	-0.02
Physical therapy assistants	-0.02	-0.01	-0.03	-0.02

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Physician assistants	-0.01	-0.00	-0.03	-0.02
Radiologic technologists	-0.05	-0.03	-0.03	-0.02
Radiologic technologists and nucl. med. t	-0.01	-0.01	-0.03	-0.02
X-ray technicians	-0.03	-0.02	-0.03	-0.02
Surgical technicians	-0.02	-0.01	-0.03	-0.02
All other health technologists and technic	-0.02	-0.01	-0.02	-0.01
Technicians, exc. health, science, and eng.	0.25	0.28	0.05	0.06
Airplane pilots	0.05	0.05	0.04	0.03
Air traffic controllers	0.00	0.00	0.00	0.00
Embalmers	-0.01	-0.00	-0.06	-0.03
Flight engineers	0.00	0.00	0.02	0.01
Library technicians	-0.00	-0.00	-0.01	-0.00
Radio operators	0.00	0.00	0.01	0.01
Tool programmers, numerical control	0.09	0.09	0.43	0.40
All other tech., exc. health, science, and	0.12	0.15	0.05	0.06
Computer specialists	0.75	0.85	0.08	0.08
Computer programmers	0.43	0.47	0.09	0.09
Computer systems analysts	0.32	0.38	0.07	0.07
Social scientists	0.00	0.04	0.00	0.01
Economists	0.01	0.01	0.01	0.03
Financial analysts	-0.00	-0.00	-0.01	-0.00
Psychologists	-0.02	-0.01	-0.02	-0.01
Sociologists	0.00	0.00	0.01	0.02
Urban and regional planners	0.00	0.00	0.01	0.01
All other social scientists	0.02	0.03	0.03	0.05
Teachers	-0.49	-0.26	-0.01	-0.00
Adult education teachers	-0.00	0.00	-0.00	0.00
Athletic coaches	-0.00	-0.00	-0.01	-0.00
College and university faculty	-0.06	-0.03	-0.01	-0.00
Dance instructors	-0.02	-0.01	-0.04	-0.03
Extension service specialists	-0.00	-0.00	-0.01	-0.00
Graduate assistants	-0.01	-0.01	-0.01	-0.00
Preschool, kindergarten, elem. sch. teache	-0.26	-0.14	-0.01	-0.01
Preschool teachers	-0.08	-0.04	-0.02	-0.01
Kindergarten and elementary school teache	-0.18	-0.10	-0.01	-0.00
Secondary school teachers	-0.11	-0.06	-0.01	-0.00
Vocational education teachers	-0.02	-0.01	-0.01	-0.01
All other teachers	-0.02	-0.01	-0.01	-0.00
Selected writers, artists, and entertainers	0.22	0.46	0.02	0.03
Actors	-0.03	-0.02	-0.06	-0.04
Athletes	0.01	0.02	0.06	0.09
Commercial and graphic artists and designe	0.09	0.14	0.05	0.07
Dancers	-0.01	-0.00	-0.06	-0.03
Designers	0.15	0.19	0.06	0.07
Musicians	-0.07	-0.04	-0.05	-0.03
Painters, artistic	-0.02	-0.01	-0.06	-0.04
Photographers	0.02	0.05	0.02	0.04
Public relations specialists	0.02	0.04	0.02	0.03
Radio and TV announcers and newscasters	0.01	0.01	0.03	0.03
Announcers	0.01	0.01	0.03	0.03
Broadcast news analysts	0.00	0.00	0.03	0.03
Reporters and correspondents	0.02	0.02	0.02	0.03
Singers	-0.01	-0.01	-0.06	-0.03
Sports instructors	-0.04	-0.02	-0.06	-0.04
Writers and editors	0.08	0.10	0.05	0.05
Writers, artists, entertainers, nec	-0.01	-0.00	-0.04	-0.03
Other professional and technical workers	1.36	2.32	0.02	0.04
Accountants and auditors	0.55	0.80	0.04	0.06
Architects	0.06	0.10	0.05	0.07
Assessors	0.00	0.00	0.00	0.00
Audiovisual specialists, education	-0.00	-0.00	-0.01	-0.00
Brokers' floor reps and security traders	-0.00	-0.00	-0.02	-0.01
Buyers, retail and wholesale trade	0.00	0.07	0.00	0.02
Claim examiners, property/casualty insuran	-0.01	-0.01	-0.03	-0.03
Claims takers, unemployment benefits	0.00	0.00	0.00	0.00
Clergy	-0.14	-0.07	-0.04	-0.02
Cost estimators	-0.10	-0.01	-0.07	-0.01
Counselors	-0.03	-0.01	-0.01	-0.01
County agricultural specialists	-0.00	-0.00	-0.01	-0.00

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Credit analysts, chief	-0.00	-0.00	-0.03	-0.03
Credit analysts	-0.01	-0.01	-0.03	-0.03
Curriculum specialists	-0.00	-0.00	-0.01	-0.00
Directors, religious education and activit	-0.02	-0.01	-0.04	-0.02
Employment interviewers	0.03	0.06	0.03	0.06
Foresters and conservationists	0.02	0.03	0.08	0.09
Insurance investigators	-0.00	-0.00	-0.03	-0.03
Judges	0.00	0.00	0.00	0.00
Law clerks	0.02	0.04	0.03	0.06
Lawyers	0.28	0.48	0.04	0.06
Lease buyers	-0.00	0.00	-0.01	0.04
Legal assistants	0.04	0.07	0.04	0.06
Librarians	-0.01	0.00	-0.00	0.00
Magistrates	0.00	0.00	0.00	0.00
Personnel and labor relations specialists	0.17	0.19	0.07	0.08
Purchasing agents and buyers	0.28	0.31	0.12	0.13
Media buyers	0.01	0.02	0.04	0.07
Purchasing agents and/or buyers	0.28	0.29	0.13	0.13
Recreation workers	-0.04	-0.02	-0.03	-0.01
Safety inspectors	-0.00	-0.00	-0.03	-0.03
Social workers	-0.09	-0.05	-0.02	-0.01
Caseworkers	-0.08	-0.04	-0.02	-0.01
Community organization workers	-0.01	-0.01	-0.02	-0.01
Special agents, insurance	-0.01	-0.01	-0.03	-0.03
Tax examiners, collectors, and revenue age	0.00	0.00	0.00	0.00
Tax preparers	0.00	0.02	0.01	0.03
Title examiners and abstractors	-0.00	-0.00	-0.03	-0.02
Underwriters	-0.02	-0.03	-0.03	-0.03
All other professional workers	0.39	0.41	0.04	0.04
Managers, officials, and proprietors	2.88	4.94	0.02	0.04
Auto parts department managers	0.00	0.01	0.00	0.02
Auto service department managers	0.00	0.02	0.00	0.02
Captains, water vessel	0.01	0.01	0.06	0.06
Chief executives, legis	0.00	0.00	0.00	0.00
Construction inspectors, public administra	0.00	0.00	0.00	0.00
Health and regulatory inspectors	0.00	0.00	0.00	0.00
Postmasters and mail superintendents	0.00	0.00	0.00	0.00
Railroad conductors	0.01	0.01	0.06	0.04
Restaurant, cafe, and bar managers	-0.00	0.13	-0.00	0.02
Sales managers, retail trade	0.00	0.07	0.00	0.02
School administrators	-0.01	-0.01	-0.01	-0.00
Assistant principals	-0.00	-0.00	-0.01	-0.00
Principals	-0.01	-0.00	-0.01	-0.00
Superintendents	-0.00	-0.00	-0.01	-0.00
Store managers	0.01	0.24	0.00	0.02
Wholesalers	0.00	0.07	0.00	0.02
All other managers	2.86	4.39	0.03	0.05
Sales workers	0.67	2.21	0.01	0.02
Broker and market operators, commodities	-0.00	-0.00	-0.03	-0.03
Contribution solicitors	-0.00	-0.00	-0.04	-0.02
Crating and moving estimators	0.01	0.01	0.04	0.04
Real estate agents and brokers	-0.21	-0.08	-0.04	-0.02
Real estate brokers	-0.02	-0.01	-0.03	-0.01
Sales agents, sales reps., real estate	-0.19	-0.08	-0.04	-0.02
Real estate appraisers	-0.01	-0.01	-0.03	-0.02
Sales agents and brokers, insurance	-0.12	-0.13	-0.03	-0.03
Sales agents and reps., financial services	-0.01	-0.01	-0.03	-0.03
Sales representatives, nontechnical	0.01	0.16	0.00	0.02
Sales representatives, technical	0.02	0.35	0.00	0.02
Sales clerks	0.02	0.68	0.00	0.02
Security salesworkers	-0.03	-0.03	-0.03	-0.03
Travel agents	0.05	0.05	0.04	0.04
Vendors	-0.00	-0.00	-0.03	-0.01
All other sales workers	0.95	1.23	0.06	0.08
Clerical workers	4.34	7.38	0.02	0.03
Adjustment clerks	0.00	0.01	0.00	0.01
Admissions evaluators	-0.00	-0.00	-0.01	-0.00
Bank tellers	-0.18	-0.20	-0.03	-0.03
New accounts tellers	-0.02	-0.02	-0.03	-0.03

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Tellers	-0.16	-0.18	-0.03	-0.03
Bookkeepers and accounting clerks	0.28	0.65	0.01	0.03
Accounting clerks	0.27	0.39	0.03	0.04
Bookkeepers, hand	0.01	0.26	0.00	0.02
Brokerage clerks	-0.01	-0.01	-0.03	-0.03
Car rental clerks	0.01	0.02	0.04	0.06
Cashiers	-0.06	0.36	-0.00	0.01
Checking clerks	-0.01	-0.01	-0.03	-0.03
Circulation clerks	0.00	0.00	0.02	0.02
Claims adjusters	-0.02	-0.02	-0.02	-0.02
Claims clerks	-0.02	-0.02	-0.02	-0.02
Claims examiner, insurance	-0.02	-0.02	-0.03	-0.03
Clerical supervisors	0.10	0.14	0.02	0.02
Coin machine operators and currency sorter	-0.00	-0.00	-0.03	-0.03
Collectors, bill and account	0.00	0.02	0.00	0.01
Court clerks	0.00	0.00	0.00	0.00
Credit authorizers	0.00	0.01	0.00	0.02
Credit clerks, banking and insurance	-0.02	-0.02	-0.03	-0.03
Credit reporters	0.01	0.01	0.03	0.05
Customer service representatives	0.03	0.04	0.03	0.04
Customer service reps., print. and publish	0.00	0.00	0.02	0.02
Desk clerks, bowling floor	-0.01	-0.01	-0.07	-0.04
Desk clerks, except bowling floor	-0.07	-0.04	-0.06	-0.03
Dispatchers, police, fire, and ambulance	-0.00	-0.00	-0.00	-0.00
Dispatchers, vehicle service or work	0.06	0.08	0.05	0.06
Eligibility workers, welfare	-0.00	-0.00	-0.00	-0.00
File clerks	0.04	0.08	0.01	0.02
General clerks, office	0.49	0.94	0.02	0.03
In-file operators	0.00	0.01	0.04	0.07
Insurance checkers	-0.01	-0.01	-0.03	-0.03
Insurance clerks, except medical	-0.00	-0.00	-0.03	-0.03
Insurance clerks, medical	-0.04	-0.02	-0.03	-0.02
Library assistants	-0.00	0.00	-0.00	0.00
License clerks	0.00	0.00	0.00	0.00
Loan closers	-0.02	-0.02	-0.03	-0.03
Mail carriers and postal clerks	0.00	0.00	0.00	0.00
Postal mail carriers	0.00	0.00	0.00	0.00
Postal service clerks	0.00	0.00	0.00	0.00
Mail clerks	-0.00	0.01	-0.00	0.01
Messengers	0.00	0.01	0.00	0.01
Meter readers, utilities	0.02	0.03	0.04	0.05
Mortgage closing clerks	-0.01	-0.01	-0.03	-0.03
Office machine operators	0.41	0.57	0.03	0.04
Bookkeeping and billing operators	0.01	0.04	0.00	0.01
Bookkeeping, billing machine operators	0.03	0.06	0.01	0.02
Proof machine operators	-0.02	-0.02	-0.03	-0.03
Transit clerks	-0.00	-0.00	-0.03	-0.03
Computer operating personnel	0.33	0.43	0.04	0.05
Computer operators	0.19	0.24	0.05	0.06
Data entry operators	0.11	0.15	0.04	0.05
Peripheral EDP equipment operators	0.04	0.05	0.05	0.06
Duplicating machine operators	0.02	0.03	0.05	0.06
All other office machine operators	0.05	0.06	0.04	0.05
Order clerks	0.16	0.21	0.04	0.05
Payroll and timekeeping clerks	0.04	0.10	0.01	0.03
Personnel clerks	0.07	0.08	0.06	0.06
Policy change clerks	-0.01	-0.01	-0.03	-0.03
Procurement clerks	0.07	0.07	0.14	0.13
Production clerks	0.50	0.49	0.22	0.21
Proofreaders	0.00	0.01	0.02	0.03
Protective signal operators	0.01	0.01	0.04	0.07
Purchase and sales clerks, security	-0.00	-0.00	-0.03	-0.03
Rate clerks, freight	0.01	0.01	0.04	0.04
Raters	-0.02	-0.02	-0.03	-0.03
Real estate clerks	-0.01	-0.00	-0.03	-0.01
Receptionists	-0.04	0.06	-0.01	0.01
Reservation agents and transport. tick. cl	0.02	0.02	0.02	0.01
Reservation agents	0.01	0.01	0.02	0.01
Ticket agents	0.01	0.01	0.02	0.01

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Travel counselors, auto club	-0.00	-0.00	-0.04	-0.02
Safe deposit clerks	-0.00	-0.01	-0.03	-0.03
Secretaries and stenographers	0.87	1.44	0.02	0.04
Secretaries	0.76	1.30	0.02	0.04
Stenographers	0.11	0.14	0.04	0.05
Typists	0.23	0.37	0.02	0.03
Service clerks	0.00	0.01	0.00	0.02
Shipping and receiving clerks	0.30	0.35	0.07	0.07
Shipping packers	0.24	0.28	0.06	0.06
Sorting clerks, banking	-0.00	-0.00	-0.03	-0.03
Statement clerks	-0.01	-0.01	-0.03	-0.03
Statistical clerks	0.04	0.06	0.04	0.05
Stock clerks, stockroom and warehouse	0.42	0.57	0.04	0.05
Survey workers	0.03	0.06	0.04	0.06
Switchboard operators/receptionists	0.09	0.14	0.03	0.04
Teachers' aides	-0.09	-0.05	-0.01	-0.01
Telephone ad takers, newspapers	0.00	0.00	0.02	0.02
Telegraph operators	0.00	0.00	0.03	0.03
Telephone operators	0.06	0.10	0.02	0.03
Switchboard operators	0.03	0.08	0.01	0.03
Central office operators	0.02	0.02	0.03	0.03
Directory assistance operators	0.01	0.01	0.03	0.03
Title searchers	-0.00	-0.00	-0.03	-0.02
Town clerks	0.00	0.00	0.00	0.00
Traffic agents	0.01	0.01	0.04	0.04
Traffic clerks	0.00	0.00	0.03	0.03
Transportation agents	0.01	0.00	0.02	0.01
Weighers	0.01	0.02	0.04	0.05
Welfare investigators	-0.00	-0.00	-0.00	-0.00
Worksheet clerks	-0.00	-0.00	-0.03	-0.03
All other clerical workers	0.36	0.47	0.02	0.03
Craft and related workers	3.62	8.06	0.02	0.05
Construction craft workers	-4.62	-2.16	-0.11	-0.05
Insulation workers	-0.10	-0.06	-0.14	-0.07
Bricklayers and stonemasons	-0.24	-0.12	-0.13	-0.06
Bricklayers	-0.25	-0.13	-0.14	-0.07
Refractory materials repairers	0.02	0.02	0.40	0.37
Stone masons	-0.01	-0.01	-0.15	-0.07
Carpenters	-1.62	-0.86	-0.13	-0.06
Cement masons and terrazzo workers	-0.23	-0.12	-0.15	-0.07
Drywall applicators and tapers	-0.20	-0.11	-0.16	-0.08
Drywall applicators	-0.14	-0.08	-0.16	-0.08
Tapers	-0.06	-0.03	-0.16	-0.08
Electricians	-0.37	0.00	-0.05	0.00
Fitters, pipelaying	-0.02	-0.01	-0.14	-0.07
Floor covering installers	-0.14	-0.07	-0.12	-0.06
Carpet cutters, carpet layers	-0.09	-0.04	-0.11	-0.05
Floor layers	-0.06	-0.03	-0.14	-0.07
Glaziers	-0.04	-0.01	-0.06	-0.02
Ironworkers	-0.17	-0.08	-0.12	-0.05
Reinforcing-iron workers	-0.08	-0.05	-0.16	-0.08
Structural steel workers	-0.09	-0.03	-0.10	-0.03
Lathers	-0.02	-0.01	-0.16	-0.08
Painters and paperhangers	-0.63	-0.32	-0.12	-0.06
Painters, construction and maintenance	-0.58	-0.30	-0.12	-0.05
Paperhangers	-0.04	-0.03	-0.16	-0.08
Plasterers	-0.04	-0.02	-0.16	-0.08
Plumbers and pipefitters	-0.51	-0.20	-0.09	-0.03
Roofers	-0.24	-0.14	-0.16	-0.08
Shipwrights	-0.00	-0.00	-0.06	-0.04
Tile setters	-0.05	-0.03	-0.15	-0.08
Mechanics, repairers, and installers	1.63	2.59	0.03	0.05
Air conditioning, refrig., and heating mec	-0.20	-0.09	-0.08	-0.04
Aircraft mechanics	0.02	0.00	0.02	0.00
Appliance installers and repairers	-0.01	0.01	-0.01	0.01
Gas and electric appliance repairers	-0.01	0.01	-0.01	0.01
Household appliance installers	-0.01	-0.00	-0.03	-0.01
Automotive body repairers	0.06	0.12	0.03	0.05
Auto seat cover and top installers	0.00	0.01	0.04	0.06

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Automotive mechanics	0.25	0.55	0.02	0.04
Auto repair service estimators	0.00	0.00	0.01	0.02
Bicycle repairers	-0.01	-0.00	-0.03	-0.01
Coin machine servicers and repairers	-0.01	0.00	-0.01	0.00
Communications equipment mechanics	0.02	0.02	0.03	0.03
Central office repairers	0.01	0.01	0.03	0.03
Frame wirers	0.00	0.00	0.03	0.03
Trouble locators, test desk	0.00	0.00	0.03	0.03
All other communications equipment mechan	0.00	0.00	0.03	0.03
Computer service technicians	0.05	0.07	0.05	0.05
Diesel mechanics	0.05	0.10	0.02	0.03
Electrical instrument and tool repairers	0.02	0.02	0.15	0.13
Electric motor repairers	0.01	0.01	0.02	0.04
Line installers and cable splicers	0.00	0.05	0.00	0.02
Cable installers	0.00	0.00	0.03	0.03
Cable repairers	0.00	0.00	0.03	0.03
Cable splicers	0.01	0.01	0.02	0.03
Line installers, repairers	-0.01	0.03	-0.01	0.01
Troubleshooters, power line	0.01	0.01	0.05	0.05
Engineering equipment mechanics	0.00	0.03	0.00	0.03
Farm equipment mechanics	0.01	0.01	0.03	0.04
Hydroelectric machine mechanics	0.01	0.01	0.04	0.05
Instrument repairers	0.07	0.07	0.13	0.13
Knitting machine fixers	-0.01	-0.01	-0.13	-0.15
Locksmiths	-0.01	-0.01	-0.05	-0.03
Loom fixers	0.00	0.00	0.04	0.04
Industrial machinery repairers	0.67	0.74	0.17	0.18
Maintenance repairers general utility	0.33	0.48	0.04	0.05
Marine mechanics and repairers	-0.00	0.00	-0.00	0.01
Millwrights	0.23	0.24	0.21	0.21
Mine machinery mechanics	0.01	0.02	0.11	0.20
Musical instrument repairers	-0.01	-0.00	-0.03	-0.01
Office machine repairers	0.00	0.02	0.00	0.02
Pinsetter mechanics, automatic	-0.01	-0.00	-0.07	-0.04
Protective signal installers and repairers	0.00	0.01	0.03	0.06
Radio and television service technicians	0.00	0.02	0.00	0.01
Railroad car repairers	0.01	0.01	0.06	0.04
Section repairers and setters	0.00	0.00	0.03	0.03
Sewing machine mechanics	-0.06	-0.08	-0.53	-0.69
Shoe repair occupations	-0.01	-0.01	-0.05	-0.04
Telephone and PBX installers and repairers	0.03	0.03	0.03	0.03
Installers, repairers, section maintainer	0.02	0.02	0.03	0.03
Station installers	0.01	0.01	0.03	0.03
Treatment plant mechanics	0.00	0.00	0.01	0.01
Water meter installers	0.00	0.00	0.00	0.00
All other mechanics, repairers, and instal	0.08	0.12	0.03	0.04
Metalworking craft workers, except mechanic	2.79	3.00	0.29	0.29
Blacksmiths	0.00	0.00	0.08	0.09
Boilermakers	-0.01	0.01	-0.02	0.02
Coremakers, hand, bench, floor	0.03	0.03	0.48	0.44
Forging press operators	0.03	0.04	0.43	0.42
Heat treaters, annealers, and temperers	0.10	0.10	0.49	0.45
Machinists and layout markers	0.84	0.88	0.30	0.30
Layout markers, metal	0.08	0.09	0.44	0.43
Machinists	0.76	0.79	0.29	0.29
Job and die setters	0.52	0.54	0.49	0.47
Machine tool setters, metalworking	0.32	0.32	0.52	0.48
Punch press setters, metal	0.09	0.09	0.39	0.38
Setters, plastic molding machine	0.06	0.07	0.56	0.66
Shear and slitter setters	0.03	0.03	0.42	0.40
All other job and die setters	0.03	0.03	0.44	0.42
Molders, metal	0.11	0.11	0.47	0.43
Patternmakers	0.07	0.07	0.54	0.49
Patternmakers, metal	0.04	0.04	0.55	0.50
Patternmakers, wood	0.04	0.04	0.54	0.48
Rolling mill operators and helpers	0.04	0.04	0.44	0.38
Sheet-metal workers and tinsmiths	0.05	0.18	0.02	0.06
Toolmakers and diemakers	0.95	0.95	0.55	0.49
All other metalworking craft workers	0.05	0.05	0.36	0.36

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Printing trades craft workers	0.16	0.21	0.03	0.04
Bookbinders	0.01	0.01	0.02	0.02
Bookbinders, hand	0.00	0.00	0.02	0.03
Bookbinders, machine	0.01	0.01	0.02	0.02
Bindery machine setters	0.00	0.00	0.02	0.02
Typesetters and compositors	0.03	0.04	0.03	0.03
Etchers and engravers	0.04	0.04	0.29	0.27
Lithographers and photoengravers	0.02	0.03	0.02	0.02
Camera operators, printing	0.01	0.01	0.02	0.02
Photoengravers	0.00	0.00	0.02	0.03
Platemakers	0.00	0.00	0.02	0.02
Strippers, printing	0.01	0.01	0.02	0.02
Printing press operators	0.07	0.09	0.03	0.04
Letter press operators	0.01	0.01	0.02	0.02
Offset lithographic press operators	0.02	0.03	0.02	0.02
Press operators and plate printers	0.04	0.04	0.08	0.09
All other press and plate printers	0.00	0.00	0.02	0.02
Other craft and related workers	3.65	4.42	0.09	0.10
Auxiliary equipment operators	0.00	0.01	0.04	0.05
Bakers	0.00	0.01	0.00	0.02
Blue collar worker supervisors	1.66	1.87	0.11	0.12
Cabinetmakers	-0.07	-0.04	-0.07	-0.04
Control room operators, steam	0.00	0.01	0.05	0.05
Crane, derrick, and hoist operators	0.13	0.16	0.10	0.12
Dental lab technicians	-0.02	-0.01	-0.03	-0.01
Dispensing opticians&ophthalmic lab technic	0.02	0.02	0.04	0.04
Lens grinders	0.01	0.01	0.12	0.12
Opticians, dispensing and optical mechani	0.01	0.01	0.02	0.03
Furniture finishers	-0.01	-0.00	-0.04	-0.01
Furniture upholsterers	-0.02	-0.01	-0.05	-0.03
Glass installers	0.00	0.01	0.02	0.05
Heavy equipment operators	-0.48	-0.19	-0.09	-0.03
Inspectors	1.25	1.21	0.28	0.26
Jewelers	-0.01	-0.00	-0.02	-0.01
Locomotive engineers	0.03	0.02	0.08	0.06
Yard engineers	0.01	0.01	0.09	0.08
Hostlers	0.00	0.00	0.06	0.04
Locomotive engineers	0.01	0.01	0.07	0.05
Logging tractor operators	-0.03	-0.02	-0.14	-0.12
Lumber graders	-0.01	-0.01	-0.14	-0.11
Machine setters, paper goods	0.01	0.00	0.07	0.06
Machine setters, woodworking	-0.01	-0.01	-0.10	-0.07
Merchandise displayers and window trimmers	0.01	0.02	0.03	0.05
Millers	0.00	0.00	0.02	0.02
Motion picture projectionists	-0.01	-0.01	-0.06	-0.04
Oil pumpers	-0.00	0.01	-0.01	0.04
Power station operators	0.01	0.01	0.04	0.04
Pumpers, head	-0.00	0.00	-0.01	0.04
Shipfitters	-0.01	-0.01	-0.06	-0.05
Ship engineers	0.00	0.00	0.02	0.03
Stationary engineers	0.04	0.04	0.06	0.07
Tailors	-0.05	-0.04	-0.05	-0.04
Testers	0.45	0.41	0.37	0.33
Upholsterers	-0.01	-0.00	-0.06	-0.02
Upholstery cutters	-0.01	-0.00	-0.08	-0.05
Upholstery workers, nec	-0.01	-0.00	-0.06	-0.02
Watchmakers	-0.00	-0.00	-0.03	-0.01
Water and sewage treatment plant operators	0.01	0.01	0.01	0.01
All other craft and related workers	0.78	0.95	0.12	0.14
Operatives	16.91	17.92	0.11	0.12
Assembler occupations	5.61	5.42	0.42	0.38
Aircraft structure assemblers	0.01	-0.01	0.02	-0.03
Assemblers	0.65	0.80	0.18	0.21
Clock, watch assemblers	0.01	0.01	0.22	0.20
Coil finishers	0.12	0.11	0.80	0.68
Electrical machinery equipment assemblers	0.58	0.53	0.61	0.54
Electrical and electronic assemblers	1.43	1.24	0.56	0.46
Instrument makers/assemblers	0.10	0.09	0.36	0.33
Machine assemblers	1.03	1.06	0.58	0.54

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Mobile home set-up operators	0.00	0.00	0.00	0.02
Power screwdriver operators	0.02	0.02	0.15	0.15
Writers, electronic	0.21	0.20	0.58	0.49
All other assemblers	1.46	1.37	0.46	0.41
Bindery operatives	0.02	0.03	0.02	0.03
Bindery workers, assembly	0.01	0.02	0.02	0.04
Bindery workers, stitching	0.00	0.00	0.02	0.03
All other bindery operatives	0.01	0.01	0.02	0.02
Laundering, drycleaning, and press. mach. o	-0.39	-0.39	-0.12	-0.11
Drycleaners, hand and machine	-0.01	-0.01	-0.05	-0.03
Folders, laundry	-0.01	-0.00	-0.06	-0.03
Laundry operators, small establishment	-0.03	-0.02	-0.05	-0.03
Markers, classifiers, and assemblers	-0.01	-0.00	-0.04	-0.03
Pressers, hand	-0.11	-0.14	-0.45	-0.57
Pressers, machine	-0.12	-0.14	-0.25	-0.29
Pressers, machine laundry	-0.03	-0.02	-0.05	-0.03
Rug cleaners, hand and machine	-0.00	-0.00	-0.06	-0.03
Spotters, drycleaning and washable materia	-0.00	-0.00	-0.06	-0.03
Washers, machine and starchers	-0.03	-0.02	-0.04	-0.02
All oth. ldg, dryclng, and press. mach. op	-0.04	-0.04	-0.38	-0.47
Meat cutters and butchers	0.01	0.01	0.02	0.02
Metalworking operatives	6.37	6.69	0.39	0.37
Dip platers, nonelectrolytic	0.04	0.04	0.39	0.36
Electroplaters	0.11	0.12	0.35	0.34
Furnace operators, cupola tenders	0.06	0.06	0.48	0.43
Heaters, metal	0.03	0.03	0.48	0.45
Machine tool operators	4.93	5.08	0.49	0.46
Drill press and boring machine operators	0.64	0.65	0.52	0.48
Grinding and abrading machine operator, m	0.59	0.60	0.51	0.47
Lathe machine operators, metal	0.76	0.79	0.54	0.50
Milling/planing machine operators	0.33	0.34	0.54	0.49
Machine tool operators, combination	1.02	1.04	0.52	0.48
Machine tool operators, numerical control	0.50	0.51	0.59	0.53
Machine tool operators, tool room	0.20	0.20	0.52	0.46
Punch press operators, metal	0.61	0.64	0.39	0.38
Power brake, bending machine operators, m	0.17	0.18	0.35	0.35
Shear and slitter operators, metal	0.11	0.11	0.37	0.36
Pourers, metal	0.05	0.05	0.45	0.40
Welders and flamecutters	1.09	1.27	0.19	0.21
All other metalworking operatives	0.05	0.05	0.42	0.37
Mine operatives, not elsewhere classified	0.06	0.16	0.04	0.10
Continuous mining machine operators	0.01	0.01	0.11	0.20
Derrick operators, petroleum and gas	-0.00	0.01	-0.01	0.04
Gagers	0.00	0.00	0.01	0.05
Loading machine operators	0.01	0.01	0.11	0.20
Mill and grinder operators, minerals	0.02	0.02	0.20	0.28
Roof bolters	0.01	0.02	0.11	0.20
Roustabouts	-0.01	0.03	-0.01	0.04
Service unit operators, oil well	-0.00	0.00	-0.01	0.04
Shuttle car operators	0.01	0.02	0.11	0.20
Well pullers	-0.00	0.00	-0.01	0.04
All other mine operatives nec	0.02	0.04	0.09	0.17
Packing and inspecting operatives	0.57	0.70	0.06	0.08
Baggers	0.00	0.04	0.00	0.02
Bundlers	-0.09	-0.10	-0.58	-0.76
Cloth graders	0.00	0.00	0.00	0.00
Graders, food and skins	0.00	0.00	0.02	0.02
Production packagers	0.61	0.67	0.10	0.11
Selectors, glassware	0.04	0.08	0.18	0.31
All other packing and inspecting operative	0.00	0.00	0.06	0.05
Painters, automotive	0.02	0.04	0.03	0.05
Painters, production	0.28	0.30	0.26	0.27
Sawyers	0.01	0.04	0.01	0.04
Cut-off saw operators, lumber	-0.02	-0.02	-0.12	-0.09
Edgers, automatic and pony	-0.01	-0.01	-0.14	-0.12
Head sawyers	-0.01	-0.01	-0.14	-0.12
Ripsaw operators	-0.02	-0.01	-0.11	-0.08
Sawyers, metal	0.08	0.09	0.46	0.43
Trim saw operators	-0.01	-0.01	-0.14	-0.12

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
All other sawyers	0.00	0.01	0.02	0.07
Sewers and stitchers	-2.96	-3.63	-0.43	-0.56
Menders	-0.00	-0.00	-0.06	-0.03
Sewing machine oprs., regular equip., garm	-2.23	-2.71	-0.51	-0.67
Sewing machine oprs., special equip., garm	-0.33	-0.41	-0.51	-0.67
Sewing machine oprs., regular equip., nong	-0.27	-0.36	-0.21	-0.30
Sewing machine oprs., special equip., nong	-0.09	-0.12	-0.21	-0.29
All other sewers and stitchers	-0.03	-0.04	-0.20	-0.28
Textile operatives	-0.15	-0.19	-0.05	-0.07
Battery loaders	0.00	0.00	0.04	0.04
Beam warper tenders and beamers	0.01	0.01	0.09	0.09
Card tenders and comber tenders	0.00	0.00	0.05	0.06
Creelers, yarn	0.01	0.01	0.05	0.05
Doffers	0.01	0.01	0.06	0.06
Drawing frame and gill box tenders	0.00	0.00	0.03	0.03
Folders, hand	-0.09	-0.11	-0.43	-0.55
Knitting machine operators	-0.03	-0.03	-0.14	-0.17
Spinners, frame	0.01	0.01	0.05	0.07
Spooler operators, automatic	0.00	0.00	0.04	0.04
Turners	-0.05	-0.05	-0.58	-0.76
Twister tenders	0.00	0.00	0.04	0.04
Weavers	0.01	0.01	0.04	0.04
Winder operators, automatic	0.00	0.00	0.02	0.02
Yarn winders	0.01	0.01	0.05	0.05
All other textile operatives	-0.05	-0.06	-0.06	-0.07
Transport equipment operatives	1.58	2.33	0.03	0.05
Ambulance drivers and ambulance attendants	0.00	0.00	0.01	0.01
Busdrivers	0.05	0.08	0.01	0.01
Busdrivers, local and intercity	0.08	0.10	0.03	0.03
Busdrivers, school	-0.03	-0.02	-0.01	-0.01
Chauffeurs	0.03	0.04	0.04	0.05
Industrial truck operators	0.61	0.68	0.14	0.15
Parking attendants	0.01	0.02	0.01	0.03
Railroad brake operators	0.03	0.02	0.07	0.05
Rental car delivery workers	0.00	0.01	0.04	0.06
Sailors and deckhands	0.01	0.02	0.03	0.04
Streetcar operators	0.00	0.00	0.00	0.00
Taxi drivers	0.03	0.03	0.04	0.04
Truckdriving occupations	0.80	1.41	0.02	0.04
Delivery and route workers	0.17	0.33	0.02	0.03
Truck drivers	0.64	1.09	0.03	0.04
Transport equipment operatives, nec	0.01	0.01	0.11	0.10
All other operatives	5.87	6.44	0.14	0.15
Batch plant operators	0.01	0.03	0.18	0.31
Blasters	0.00	0.01	0.03	0.10
Cutters, machine	-0.01	-0.01	-0.03	-0.04
Cutters, portable machine	-0.06	-0.07	-0.45	-0.59
Cutting machine operators, food	0.00	0.00	0.02	0.02
Die cutters and clicking machine operators	0.01	-0.01	0.04	-0.09
Dressmakers, except factory	-0.04	-0.02	-0.05	-0.03
Drillers, hand and machine	0.00	0.02	0.02	0.11
Dyers	-0.00	-0.00	-0.02	-0.02
Exterminators	0.02	0.03	0.04	0.07
Filers, grinders, buffers, and chippers	0.44	0.45	0.38	0.36
Fuel pump attendants and lubricators	0.01	0.10	0.00	0.02
Furnace operators and tenders, except meta	0.03	0.05	0.06	0.09
Furniture assemblers and installers	0.00	0.00	0.00	0.02
Misc. mach. oprs., meat and dairy products	0.01	0.01	0.02	0.02
Misc. mach. oprs., all other food products	0.01	0.01	0.01	0.02
Miscellaneous machine operatives, tobacco	0.00	0.00	0.02	0.02
Misc. machine operatives, lumber and furni	-0.04	-0.02	-0.08	-0.05
Misc. machine oprs., paper and allied prod	0.06	0.05	0.07	0.06
Misc. mach. oprs., chemicals and allied pr	0.34	0.34	0.23	0.23
Misc. mach. operatives, rubber and misc. p	1.28	1.48	0.54	0.61
Misc. mach. operatives, leather and leath.	-0.01	-0.02	-0.18	-0.50
Misc. mach. operatives, stone, clay, and g	0.09	0.16	0.18	0.31
Miscellaneous machine oprs., primary metal	0.34	0.32	0.48	0.43
Misc. machine operatives, manufacturing, n	0.20	0.21	0.23	0.24
Miscellaneous machine oprs., nonmanufactur	0.01	0.02	0.03	0.05

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Miscellaneous operatives, nec, durable goo	0.29	0.33	0.31	0.33
Misc. operatives, nec, nondurable goods	-0.05	-0.09	-0.02	-0.04
Mixing operatives	0.02	0.03	0.04	0.07
Nailing machine operators	-0.02	-0.01	-0.13	-0.11
Oilers	0.05	0.06	0.12	0.14
Photographic process workers	0.04	0.06	0.04	0.06
Punch and stamping press operators, exc. m	0.02	0.03	0.37	0.47
Riveters	0.04	0.03	0.27	0.21
Rotary drill operators	-0.00	0.01	-0.01	0.04
Rotary drill operator helpers	-0.00	0.01	-0.01	0.04
Sandblasters and shotblasters	0.05	0.05	0.41	0.40
Sanders, wood	-0.02	-0.01	-0.09	-0.05
Shoemaking machine operators	0.02	-0.06	0.08	-0.24
Surveyor helpers	0.02	0.04	0.03	0.05
Termite treaters and helpers	0.01	0.01	0.04	0.07
Tire changers and repairers	0.01	0.02	0.01	0.02
Winding operatives, not elsewhere classifi	0.25	0.24	0.57	0.52
Coil winders	0.23	0.22	0.84	0.73
Paper reel and rewinder operators	0.00	0.00	0.07	0.06
All other winding operators, nec	0.02	0.02	0.16	0.17
Wood machinists	-0.02	-0.01	-0.06	-0.04
Operatives, not elsewhere classified	2.45	2.58	0.15	0.15
Service workers	-1.94	1.47	-0.01	0.01
Building custodians	0.24	0.95	0.01	0.02
Food service workers	-0.76	0.68	-0.01	0.01
Bakers, bread and pastry	-0.00	0.01	-0.00	0.01
Bartenders	-0.07	0.03	-0.01	0.01
Butchers and meat cutters	0.00	0.03	0.00	0.02
Cooks and chefs	-0.16	0.09	-0.01	0.00
Cooks, institutional	-0.10	-0.05	-0.02	-0.01
Cooks, restaurant	-0.05	0.05	-0.01	0.01
Cooks, short order and specialty fast fo	-0.02	0.09	-0.00	0.01
Food prep. and service wkrs., fast food re	-0.00	0.20	-0.00	0.02
Hosts/hostesses, rest., lounge, coffee sho	-0.01	0.02	-0.01	0.01
Kitchen helpers	-0.17	0.01	-0.01	0.00
Pantry, sandwich, and coffee makers	-0.01	0.01	-0.01	0.00
Waiters and waitresses	-0.21	0.21	-0.01	0.01
Waiters assistants	-0.07	0.01	-0.02	0.00
All other food service workers	-0.06	0.06	-0.01	0.01
Selected health service workers	-0.86	-0.42	-0.03	-0.01
Dental assistants	-0.07	-0.04	-0.03	-0.02
Health aides, except nursing	-0.00	0.00	-0.02	0.00
Licensed practical nurses	-0.20	-0.07	-0.02	-0.01
Medical assistants	-0.05	-0.03	-0.03	-0.02
Nursing aides, orderlies and attendants	-0.48	-0.25	-0.03	-0.02
Pharmacy helpers	-0.01	-0.01	-0.03	-0.01
Psychiatric aides	-0.06	-0.03	-0.03	-0.02
Selected personal service workers	-0.95	-0.56	-0.04	-0.03
Barbers	-0.08	-0.05	-0.05	-0.03
Baggage handlers and porters	0.00	0.00	0.03	0.02
Bellhops, bag porters, and doorkeepers	-0.01	-0.01	-0.04	-0.02
Checkroom and locker room attendants	-0.01	-0.01	-0.06	-0.04
Child care attendants	-0.03	-0.01	-0.05	-0.02
Child care workers	-0.20	-0.11	-0.04	-0.02
Cosmetologists	-0.40	-0.25	-0.06	-0.03
Cosmetologists/women's hairstylists	-0.37	-0.23	-0.06	-0.03
Manicurists	-0.01	-0.01	-0.06	-0.03
Shampooers and scalp treatment operators	-0.01	-0.01	-0.06	-0.03
Flight attendants	0.01	0.01	0.01	0.01
Funeral attendants	-0.01	-0.00	-0.06	-0.03
Game and ride operators and concession wor	-0.04	-0.02	-0.06	-0.04
Guides, sightseeing and establishment	-0.00	-0.00	-0.04	-0.02
Housekeepers, hotel and motel	-0.06	-0.04	-0.05	-0.03
Masseurs and masseuses	-0.00	-0.00	-0.06	-0.03
Pin chasers	-0.01	-0.00	-0.07	-0.04
Recreation facility attendants	-0.03	-0.02	-0.04	-0.02
Reducing instructors	-0.03	-0.02	-0.06	-0.03
Ushers, lobby attendants, and ticket taker	-0.02	-0.02	-0.06	-0.04
Welfare service aides	-0.03	-0.02	-0.03	-0.01

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Personal service workers, nec	-0.00	-0.00	-0.02	-0.00
Protective service workers	0.33	0.61	0.02	0.03
Bailiffs	0.00	0.00	0.00	0.00
Checkers, fitting room	0.00	0.00	0.00	0.02
Correction officials and jailers	0.00	0.00	0.00	0.00
Crossing or bridge tenders	-0.00	0.00	-0.00	0.00
Crossing guards, school	0.00	0.00	0.00	0.00
Firefighting occupations	0.00	0.00	0.00	0.00
Fire fighters	0.00	0.00	0.00	0.00
Fire inspectors	0.00	0.00	0.00	0.00
Fire officers	0.00	0.00	0.00	0.00
Fish and game wardens	0.00	0.00	0.00	0.00
Guards	0.34	0.59	0.03	0.05
Lifeguards	-0.03	-0.02	-0.06	-0.03
Police and detectives, public service	0.00	0.00	0.00	0.00
Parking enforcement officers	0.00	0.00	0.00	0.00
Police detectives	0.00	0.00	0.00	0.00
Police officers	0.00	0.00	0.00	0.00
Police patrolmen/women	0.00	0.00	0.00	0.00
Sheriffs and U.S. Marshalls	0.00	0.00	0.00	0.00
Private detectives	0.01	0.02	0.04	0.07
Store detectives	0.00	0.01	0.00	0.02
Private household workers	0.00	0.00	0.00	0.00
Child care workers, private household	0.00	0.00	0.00	0.00
Cooks, private household	0.00	0.00	0.00	0.00
Housekeepers, private household	0.00	0.00	0.00	0.00
Laundresses, private household	0.00	0.00	0.00	0.00
Maids and servants, private household	0.00	0.00	0.00	0.00
Supervisors, nonworking, service	0.03	0.07	0.01	0.02
All other service workers	0.04	0.15	0.01	0.02
Laborers, except farm	2.88	4.53	0.04	0.06
Animal caretakers	0.28	0.31	0.25	0.29
Construction laborers exc. trade helpers	-0.20	-0.11	-0.06	-0.03
Air hammer operators	-0.03	-0.02	-0.16	-0.08
Asphalt rakers	-0.04	-0.02	-0.16	-0.08
Fence erectors	-0.03	-0.02	-0.16	-0.08
Form setters, metal road forms	-0.01	-0.01	-0.16	-0.08
Highway maintenance workers	0.00	0.00	0.00	0.00
Pipelayers	-0.08	-0.04	-0.12	-0.06
All other construction laborers	-0.01	-0.01	-0.16	-0.08
Cannery workers	0.01	0.01	0.02	0.02
Chain offbearers, lumber	-0.04	-0.03	-0.14	-0.12
Cleaners, vehicle	0.04	0.07	0.02	0.04
Conveyor operators and tenders	0.08	0.09	0.16	0.17
Forest conservation workers	0.00	0.00	0.02	0.02
Furnace operators and heater helpers	0.03	0.03	0.47	0.42
Garbage collectors	0.02	0.03	0.02	0.02
Gardeners and groundskeepers, except farm	0.88	1.06	0.11	0.13
Helpers, trades	-0.48	-0.06	-0.05	-0.01
Line service attendants	0.01	0.01	0.02	0.01
Loaders, cars and trucks	-0.01	-0.01	-0.14	-0.12
Loaders tank cars and trucks	0.02	0.02	0.26	0.28
Off-bearers	-0.03	-0.02	-0.12	-0.09
Riggers	0.02	0.03	0.07	0.10
Septic tank servicers	-0.00	-0.00	-0.06	-0.03
Shakeout workers, foundry	0.03	0.03	0.45	0.41
Stock handlers	0.24	0.43	0.02	0.03
Order fillers	0.23	0.29	0.05	0.06
Stock clerk, sales floor	0.01	0.14	0.00	0.02
Timbercutting and logging workers	-0.08	-0.07	-0.14	-0.11
Choker setters, lumber	-0.01	-0.01	-0.14	-0.12
Fallers and buckers	-0.05	-0.04	-0.14	-0.12
All other timbercutting and logging work	-0.01	-0.01	-0.12	-0.09
Work distributors	-0.08	-0.10	-0.58	-0.76
All other laborers, except farm	2.13	2.81	0.06	0.08
Farmers and farm workers	8.10	9.03	0.38	0.44
Farmers and farm managers	4.57	5.09	0.38	0.44
Farmers (owners and tenants)	4.39	4.89	0.38	0.44
Farm managers	0.18	0.20	0.38	0.44

Differences in Occupational Requirements: Base versus TAB

	Thousands of Jobs		Percentage of Base	
	1995	2000	1995	2000
Farm supervisors and laborers	3.53	3.94	0.38	0.44
Farm supervisors	0.11	0.12	0.38	0.44
Farm laborers	3.43	3.82	0.38	0.44

CHAPTER X

WAYS TO A FIRMER FOUNDATION FOR MODELING

Hindsight is usually clearer than foresight. We now know the problems we encountered at the end of the study and can see how they could have been avoided by more work and more data at the outset. We were, we hope understandably, concerned to deliver the promised product and wanted to make a first cut at it with data which we could obtain easily and without long delays. We do not regret the decision to proceed with what was readily available, but we now see clearly some needs for an improved infrastructure for Mexico-U.S. modeling. We have included on the diskettes which accompany this study the series we adapted from the U.S. trade data; it has been classified in both LIFT and MIMEX sectors. But such a bank is not enough, for allocating U.S. trade data to Mexican sectors does not produce series compatible with the Mexican national accounts.

Our top priority for further work would therefore go to improvement in the data underpinnings. Our principal problem at the end of the study was the inconsistency between our trade data -- which came only from U.S. sources -- and the MIMEX model. Anyone working in this area sorely needs a full accounting of the bi-lateral trade in the statistical systems of both countries. The use of the Harmonized System for trade classification should make it possible to reconcile -- or at least confront -- disparities at the primary data level. A bank of trade data from which could be produced exports and imports for both countries consistent with the national accounts of both countries would be the first step towards sounder modeling.

A second step, closely related to the first, is building better connections with the Mexican statistical institutions generally. CIMAT is making good progress in this work, but more extensive data banks in trade, output, prices, employment, and investment need to be organized in a standard format and exchanged for similar banks for the United States.

A third step, also closely related to the first, would be proper treatment of the maquiladora-like industries. Under a full Free Trade Agreement, there would presumably no longer be any need on the Mexican side to keep in bond the pieces imported for assembly and re-export. They would become ordinary imports. The grounds for and the data for exclusion of these items from Mexican import data would disappear. Similarly on the U.S. side, there would be no tariffs from which to exempt the U.S. content of imports. So as a special legal entity, the maquiladora would cease to exist. But the economic reality of pieces being collected in the U.S. and shipped to Mexico for assembly would continue as stronger than ever, freed from the bureaucratic burden of formalities at the border. A more satisfactory, automatic way of modeling such arrangements needs to be developed. One way is splitting up processing stages of what are now single industries. The Apparel industry, for example, could be divided between the industry which produces cut pieces and the industry which assembles them. This splitting would need to be done in the maximum-detail input-output table. It would not necessarily be easy to do or highly accurate, but it could improve on the present treatment which lumps together two very different modes of production with distortions in projections of labor requirements if the

proportions of the two modes change.

Another item of evident interest would be the construction of a U.S. input-output table which distinguishes in each cell the imported materials from the domestically produced materials. Almost all other countries which have input-output tables make this distinction, but the Bureau of Economic Analysis (BEA) has never done so. The methods used in other countries could be applied here, if not by BEA, then by others.

The scope of this study has been restricted to studying what might be called commercial scenarios as opposed to structural ones. A structural scenario might consider the increase in efficiency in Mexican industries coming as a result of greater exposure to world trade or as a consequence of greater foreign investment in Mexico aimed at producing for the domestic Mexican market. We have been urged to run such scenarios with the present model. The present model is perfectly able to handle such scenarios. The problem is formulating them in a meaningful, realistic way. Unfortunately, we have little idea of what are reasonable expectations of the productivity consequences of an FTA. While we could always generate some numbers by assuming a production function, we would feel very uncomfortable with such projections. Some individual industry comparisons of productivity and capital could be helpful in formulating such scenarios. There is now serious work along these lines going on in the STAN project in the OECD. This work does not presently include Mexico, but it includes some other non-members. Perhaps Mexico could be included in STAN, or failing that, the STAN methods could be applied to Mexico. Alternatively, a detailed U.S.-Mexico comparison could be undertaken.

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Appendix A

LIFT Sectors Defined in SIC Terms

Sector title	related 1977 SIC codes				
1 Agriculture, Forestry, Fishery	01	02	07	08	09
2 Iron ore mining	101	106			
3 Nonferrous metals mining	102-5	108pt	109		
4 Coal mining	1111	1112 pt	1211	1212 pt	
5 Natural gas extraction	131 pt	132 pt	138 pt		
6 Crude petroleum	131 pt	132 pt	138 pt		
7 Non-metallic mining	141-145	147	148 pt	149	
8 Construction	15-17	108 pt	1112 pt	1212 pt	138pt
	148 pt				
9 Food & Tobacco	20	21			
10 Textiles, exc. Knits	221-224	226-229			
11 Knitting	225				
12 Apparel, Household textiles	23				
13 Paper	26				
14 Printing & Publishing	27				
15 Agricultural Fertilizers	287				
16 Other Chemicals	281-286	289			
17 Petroleum refining	29				
18 Fuel oil [1]	29113-5				
19 Rubber products	301-304	306			
20 Plastic products	307				
21 Shoes and Leather	31				
22 Lumber	24				
23 Furniture	25				
24 Stone, Clay, Glass	32				
25 Ferrous metals	331-332	339	3462		
26 Copper	3331	3340	3351	3362	
27 Other Nonferrous metals	333 exc 3331		335 exc 3351		
	336 exc 3362		3463		
28 Metal products	34				
29 Engines and turbines	351				
30 Agricultural Machinery	352				
31 Constr, mining, oilfield eq	3531-3				
32 Metalworking machinery	354				
33 Special industry machinery	355				
34 Misc non-electrical mach.	3534-7	356	359		
35 Computers	3573	3574			
36 Other Office equipment	3572	3576	3579		
37 Service industry machinery	358				
38 Communic eq, Electronic comp	366	367			
39 Elec indl app & distrib eq	361-362	3825			
40 Household appliances	363				
41 Elec lighting & wiring eq, misc elec eq	364	369			
42 TV sets, radios, phonographs	365				
43 Motor vehicles	371				
44 Aerospace	372				
45 Ships, boats	373				
46 Other Transp. Equip.	374	375	379		
47 Instruments	38 exc 3825				
48 Misc. Manufacturing	39				
49 Railroads	40	474			
50 Trucking, hwy pass transit	41	42			

51	Water transport	44			
52	Air transport	45			
53	Pipeline	46			
54	Transportation services	47	exc 474		
55	Communications services	48			
56	Electric utilities	491	493 pt		
57	Gas utility	492	493 pt		
58	Water and sanitation	493	pt 494-497		
59	Wholesale trade	50	51		
60	Retail trade	52-57	59	7396	8042
61	Eating & drinking places	58	70 pt		
62	Finance & insurance	60-64	67		
63	Real estate	65-66	1531 pt		
64	Owner-occupied housing				
65	Hotels; repairs exc auto	70	pt 71-72	762-4	7699 pt
66	Business services	73	exc 7396	7692,4	7699 pt
67	Automobile repairs	75			
68	Movies and amusements	78	79		
69	Medicine, education, npo	80	exc 8042	82-84,86	8922
70	Fed & S&L govt enterprises				
71	Non competitive imports				
72	Domestic servants				
73	Unimportant industry [2]				
74	Scraps and used				
75	Rest of the world industry				
76	Government industry				
77	Inforum stat. Discrepancy [3]				
78	NIPA stat. Discrepancy [4]				

- [1] Sector 17 shows shipments of all petroleum refining. However all fuel oil is sold to sector 18; therefore, the sales to other sectors show purchases of gasoline, aviation fuel, and petrochemical feedstocks. The distribution of sales for sector 18 shows purchases of residual and distillate fuel oil, diesel fuel, and kerosene.
- [2] The "Unimportant industry" was created when the I-O table was updated; it is a collection of very small flows.
- [3] The "INFORUM statistical discrepancy" also results from the updating process. INFORUM estimates of PCE and PDE, which were reconciled with 1982 product shipments, differ slightly from NIPA estimates.
- [4] The NIPA statistical discrepancy is the figure published in Table 1.7 of the National Accounts.

DOM, the Detailed Output Model, expands INFORUM's product detail to to 420 sectors. For most manufacturing sectors, this detail approximates 4-digit SIC.

Appendix B

MIMEX Sectors in Spanish and English

01 Agricultura	Plant agriculture
02 Ganaderia	Animals, livestock
03 Silvicultura	Forestry products
04 Caza y pesca	Fishery products
05 Carbon y derivados	Coal mining
06 Petróleo y gas	Crude petroleum, natural gas
07 Mineral de hierro	Ferrous mining
08 Metalicos no ferroso	Non-ferrous mining
09 Canteras, arena, grava	Stone and clay mining
10 Otros minerales no metálicos	Other non-metal mining
11 Carnicos y lácteos	Meat and milk products
12 Preparación de frutas y legumbres	Preserved fruits and vegetables
13 Molienda de trigo	Wheat milling
14 Molienda de nixtamal	Corn milling
15 Molienda de café	Coffee
16 Azúcar y derivados	Sugar
17 Aceites y grasas comestibles	Fats and oils
18 Alimentos por animales	Food for animals
19 Otros productos alimenticios	Other food products
20 Bebidas alcohólicas	Alcoholic beverages
21 Cerveza y malta	Beer
22 Refrescos embotella	Soft drinks and flavorings
23 Tabaco	Tobacco products
24 Hilados y tejidos de fibras blandas	Soft fiber textiles
25 Hilados y tejidos de fobras duras	Hard fiber textiles
26 Otras industrias textiles	Other textiles
27 Predas de vestir	Confectinary products
28 Cuero y calzado	Leather
29 Aserraderos, triplay y tableros	Lumber and plywood
30 Otros productos de madera y corcho	Other wood and cork products
31 Papel y cartón	Paper and paperboard
32 Imprentas editorial	Printing
33 Petróleo y derivados	Petroleum refining
34 Petroquímica básica	Basic petrochemicals
35 Química básica	Basic chemicals
36 Abonos y fertilizantes	Pesticides and fertilizers
37 Resinas sintéticas y fibras artificiales.	Synthetic resins and fibers
38 Productos farmaceuticos	Medicinal products
39 Jabones, detergentes y cosméticos	Cleaning and toilet
40 Otros productos químicos	Other chemicals

41 Productos de hule	Rubber products
42 Artículos de plástico	Plastic products
43 Vidrio y productos	Glass
44 Cemento	Cement
45 Prods de minerales no metálicos	Other mineral products
46 Hierro y acer básico	Iron and Steel
47 Metales no ferrosos básicos	Non-ferrous metals
48 Muebles metálicos	Metallic furniture
49 Productos metálicos estructurales	Structural metal products
50 Otros productos metálicos	Other metallic products
51 Maquinaria y equipo no eléctrico	Non-electric machinery
52 Maquinas y aparatos eléctricos	Electric industry apparatus
53 Aparatos electrodomésticos	Household appliances
54 Equipos y aparatos electrónicos	Electronic equipment
55 Otros equipos y aparatos eléctricos	Other electrical equipment
56 Automóviles	Motor vehicles
57 Carrocerías, motores y partes	Auto bodies, motors, parts
58 Otro equipo de transporte	Other transportation equipment
59 Otras industrias manufactureras	Miscellaneous manufacturing
60 Construcción	Construction
61 Electricidad	Electricity
62 Comercio	Trade
63 Restaurantes y hoteles	Hotels restaurants
64 Transporte	Transportation
65 Comunicaciones	Communications
66 Servicios financieros	Financial services
67 Alquiler de inmuebles	Real estate rental
68 Servicios profesionales	Professional services
69 Servicios de educación	Educational services
70 Servicios médicos	Medical services
71 Servicios de esparcimiento	Amusements
72 Otros servicios	Other services
73 Gobierno	Government
74 Transacciones netas	Net tourism

Appendix C

LIFT: INFORUM's Model of the U.S. Economy

A Contribution to the 9th International Input-Output Conference

Margaret Buckler McCarthy

LIFT (for Long-term Interindustry Forecasting Tool) is a model of the economy of the United States built by INFORUM. Among the models in the INFORUM family, it is both the oldest and the most fully developed. Here, the evolution of our U.S. modeling efforts are quickly traced. Then the structure of LIFT is described. The paper concludes with a short discussion of data consideration associated with this sort of modeling effort.

EVOLUTION

With his model developed in the mid-sixties, Clopper Almon combined input-output and regression-based econometrics. Final demands were determined by behavioral equations, which were estimated with econometric techniques. Input-output coefficients were projected to change. The resulting model could be used for business forecasting as well as government policy analysis. These efforts were continued at INFORUM, Interindustry Forecasting at the University of Maryland, a project which Almon founded in 1967.

The first generation of INFORUM models of the U.S. economy emphasized the real or product side of the economy. These models were not closed with respect to income. Rather, the model was solved to determine the level of real income which was consistent with an assumed level of employment. Efforts were concentrated on the estimation of equations to explain the behavior of the components of final demand by category and product sector. Labor requirements were determined by productivity equations estimated at the industry level. These models were dynamic; investment demand, by industry, depended on the rate of growth of that industry. An "across-the-row" approach projected the I-O coefficients.

Several principles were developed in these initial models which continue to guide our modeling efforts. Behavioral equations were estimated for detailed sectors, as functions of sector-specific variables. The models were dynamic, with changing I-O coefficients and with investment dependent upon the rate of growth of output. The models forecasted a specific sequence of future years, not an equilibrium at some future point without specifying the path to the equilibrium. The parameters of the various equations had to be sensible because the models were put to practical use. The causation in these models ran from the sectoral detail to the macroeconomic totals. The central I-O equation,

$$q = Aq + f$$

provided structural consistency to the model. Because each of the components of this equation (the final demands and the I-O coefficients) were explicitly modeled, activity in one industrial sector was linked, in a consistent manner, with the rest of the economy.

In this first generation of models, relative prices were often found to be useful variables in explaining final demand behavior. Relative prices appeared in the equations for personal consumption, exports, and imports; they were a component of the cost of capital in the investment demand equations. However, relative prices were essentially exogenous in these early models. They were forecast as trends which could be varied by assumption.

In what we will term the second generation of its modeling efforts, separate price and income models were added to INFORUM's model of the real side of the economy. Prices were estimated as a function of unit costs (for labor and materials) and a distributed lag on output. Of course the most important component of this equation was unit labor costs, which were derived from wage rate equations and the product model's labor productivity.

INFORUM has tried several approaches at modeling the price/income side. Rather than describe these approaches, we will summarize our experiences. We have had the most success when we abandoned the price response equation described above, and instead, modeled the components of value-added. Then, we solved for prices with the dual equation,

$$p = pA + v .$$

(Early efforts to model the pass-through of material and labor costs tended to give problems with long-term stability and consistency. Considerable effort was put into data manipulation, in an effort to match various series with a desired set of producing sector definitions. In retrospect, we can say that such an approach made the model unwieldy -- it was difficult to maintain, update and verify.)

In this second generation of modeling effort, we had separate models for the product side, for the price side, and for the income side of the economy. The models were run iteratively until they converged on a consistent solution.

In the third, or current, generation of models, equations for real, price, and income side activity became part of a single model, which was explicitly closed with respect to income. Thus, the current INFORUM model of the U.S. economy, LIFT, is a macroeconomic model, in that it determines all the variables usually considered in macroeconomics -- income, savings, employment, unemployment, inflation, interest rates, and so on. There is no aggregate driver, and thus the INFORUM approach differs from the approach used by most other macro models: its industry detail is a central part of the model's structure and causation. Now we will outline the model.

MODEL DESCRIPTION

LIFT has three component parts: 1) the real or product side, 2) the price or income by industry side, and 3) the accountant. The real side estimates final demands, output by producing sector, and labor requirements. The price side estimates both the components of gross product originating by industry (value-added) and unit prices by product. The accountant closes the model with respect to income, determines the economic aggregates, and estimates transactions which have not been calculated elsewhere in the model. The sides are run iteratively, until the model converges on a solution. Tables at the end of this section show LIFT's exogenous variables and the influences in its behavioral equations.

LIFT: The Real Side

In the real side of LIFT, equations for final demands are evaluated and production and labor requirements are calculated for 78 producing sectors. Government purchases are exogenous. Other components of final demand are determined by behavioral equations.

Personal consumption (PCE) equations have been estimated for nearly eighty categories of expenditures. These categories are defined by the National Income and Product Accounts (NIPA). The expenditure categories are translated into producing sectors with a bridge matrix, which varies by trend and assumption. The PCE equations are derived from a two-step estimation procedure. From cross section data, parameters are estimated for the level and size distribution of income, the age structure of the population, and other demographic characteristics. The cross section estimates are combined with time series data to estimate parameters for relative prices, changes in income, and trends. The PCE equations are estimated as a system so that goods can be substitutes or complements with respect to relative prices. Total consumer spending is determined by disposable income less savings. The modest scaling (less than one percent) necessary to meet this constraint indicates that the system of equations is well-behaved.

Equipment investment equations have been estimated for 55 industries, aggregates of the 78 producing sectors, and utilize a Diewert cost function. Investment depends upon changes in industry outputs and changes in the relative prices of capital, labor, and energy. These changes are in the form of a distributed lag over five years. Investment by industry is translated into demands for capital goods with a bridge matrix. The bridge coefficients change in response to trends and the investment cycle. For example, during investment booms, the share of machine tools in investment increases in many industries.

Construction is determined for 31 categories of structures. The private residential categories depend upon consumption or income, interest rates, stocks, and demographic data. The private non-residential categories depend upon industry outputs, interest rates and stocks.

Inventory change equations are always difficult to estimate. For an industry model, the problem is even more difficult because first we must obtain a time series of historical inventories by product held. (Most data is by holder of the inventory.) We have put together a crude series and estimated equations, by product, as functions of use of the product, interest rates, and stocks of inventories.

The INFORUM International System contributes product-specific explanatory variables for foreign trade. Exports by product are a function of foreign demand and relative prices. The foreign demands are demands by other countries for imports. The foreign prices have been adjusted for variations in exchange rates. Imports by product are a function of product-specific domestic demand and relative foreign to domestic prices.

The solution of the I-O equation,

$$q = Aq + f,$$

yields output. The solution for output is an iterative one. Because current output, imports, and inventory change depend upon one another, these three equations are solved together. (Another

iterative loop includes equipment and construction investment in the determination of output.) Coefficients in the intermediate and construction matrices are not constant, but change in response to trends. The trends are estimated as logistic curves and reflect an "across-the-row" approach.

Labor requirements (worker-hours) for the 78 sectors are estimated as a function of trends and changes in output. The equations recognize that the influence of output is not symmetric over the business cycle. (Labor hoarding occurs at the beginning of a downturn, while there is a reluctance to increase hiring in the early stages of recovery.) Other equations estimate the length of the work year. Employment is determined by labor productivity, output, and the length of the work year.

LIFT: The Price-Income Side

To determine unit prices for 78 products, we solve the dual equation,

$$p = pA + v$$

(unit prices are the sum of unit material plus unit value-added costs). Value-added by industry is determined from equations for the components of Gross Product Originating (GPO) by some forty industries.

The real side of the model is defined in terms of products. Final demands are demands for products. Statistics on prices measure the prices of products. (For these reasons, our I-O table reflects a commodity technology.) However, statistics on the factors of production (from the National Accounts) -- labor income, capital income, and indirect taxes -- reflect the organization of firms. Therefore, to translate between the real side's product classification and the income side's industry classification, we have constructed a "Product-to-Industry" Bridge. This bridge is similar to, but somewhat different from, the Make Table (which identifies where, in terms of industries, products are made). Our bridge translates value-added between its product and industry classification. This translation is made in both directions. When the GPO equations need an indicator of real activity, the bridge is used to produce "constant-price, value-added weighted, output." Alternatively, when we have determined nominal GPO by industry, we use the bridge to translate it into our estimate of value-added by product.

Labor compensation is determined by hours (from the real side) and equations for average hourly compensation ("wage" rates). Industry wages are relative to either a manufacturing or non-manufacturing aggregate wage, and depend upon outputs, foreign trade, inflation and unemployment. In the aggregate equations are the growth of the money supply relative to GNP, labor productivity, and changes in the unemployment rate.

Corporate profits and proprietor income, by industry, are functions of material and labor costs, and of various measures of economic activity. Net interest payments are a function of interest rates. Other equations determine the remaining components of capital income: capital consumption allowances, inventory valuation adjustments, and business transfer payments. Indirect business taxes (sales taxes, property taxes, excise taxes) are the other component of GPO.

LIFT: The Accountant

We refer to the third side of the model as the "accountant," for it does the work of the national income accountant. It compiles the aggregate national account tables by summing up the sectoral detail for final demands and income by industry. It converts value-added information into personal income. It determines nominal GNP by applying the estimates of unit prices to the real (constant dollar) estimates of final demand. The accountant also completes transactions not done elsewhere in the model.

A major portion of the accountant deals with government transactions. Government expenditures begin with real purchases which are converted into current dollars. Next, transfer payments are added. Some transfer payments are assumed to be constant (or slightly trended) in real terms, per recipient. Among these types of transfer payments are those for old age, medicare, and the unemployed. Other types of transfer payments are exogenous in nominal terms. The other important category of government expenditure is interest payments which are a function of the debt and of interest rates. Behind the government revenue calculations are our estimates of the income distribution, together with tax functions which utilize the rate schedules of the current tax law.

The accountant constructs personal income as the sum of labor income and proprietor income (from the income side), interest income from business and from government, and transfer payments from government and business. Taxes are removed from personal income to yield disposable income. When deflated, it becomes real disposable income, the variable used to explain the real side's personal consumption expenditures. The savings function is also calculated by the accountant. It is a function of the unemployment rate, the percentage change in income, the transfer share of income, and the auto share of PCE.

A key feature in the stability of the model is the role of unemployment rate in several equations. As economic activity slackens, the savings rate falls. Thus, consumers spend a larger share of their income and help stimulate demand. On the price side, an increasing unemployment rate moderates increases in several of the components of income by industry, thus moderating inflation and keeping up the level of real income.

The INFORUM model has benefitted from the contributions of many researchers as shown in the selected bibliography at the end of the paper.

LIFT: INFORUM's Macro-Interindustry Model of the U.S. Economy
Components and Influences of Product Side

<u>COMPONENT</u>	<u>NUMBER OF SECTORS</u>	<u>INFLUENCES</u>
Output	78	$q = Aq + f$, production = intermediate + final demand
Personal consumption by NIPA expenditure category	78	Disposable income Size distribution of income Change in disposable income Time Relative prices Age structure of population Other demographic data
Equipment investment by investing industry	55	Change in product outputs Change in relative prices: Cost of capital (post-tax), Labor, and Energy Stocks of equipment
Construction by category	31	Outputs, Income, or PCE Interest rates Stocks of structures Demographic data
Inventory investment	78	Product output Interest rates Inflation rate Stocks of inventories
Imports	78	Domestic demand by product Foreign/domestic product prices Exchange rates
Exports	78	Foreign demand by product Domestic/foreign product prices Exchange rates
Labor productivity	78	Output cycles by sector Time
Length of work year	78	Change in outputs Time
Employment	78	Defined by labor productivity, output, and length of work year
Consumption, Equipment, and Construction by <u>product</u> sector	78	Final demand by category bridged to producing sector

LIFT: INFORUM's Macro-Interindustry Model of the U.S. Economy
Components and Influences of Price-Income Side

COMPONENT

INFLUENCES

Product prices

$p = pA + v$
 Unit prices = sum of unit costs costs
 (materials and value-added)

Value-added by product sector

46 GPO industries are translated to 78
 products with the Product-to-Industry
 Bridge

GPO by Industry:

Labor compensation

Aggregate equations:

Manufacturing Wage Rate

Labor productivity
 Excess money growth (over 5 years)
 Price shocks
 Changes in unemployment rate

Non-manufacturing Wage Rate

Manufacturing wage rate
 Labor productivity
 Price shocks
 Changes in unemployment rate

Industry equations:

Relative industry/aggregate wages

Unemployment
 Inflation
 Industry output
 Industry exports and imports

Return to capital = (identity)

(see: "Components and Influences
 of Capital Income")

Corporate profits +
 Proprietor income +
 Net interest payments +
 Depreciation allowances +
 Inventory valuation adjustments +
 Business transfer payments

Indirect business taxes (IBT)

Total of all industries

Lagged IBT as share of nominal GNP
 Growth in real GNP

Industries

Share of total IBT

LIFT: INFORUM's Macro-Interindustry Model of the U.S. Economy
Components and Influences of Capital Income in LIFT

<u>COMPONENT</u>	<u>INFLUENCES</u>
Corporate Profits Equations by 46 GPO industries	Change in industry material costs Change in industry labor costs Change in demand (output, unemployment)
Proprietor Income Four industries that comprise 80% of total proprietor income Business services Agriculture Construction Wholesale and retail trade All other proprietor income (as share of value added)	Change in industry labor costs Change in industry material costs Change in demand Transitory nominal GNP Change in profit share of income Change in labor share of income Transitory nominal GNP = avail Business failures
Net Interest Payments Total domestic payments Industries Rest of world	Current interest rate and smoothed average rate (rate on AAA-rated bonds) Share of total domestic payments Change in net factor income
Capital Consumption Allowances Corporate and Non-corporate (same influences; different equations) Industries	Inflation Change in equipment investment Change in structures investment Transitory nominal GNP Share of total allowances
Inventory Valuation Adjustments Corporate and Non-corporate Industries	Inflation Change in business inventories Share of total adjustments
Business Transfer Payments Total of all industries Industries	Lagged real interest rate Share of total transfers
Rental Income	Inflation Change in Output Rental income share of nominal GNP "Excess" nominal GNP

LIFT: INFORUM's Macro-Interindustry Model of the U.S. Economy

Other Variables

<u>VARIABLE</u>	<u>SOURCE</u>
Population	Exogenous: Census Bureau projections
Labor Force	Exogenous: Bureau of Labor Statistics projection
Tax policy	Exogenous: 1986 Tax Law
Monetary policy	Exogenous: INFORUM (M2 growth rate)
Government expenditures	
Purchases of goods and services	Exogenous: INFORUM assumption
Transfer payments	Exogenous: INFORUM assumptions:
Old age	Constant in real terms per recipient
Medicare	3%/year growth real terms per recipient
Unemployment	Constant in real terms per recipient
Other	Nominal level assumed
Interest payments	Endogenous: depends on Debt and Interest rates
Other	Exogenous: INFORUM assumption
Price of Crude Oil	Exogenous: INFORUM assumption
Savings rate	Endogenous: Percent change in disposable income
	Auto purchases as share of income
	Transfer share of income
	Unemployment rate
Interest rates	
3 month Treasury Bill Rate	Endogenous: Inflation
Commercial Paper Rate	Velocity of money
10 year Treasury Bond Rate	Unemployment rate
AAA Corporate Bond Rate	
Mortgage Rate	

Intermediate and Bridge Tables

Intermediate materials and Construction materials bridge	Across-the-row trends
PCE Bridge	Trends
Equipment Investment Bridge	Investment cycle Trends

DATA CONSIDERATIONS

INFORUM-type models are not the only econometric models which use I-O techniques. They are, however, distinguished from most other such models of the U.S. economy in terms of their data foundation. This data foundation consists of updated I-O tables and detailed historical series of outputs, prices, final demands, and the components of income by industry. A relatively small part of the data is readily available from the National Income and Product Accounts (NIPA). Much of the data had to be gathered from a variety of sources and subjected to considerable scrutiny. Indeed, the data foundation is both the blessing and the curse of INFORUM-type models. The blessing is, of course, the richness of this data foundation which enables us to build models which emphasize behavioral equations at a detailed level. The curse is all the hard work which is necessary to amass and maintain the data. Perhaps half of our research effort is devoted to the development and maintenance of an adequate database. Here, with reference to the U.S., we will describe our data efforts. And you will note that our perspective, as builders of behavioral economic models, is somewhat different from the perspective of the national account statistician. And rightly so, because our purposes are different.

The Input-Output Table

In the U.S., a detailed, "benchmark" I-O table is prepared about every five years by the Bureau of Economic Analysis (BEA). It reflects data collected in the various economic censuses. A table for 1977, which had 540 sectors, is the most recently published "benchmark" table.¹ A principal use of these benchmark tables is the benchmark revision of the NIPA. In other words, every five years, the national account detail is adjusted to reflect, among other things, the detail revealed by the I-O table.²

BEA prepares both a "use" and a "make" table. The use table shows commodities purchased by each industry, and thus reflects the way in which census data was collected. The make table shows the commodities made by each industry. BEA also calculates a "commodity-to-commodity" table with the assumption of industry technology.³

INFORUM uses a commodity-to-commodity table in its model. However, we derive this table with a process we call "purification." From a modeling perspective, in our view, the industry technology assumption is a poor one with which to derive a commodity-to-commodity table. Perhaps a silly, but clear example can illustrate our objection to the industry technology assumption. Suppose ice cream is a secondary product in two industries, motor vehicles and electric utilities. Under the industry technology assumption, ice cream, as a secondary product in motor vehicles, is made with

¹BEA is presently (August 1989) hard at work on a benchmark table for 1982. The publication of the 1982 table is expected at the end of this year. BEA also has a program which prepares annual tables for 85 sectors. A 1983 table was published in February 1989.

²In some other countries, such as Canada, France, and Norway, the I-O effort is integrated on an annual basis with the construction of the national accounts.

³With the industry technology assumption, it is assumed that the secondary products of an industry are made according to the input structure of the industry.

tires, metal stampings, glass, plastics, etc. while as a secondary product in electric utilities, ice cream is made with coal, oil, and natural gas. Note that both of these technologies for making ice cream differ significantly from the technology of the ice cream industry, where we find milk, sugar, fruit, chocolate, etc. While this example is an extreme one, it illustrates the way in which the industry technology assumption can lead to strange results. Notice also that this assumption implies that there are as many technologies for making a product as there are industries in which the product is made.

INFORUM's purification technique assumes that each product is made with a single, unique technology. Our method is similar to a "commodity technology" assumption, but avoids some of the problems (negative flows) that a strict application of the assumption can give. The algorithm⁴ is an iterative one, in which the production technology is revised until the solution converges. The industry in which a product is primary provides the initial assumption for the production technology of a product. Inputs are transferred from the secondary to the primary producer. Transfers are made only to the extent that they are available from the secondary producer. In this way, negative transfers are avoided.

Why worry about whether the table is a "commodity-to-commodity" or a "commodity-to-industry" table? The commodity-to-industry table is the most faithful representation of data collected in the census. However, our objective as model builders is somewhat different from the objective of the statisticians. Final demands are demands for commodities. We want an I-O table, which when used for analytical purposes, will translate these final demands into production requirements. Similarly, when we use the I-O table to estimate the unit cost component of prices, we are trying to model the prices of commodities. Obviously, in models with a lot of sectoral detail, this consideration is of added importance. Each researcher should be aware of the structure of secondary products in the table with which he is working and evaluate the consequences. In one sense, a commodity-to-commodity table simplifies the modeling process. For if we did not have a commodity-to-commodity table, we would have to grapple with a way to determine transfers as we go from a product definition of final demands and prices to an industry definition of production requirements.

A second consideration which INFORUM has in regard to the I-O table is that it be reasonably up-to-date. Therefore, we use data from the most recent economic censuses to update the published table.⁵ Census data is particularly useful in an update, because of the information about interindustry flows. We make use, as well, of our estimates of outputs and final demands which are described below. In the spring of 1986, we completed our update of the 1982 table. Last year, we did an update to 1985; however, the 1985 table was without the benefit of census data. Our tables are not constructed from scratch; they are updates of the most recent published table. They remain as close as possible to the base year table while achieving consistency with all the data we can muster for the update year.

⁴See Almon, 1985 for a complete description.

⁵See Almon, 1985 for a description of the general update method.

Outputs and Prices

Perhaps the most important time-series for I-O model building is data on production. We need such estimates in both current and constant prices. In the U.S., there is no single source for such data. The series on product shipments, from the Census and Annual Survey of Manufactures, is the principal source for current price outputs for this sector of the economy. For the non-manufacturing sector, we draw upon a variety of sources. Good data on the service sector of the economy is particularly hard to obtain.

We maintain data on manufacturing product shipments by five-digit SIC (Standard Industrial Classification). This data includes more than one thousand series. We have put considerable effort into keeping the series consistent over time in terms of the definitions of the data series. This data is the basis of our historical production series for manufacturing. We will see shortly that it is also an aid in the estimation of two components of final demand, personal consumption expenditures and producers' durable equipment investment.

For estimates of detailed manufacturing price deflators, we are indebted to the section of BEA which prepares estimates of gross product for the NIPA. (In this context, "gross product" refers to value-added, the components of income-by-industry.) At the level of 5-digit SIC product detail, BEA maintains price deflators derived from producer prices indexes and other sources. Our non-manufacturing prices, like the estimates of output, come from a variety of sources.

One problem with I-O modeling is that of current data at a detailed level. For example, 1986 is the most recent year for which we have data on manufacturing product shipments. (1987 was a year in which economic census data had to be tabulated; preliminary data is being released.) Therefore, alternate data sources must be used for current estimates of activity. Here, our principal source is the indexes of industrial production which are prepared by the Federal Reserve to measure monthly activity⁶. When these indexes are used for estimates of activity over longer periods of time, care must be exercised. We have had success in using regression analysis to project our historical series with the industrial production indexes.

Investment in Producers' Durable Equipment (PDE)

As noted above in the model description, forecasts of investment by industry are translated into the PDE component of final demand with a capital equipment matrix (B-matrix). We have put considerable effort into the estimation of historical data for these three components (investment by investing industry, PDE by product purchased, and the B-matrix).

For about 20 product groups, estimates of PDE in purchasers' prices is available from the NIPA. To obtain estimates of PDE in greater detail, we adjust the 5-digit product shipments of include imports and to exclude exports. From the BEA I-O workfile, we computed the 1977 ratio of PDE to adjusted shipments. (At the 5-digit level of detail, products are frequently defined specifically enough that so that we can distinguish capital goods or consumer goods from intermediate products.) We obtain our time series of PDE by multiplying the ratio by the time series of adjusted

⁶In some instances, these indexes are good measures of physical quantities, such as tons of coal. Such series are just the information which we need. For other sectors, it is more difficult to measure production directly and a proxy is employed. One frequently used proxy is the use of electricity. Another is hours of production workers.

shipments. The 5-digit PDE is aggregated to the 400 sectors of DOM (INFORUM's Detailed Output Model) and reconciled with the NIPA estimates.

We deflate PDE with weighted deflators which reflect our measures of domestic prices and import prices. We have chosen a computer deflator which differs significantly from the BEA hedonic index for computer prices.⁷ We did not use the BEA deflators for PDE because of the computer deflator problem and because (at least until recently) BEA used only domestic prices to deflate PDE.

From a variety of sources, we determined investment by 55 industry groups. The Annual Survey of Manufactures provides data on new equipment purchases. Data for the non-manufacturing sectors is quite scarce. Estimates were adjusted as needed to match the PDE total from the NIPA.

Next, with the time series, in current prices, of PDE by producing sector and investment by industry and with a base year capital flow matrix, we use rAs balancing to estimate a time-series of capital flow tables. The capital flow tables are deflated with our PDE deflators. Then the column sums of the capital flows matrices yield constant price estimates of investment by industry.

Personal Consumption Expenditures

The NIPA provide data, in current and constant prices, by category of consumer spending, for which we estimate our consumption functions. The NIPA time series are based on retail sales, which are assigned to spending categories on the basis of Census information on merchandise line sales. (These time series are revised as part of the benchmark revisions to incorporate the work of the I-O division in preparing the benchmark I-O table.) To determine PCE by product, we pass consumer spending through a PCE bridge table.

Historically, we have made direct estimates of PCE in producers' prices. The 1977 PCE workfile was used to calculate (at the 5-digit level) the ratio of PCE to shipments which had been adjusted to include imports and exclude exports. The ratio and the time series of adjusted shipments yielded a time series of PCE. This source is generally the one which we used for our final demand estimates in the update of the I-O table. We deflated adjusted PCE with the weighted deflators described above. For many (but not all) manufacturing consumer goods sectors, if we know production and reduce it for exports and increase it for imports, we should have a good estimate of consumer purchases. Apparel and toys are examples where this method should provide reasonable estimates. Gasoline and motor vehicles are examples where the method is unreasonable.

However, there were some significant differences between the NIPA-bridged PCE and the 5-digit based PCE. These differences were particularly large in the constant dollar series. Of course the bridge table is not constant, but the differences did not seem to represent a bridging problem. (For a number of categories, such as apparel, bridging merely removed trade and transportation margins from data in purchasers' prices in order to derive the estimate in producers' prices. In such cases, we were perplexed when the two series exhibited significantly different trends.) For the constant dollar series, one possibility is that our prices, which reflect weighted domestic and import prices, differ from the NIPA deflators, which reflect the consumer price indices. Another troubling consideration is the degree of change which has occurred in the NIPA PCE detail as a result of the benchmark revisions in the national accounts.

⁷See McCarthy, "The Measurement of Real GNP" in INFORUM's Nov. 1988 Outlook.

This problem is one which we have not resolved to our satisfaction. It seems to represent inconsistencies in the data sources. Therefore, we have constructed a measure, the INFORUM statistical discrepancy, which is the difference between historical output and the output predicted by our estimates of historical final demands (including bridged PCE) and our historical, updated I-O tables. Therefore, in the model, we use

$$q = Aq + f + sd$$

to calculate output. In the forecast, "sd" is constant.

Exports and Imports

Foreign trade is becoming increasingly important in the U.S. economy. INFORUM maintains detailed series of merchandise exports and imports in current and constant prices. The Census Bureau collects data on merchandise trade in tremendous detail. Until a few years ago, Census published detailed data on exports and imports in SIC-based product codes. Unfortunately, these volumes have been discontinued; detailed data is now published only in various foreign trade classifications. (This loss is a significant one, because those volumes made comparison with other domestic data a simple matter. Their detail also permitted the construction of unit value indexes to measure price change.) We are indebted to the International Trade Administration in the Department of Commerce for sharing with us their series of merchandise exports and imports classified by 4-digit SIC. With a few exceptions, data on trade in services is hard to obtain.

We deflate exports with domestic deflators for producer prices. We deflate imports with foreign producer-price deflators, adjusted for changes in exchange rates, and weighted by country of origin. The Bureau of Labor Statistics publishes some deflators for exports and imports. These series cover recent years and selected products. We have made some use of them, particularly as substitutes for the unit-value indexes.

Value-added

We obtain estimates of value-added, for some 14 components and about forty industries, from the NIPA as their series on gross product originating (GPO) by industry. The NIPA obtain much of the capital income data from tabulations of the income tax returns of companies. The principal difficulty, for us, with the GPO data is its classification. To overcome this problem, we have constructed a "product-to-industry" bridge for value-added, which was described above.

All of this data effort is quite a lot of work. But it is an essential part of building an INFORUM-type model. Only with a firm foundation of historical data can we hope to build models of long-term growth by industry.

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GUIDE TO DATA ON DISKETTES

- TRADE3D** US Exports to Mexico and World, US Imports from Mexico and World, 2- and 3-Digit data, current \$, 1983-1989. For 1983-1988, the data were collected in the TSUSA and converted later to HS. In 1989, they were collected in HS. The HS were then converted to 1987 SIC. This is a compressed bank; assign with "cbk trade3d".
- MEXPRICE** Mexican prices by Mimex sector, 1980 = 100. The "p" series are the crude price series, converted from monthly to annual data; the "pdol" series have been divided by the exchange rate to show prices in dollars.
- LIFTEXIM** Lift exports and imports in current prices and constant prices. Price indexes for exports and imports. Mexican prices in Lift sectors.
- TRADE** US Exports to Mexico and World, US Imports from Mexico and World, 1980-1989, 1983-1989 on Harmonized basis, linked in 1983 to previous series on TSUSA basis.
- TRADEMS** US Exports to Mexico and Imports from Mexico in MIMEX sectors. Linked as in TRADE.
- MIMEXBAS** Base run of Mimex model (compressed)
- USABAS** Lift model, selected variables, base run, June 1990. (compressed)
- NOMPROT** The Ten Kate data on Nominal Protection in Mexico.
- PLM** Mexican prices, converted to dollars and in Lift sectors
- U2M\$** MIMEX price indexes, US exports to Mexico in MIMEX sectors in 1980\$
- PIMPORTS** US Import price indexes, LIFT sectors

