# ECONOMY-WIDE MODELING OF THE ECONOMIC IMPLICATIONS OF A FTA WITH MEXICO AND A NAFTA WITH CANADA AND MEXICO

Report on Investigation
No. 332–317 Under
Section 332 of the
Tariff Act of 1930

# UNITED STATES INTERNATIONAL TRADE COMMISSION

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# PREFACE

The United States has entered into trilateral negotiations with Canada and Mexico to establish a North American free trade agreement (NAFTA). There has been considerable public interest in the economic implications of such an agreement. Public debate in this regard has focused on, among other things, the results of various economy-wide models of a NAFTA. On July 24, 1991, the United States International Trade Commission (USITC) received a request[1] from the United States Trade Representative (USTR) to conduct an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) and to prepare a report, based on a symposium to be held by the Commission, on the technical merits and major findings of economy-wide modeling of the economic implications of a FTA with Mexico and a NAFTA with Mexico and Canada. Pursuant to this request, the Commission instituted investigation no. 332-317 on October 28, 1991.[2]

The symposium was held February 24-25, 1992 at the USITC, 500 E Street, NW, Washington, DC.[3] Twelve modeling teams presented technical papers, followed by professional economists who discussed each paper. The symposium included nearly all of the research by computable general equilibrium (CGE) modelers currently involved in studying the NAFTA as well as one macroeconomic forecasting model of a FTA with Mexico.

Policymakers and the public will find that the results are generally consistent; however, each model addresses a different aspect of the NAFTA. The models presented at the symposium fell into four broad categories. The first category were static CGE models of one or more countries that examined liberalization of trade barriers in all sectors simultaneously but whose sectoring schemes were fairly broad. The second category of models focused on a particular sector, in this case either agriculture or autos. This second type of CGE model has the advantage of capturing some key institutional features of sectors that are of necessity omitted from most large models. The third and last category of CGE models were dynamic. Dynamic CGEs capture the increased rates of economic growth resulting from trade liberalization that are not modeled in static CGEs. The fourth and final category was the linked macroeconomic model, which incorporates macroeconomic features not included in CGEs.

This report is organized in two volumes. The first volume is a critical review and summary prepared by the Commission staff of these papers and comments. The second volume is an addendum of all the papers submitted by the authors and the discussants' written comments.

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[1] See app. A.
[2] See app. B.
[3] The symposium program is included in app. C.

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# Addendum

# EXECUTIVE SUMMARY

## Introduction

The United States has entered into trilateral negotiations with Canada and Mexico to establish a North American free trade agreement (NAFTA). The prospect of a NAFTA has generated considerable public debate in the United States about the overall economic benefit to the United States as well as the likely impact on labor and the environment. Public debate in this regard has focused on, among other things, the results of various economic studies of a NAFTA. Many of these studies involve the application of "economy-wide" economic models. Economy-wide models allow for explicit analysis of the complex interaction of comprehensive policy changes, such as those that would follow the implementation of a NAFTA. Such studies may provide a sense of the various economic changes that would be induced by a NAFTA.

On February 24-25, 1992, the Commission held a symposium on economy-wide models of a NAFTA at the request of the U.S. Trade Representative. The symposium followed a public call for papers on the subject. This report provides the 12 papers and 24 discussants' comments from the symposium, along with an overview and summary by the Commission.

Estimates of the economic effects of a NAFTA are influenced by the structure of the economic model employed. For this reason, the Commission report includes a technical assessment of the models presented. All of the papers but one presented at the Commission symposium are based on computable general equilibrium (CGE) models. The one exception is the Almon study, which employs a linked macroeconomic forecasting model. Both approaches have advantages. While linked macroeconomic models have been in use for almost a generation for trade policy analysis, the application of CGE models in this context is relatively recent. The public debate over a NAFTA represents the first time this new class of economic models has been featured prominently in the public debate on U.S. trade policy.

CGEs are models of a whole economy. They include upstream and downstream links between different sectors of the economy, as well as the competition between these sectors for the productive resources of the economy. CGE models are firmly grounded in economic theory, and embody microeconomic principles regarding firm and consumer behavior, national budget constraints, and the measurement of economic welfare. Linked macroeconomic models do not place as much emphasis on rigorous theoretical underpinnings as do CGE models. Both linked macroeconomic and CGE models rely on the assessment of behavioral patterns and economic structure through the statistical analysis of data. However, linked macroeconomic models place much more emphasis on the statistical estimation of economic relationships based on historical data and the testing of model forecasts. Policy analysis in CGE models is conducted with respect to the underlying structure of an economy in a "benchmark" year, while in linked macroeconomic forecasting models such structure is projected forward as part of the forecast.

## An Overview

The focus of the papers presented at the symposium is varied. Some emphasize the effects of a NAFTA across broad sectors of the economy, while others examine in detail the impact on specific sectors, such as autos or agriculture. Despite the different approaches taken in these studies, there is a surprising degree of unanimity in their results regarding the aggregate effects of a NAFTA. All three counties are expected to gain from a NAFTA. The greatest impact will be on the Mexican economy, with less impact on the Canadian and U.S. economies.

Most of the studies presented at the symposium are static. This means that they emphasize the likely effects that a NAFTA would have on the level of national income through reallocation of capital and labor and changes in the size of firms or of whole sectors. The estimated aggregate gains from a NAFTA through such static effects are not very large. However, a NAFTA may also lead to an accelerated rate of economic growth, particularly in

Mexico. Such changes in economic growth rates are referred to as "dynamic gains from trade."[1] Dynamic gains from trade can result from the accelerated transfer of technology, accumulation of skills, access to specialized capital goods, the global or regional integration of production, and changes in the rate of innovation. Like the static gains from trade, most of the dynamic gains from a NAFTA are expected to accrue to Mexico.

The linked macroeconomic forecasting model employed by Almon explicitly incorporates unemployment. In contrast, the CGE models treat the labor market more simply by assuming either fixed aggregate employment or a fixed aggregate real wage. A comparison of the results under linked macroeconomic forecasting and CGE approaches suggests that this distinction does not greatly affect the assessment of a NAFTA. Aggregate employment and wages are expected to rise in all three countries.

In addition to tariff liberalization, the liberalization of nontariff barriers (NTBs) also has significant economic implications, as do increased financial capital flows. The gains from liberalization of both tariffs and NTBs may be substantially greater than those from tariff liberalization alone. In estimates that assume capital flows into Mexico due to a NAFTA, the benefits for Mexico are even greater than those from liberalization of just tariffs and NTBs.

# Likely Impact on the U.S. Economy

With one exception (Roland-Holst et al.), models estimate that a NAFTA would cause U.S. real gross domestic product (GDP) to expand by 0.5 percent or less. Aggregate employment increases range from less than 0.1 to 2.5 percent while aggregate real wage increases range from less than 0.1 to 0.3 percent. The limited effect of a NAFTA on the U.S. economy is not surprising. The U.S. economy is relatively open, with trade-weighted average tariffs of 3.6 percent in 1989. It is also much larger than the Mexican economy. While Mexico is the third largest U.S. trading partner, Mexico supplied only 6 percent of total U.S. imports and absorbed only 7 percent of total U.S. exports in 1989.

Under liberalization of tariffs alone, estimated increases in U.S. real GDP range from negligible to 0.1 percent. If NTBs are liberalized as well, the estimated percent increases are as high as 2.1 percent. With one exception (two of four scenarios in the Hinojosa and Robinson study), U.S. aggregate employment also rises as a result of a NAFTA. Estimated employment increases range from negligible to 2.5 percent. Aggregate real wage levels are estimated to rise by between less than 0.1 to 0.3 percent. Evidence concerning the effect of a NAFTA on real wage levels for the lower tier of the U.S. labor force (workers with low levels of education and labor market experience) is mixed, with some studies showing decreases and others showing increases, although the real wage changes are all less than two percent. Any capital flows induced by a NAFTA are unlikely to have much impact on the U.S. economy, given the relative sizes of the Mexican and U.S. capital markets. In those studies that assessed additional financial capital flows for Mexico, estimated increases in real GDP range from less than 0.1 to 0.3 percent for the United States. By comparison, these same studies estimated gains of less than 0.1 to 0.2 percent without additional capital flows.

# Likely Impact on the Mexican Economy

Although Mexico accounts for a small share of U.S. trade, the United States accounts for a substantial share of Mexican trade (over 70 percent of Mexico's exports and imports in 1989). Furthermore, much of the liberalization included in a NAFTA would be undertaken by Mexico. The effects of such liberalization will therefore be concentrated in Mexico. As Mexico opens its economy to the Canadian and U.S. economies, a NAFTA would induce significant economic restructuring in Mexico, with only limited effects on the larger and more developed economy of the United States.

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[1] The U.S. International Trade Commission has initiated a study of the economic literature on the dynamic effects of trade liberalization. This study was initiated under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) following a request from the U.S. Trade Representative. The Commission's report on this subject will be available in December 1992.

For Mexico, estimated increases in real GDP range from less than 0.1 to 11.4 percent for the CGE models. (The Almon study estimates that Mexican GDP decreases by 0.4 percent). Under liberalization of tariffs alone, estimated increases in real GDP range from negligible to 1.9 percent in the static models. If NTBs are liberalized as well, the estimated static gains range from 0.3 to 3.4 percent of real GDP. Calculations of dynamic effects show that dynamic gains from a NAFTA may be on the order of 50 percent of Mexican real GDP over a period of 25 years. With two exceptions (the Almon study and one of four scenarios in the Hinojosa and Robinson study), Mexican aggregate employment increases by between 0.1 to 6.6 percent. Aggregate real wage increases range from 0.7 to 16.2 percent. Potential financial capital flows are also important for the Mexican economy. Sources of additional capital include Canada and the United States, Mexican capital currently invested abroad, and other countries outside North America. In those studies that assumed additional capital flows for Mexico, increases in real GDP range from 3.1 to 8.1 percent.

The liberalization of Mexican agriculture has interesting implications for labor migration patterns. The likely economic implications depend critically on whether liberalization is phased in or implemented immediately. Both of the studies that focused on this issue (the Levy and van Wijnbergen study and the Robinson et al. study) found a phase-in to be potentially beneficial because the adverse effects of corn liberalization on rural workers and farmers during the first few years following liberalization are lessened. However, instantaneous liberalization may induce substantial rural emigration. These authors argue that Mexico may need a lengthy transition period and may need to allocate resources to agriculture during the transition. Undue haste in introducing free trade in agriculture and eliminating Mexican agricultural support programs, they argue, may not be desirable for either Mexico or the United States when the social and economic costs associated with increased migration are weighed against the benefits of increased trade. Timing can be crucial in this regard. While the increased economic growth needed to absorb displaced labor takes time, any increase in rural emigration can be immediate.

## Likely Impact on the Canadian Economy

Only three of the studies covered by this report examined the likely implications of a NAFTA for Canada. Canada is already part of a bilateral FTA with the United States. The likely incremental impact on Canada of adding Mexico to the existing FTA is thus much smaller when compared to the impact of a NAFTA on Mexico.

The estimated increases in Canadian real GDP are less than those for Mexico or the United States in two of the three studies (Brown et al. and Cox and Harris) that focus on Canada. These increases range from negligible to 10.8 percent of real GDP. In two of the studies (Brown et al. and Cox and Harris), the impact on Canadian real GDP and welfare is less than 1 percent. In the Brown et al. and Cox and Harris studies, increases in aggregate real wages are between negligible and 0.5 percent. In the Roland-Holst et al. study, employment increases by 0.6 percent due to a NAFTA that covers only tariffs. However, with liberalization of NTBs in addition to tariffs, Canadian employment rises by between 7.3 and 11.0 percent.

# OVERVIEW AND SUMMARY OF ECONOMY-WIDE MODELS OF A NAFTA

The prospect of a North American free trade agreement (NAFTA) has generated considerable public debate in the United States about its overall benefits as well as its impact on labor and the environment. In this context, economy-wide models of trade liberalization between Canada, Mexico, and the United States may provide some sense of the magnitude of various economic effects.

In its statement to the Congress during the debate over extension of fast-track negotiating authority,[1] the Bush administration cited three major economic analyses of a NAFTA: the Almon study, the Peat Marwick study, and a U.S. International Trade Commission (USITC) study.[2] Almon's study employed two separate macroeconomic forecasting models, for Mexico and the United States, and linked them through the bilateral trade equations. The Peat Marwick project constructed a computable general equilibrium (CGE) model of Mexico and the United States. The USITC study was qualitative rather than quantitative, but it drew upon partial equilibrium models of particular industrial sectors and a small CGE model to assess the implications for U.S. workers.

In addition to citing these three studies, the administration pledged to draw on new economic analyses of a NAFTA as they become available. Accordingly, the U.S. Trade Representative (USTR) requested that the Commission hold a public symposium, at which researchers involved in state-of-the-art economy-wide analyses of a NAFTA would present papers laying out their methods and findings and at which qualified experts would critique

the papers. The symposium was held at the Commission on February 24-25, 1992. In general, the papers presented at the USITC symposium found that the NAFTA promises economic benefits for all three nations involved, that the dynamic gains from a NAFTA would far outweigh the static gains, and that aggregate real wages of U.S. workers would rise.

This volume provides an overview and summary of the economy-wide models presented at the USITC symposium. It offers a brief theoretical discussion of the various ways in which a NAFTA might affect the North American economy, followed by a description of various types of economy-wide (primarily CGE) models. Subsequently, it compares the assumptions and structure of the various models. In light of the differences in modeling assumptions, it presents an overview and comparison of aggregate results. Following the comparison of model structure and aggregate results, it summarizes each study. Each of these summaries briefly describes the study's methodology, principal findings, and policy implications.

## Theoretical Principles

There is little precedent for a free trade agreement (FTA) between countries of such differing income levels. Canada and the United States have similar income levels and capital-labor ratios. Mexico, however, is labor-abundant as compared with its two North American neighbors. Accordingly, traditional trade theory suggests that the gains from trade should be higher from a NAFTA than from the Canada-U.S. free trade agreement (CAFTA), especially for the smaller country.

Conversely, the effect of a NAFTA on U.S. wages, especially for the lower tier, may be greater than that of the CAFTA because there is a larger disparity between Mexican and U.S. wages. Labor is relatively abundant in Mexico, as compared with the United States, and so traditional trade theory suggests that U.S. wages could fall in response to a NAFTA, both in absolute terms and relative to the return on capital.

Another potentially important factor is the existence of scale economies. Industries with fixed costs, such as autos, can produce at lower cost per unit if the scale of production is increased. The theory of trade under imperfect competition suggests that trade barriers may result in too large a number of product varieties being produced in each country, with each being produced at too low a volume. This is arguably the case, for example, for the portion of the Mexican auto industry near Mexico City. Trade liberalization may lead to economic gains through rationalization of the domestic industry. These rationalization gains, whereby inefficent plants are closed and remaining plants operate at more efficient levels, may be an important part of the effects of a NAFTA, especially for Mexico.

There may also be important dynamic gains from a NAFTA. Mexico currently has high tariffs on imported capital goods and intermediate inputs. One effect of

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[1] The President notified the Congress of his decision to proceed with free-trade negotiations with Mexico under "fast-track" negotiating authority on September 25, 1990. Fast-track authority means Congress must vote to accept or reject a negotiated agreement without amendment. Following further discussions with Mexico and Canada, the President notified Congress on February 5, 1991 of the decision of all three Governments to broaden the negotiations to include Canada, and so to work towards a NAFTA.

[2] See, "Response of the Administration to Issues Raised in Connection With the Negotiation of a North American Free Trade Agreement," Transmitted to the Congress by the President on May 1, 1991. The three studies are: "Industrial Effects of a Free Trade Agreement between Mexico and the U.S.A.," Research Report prepared for the U.S. Department of Labor, Bureau of International Labor Affairs, under Contract J-9-K-9-0077 (Professor Clopper Almon, Principal Investigator), September 1990; "Analysis of Economic Effects of a Free Trade Area between the United States and Mexico," KPMG Peat Marwick, Policy Economics Group, prepared for the U.S. Council of the Mexico-U.S. Business Committee, Washington, DC, 1991; "The Likely Impact on the United States of a Free Trade Agreement with Mexico," USITC Publication 2353, February 1991.

trade liberalization may be to increase incentives for investment in Mexico, which would accumulate over time into higher capital stocks in Mexican industry and lead to a one-time increase in Mexican output per worker. Trade liberalization may also increase the availability of specialized capital goods that embody advanced technology. Economic theory suggests that increased availability of specialized inputs can lead to a permanent increase in the rate of economic growth. If the conditions needed for increased growth are satisfied in the Mexican case, the dynamic gains from a NAFTA may far exceed all of the other gains that occur in the static models discussed above.

## Taxonomy of Economy-Wide Models

To understand how results of the numerous economy-wide models of a NAFTA may differ, it is first necessary to understand some basic structural differences between the models presented at the USITC symposium. There is, first, a fundamental distinction between CGE and macroeconomic forecasting models. The macroeconomic forecasting approach estimates behavioral relationships from time-series data (i.e., a series of data points in different years) but the model has little microeconomic foundation. CGE models, however, are firmly rooted in microeconomic theory. They use the structure of the economy in a single year, referred to as the *benchmark*, as a basis for policy experiments[3] but they estimate the behavioral relationships in the model based on an empirical analysis of time-series data. All of the models presented at the symposium, except the Almon model, are CGEs, however.

Static models use data on trade, interindustry transactions, and consumption patterns for a specified base year. Trade liberalization experiments alter the level of tariffs and solve the model for prices and quantities that would prevail in the base year if everything had been the same except for the level of tariffs. This is referred to as comparative statics because actual prices and quantities in a single year are compared with hypothetical prices and quantities in that same year, constructed to reflect the change in tariffs.

Dynamic models construct an entire time path using data on levels and growth rates for variables in a base year, for example 1991. The dynamic model is used to simulate what prices and quantities would be in the future, for example 1992-2000, given the data and assuming that some variables are not determined within the model. Typically, the evolution of monetary and fiscal policy is assumed to be determined outside the model (i.e., the money stock and government budget deficit are exogenous). Given this reference or base path for prices and quantities, the model is solved again, using different tariff rates, to obtain a second time path for prices and quantities. The difference

between these two paths of prices and quantities is interpreted as the incremental effect of the tariff changes.

Many of the current CGE models of a NAFTA are static models. Within the set of static models, there is a distinction between models that assume constant returns to scale and models that assume increasing returns to scale.[4] In contrast to the constant returns to scale assumption, if there are increasing returns to scale, it is necessary to modify the standard assumption that firms take prices as given. Some form of imperfect competition must be assumed.[5] Under most forms of imperfect competition, it is possible to hold the number of firms in the market fixed or, alternatively, to allow costless entry and exit. The form of imperfect competition chosen and whether or not there is free entry (and exit) can affect the simulation results in a complex manner.

If there are increasing returns to scale, trade liberalization may induce inefficient firms to exit and push remaining firms down their average cost curves.[6] This is a potentially important source of gains from trade, in addition to the standard gains arising from differences in factor proportions. Hence, there is a presumption that CGE models of a NAFTA that incorporate imperfect competition will capture important gains from trade liberalization precluded by models that assume perfect competition. Results are sensitive to the choice of pricing hypothesis in imperfectly competitive models and so they should be interpreted with care.

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[3] The following terms are used interchangeably by authors of the studies summarized in this report: cases, experiments, scenarios, simulations, and versions.

[4] See Bela Gold, "Changing Perspectives on Size, Scale, and Returns: An Interpretive Survey," Journal of Economic Literature 19, March 1981, pp. 5-33.

[5] The following types of imperfect competition are specified in CGE models of a NAFTA: Bertrand, Cournot, contestable markets, Eastman-Stykolt, and monopolistic competition hypotheses. Bertrand pricing means that firms set prices to maximize profits, taking prices set by competitors as given. Bertrand equilibrium occurs when each firm's price is equal to the price that other firms expect it to choose. Cournot quantity setting means that firms set quantities to maximize profits, taking quantities selected by competitors as given. Cournot equilibrium occurs when each firm's quantity is equal to the quantity that other firms expect it to choose. Under the contestable markets hypothesis, firms set price equal to average cost, which is just low enough to deter entry by potential competitors. Under the Eastman-Stykolt hypothesis, domestic firms all charge a focal price, which is assumed to equal the landed price of imports inclusive of duties. The Chamberlin-Cournot monopolistic competition hypothesis assumes that all firms in an industry produce different varieties of a good using the same technology, cross-price elasticities of demand between varieties are equal, and entry is free.

[6] The firm's average cost curve gives the firm's total cost of production, divided by the level of output, for several different output levels. If there are substantial costs to opening up a plant in order to begin production (fixed costs), then the firm's average cost will decline as the level of production is increased because fixed costs are spread over a greater volume of output.

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Turning now to dynamic CGEs, there is a distinction between level and growth effects. A tariff reduction on capital goods imports, for example, will lead to increased investment and a larger capital stock. In itself, however, the tariff decrease will lead only to an increase in the level of output per worker, not in the rate of economic growth. Sources of economic growth include population growth and technical change. The rate of technical change may be specified either exogenously or endogenously. Endogenous technical change may result from human capital accumulation, learning-by-doing, specialized inputs, or research and development. If technical change is endogenous, it is theoretically possible for trade liberalization to increase the rate of economic growth. Thus, endogenous growth models are needed to capture dynamic gains from trade liberalization. These dynamic gains may greatly exceed the gains from trade in static models.

## Comparison of NAFTA Model Structure

Turning to the models presented at the USITC symposium, table 1 summarizes the main structural features of each CGE.[7] The table is divided into static models in 1(a) and dynamic models in 1(b). The Hunter et al. model focuses primarily on North American autos and Robinson et al. concentrates on Mexican and U.S. agriculture. Cox and Harris focus on Canada while Sobarzo focuses on Mexico. These models miss some feedback effects between countries but they capture more of the structure of the country being modeled than do multicountry models. Bachrach and Mizrahi (Peat Marwick) and Roland-Holst et al. are multicountry models with a large number of industrial sectors in each country.

Brown's model is virtually identical to the Brown et al. (1992) model with three countries and 29 sectors that was constructed to analyze a NAFTA.[8] However, this version contains only two countries, and two sectors. Brown's model is extremely useful for identifying the causal links that give rise to some seemingly counterintuitive results in the larger model. It also serves to make the structure of the larger model more transparent.

In most of the static models, it is assumed that labor is homogeneous, perfectly mobile between sectors within a country, and immobile internationally. While these assumptions are standard in trade theory, it

would clearly be desirable to relax them to study a NAFTA. Robinson et al. is the only static model that allows for different types of labor and for international labor migration.

Various assumptions are made in the static models regarding market structure. Constant returns to scale is simplest to model but it omits potentially important gains from trade. Many of the models assume increasing returns to scale and combine this with one or more forms of imperfect competition. Hunter et al. also allows for multinational firms, which are potentially important in this context because a high proportion of North American trade is intrafirm trade.

The static models also make a variety of assumptions regarding aggregate wage or employment determination, international mobility of capital, and exchange rate determination. These are referred to as closure rules. With regard to the labor market, many models assume that each country's endowment of labor is fixed so that the wage adjusts to clear the labor market. Alternatively, some models assume that the wage is fixed so that aggregate employment adjusts to clear the labor market.

Labor market closure must be adapted in models that allow for different types of labor. The Robinson et al. model, for example, assumes that there is enough migration to hold constant (or fix) the following quantities: (1) the rural/urban-unskilled wage differential within Mexico; and (2) the rural/rural and urban-unskilled/urban-unskilled wage differentials between Mexico and the United States (expressed in a common currency). An implication of this closure rule is that, for good or ill, an exchange rate change will lead to international labor migration.

With regard to capital mobility, there is a choice between fixing the return on capital, thereby allowing for imports of capital, and fixing the aggregate capital stock, thereby allowing the return on capital to adjust. If the aggregate capital stock is assumed to be determined exogenously, then it is possible to combine an exogenous increase in the aggregate capital stock with a trade liberalization experiment. Since both methods of allowing for capital imports are ad hoc, a more acceptable alternative would be to model the effect of trade liberalization on firms' investment decisions. As discussed below, this approach has been taken by Young and Romero.

Finally, there is a choice between fixing the exchange rate and allowing the trade balance to adjust to restore equilibrium in the foreign exchange market or, alternatively, fixing the trade balance and allowing the exchange rate to adjust to clear the foreign exchange market. Most models fix the trade balance and allow the exchange rate to adjust. This would be appropriate, for example, if the capital account were determined outside the model, e.g., by monetary forces. Ideally, both the current and capital account would be determined within the model so that the trade balance

[7] Two of the papers presented at the USITC symposium are not included in table 1. Almon's model is a macroeconomic forecasting model which, as discussed in the preceeding section, has a structure that is very different from the CGEs presented in table 1. Kehoe's paper presents some theoretical models that incorporate dynamic gains from trade but he does not yet have an operational applied general equilibrium model.

[8] See, Drusilla K. Brown, Alan V. Deardorff, and Robert M. Stern, "A North American Free Trade Agreement: Analytical Issues and a Computational Assessment," World Economy 15, January 1992, pp. 11-29.

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**Table 1a**
**Structure of static general equilibrium models of a NAFTA**

| Model | Countries | Base year | No. of sectors | Primary factors | Market structure | Closure | Policy instruments |
|---|---|---|---|---|---|---|---|
| Bachrach and Mizrahi ........ | Mexico U.S. | 1988 | 44 | Capital Energy Labor | CRTS[1] | Fixed wage or fixed employ. Fixed capital stock Fixed trade balance | Tariffs NTBs[1] |
| Brown .................... | Home Foreign | NA | 2 | Capital Labor | IRTS[1] Bertrand pricing Free entry | Fixed employ. Fixed capital stock | Tariffs |
| Cox and Harris .............. | Canada | 1981[2] | 19 | Capital Labor | IRTS E–S and MC pricing[3] Free entry | Fixed employ. Fixed world rental rate | Tariffs |
| Hunter et al. ................ | Canada Mexico U.S. | 1988 | Autos Composite | Labor[4] Resources | IRTS Cournot pricing Free entry Multinational firms | Fixed employ. | Tariffs |
| Robinson et al. .............. | Mexico U.S. | 1988[5] | 5 Ag. 6 Other | Capital Labor: Rural Urban: unskilled skilled Professional Agricultural Land | CRTS | Fixed employ. Migration: Rural–Urban Mexico–U.S. Fixed trade balance | Tariffs NTBs Agricultural programs |
| Roland–Holst et al. ........... | Canada Mexico U.S. | 1988 | 26 | Capital Labor | CRTS IRTS Cournot pricing and free entry Average cost pricing and no entry | Fixed wage Fixed capital stock Fixed trade balance | Tariffs NTBs |

See footnotes at end of table.

**Table 1a—Continued**
**Structure of static general equilibrium models of a NAFTA**

| Model | Countries | Base year | No. of sectors | Primary factors | Market structure | Closure | Policy instruments |
|---|---|---|---|---|---|---|---|
| Sobarzo ................... | Mexico | 1985 | 27 | Capital Labor | IRTS E–S and MC pricing Free entry | Version 1[6] Version 2 Version 3 | Tariffs |

[1] CRTS and IRTS denote constant and increasing returns to scale, respectively. NTBs are nontariff barriers.

[2] The benchmark data set utilizes 1981 production data but reflects 1989 trade flows and tariff rates.

[3] A weighted average of the Eastman–Stykolt and monopolistically competitive pricing hypotheses was used.

[4] "Labor" in this model represents an aggregate of all variable factors used to produce autos. "Resources" represents a sector–specific factor used to produce the composite commodity. Both factors bear no relationship to empirical entities of the same name.

[5] The base year for Mexico is mostly 1988. The United States uses a 1987 base year, in order to abstract from the effects of the 1988 drought, but imposes 1988 U.S.–Mexican bilateral trade flows on a 1987 base U.S. economy.

[6] Sobarzo's three versions are distinguished by their closure rules:

        Version 1—fixed wage, fixed capital stock, and fixed trade balance
        Version 2—fixed wage, fixed capital stock, and fixed exchange rate
        Version 3—fixed employment, fixed return on capital, and fixed exchange rate.

Source: USITC symposium, February 24–25, 1992.

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and the exchange rate would be jointly determined.[9] However, none of the NAFTA models adopts this more complex approach.

Table 1(b) compares the structure of the dynamic models. To incorporate dynamic features, it is generally necessary to economize on the number of sectors. Levy and van Wijnbergen, for example, focus on Mexican agriculture and do not analyze trade liberalization in industry or services. McCleery's model has only two sectors in each country. Young and Romero focus on capital goods, distinguishing between buildings, machines, and vehicles.

The Levy and van Wijnbergen model distinguishes seven different primary factors of production. In addition, it contains six different household types. Household types are distinguished by their ownership of the factors of production. This provides a rich structure for analyzing the impact of Mexican corn liberalization for the distribution of income between household types. Because the model is also dynamic, it is possible to examine the implications of policy timing for groups that may experience short-term losses as a result of corn liberalization. Finally, the model incorporates rural/urban migration within Mexico, so that pressures on rural labor markets resulting from corn liberalization spill over onto the urban labor market.

McCleery takes a fairly standard static CGE and imposes some potentially important dynamic features. Rates of return on capital in Mexico are assumed to differ from rates of return in the United States due to risk differentials. A NAFTA may lower these risk premiums and thereby induce additional capital flows into Mexico. Dynamic gains from trade are incorporated by assuming that the rate of productivity change depends on total output of capital goods. The effect of trade liberalization on growth is modeled by changing the rate at which an increase in output of capital goods leads to an increase in productivity growth.

Young and Romero highlight the importance of high Mexican tariffs on imports of capital goods by modeling the firm's forward-looking investment decision. A firm decides how much to invest in capital goods by comparing the cost of hiring an additional unit of capital with the present value of revenue obtained from installing the extra capital. Liberalization of capital goods imports leads to increased investment which, over time, accumulates to form a higher capital stock. The theoretical model assumes that capital per worker eventually reaches a certain value and stays there permanently. Liberalization of capital-good imports therefore leads to a one-time increase in output per worker but there is no increase in the growth rate.

## Comparison of NAFTA Model Results

From the preceeding section, it is apparent that there is great variety in the number of countries, sectors, theoretical structures, and institutional details

across the models presented at the USITC symposium. Accordingly, it is useful to see if all of the studies reach the same qualitative conclusions and, if so, whether the estimated changes are similar in magnitude. This section attempts to make a broad comparison of aggregate results from models of a NAFTA for Canada, Mexico, and the United States.

Aggregate results from the models presented at the USITC symposium are presented in table 2.[10] Panel (a), for example, presents percent changes in Canadian aggregate welfare, real gross domestic product (GDP), employment, the real wage rate, the return on capital, and the trade balance. Corresponding results for Mexico and the United States are reported in panels (b) and (c), respectively. The table presents more than one policy scenario for some models. These additional scenarios show how a tariffs-only experiment differs from one that also incorporates nontariff barriers (NTBs), and also shows the importance of Mexican capital inflows and labor migration between Mexico and the United States.[11]

Overall, these studies uniformly demonstrate that all three countries would benefit from a NAFTA, as shown by increases in welfare and real GDP.[12] Mexico stands to gain the most, with estimated welfare increases ranging from 0.11 to 5.0 percent. Mexican real GDP increases by 0.01 to 11.39 percent. The United States would gain 0.07 to 2.55 percent in welfare and real GDP would increase by 0.02 to 2.07 percent. Most studies show smaller gains for Canada than for Mexico, with welfare changes of 0.03

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[9] See Lawrence H. Goulder and Barry Eichengreen, "Trade Liberalization in General Equilibrium: Intertemporal and Interindustry Effects," NBER Working Paper 2695, Cambridge, MA, 1989.

[10] The table does not include results for the Hunter et al. or Kehoe papers in this symposium. Hunter et al.'s model focuses on trade liberalization in autos only; therefore, it is inappropriate to present its aggregate welfare results alongside results from models that liberalize trade barriers in all sectors. Kehoe's paper contains a theoretical discussion and some calculations based on regression results but does not contain an applied general equilibrium model.

Table 2 also includes results from two prior papers using models presented at the USITC symposium: Brown et al. (1992); and Raul Hinojosa-Ojeda and Sherman Robinson, "Alternative Scenarios of U.S.-Mexico Integration: A Computable General Equilibrium Analysis," Working Paper No. 609, Department of Agricultural and Resource Economics, University of California, Berkeley, April 1991. These papers help to show how results from CGE models of a NAFTA vary as nontariff barriers (NTBs), capital flows, and migration are included.

[11] In addition, it is possible to isolate the effect of various modeling issues, such as constant returns to scale versus increasing returns to scale, the form of imperfectly competitive pricing behavior, the degree of product heterogeneity across firms and nations, and the importance of dynamic considerations.

[12] Equivalent variation is used in most of the studies to measure the change in aggregate welfare. This shows the additional income needed at base period prices to make people as well off as they would be following the policy change.

**Table 1b**
**Structure of dynamic general equilibrium models of a NAFTA**

| Model | Countries | Base path | No. of sectors | Primary factors | Households | Source of growth | Closure |
|---|---|---|---|---|---|---|---|
| Levy and van Wijnbergen | Mexico | 1991 to 2000 | Corn Basic grains Vegetables Other agriculture Livestock Industry Services | Capital: industry services Labor: rural urban Land: irrigated livestock rain–fed | Subsistence farmer Landless rural worker Rain–fed farmer Irrigated farmer Urban worker Urban capitalist | Exogenous Hicks– neutral technical progress Exogenous capital stock and population growth | Exogenous world prices for traded goods Exogenous world rate of interest Rural–urban migration |
| McCleery | Mexico U.S. | 1991 to 2000 | Tradeable Nontraded | Capital Labor: skilled unskilled | 11 household types | Exogenous population growth Technical progress depends on output of capital goods | No migration Exogenous world rate of interest Exogenous new capital inflows into Mexico |
| Young and Romero | Mexico | 1992 to 2000 | 9 Consumption and intermediate goods 3 Capital goods: buildings machines vehicles | Capital Labor | Single household type | Exogenous population growth | All goods except buildings traded Exogenous world prices of traded goods Exogenous real rate of interest |

Source: USITC symposium, February 24–25, 1992.

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**Table 2a**
**Aggregate results from economy-wide models of a NAFTA: Canada**

*(Percent changes)*

| Model/Policy scenario[1] | Welfare | Real GDP | Employment | Wage | Return to capital | Trade balance |
|---|---|---|---|---|---|---|
| **Static:** | | | | | | |
| Brown et al.: | | | | | | |
| Experiment A .......................... | + 0.7 | NA[2] | NC[2] | + 0.4 | + 0.4 | NC |
| Experiment B .......................... | + 0.7 | NA | NC | + 0.5 | + 0.5 | NA |
| | | | | | | |
| Cox and Harris ........................ | + 0.03 | + 0.12 | NC | + 0.04 | NC | NA |
| | | | | | | |
| Roland–Holst et al.: | | | | | | |
| Experiment 1........................... | + 0.24 | + 0.38 | + 0.61 | NC | + 0.94 | NC |
| Experiment 2........................... | + 4.87 | + 7.22 | + 8.96 | NC | +14.50 | NC |
| Experiment 3........................... | + 4.08 | + 5.82 | + 7.29 | NC | +13.57 | NC |
| Experiment 4........................... | + 6.75 | +10.57 | +11.02 | NC | +20.74 | NC |

[1] The following policy scenarios were selected:
    Brown et al.:
        Experiment A—NAFTA, tariffs, and NTBs
        Experiment B—NAFTA, tariffs, NTBs, and direct foreign investment
    Cox and Harris:  NAFTA as compared to Canada–U.S. FTA, tariffs only
    Roland–Holst et al.:
        Experiment 1—CRTS, tariffs only
        Experiment 2—CRTS, tariffs and NTBs
        Experiment 3—IRTS, Cournot, tariffs and NTBs
        Experiment 4—IRTS, contestable markets, tariffs and NTBs
[2] NA means that the figure is not available.  NC means the variable is unchanged by assumption.

Source:  USITC symposium, February 24–25, 1992.

**Table 2b**
**Aggregate results from economy–wide models of a NAFTA: Mexico**
*(Percent changes)*

| Model/Policy scenario[1] | Welfare | Real GDP | Employment | Wage | Return to capital | Trade balance |
|---|---|---|---|---|---|---|
| **Static:** | | | | | | |
| Bachrach and Mizrahi: | | | | | | |
|   Scenario 1 | NA[2] | + 0.32 | + 0.85 | NC[2] | + 0.60 | + 1.18 |
|   Scenario 2 | NA | + 4.64 | + 6.60 | NC | NC | +59.12 |
| Brown et al.: | | | | | | |
|   Experiment A | + 1.6 | NA | NC | + 0.7 | + 0.6 | NC |
|   Experiment B | + 5.0 | NA | NC | + 9.3 | + 3.3 | NA |
| Hinojosa and Robinson:[3] | | | | | | |
|   Experiment 1 | NA | + 0.1 | −0.1 | RW 0.7<br>UU 0.7<br>UW 0.3<br>WC 0.2 | -0.4 | NC |
|   Experiment 2 | NA | + 0.3 | + 0.3 | RW -0.2<br>UU -0.2<br>UW 1.0<br>WC 1.0 | + 1.1 | NC |
|   Experiment 4a | NA | + 6.4 | + 0.1 | RW 9.2<br>UU 9.2<br>UW 7.4<br>WC 8.8 | -1.2 | NC |
|   Experiment 4b | NA | + 6.8 | + 1.4 | RW 4.7<br>UU 4.7<br>UW 7.7<br>WC 9.1 | -0.9 | NC |
| Robinson et al.[4] | NA | + 0.27 | NA | RW 1.8<br>UU -0.2<br>US 1.1<br>P 1.0 | + 1.1 | NC |
| Roland–Holst et al.: | | | | | | |
|   Experiment 1 | + 0.11 | + 0.13 | + 0.33 | NC | + 0.45 | NC |
|   Experiment 2 | + 2.28 | + 2.27 | + 1.49 | NC | + 5.18 | NC |
|   Experiment 3 | + 2.47 | + 2.57 | + 1.73 | NC | + 5.77 | NC |
|   Experiment 4 | + 3.29 | + 3.38 | + 2.40 | NC | + 6.57 | NC |
| Sobarzo: | | | | | | |
|   Version 1 | + 2.0 | + 1.7 | + 5.1 | NC | + 6.2 | NC |
|   Version 2 | + 2.3 | + 1.9 | + 5.8 | NC | + 6.6 | + 5.6 |
|   Version 3 | + 2.4 | + 8.0 | NC | +16.2 | NC | +18.3 |
| **Dynamic:** | | | | | | |
| Almon: | | | | | | |
|   TO | NA | 0.0 | -0.01 | NA | NA | -2.87 |
|   TAB | NA | −0.35 | -0.90 | NA | NA | -9.41 |

**Table 2b—Continued**
**Aggregate results from economy-wide models of a NAFTA: Mexico**
*(Percent changes)*

| Model/Policy scenario[1] | Welfare | Real GDP | Employment | Wage | Return to capital | Trade balance |
|---|---|---|---|---|---|---|
| Levy and van Wijnbergen[5] | SF -3.3<br>LR -1.6<br>RF -5.7<br>IF 2.8<br>UW -1.6<br>UC 1.8 | NA | NC | NA | NA | NA |
| McCleery: | | | | | | |
| Scenario 1 | NA | + 0.01 | NC | NA | NA | NA |
| Scenario 2 | NA | + 3.09 | NC | NA | NA | NA |
| Scenario 3 | NA | +11.39 | NC | NA | NA | NA |
| Young and Romero: | | | | | | |
| Scenario 1 | NA | + 2.6 | NC | NA | NC | NA |
| Scenario 2 | NA | + 8.1 | NC | NA | -25.0 | NA |

**Footnotes to table 2b.**
[1] The following policy scenarios were selected:
Bachrach and Mizrahi:
 Scenario 1—FTA without additional capital in Mexico
 Scenario 2—FTA with additional capital in Mexico
Brown et al.:
 Experiment A—NAFTA, tariffs, and NTBs
 Experiment B—NAFTA, tariffs, NTBs, and direct foreign investment
Hinojosa and Robinson:
 Experiment 1—tariff removal
 Experiment 2—trade liberalization (tariffs & NTBs)
 Experiment 4a—Mexican growth (tariffs, NTBs, & capital flows)
 Experiment 4b—growth and migration (4a plus migration)
Robinson et al.: No. 2—trade liberalization
Roland–Holst et al.:
 Experiment 1—CRTS, tariffs only
 Experiment 2—CRTS, tariffs and NTBS
 Experiment 3—IRTS, Cournot, tariffs and NTBs
 Experiment 4—IRTS, contestable markets, tariffs and NTBs
Sobarzo:
 Version 1—fixed wage, fixed capital stock, fixed trade balance
 Version 2—fixed wage, fixed capital stock, fixed exchange rate
 Version 3—fixed employment, internationally mobile capital, fixed exchange rate
Almon:
 TO scenario—removal of tariffs only, after 10 years
 TAB scenario—removal of tariffs and NTBs, after 10 years

**Footnotes to table 2b.—Continued**

Levy and van Wijnbergen: Case 1—immediate liberalization of corn

McCleery:

Scenario 1—free trade only (tariffs & NTBs)

Scenario 2—free trade with increased investor confidence

Scenario 3—free trade with increased investor confidence and dynamic gains

Young and Romero:

Scenario 1—free trade (tariffs only)

Scenario 2—free trade and lower real interest rates

[2] NA means that the figure is not available. NC means the variable is unchanged by assumption.

[3] The four wage changes in Hinojosa and Robinson refer to: rural workers (RW); urban unskilled (UU); union workers (UW); and white collar (WC).

[4] The four wage changes in Robinson et al. refer to: rural workers (RW); urban unskilled (UU); urban skilled (US); and professional (P).

[5] The six welfare changes in Levy and van Wijnbergen refer to: subsistence farmer (SF); landless rural worker (LR); rain-fed farmer (RF); irrigated farmer (IF); urban worker (UW); and urban capitalist (UC).

*Source:* USITC symposium, February 24–25, 1992.

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**Table 2c**
**Aggregate results from economy-wide models of a NAFTA: United States**
*(Percent changes)*

| Model/Policy scenario[1] | Welfare | Real GDP | Employment | Wage | Return to capital | Trade balance |
|---|---|---|---|---|---|---|
| **Static:** | | | | | | |
| Bachrach and Mizrahi: | | | | | | |
| Scenario 1 | NA[2] | + 0.02 | NC[2] | + 0.02 | + 0.03 | + 0.03 |
| Scenario 2 | NA | + 0.04 | NC | + 0.03 | + 0.07 | + 0.07 |
| Brown et al.: | | | | | | |
| Experiment A | + 0.1 | NA | NC | + 0.2 | + 0.2 | NC |
| Experiment B | + 0.3 | NA | NC | + 0.2 | + 0.2 | NC |
| Hinojosa and Robinson:[3] | | | | | | |
| Experiment 1 | NA | + 0.1 | + 0.2 | RW -0.1 / UU -0.1 / UW 0.0 / WC 0.0 | + 0.0 | NC |
| Experiment 2 | NA | 0.0 | -0.1 | RW 0.3 / UU 0.4 / UW 0.0 / WC 0.0 | + 0.0 | NC |
| Experiment 4a | NA | + 0.1 | 0.0 | RW -0.4 / UU 0.7 / UW 0.1 / WC 0.3 | + 1.2 | NC |
| Experiment 4b | NA | + 0.1 | -0.3 | RW 1.8 / UU 1.8 / UW 0.0 / WC 0.2 | + 1.1 | NC |
| Robinson et al.[4] | NA | + 0.23 | NA | RW -1.3 / UU -1.7 / US 0.1 / P 0.1 | + 0.1 | NC |
| Roland-Holst et al.: | | | | | | |
| Experiment 1 | + 0.07 | + 0.06 | + 0.08 | NC | + 0.10 | NC |
| Experiment 2 | + 1.67 | + 1.34 | + 1.88 | NC | + 2.43 | NC |
| Experiment 3 | + 1.58 | + 1.30 | + 1.79 | NC | + 2.49 | NC |
| Experiment 4 | + 2.55 | + 2.07 | + 2.47 | NC | + 3.40 | NC |
| **Dynamic:** | | | | | | |
| Almon: | | | | | | |
| TO | NA | + 0.11 | + 0.03 | + 0.19 | + 1.64 | +12.3 |
| TAB | NA | + 0.17 | + 0.05 | + 0.28 | + 1.64 | +18.4 |
| McCleery: | | | | | | |
| Scenario 1 | NA | + 0.22 | NC | NA | NA | NA |
| Scenario 2 | NA | + 0.32 | NC | NA | NA | NA |
| Scenario 3 | NA | + 0.51 | NC | NA | NA | NA |

**Footnotes to table 2c.**

[1] The following policy scenarios were selected:

Bachrach and Mizrahi:

    Scenario 1—FTA without additional capital in Mexico

    Scenario 2—FTA with additional capital in Mexico

Brown et al.:

    Experiment A—NAFTA, tariffs, and NTBs

    Experiment B—NAFTA, tariffs, NTBs, and direct foreign investment

Hinojosa and Robinson:

    Experiment 1—tariff removal

    Experiment 2—trade liberalization (tariffs & NTBs)

    Experiment 4a—Mexican growth (tariffs, NTBs, & capital flows)

    Experiment 4b—growth and migration (4a plus migration)

Robinson et al.: No. 2—trade liberalization

Roland–Holst et al.:

    Experiment 1—CRTS, tariffs only

    Experiment 2—CRTS, tariffs and NTBS

    Experiment 3—IRTS, Cournot, tariffs and NTBs

    Experiment 4—IRTS, contestable markets, tariffs and NTBs

Almon:

    TO scenario—removal of tariffs only, after 10 years

    TAB scenario—removal of tariffs and NTBs, after 10 years

McCleery:

    Scenario 1—free trade only (tariffs & NTBs)

    Scenario 2—free trade with increased investor confidence

    Scenario 3—free trade with increased investor confidence and dynamic gains

[2] NA means that the figure is not available. NC means the variable is unchanged by assumption.

[3] The four wage changes in Hinojosa and Robinson refer to: rural workers (RW); urban unskilled (UU); union workers (UW); and white collar (WC).

[4] The four wage changes in Robinson et al. refer to: rural workers (RW); urban unskilled (UU); urban skilled (US); and professional (P).

Source: USITC symposium, February 24–25, 1992.

to 6.75 percent and increases in real GDP ranging from 0.12 to 10.57 percent.[13]

Given the degree of unanimity of the studies regarding the sign of aggregate welfare and real GDP effects resulting from a NAFTA, it is possible to take the comparison a step further and look at the incremental effects of liberalizing NTBs in addition to tariffs and of including capital flows. With tariffs only, increases in Mexican real GDP range from 0.0 to 1.9 percent; increases in U.S. real GDP range from 0.02 to 0.11 percent. Within these ranges, effects are somewhat larger in models that incorporate imperfect competition.[14] Still, elimination of tariffs yields only small benefits in static models of a NAFTA.

The benefits of a NAFTA are potentially much larger if NTBs are liberalized in addition to tariffs. Estimated percent increases in real GDP range from 0.27 to 3.38 for Mexico and from 0.02 to 2.07 for the United States. The key to differences within these ranges lies in the choice of NTB measure, especially for Mexico. In the Mexican case, there is little systematic evidence regarding the extent and restrictiveness of NTBs. The principal alternative NTB measures for Mexico are ad hoc increases in Mexican exports for selected sectors, percent coverage by import licensing, and trade coverage ratios from the United Nations Conference on Trade and Development and General Agreement on Tariffs and Trade (UNCTAD-GATT) data base. The largest effects are obtained by Roland-Holst et al. using trade coverage ratios as ad valorem equivalents of NTBs.[15]

Several studies assess the importance of capital flows in relation to a NAFTA. As compared to simulations that liberalize only tariffs and NTBs, the incremental effect of including capital flows into Mexico is to further increase the gains from a NAFTA, especially for Mexico. Estimated increases in real GDP range from 3.1 to 8.1 percent for Mexico and from 0.04 to 0.32 for the United States. Two conclusions are immediately apparent. First, capital

flows lead to substantially larger increases in Mexican output, compared with liberalization of tariffs and NTBs only. The incremental increase in Mexican real GDP lies between 3.1 and 6.1 percent. Second, the U.S. capital market is sufficiently large that capital flows from the United States to Mexico do not appreciably affect U.S. real GDP.

While all of the studies show that labor benefits in all three countries in some aggregate sense, the evidence is less clear with regard to particular labor categories. With two minor exceptions, aggregate employment or aggregate real wage rates rise in all three countries.[16] Aggregate employment increases range from 0.1 to 6.60 percent for Mexico and from 0.03 to 2.47 percent for the United States. Aggregate real wages increase by 0.7 to 16.2 percent for Mexico and by 0.02 to 0.28 percent for the United States. Mexican labor benefits more from a NAFTA if capital inflows are included in the simulation, since a larger Mexican capital stock makes Mexican labor more productive.

Three papers address the implications of a NAFTA for particular segments of the U.S. labor force. The results are mixed, although the real wage changes are all less than two percent. Although wages of urban skilled and professional workers increase by 0.3 percent or less as a result of a NAFTA in the Hinojosa and Robinson and Robinson et al. papers, high-wage manufacturing workers experience slower earnings growth in McCleery's paper as a result of a NAFTA (though less than two percent). Real wages of rural and urban unskilled workers generally fall (though by less than two percent) in Robinson et al. because of increased migration to the United States, although a 10 percent increase in Mexico's capital stock is sufficient to reverse this result. Hinojosa and Robinson, in contrast, show real wage increases for rural and urban unskilled workers in at least two of the four scenarios shown in table 2(c). McCleery's results indicate that the discounted income stream of U.S. low-wage workers is expected to rise, although they may suffer initial earnings losses. Existing research does not provide a basis for definitive conclusions regarding the effect of a NAFTA on different components of the U.S. labor force, and further research is needed in this area.

To sum up, there is a surprising degree of unanimity in the models presented at the USITC symposium regarding the aggregate effects of a NAFTA for Canada, Mexico, and the United States. All three countries are expected to gain from a NAFTA, with the benefits for Mexico generally exceeding those for its North American neighbors. Aggregate employment and aggregate real wages are also expected to rise in each country, especially in

[13] Roland-Holst et al. show that Canada is the biggest winner from North American free trade, in contrast with the other studies. In this regard, it should be noted that their North American trade liberalization scenarios do not separate out the effects of a NAFTA from those of the CAFTA. Given the large subsistence sector in Mexico, Canada is actually more trade-dependent than Mexico. Therefore, trade liberalization yields larger benefits for Canada.

[14] Sobarzo's estimated welfare and real GDP gains for Mexico are notably large given that they are based on liberalization of tariffs only. As his sensitivity test shows, this is due to use of the Eastman-Stykolt pricing hypothesis, which assures that firms move sharply down their average cost curves in response to tariff liberalization.

[15] Trade coverage measures of NTBs give the percentage of an import category that is subject to some form of NTB. Large trade coverage ratios imply large gaps between domestic and world prices of imports. This price gap, expressed as a percentage of the world import price, is the ad valorem equivalent of NTBs.

[16] Hinojosa and Robinson find a small drop in the Mexican labor force (-0.1 percent) if tariffs only are liberalized; this result is reversed by more comprehensive trade liberalization, capital flows, and migration. Almon's study shows a small drop in Mexican aggregate employment (-0.01 percent for tariffs only and -0.90 percent for tariffs and NTBs).

Mexico. Inclusion of NTBs in the simulation yields a significant increase in the benefit from a NAFTA, while capital flows into Mexico are of even greater importance for the Mexican economy. Capital flows from the United States into Mexico did not have much impact on the U.S. economy, given the relative sizes of the Mexican and U.S. capital markets. Finally, evidence concerning the effect of a NAFTA on real wages for the lower tier of the U.S. labor force were mixed, with some studies showing decreases and others showing increases.

The USITC symposium brought together nearly all of the CGE modelers who are currently involved in studying a NAFTA. In addition, the conference included one study that employs linked macroeconomic forecasting models. The set of papers presented is a partial one because many of the researchers have previously written on the same subject or may have new work in process. Therefore, the research presented at the USITC symposium represents a snapshot rather than a complete and final accounting.

Within the United States, there has been unprecedented interest by the general public, administration, and Congress, in formal economic models of a NAFTA. In view of this, it is important not to overemphasize the results of the models. Trade negotiators often are concerned with very detailed product categories and policies. Even a general equilibrium model that focuses on one sector may not be sufficiently detailed to capture the matters of most immediate concern to negotiators. Limitations are also caused by the fact that no modeler can predict let alone model the intricacies of the final agreement.

## Summaries of Individual Studies

*1. Clopper Almon, "Industrial Effects of a Free Trade Agreement Between Mexico and the U.S.A."*

### Abstract

*This study of a Mexico-U.S. FTA was conducted jointly by Interindustry Forecasting at the University of Maryland (INFORUM) and the Centro de Investigationes Matematicas at the University of Guanajuato (CIMAT). It is based on linking a 78-sector U.S. macroeconomic model with a 74-sector Mexican macroeconomic model. Each model determines employment, production, prices, exports, and imports in all sectors. Trade flows between the two countries link their economies.*

*U.S. output, exports, and employment all increase modestly from the FTA. Many sectors in the United States experience an increase in employment, while a few suffer employment losses; total U.S. employment increases by 29,300 to 44,500 workers after five years. In Mexico, personal consumption, investment, and exports are all stimulated by a FTA. However, imports increase*

*even more strongly so that Mexican real GDP declines. This result stems from limiting the scope of the assumed policy changes to removal of tariffs and some NTBs; Mexican restrictions on direct foreign investment are assumed unchanged.*

## Technical Summary

### Introduction

This model differs significantly from other models discussed in this report. The model is actually a combination of two macroeconomic models. The Long-Term Interindustry Forecasting Tool (LIFT) model, built by the Interindustry Forecasting at the University of Maryland (INFORUM) group, is a multisectoral model of the United States; the Modelo Interindustrial Mexicano (MIMEX) model of the University of Guanajuato's Centro de Investigationes Matematicas (CIMAT) is a model of the Mexican economy. The two models are linked through their import and export equations. The value of U.S. imports from Mexico equals the value of Mexican exports to the United States, and the value of U.S. exports to Mexico equals the value of Mexican imports from the United States. The LIFT model contains more sectoral detail; for example, individual U.S. industries have distinct investment functions, whereas there is a single aggregate Mexican investment function in the MIMEX model.

Both models are constructed largely from empirical estimation of the parameters of their behavioral equations. In that respect, they are more like econometric models than CGE models; they also contain equations describing the sectoral and aggregate quantities treated in most CGE models. The INFORUM-CIMAT model allows for unemployment and it is possible to analyze changes in monetary and fiscal policy. They are not, however, built on neoclassical microeconomic foundations, as are CGE models. The author refers to them as multisectoral macroeconomic models.

The focus of the analysis is at the individual industry level. The model attempts to forecast the effects of a Mexico-U.S. FTA on output, exports, imports, consumption, employment, and income by industry. The model is used to conduct two experiments. The first is an immediate elimination of all tariff barriers between the two countries. The second experiment adds to the immediate tariff elimination the effects of relaxing selected NTBs.

### Experiments

The first stage of the analysis of a Mexico-U.S. FTA is the estimation of changes in trade flows due to the removal of trade barriers. First, the duty reductions are translated into changes in the prices of Mexican and U.S. imports from all sources. A fraction of the consequent increase in imports from all sources is then apportioned to the FTA partner, on an industry-by-industry basis, based on trade-share

equations. The LIFT and MIMEX models are run iteratively until corresponding bilateral trade flows are equalized.[17]

The second experiment adds the gradual lifting of some NTBs affecting Mexican imports of agricultural products, computers, and motor vehicles from the United States and U.S. imports of apparel from Mexico. The removal of these barriers is modeled as the addition of factors ("add factors") to the sector-specific import equations of the importing country. As was done for the tariff removal exercise, these factors are added to total imports, which are then allocated by trade-share functions between the partner country and the rest of the world.[18]

## Results

According to the INFORUM-CIMAT model, the United States experiences a larger increase in exports than does Mexico because import barriers are initially higher on the Mexican side. Under the second "tariff and barriers" experiment, U.S. exports to Mexico rise by $5.0 billion in 1995 (in constant 1977 dollars), and total U.S. exports rise by $5.5 billion. Total U.S. imports rise by $1.2 billion. U.S. imports from Mexico (equal to Mexican exports to the United States) increase by $1.6 billion, indicating a diversion of trade from the rest of the world. Mexico's total exports rise by the same amount as its exports to the United States, and total Mexican imports increase by $3.2 billion, considerably less than the $5.0 billion increase in Mexican imports from the United States.

The distinguishing feature of this model is its sectoral disaggregation. The top job-gaining sectors in the United States are agriculture, machinery, and metal products. Apparel, formerly protected, loses job opportunities, as do construction in particular and services in general. Total U.S. employment increases by 44,500 jobs after five years, with the largest gains (10,600 jobs) in agriculture and manufacturing (48,800 jobs). Construction employment declines by 12,800 jobs and about 6,000 jobs each in medicine and apparel are eliminated.

Effects on individual U.S. States and occupations were calculated outside of the model. Results for specific industrial sectors are allocated among States and occupations but neither occupational nor regional distinctions are incorporated into the model structure. Concise summary tables of these results appear in the overview of the research presented in the addendum to this report.

Mexican employment initially falls by about one-half percentage point under the second experiment, and real GDP falls by a barely perceptible amount. In Mexico, increased job opportunities occur in apparel, leather and footwear, textiles, trade, services, and construction; losses occur in agriculture and machinery. Mexican results are not reported by occupation or region.

## Conclusions

The INFORUM-CIMAT study is somewhat limited in the policy experiments it attempts: instantaneous elimination of tariffs, followed by a phased in reduction of selected NTBs. It does not consider relaxation of investment restrictions, which are among the most important recent Mexican policy reforms. Similarly, it does not allow for productivity changes resulting from increases in Mexico's capital stock. Also, demographic changes and migration are not treated.

It is difficult to identify the causal links between underlying model assumptions and some of the policy simulation results. For example, reduced job opportunities occur in the service sectors of both countries. This lack of model transparency lessens somewhat the utility of this study for policy evaluation.

Despite these shortcomings, the INFORUM-CIMAT study is a valuable first attempt to assess the likely effects of a Mexico-U.S. FTA on industrial structure. The study complements the CGE models because it incorporates macroeconomic features such as unemployment as well as an explicit role for monetary and fiscal policy.

2. **Carlos Bachrach and Lorris Mizrahi, "The Economic Impact of a Free Trade Agreement Between the United States and Mexico: A CGE Analysis"**

## Abstract

This paper presents a detailed technical description of the economy-wide analysis conducted by the Policy Economics Group of KPMG Peat Marwick to study the economic impact of a FTA between Mexico and the United States. A previous study by Peat Marwick occupied a central place in the early debate concerning the economic effects of a Mexico-U.S. FTA.

The KPMG Peat Marwick study examines 44 production sectors in both Mexico and the United States. The countries are linked via trade and balance of payments relations.

Simulated effects of a FTA between Mexico and the United States were run under two different assumptions about investment flows. First, it was assumed that capital, which moves freely between sectors within each country, is fixed in each country. They find that U.S. aggregate real income rises by 0.02 percent, Mexican aggregate real

[17] See Clinton R. Shiells and Robert C. Shelburne, "A Summary of, 'Industrial Effects of a Free Trade Agreement Between Mexico and the U.S.A.,' by the Interindustry Economic Research Fund, Inc.," USITC symposium, February 24-25, 1992, pp. 2-3.

[18] For a fuller discussion, see Shiells and Shelburne, USITC symposium, February 24-25, 1992, p. 2.

*income rises by 0.32 percent, and two-way trade increases by about four or five percent. Second, it was assumed that Mexico receives about $25 billion in additional investment. With this additional investment, U.S. aggregate real income increases by 0.4 percent, Mexican aggregate real income increases by 4.64 percent, and U.S. imports from Mexico increase by around 13 percent. These results are identical to Peat Marwick's earlier study.*

## Technical Summary

### Introduction

The purpose of the Bachrach-Mizrahi paper is to present a detailed technical description of the CGE model used by the Policy Economics Group of KPMG Peat Marwick to study the economic impact of a FTA between Mexico and the United States. An earlier study by Peat Marwick occupied a central place in the early debate concerning the economic effects of a Mexico-U.S. FTA.

### Methodology

There are two fully specified CGE models: one for Mexico and one for the United States. They are fully linked through bilateral trade equations and via each country's balance of payments. The CGE for each country has 44 commodity sectors and assumes perfect competition throughout. Consumers allocate expenditure to aggregates of imports and domestic products; producers differentiate output for domestic sale versus export. All trade barriers in the model are expressed in the form of ad valorem taxes.[19]

Simulated effects of a Mexico-U.S. FTA were obtained under two different capital-mobility assumptions. First, it was assumed that capital is perfectly mobile between sectors within each country but immobile between nations. Second, it was assumed that Mexico receives about $25 billion in additional capital, just enough to bring Mexico's real return on capital down to its pre-FTA level. This assumption attempts to derive indirectly the likely effects of liberalization of Mexico's current investment restrictions.

A few caveats must be kept in mind when evaluating Bachrach and Mizrahi's results under the assumption that additional capital flows into the Mexican economy. First, it is assumed that 40 percent of the additional capital is owned by foreigners and 60 percent is owned by Mexicans; half of the net profits generated by the foreign-owned share is assumed to be repatriated. Second, the additional capital does not displace capital that would have been located in the United States. Rather, it displaces U.S. capital that would have been located in the rest of the world. Finally, and most importantly, the model is used to solve for the equilibrium that is achieved once all of the additional capital has been installed. Because a large portion of this capital is imported, Mexico's trade balance would worsen during the transition period. This transitional deterioration in Mexico's trade balance is not captured in the model results.

### Results

The results for both cases, which are identical to the earlier Peat Marwick study, are presented in table 3.

### Scenario 1: No Additional Capital in Mexico

Not surprisingly, Bachrach and Mizrahi find that most effects on the United States are small. In fact, the major effect for both economies is the reallocation of resources between sectors. Real income, the aggregate real wage rate and the real rate of return on capital all increase by about 0.02 to 0.03 percent. By assumption, employment remains fixed; however, the increase in the aggregate real wage rate implies a higher demand for U.S. labor.[20]

The average tariff levied by Mexico on U.S. goods and services is 7.1 percent. With the elimination of Mexican tariffs, U.S. exports to Mexico increase by 5.4 percent. Because of the increased competitiveness of the U.S. economy, exports to the rest of world increase slightly (0.03 percent). The average combined tariff imposed by the United States on Mexican goods and services is 3.5 percent. With the elimination of U.S. tariffs, imports from Mexico increase by 4.2 percent while imports from the rest of the world decline by a minimal amount.

Under the pre-FTA regime, the model finds that the United States runs a trade deficit with Mexico. Under the FTA, the U.S. trade balance with Mexico deteriorates by 1.8 percent. The United States' trade balance with the rest of the world improves, partly through trade diversion and partly through increased competitiveness. This improvement more than offsets the worsening of the trade balance with Mexico, causing the overall U.S. trade balance to improve.

Changes in Mexico's income and employment are also small, though larger than in the United States. Mexican real income rises by 0.32 percent while the rate of return on capital increases by 0.6 percent. It is assumed that the Mexican aggregate wage rate remains fixed; the increase in labor demand causes employment to increase by 0.85 percent or 188,000 jobs.

As noted above, Mexico's trade balance with the United States improves. However, exports to the rest of the world decrease while imports from the rest of the world increase. This leads to a significant decline in the trade balance with the rest of the world, which

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[19] In all respects, the models are very much in the tradition of Kemal Dervis, Jaime de Melo, and Sherman Robinson, General Equilibrium Models for Development Policy, Cambridge, UK: Cambridge University Press, 1982.

[20] Under an alternative scenario, the aggregate real wage was held constant and employment was allowed to vary. The authors found that employment in the United States would grow by 0.04 percent, or 40,800 jobs.

**Table 3**
**Economic effects of a Mexico-U.S. FTA**

*(Percent changes)*

| | Mexico | | United States | |
|---|---|---|---|---|
| | *Without additional capital in Mexico* | *With additional capital in Mexico* | *Without additional capital in Mexico* | *With additional capital in Mexico* |
| Income and employment: | | | | |
| Real income ........................... | 0.32 | 4.64 | 0.02 | 0.04 |
| Real wage rate ......................... | NC[1] | NC | 0.02 | 0.03 |
| Real rate of return ..................... | 0.60 | NC | 0.03 | 0.07 |
| Employment ............................ | 0.85 | 6.60 | NC | NC |
| Exports: (volume) | | | | |
| To FTA partner ........................ | 4.22 | 12.94 | 5.39 | 5.21 |
| To rest of world ....................... | -0.28 | 18.06 | 0.03 | 0.16 |
| Imports: (volume) | | | | |
| From FTA partner ...................... | 5.39 | 5.21 | 4.22 | 12.94 |
| From rest of world ..................... | 0.38 | 0.27 | -0.00 | -0.20 |
| Trade balance: | | | | |
| With FTA partner ...................... | 1.63 | 26.88 | -1.81 | -20.79 |
| With rest of world ..................... | -3.06 | 76.39 | 0.14 | 1.32 |
| Overall trade balance ................. | | 59.12 | 0.03 | 0.07 |

[1] NC denotes no change by assumption.

Source: Bachrach and Mizrahi, USITC symposium, February 24-25, 1992.

dampens the improvement in Mexico's overall trade balance.

## Scenario 2: Additional Capital in Mexico

In general, changes to the U.S. economy are larger if additional capital is assumed to flow into Mexico. However, effects on U.S. income and employment remain small. In the United States, real income increases by 0.04 percent, the aggregate real wage rate increases by 0.03 percent, and the rate of return on capital increases by 0.07 percent.[21] The largest effects occur in U.S. trade with Mexico, where U.S. imports from Mexico increase by 12.9 percent and the bilateral trade balance deteriorates on the U.S. side by 20.8 percent.

Relative to the U.S. economy and to the effects that occur with no additional capital, the effects registered with additional capital in the Mexican economy are significantly larger. Mexican real income increases by 4.6 percent while employment increases by 6.6 percent.

The largest effects occur in Mexico's exports and in its trade balance. Mexican exports to the United States and the rest of the world increase by 12.9 and 18.1 percent, respectively. Mexico's trade balance with the United States improves by 26.9 percent, while its overall trade balance improves by 59.1 percent. The larger changes in trade patterns with additional capital

in Mexico are attributed mainly to the stronger real devaluation of the peso.[22]

### Sectoral Effects

The authors also stress that a significant effect of the FTA will be the reallocation of resources across industries in each country. With the elimination of trade barriers, highly protected sectors contract relative to less protected sectors. The most highly protected sectors in the United States include textiles, apparel, and sugar refining. These sectors, with the exception of apparel, are among those that expand the most in Mexico.[23]

In Mexico, the most protected sectors include apparel, motor vehicles, cleaning and toilet preparations, transport equipment, machinery and equipment, tobacco manufactures and optical instruments. With the exception of apparel, these are the sectors that expand the most in the United States under the FTA. Apparel, which is highly protected in both countries, is an exception because it is more protected in the United States than in Mexico.

### Conclusions

Bachrach and Mizrahi's analysis indicates the importance to Mexico of additional capital inflows that might result under a FTA. The increase in capital is

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[21] Under the alternative assumption of fixed aggregate real wages in the United States, the authors found that the demand for U.S. labor increased by 0.05 percent or 61,000 jobs.

[22] In this case, the value of the Mexican peso relative to the U.S. dollar declines by five percent. This is due to the fact that, once the additional Mexican capital is in place, the foreign-owned share of net profits is repatriated.

[23] See tables 5 and 6 in Bachrach and Mizrahi's paper for more detail on sectoral changes in U.S. employment and output under a FTA.

intended to reflect the elimination or reduction of investment restrictions in Mexico that might be incorporated into a NAFTA. Results of this paper must be interpreted with care given that the capital flows resulting from the elimination of investment barriers are not formally modeled. Consequently, the deterioration in the trade balance that would result from increased capital flows during the transition period is not reflected in the simulation results.

Given the above caveats, Mexico's changes in income and employment show much larger improvements under the assumption of additional capital than under the assumption that the Mexican capital stock is fixed. With the fixed-capital assumption, changes to income, employment, and trade are small for both countries. The effects on particular sectors are larger, especially in Mexico. In addition, Mexico's exports to, and its trade balance with, the United States are markedly larger under the assumption of additional capital. The authors point out that their estimates might be understated because additional capital flows are assumed to reduce Mexico's real rate of return on capital to pre-FTA levels. If a NAFTA incorporates removal of all Mexican investment restrictions, Mexico might attract larger inflows of capital than are assumed in these experiments.

The simulations indicate that the most pronounced changes due to a FTA occur for Mexico. For the United States, changes in both aggregate real income and employment are small even if additional capital flows into Mexico. The largest effects for the United States under the assumption of additional capital occur in its imports from Mexico (large increases) and in its trade balance with Mexico (large deterioration). The simulation with additional capital in Mexico shows that the increase in U.S. imports from Mexico and deterioration of the U.S.-Mexico bilateral trade balance are both large. However, changes in sectoral output and employment are small.

### 3. Drusilla K. Brown, "Properties of Computable General Equilibrium Trade Models With Monopolistic Competition and Foreign Direct Investment"

## Abstract

Prior studies of preferential trading arrangements fall, with some exceptions, into two broad categories: rigorous theoretical analyses with little empirical content and large-scale empirical analyses with results that often are difficult to interpret. As an example, a recent study by Brown, Deardorff, and Stern of the NAFTA is based on a model with five country groups and 30 sectors. They found, among other things, that a NAFTA would raise the U.S. wage and the Mexican return on capital. This is a somewhat counterintuitive result because traditional trade theory predicts that real returns to a relatively

scarce production input, such as capital in Mexico, should fall if tariffs are removed.

The present analytical approach is identical to that used by Brown et al. However, the author pares down the original analysis to two countries (home and foreign) and two goods (albeit with numerous differentiated varieties of each). This approach allows the author to examine the model characteristics that drive various empirical results. Several policy experiments are conducted: (1) a tariff levied by the home country on one sector; (2) a tariff levied by the home country on both sectors; (3) tariffs of unequal size levied by the home country in both sectors; (3) changes in the relative sizes of the two countries; (4) differences in the ratio of capital to labor across countries; and (5) investment flows between countries.

Brown uses these policy experiments to help explain why the U.S. aggregate real wage rate might rise as a result of a NAFTA even though labor is in more limited supply than capital in the United States. The U.S. aggregate real wage falls relative to the rate of return on capital in the United States but still rises absolutely. In Brown's analysis, prices received by U.S. producers rise relative to those received by foreign producers. This pulls up the value of hiring an additional hour of U.S. labor, thereby raising the U.S. aggregate real wage rate.

## Technical Summary

### Introduction

Applied general equilibrium modeling of trade policy can be somewhat mysterious. Even when the structure of a model is presented in some detail, the causal links within the model are sometimes difficult to identify. One of the challenges facing the policy analyst is to understand the primary forces driving the workings of a simulation model, and to explain the role that these forces play in generating specific results.

Rather than present empirical results based on a full-blown policy model, Brown has chosen to construct a simplified version of the model used to analyze a NAFTA in Brown et al. (1992). The author lays out the various parts of the model, and proceeds to take the reader through the various ways in which these parts interact. This insightful paper complements a number of other papers presented at the symposium.

### Model

The model is a simplified version of the more complex models of monopolistic competition often used for CGE analysis. In particular, the model laid out in this paper is virtually identical to the one used by Brown et al. (1992) to analyze a NAFTA. While the newer model contains all of the main features found in the earlier model, its dimensions are quite limited. This makes the reverse-engineering exercise that is the core of the paper much more tractable.

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The model includes two countries, two sectors, and two factors of production (capital and labor). Both sectors are characterized by monopolistic competition. This means that firms produce differentiated products and are able to exercise some market power in their pricing decisions.[24] Economic profits are limited by the potential entry of other producers. Consumers, for their part, are assumed to prefer more product variety to less.

A firm's pricing decision depends on how much market power it has. The degree of market power is measured by the firm's perceived elasticity of demand. This elasticity can be affected in a complex manner by changes in the tariff structure.[25]

## Results

As discussed above, Brown et al. (1992) analyze the effects of North American trade liberalization using a fuller version of the model presented in this paper. The results presented Brown's symposium paper provide insight into these findings. The basic results in Brown et al. (1992) are as follows. First, welfare rises for Canada, Mexico, and the United States, with minimal impact on the rest of the world. Second, there is no discernable effect on the Canadian position in the U.S. market following free trade with Mexico. Third, trade liberalization leads to an increase in both Mexican and U.S. aggregate real wages, with a narrowing of the wage gap (meaning Mexico's wages rise more). Fourth, average production costs fall more in Mexico than in Canada or the United States. Finally, the return on capital rises in Mexico, due to reductions in average costs (i.e., scale effects).

There was little discernable impact on the United States in the NAFTA simulations presented in Brown et al. (1992). However, there were substantial gains for Mexico. The results in Brown's symposium paper illustrate why this is so. In the model, small countries enjoy the greatest gains from increasing returns to scale following liberalization. Producers in sectors subject to increasing returns are more likely to produce at lower levels of output in the small country prior to liberalization because the home market is smaller. Given increasing returns, these lower levels of output

correspond to higher average costs.[26] For large countries, economic integration with a small country will have little effect on the size of their market and, hence, little impact on average cost. This result also helps to explain why the other papers presented at the conference generally found only slight welfare effects for the United States. The relatively small size of the Mexican economy precludes large welfare changes in the United States as a result of a NAFTA.

The results of this paper also help to explain why U.S. aggregate real wages rise slightly in the Brown et al. (1992) simulations of a NAFTA. Because the Mexican economy is relatively labor-abundant, one might expect aggregate real wages actually to fall slightly. In fact, U.S. labor will lose *relative* to capital in this type of model. However, U.S. labor will gain in an absolute sense from a NAFTA. This is because the greatest liberalization occurs in Mexico. Improved market access for U.S. products translates into an increase in the price of U.S. exports relative to the price of U.S. imports (i.e., a terms-of-trade gain) and an overall gain for the U.S. economy. This terms-of-trade gain pulls up the income of both labor and capital, although labor does not gain by as much as capital.

## 4. David Cox and Richard G. Harris, "North American Free Trade and Its Implications for Canada: Results from a CGE Model of North American Trade"

### Abstract

This paper reports on the impact of a NAFTA on top of the existing CAFTA, using an economy-wide analysis whose primary focus is the Canadian economy. The 19-sector analysis used in this paper was originally applied to the 1988 CAFTA. In contrast to the original analysis, Mexico is distinguished as a separate trading partner (along with the United States and an aggregate of the rest of the world).

Measuring effects relative to a fully-implemented CAFTA, a NAFTA yields very small benefits for Canada (0.03 percent of aggregate real income). This results from the fact that trade and trade barriers between Canada and Mexico are currently small. In addition, model simulations suggest there is little to be gained by Canada from inclusion in a NAFTA, relative to the effects of adding a Mexico-U.S. FTA on top of a CAFTA.

From Canada's perspective, a central question is the extent to which Canada will lose U.S. import share to Mexico as a consequence of the NAFTA. The simulations reported in the paper show that Canada's import shares in the United States fall by no more than one percentage point in any sector.

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[24] A firm has market power if it can raise its price without losing all of its customers. If the demand curve facing a firm is steep, then it can raise its price without losing many sales, i.e., it has considerable market power.
[25] The firm's perceived elasticity of demand gives the percentage change in quantity demanded that a firm believes will result from a one percent change in its price.

It is common in the theoretical literature to assume that the perceived elasticity of demand is fixed. This is valid if the number of product varieties is large. While convenient, firm-level responses to changes in perceived market power, resulting from tariff changes, are precluded.

By departing from the fixed-elasticity assumption, this paper lends useful insight into the interaction between firm-level market power and trade policy changes. See Elhanan Helpman and Paul R. Krugman, Market Structure and Foreign Trade, Cambridge, MA: MIT Press, 1985, pp. 118-19.

[26] Engineering data reported by Hunter et al., USITC symposium, February 24-25, 1992, support the notion that, at least for the auto sector, average costs are much higher in Mexico than in the United States.

As an alternative to a NAFTA that leaves external barriers unchanged, Cox and Harris perform an experiment with increased external barriers. Canada would gain nothing, as measured by aggregate real income, from a North American trade block that raised external trade barriers to suppliers outside North America; although such actions would raise Canada's share of U.S. imports substantially.

The largest potential economic gains to Canada from a NAFTA might result from opening up the Canadian market to price competition from Mexican industry. Policy experiments show that giving Mexico access to the Canadian market would induce minimal closure of plants by Canadian industry, thereby leading to only minor increases in output per worker, aggregate real wages, and aggregate real income.

## Technical Summary

### Introduction

This paper provides a quantitative analysis of the economic effects for Canada of proposed changes in the pattern of trade barriers between Canada, Mexico, the United States, and the rest of the world. The paper uses a CGE model of Canada to assess the effects of a NAFTA on trade flows, real income, benefits to consumers, labor adjustment, and aggregate welfare. The main focus of the paper is on the economic effects of a NAFTA on Canada. This work is an outgrowth of a model constructed by the authors to assess the effects of the CAFTA.[27]

In this paper, three types of policy questions are addressed. First, the model is used to determine to what extent Canada would suffer from trade diversion as a result of a Mexico-U.S. FTA. From Canada's point of view, the United States is its largest export market, so the prospect of a NAFTA has caused some worry in Canada by those who fear that some of Canada's exports to the United States will be displaced by greater exports from Mexico. Second, the CGE model is used to assess the aggregate welfare benefits to Canadian consumers from lower priced Mexican imports. Finally, the model provides estimates of the expansion in Canadian exports to both Mexico and the United States from a NAFTA. This issue is of particular concern because many fear that Canada, as well as the United States, will lose some jobs in import-competing sectors as a result of a NAFTA. Calculating the effects on exports helps keep the debate in focus by showing how a NAFTA will expand employment in export sectors, and thus balance the arguments of those who concentrate on the potential job losses from a NAFTA.

### Model

The Canadian economy is disaggregated into 19 sectors: agriculture, forestry, fishing, mining, five service industries, and 10 manufacturing sectors. In terms of market structure, the 10 manufacturing industries are modeled as imperfectly competitive, increasing returns industries, while the remaining sectors are perfectly competitive. The economy is endowed with two factors of production, capital and labor. The domestic supply of each factor is fixed; however, capital is assumed to be internationally mobile. Furthermore, the authors assume that the supply of capital is perfectly elastic. In other words, the rental rate for capital services facing Canadian firms is fixed at the world rental rate. Labor is internationally immobile and, therefore, the aggregate wage is determined by the equality of domestic labor demand and labor supply.

It is important to bear in mind two characteristics of this model. First, it does not capture the workings of the Mexican and U.S. economies in as much detail as the Canadian economy. For Mexico, the United States, and the rest of the world, commodity prices and national income are determined exogenously. Second, the model makes two alternative assumptions concerning how firms set prices in the imperfectly competitive sectors: (1) Chamberlin-Cournot monopolistic competition; and (2) the Eastman-Stykolt hypothesis. Under the monopolistically competitive structure, firms set prices so that their markup over unit cost equals the reciprocal of the price elasticity of demand. Under the Eastman-Stykolt structure, firms are assumed to collude by setting their output price equal to the world price plus tariff.[28] In both cases, the authors assume that firms will enter or exit the industry until profits are zero.

The present model is an outgrowth of a previous 88-sector model used by the authors to assess the effects of the CAFTA. The model used here is calibrated to a 1981 data set, incorporating data on trade flows and tariffs for 1989. Trade barriers used in this model are confined to tariffs; the model does not consider the effects of removing NTBs. Furthermore, the model is not designed to answer questions concerning the impact of liberalized foreign investment.

### Results

Five experiments are performed. First, the model is used to estimate the economic effects of completing the tariff reductions agreed to in the CAFTA, with particular emphasis on the effects for Canada. The results from this experiment show that Canada would experience a rise in aggregate real income of 3.1 percent and an increase in the aggregate real wage of

[27] Complete documentation of the model may be found in Richard G. Harris, "A Guide to the GET Model," Working Paper 88-10, Fiscal Policy and Economic Analysis Branch, Department of Finance, Ottawa, Canada, 1988.

[28] A discussion of the methods used to model imperfect competition in CGE models can be found in Richard Harris, "Applied General Equilibrium Analysis of Small Open Economies With Scale Economies and Imperfect Competition," American Economic Review 74, December 1984, pp. 1016-32.

5.5 percent, despite a modest terms-of-trade loss.[29] Most significantly, a CAFTA leads to a 25 percent increase in the volume of U.S.-Canadian trade. The Canadian share of U.S. imports rises from 18.1 percent to 21.3 percent, while the U.S. share of Canadian imports rises from 67.2 percent to 68.5 percent. The CAFTA stimulates a small amount of additional trade between Canada and Mexico (1.1 percent), while there is also a small decrease in trade between Mexico and the United States. The rest of the world loses market share in both Canada and the United States. Overall, Mexico does not lose an appreciable amount of its market share in either Canada or the United States.

The second experiment evaluates the merits of a "hub and spoke arrangement" (HASP) for Canada. Under a HASP, the United States is assumed to enter a separate FTA with Mexico, without Canada's participation. This experiment compares the effect on Canada of a HASP with the effect of a NAFTA. In the case of a HASP, the results show very small effects for Canada: a reduction in real GDP of 0.02 percent and a small reduction in trade volumes. With a NAFTA, Canada experiences an increase in real GDP of 0.12 percent and a slight increase in trade volumes. Results show that a CAFTA is much more important for Canada than a HASP or a NAFTA. Under both the HASP and NAFTA, Mexico gains market share in the United States, while both Canada and the rest of world lose, relative to the outcome under a CAFTA. Mexico's gains are concentrated in the machinery, appliances, nonmetallic minerals, agriculture, and textile sectors. Despite these gains, the effect of either arrangement on Canada is small.

In the third experiment, the model is used to estimate the impact of a 10 percent rise in Mexican aggregate income in conjunction with a NAFTA. This experiment produces some very small effects, which the authors interpret with caution. Since U.S income does not respond to changes in Mexican income by assumption, the model may not be capturing the full range of indirect effects. Additionally, the model is used to simulate an increase in Mexican productivity. Once again, the effects are small, and there is no perceptible effect on Canada.

In the fourth experiment, Canada, Mexico, and the United States are assumed to form a trading bloc by increasing their tariffs on imports from the rest of the world by 10 percent. The main result from this experiment is that Canada suffers a reduction in real income, although Canada and Mexico increase their shares of the U.S market. The trading bloc as a whole is worse off. From this, the authors conclude that the formation of a trading bloc on the part of Canada, Mexico, and the United States is not a desirable policy.

Finally, an experiment is performed to assess the effects on Canada of greater price competition from Mexico. Increased penetration of the Canadian market

by lower priced Mexican imports could reduce prices and costs in certain Canadian industries. Therefore, the results of a NAFTA might differ substantially from a CAFTA if Mexico poses a realistic threat of increased competition for Canadian industries. Under the HASP arrangement described before, greater competition from Mexico has virtually no effect on Canada. Under a NAFTA, there is a one percent welfare gain for Canada. This result comes about principally through an increase in labor productivity of 2.4 percent. In this case, increased Mexican access to the Canadian market forces a rationalization of Canadian industry, relative to the outcome under a CAFTA.

## Conclusions

In general, the results from the various experiments performed show that, from the Canadian perspective, the effects of a NAFTA are small compared to a CAFTA. Using the results reported here, the fears of many who believe that Canada would suffer substantially from trade diversion under a NAFTA are not realized. The NAFTA would produce a small but positive change in welfare for Canada. Actually, there is very little difference between the outcome for Canada under a HASP or a NAFTA. The largest source of gain for Canada lies with the possibility of further cost reductions due to increased competition from Mexico.

5. *Linda Hunter, James R. Markusen, and Thomas F. Rutherford, "Trade Liberalization in a Multinational-Dominated Industry: A Theoretical and Applied General Equilibrium Analysis"*

## Abstract

*This paper presents an economy-wide analysis of the North American auto industry. The focus of the analysis is on the production of finished autos. Because the model focuses on finished autos, no assessment is made of the subcomponents trade and related assembly operations. In this paper, the authors examine how a FTA might reallocate production among Canada, Mexico, and the United States and to what extent increased Mexican production might divert imports from outside North America as opposed to displacing Canadian and U.S. production.*

*Analytical efforts are devoted to capturing, among other factors, the coordination of trans-border prices and outputs by multinational firms. The closure of redundant plants producing parts and the reduction in numbers of models per plant are not considered, and hence reported increases in national income should be viewed as minimums.*

*The authors find that free trade for producers, a scenario similar to the U.S.-Canada auto pact, results in significant gains for Mexico (2.8 percent of auto production cost or 0.09 percent of real GDP) and has virtually no effect on producers and consumers in Canada and the United States. Free*

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*trade for consumers (full market integration) results in a very large gain to Mexico (22.3 percent of auto production cost or 0.73 percent of GDP) as its auto industry is forced to eliminate some auto plants. However, effects on Canada and the United States remain small.*

## Technical Summary

### Introduction

In this paper, the authors develop a CGE model that incorporates increasing returns to scale and multinational enterprises in the automobile sector. Auto firms coordinate their production, pricing, and sales decisions across all three markets. The model allows for auto plant closures and relocation within the North American market. It represents the first time multinational behavior has been explicitly included in a CGE model of trade. The authors find that the existence of multinational enterprises in the auto sector has important implications for the welfare effects of Mexico-U.S. or North American free trade in autos.

The authors work with the model to assess the implications of free trade in autos for returns to scale in individual auto plants. This effect is important because plants in Mexico currently operate at low, and hence very costly, levels of output. The authors also examine the pricing decisions of automakers under various versions of a possible NAFTA auto pact. The implications of free trade in autos for manufacturers and for consumers depend critically on whether free trade applies to manufacturers alone, as in the Canada-U.S. auto pact or, alternatively, whether it applies at the consumer level as well.

### Model

The authors devote considerable effort to modeling the role of multinational enterprises in the North American auto market. These firms all exercise some degree of market power and produce autos under increasing returns to scale. Multinationals coordinate their pricing and production decisions across Canada, Mexico, and the United States. The model focuses only on production of finished autos. It is built on an approach similar to that taken by Horstmann and Markusen (1986) and Markusen and Venables (1988).[30] Multinational enterprises form conjectures regarding the production response of other firms to their own production decisions. In addition, firms are assumed to anticipate consumer arbitrage correctly. Essentially, the latter condition means that, when allowed, consumers will buy autos where they are least expensive, and sell where they are most expensive.

Firms anticipate this possibility. Thus, free trade at the consumer level forces a uniform NAFTA pricing strategy (allowing for transport costs).

The authors do not examine, in any way, the implications of trade liberalization for the pattern of production and trade in auto parts. Yet the current structure of North American auto trade suggests that specialization at the intermediate product level and associated scale economies are important ingredients in assessment of the likely effects of a NAFTA auto pact.[31] The model thus ignores a basic and important characteristic of the industry: two-way trade in intermediate components and specialization within the North American market at the intermediate product level.

Furthermore, estimates of potential returns to scale are based on engineering data. These data are used to estimate the elasticity of scale, which is the ratio of average to marginal costs. However, the existing engineering data may overestimate the actual degree of returns to scale.[32]

### Results

Five sets of results are reported in the paper. The bilateral (BILAT) scenario corresponds to a Mexico-U.S. auto pact for producers, while the trilateral (TRILAT) scenario corresponds to a NAFTA auto pact for producers. These cases are examined for both production by multinational enterprises and production by national enterprises. The multinational enterprise scenarios most closely correspond to the real structure of the North American auto market. The final scenario (INTEG) corresponds to full NAFTA market integration for producers and consumers.

Results of the various scenarios are summarized in the table 4. Under all scenarios, U.S. auto production declines by between 0.07 percent and 1.7 percent. Canadian output declines by between 0.5 and 1.8 percent. Canadian and U.S. welfare remains virtually unchanged under all scenarios, while Mexican welfare rises by between 0.09 percent and 0.73 percent of GDP. The greatest impact is under INTEG. Under this scenario, there is a consolidation of production in Mexico. Mexican welfare rises by 0.73 percent of GDP, or 22.34 percent of auto production costs, while Mexican production rises by 42.5 percent. Under this scenario, U.S. auto production falls by 1.7 percent while welfare is virtually unchanged, falling by 0.005 percent of GDP.

It must be emphasized that the welfare effects reported are based strictly on liberalization of trade in autos. There is no assessment of liberalization in other

[30] Ignatius J. Horstmann and James R. Markusen, "Up the Average Cost Curve: Inefficient Entry and the New Protectionism," Journal of International Economics 20, May 1986, pp. 225-47; and James R. Markusen and Anthony J. Venables, "Trade Policy with Increasing Returns and Imperfect Competition: Contradictory Results from Competing Assumptions," Journal of International Economics 24, May 1988, pp. 299-316.

[31] See Wilfred J. Ethier, "National and International Returns to Scale in the Modern Theory of International Trade," American Economic Review 72, June 1982, pp. 389-405.

[32] See Richard G. Harris, "Market Structure and Trade Liberalization: A General Equilibrium Assessment," in T.N. Srinivasan and J. Whalley, eds., General Equilibrium Trade Policy Modeling, Cambridge, MA: MIT Press, 1986, pp. 231-50.

**Table 4**
**Effects of North American trade liberalization in the auto sector**

| | Multinational enterprises | | | National enterprises | |
|---|---|---|---|---|---|
| | BILAT | TRILAT | INTEG | BILAT | TRILAT |
| Auto production: (Percent changes) | | | | | |
| Canada | -0.6 | -0.6 | -1.8 | -0.5 | -0.7 |
| Mexico | 21.9 | 21.9 | 42.5 | 26.6 | 28.1 |
| United States | -0.5 | -0.5 | -1.7 | -0.07 | -0.07 |
| Rest of world | -0.1 | -0.1 | -0.04 | -0.2 | -0.2 |
| Welfare effects: (Percent of GDP) | | | | | |
| Canada | -0.002 | -0.002 | -0.008 | -0.001 | 0.01 |
| Mexico | 0.09 | 0.09 | 0.73 | 0.09 | 0.19 |
| United States | -0.002 | -0.002 | -0.005 | -0.002 | 0.001 |
| U.S. auto imports: (Change in millions) Source | | | | | |
| Canada | -0.01 | -0.01 | -0.037 | -0.01 | 0.02 |
| Mexico | 0.09 | 0.09 | 0.157 | 0.2 | 0.22 |
| Rest of world | -0.04 | -0.04 | 0.003 | -0.07 | -0.10 |
| Total | 0.04 | 0.04 | 0.123 | 0.12 | 0.10 |

Source: Hunter et al., USITC symposium, February 24-25, 1992.

sectors. In fact, all nonauto production is aggregated into a single "composite" sector, within which free trade is already assumed. Furthermore, the authors do not assess the effects of liberalization at the intermediate product level. Their trade liberalization experiments are restricted to assembled autos. These results are not necessarily indicative of the likely effects of a full-blown NAFTA agreement that applies across several major sectors of the economy.

**6. Timothy J. Kehoe, "Modeling the Dynamic Impact of North American Free Trade"**

## Abstract

This analysis considers the changes in Mexico's economic growth rate that might occur over a 25 year period due to trade liberalization. Recent single-year economy-wide analyses of a NAFTA have tended to find favorable but small impacts of such an agreement. One reason for this is that single-year analyses cannot capture the impact of changes in trade policy on growth rates.

A major impact of a NAFTA would be to create a stable economic environment that would encourage some investment to flow from Canada and the United States to capital-poor Mexico. Such investment flows are important; yet simple calculations show that a low ratio of capital to labor cannot be the major factor in explaining the low level of output per worker in Mexico compared to that in a country like the United States. The analysis therefore considers other reasons why Mexico's output-per-worker is less than U.S. output-per-worker, such as the process of industrial learning-by-doing and access to sophisticated
technology. These additional sources of growth are not fully understood, even at a theoretical level.

Preliminary calculations based on empirical evidence from a comparison of growth rates across countries between 1970 and 1985 indicate that increased openness to trade would enable Mexico to increase its growth rate of output per worker by approximately 1.7 percent per year more than it could otherwise. After twenty-five years, this would have the effect of increasing output per worker by more than 50 percent. These numbers dwarf the benefits found by more conventional, single-year economy-wide analyses.

## Technical Summary

### Introduction

This paper emphasizes the dynamic gains from trade liberalization that are beyond the scope of the static applied general equilibrium models currently used to analyze the NAFTA. Gains from trade in static, perfectly competitive models stem from increased efficiency of resource allocation, in accordance with the principle of comparative advantage, and improved consumption possibilities. In static models with imperfect competition, additional gains from trade may result from increasing returns to scale, as firms move down their average cost curves, and increased product variety for consumers. Static gains change the level of aggregate output but not its growth rate. As such, static gains from trade are rather small as a percent of GDP.

In contrast, dynamic gains from trade increase the rate of economic growth. Therefore, even a small increase in the growth rate will lead to a large

cumulative effect on output. Growth effects of trade liberalization can flow through a variety of channels: improved access to specialized capital goods, human capital accumulation, learning-by-doing, and new product introduction. These features give rise to sustained economic growth.[33]

## Capital Flows

Mexico's motivation to implement a NAFTA stems in part from the desire to increase capital flows into Mexico. Some modelers have incorporated capital flows by assuming that Mexico's aggregate capital stock increases by a given percentage or, alternatively, to maintain the rate of return on capital that prevails in the absence of a NAFTA. Capital flows are important because an increase in Mexico's capital-to-labor ratio would lead to higher per capita output.

Differences in capital-labor ratios between Mexico and the United States cannot fully account for differences in per capita output levels, however. Based on purchasing power parity comparisons, 1988 real GDP per capita was $14,581 in Mexico and $37,608 in the United States.[34] During the 1988-90 period, the real return on bank equity in Mexico averaged 28.2 percent per year, far less than the 86 percent that would be expected, based on the simple calculations performed in the paper, if differences in capital-labor ratios alone accounted for per capita output differences.

Although capital flows into Mexico are unlikely to equalize Mexican and U.S. per capita output, they are clearly very important. Simple calculations in the paper show that capital flows sufficient to bring Mexico's net interest rate down from 28 percent to five percent (roughly the U.S. level) would increase Mexican per capita GDP to about $24,300. This would close about 42 percent of the current gap between Mexico and the United States.

## Interindustry Specialization

Learning-by-doing in production is one possible channel through which trade can lead to increased

economic growth. A firm learns to produce a good more cheaply with experience. If other firms benefit from this experience, the average cost of production for each firm will depend on cumulative output of the entire industry. As industry output increases, learning-by-doing results in continual productivity improvements and thereby provides a source of sustained economic growth.[35]

Growth for the economy as a whole is a weighted average of growth rates for individual industries, with weights given by industry output shares. Levels of experience in production, and hence productivity, differ among industries. To the extent that trade leads to specialization in industries with high rates of productivity, this can lead to increased economic growth for the economy as a whole. A specialization index is developed to capture the relationship between trade, interindustry specialization, and economic growth. This index is subsequently used in a regression to estimate the effects of a NAFTA on Mexican economic growth, as discussed below.

## Intraindustry Trade

Trade can also lead to growth by allowing a country to import specialized capital or intermediate goods that improve the productivity of its labor force. Learning-by-doing with spill-overs can lead to the introduction of new capital goods or quality improvements in old ones. By increasing the quality and variety of intermediate inputs available to firms, learning-by-doing can lead to sustained economic growth.

A country may produce specialized intermediates itself or import them. With no trade, there is a dynamic scale effect. Larger countries can produce a broader range of capital goods and thereby achieve higher rates of economic growth. By opening up to trade, a country gains access to the accumulated experience of other countries in the production of specialized inputs. Thus, trade can lead to increased growth.

Based on these considerations, it is to be expected that countries with a greater volume of trade in intermediates would have higher rates of growth. The Grubel-Lloyd index is often used to measure the extent to which a country trades in specialized intermediate inputs. This index is used, along with the afore-mentioned index of interindustry specialization, in a regression to estimate the growth effect of a NAFTA, as discussed below.

## NAFTA and Mexican Growth

To illustrate the importance of dynamic gains from trade, output growth per worker is regressed on the

[33] For further elaboration of these issues, see Richard E. Baldwin, "Measurable Dynamic Gains from Trade," Journal of Political Economy 100, February 1992, pp. 162-74; Robert E. Lucas, Jr., "On the Mechanics of Economic Development," Journal of Monetary Economics 22, July 1988, pp. 3-42; and Paul M. Romer, "Growth Based on Increasing Returns Due to Specialization," American Economic Review 77, May 1987, pp. 56-62.

[34] Information on prices of comparable items in different countries is collected as part of the International Comparison Project (ICP), sponsored by the United Nations, the World Bank, and the University of Pennsylvania. Relative prices from this survey are used to compare differences in the cost of purchasing a representative bundle of commodities across countries in the survey. International comparison of per-capital GDPs based on this survey are referred to as purchasing power parity comparisons, since the differences in per-capita real GDP across countries obtained from the ICP survey reflect differences in the buying power of a person's income in different countries.

[35] There is evidence for particular products that the benefits of learning-by-doing tail off after a certain level of production experience is reached. However, continual introduction of new products can lead to perpetual economic growth, if the benefits of learning-by-doing in the production of older goods spills over onto newer goods.

specialization and Grubel-Lloyd indexes and other variables using a cross-country data set.[36] Rough assumptions are made regarding the effects of free trade on the specialization and Grubel-Lloyd indexes described above.[37] These assumed changes, when combined with coefficient estimates from the regression, yield an estimated increase in the growth rate of Mexican manufacturing output per worker of 1.645 percent per year.[38] After 25 years, output per worker would be more than 50 percent higher than it would otherwise have been. These calculations are crude but illustrate that the dynamic gains Mexico may expect from free trade would dwarf the static gains.

## Conclusions

The literature on dynamic gains from trade is still at a tentative stage, even at a theoretical level. Satisfactory applied general equilibrium models do not currently exist that incorporate sources of growth such as specialization, human capital accumulation, learning-by-doing, and new product introduction. Development of such applied models lies in the future.

While these calculations of dynamic gains from trade for Mexico are rough, it is clear that even a modest increase in the growth rate will accumulate into large changes in per capita output over extended periods. This insight does not depend on the particulars of how the growth rate increase is calculated.

## 7. Santiago Levy and Sweder van Wijnbergen, "Transition Problems in Economic Reform: Agriculture in the Mexico-U.S. Free Trade Agreement"

### Abstract

In this paper, the authors develop an economy-wide model of Mexico to examine the effects on national income of liberalizing the Mexican corn market (with a phase-in period) and the U.S. fresh fruits and vegetables market in a

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[36] Regressions using a cross-country data set for a large number of countries over the 1970-85 period were reported in David K. Backus, Patrick J. Kehoe, and Timothy J. Kehoe, "In Search of Scale Effects in Trade and Growth," Research Department Working Paper 451, Federal Reserve Bank of Minneapolis, February 1991.

[37] Average specialization and Grubel-Lloyd indexes for 1970-85 are as follows:

|  | Specialization Index: | Grubel-Lloyd Index: |
|---|---|---|
| Canada | 7.10 x 10⁻² | 0.642 |
| Mexico | 5.93 x 10⁻⁴ | 0.323 |
| United States | 1.92 x 10⁻³ | 0.597 |

It is assumed that free trade allows Mexico to increase its specialization index to $1.00 \times 10^{-2}$ and its Grubel-Lloyd index to 0.600.

[38] Estimated regression coefficients on the specialization index and the Grubel-Lloyd index were 0.359 and 1.018, respectively. The increase in Mexican output growth per worker is estimated as follows:

$0.359 \ln(1.00 \times 10^{-2}/5.93 \times 10^{-4})$
$+ 1.018 \ln(0.600/0.323) = 1.645$

*Mexico-U.S. FTA. The analysis distinguishes six types of households: landless rural workers, subsistence farmers, rain-fed farmers, owners of irrigated land, urban workers, and urban capitalists. Rural workers migrate to urban areas in response to changes in relative wages.*

*Immediate elimination of trade and domestic restrictions on the Mexican corn sector, without eliminating U.S. trade restrictions on fresh fruits and vegetables and without land improvements, would lead to large gains in net income (i.e., increases in national income after income transfers to losers and taxes on those who gain) for Mexico ($42.4 billion). However, income for four of six household types would fall: subsistence farmers, landless rural workers, rain-fed farmers, and urban workers. Losses to rural groups stem from lower rural wages as well as reduced rain-fed land values. Decreased demand for rural workers induces rural-urban migration, thereby lowering wages of urban workers as well.*

*Finally, the effects on net income of a phase-in period for corn liberalization, public investment in land improvements such as irrigation projects, and liberalization of the U.S. fresh fruits and vegetables market are analyzed. By combining these policy changes, it is possible to increase net income for Mexico ($43.2 billion) while none of the six groups is made worse off.*

## Technical Summary

### Introduction

A model of Mexico is constructed to examine the distributional and efficiency effects of liberalizing the Mexican corn and U.S. fresh fruits and vegetables markets in a Mexico-U.S. FTA. There are substantial overall gains to Mexico from corn liberalization. However, some groups lose due to reductions in the value of rain-fed land and rural agricultural wages. A phase-in period for corn liberalization, a program for irrigation of Mexican rain-fed land, and liberalization of the U.S. fresh fruits and vegetables market, are shown to increase welfare for all groups.

### Model

The CGE model of Mexico used to perform the policy experiments described below has only one country in the model and world prices of tradable goods are fixed. The economy produces seven goods: corn, basic grains, vegetables, other agriculture, livestock, industry, and services. All goods except services are traded internationally; domestically produced goods are perfect substitutes for foreign goods. Goods are produced using seven factors of production: rural labor, urban labor, rain-fed land, irrigated land, livestock land, industry capital, and services capital. Rural-to-urban migration within Mexico occurs in response to differences in rural and urban standards of living.

Factors of production are owned by six different household types: subsistence farmers, landless rural workers, rain-fed farmers, irrigated farmers, urban workers, and urban capitalists. Welfare of each household type in each period depends on consumption levels of each good. Measures of welfare reported in the results below are obtained by adding together the welfare in each period, discounting welfare in future periods appropriately.

Liberalization of corn is expected to improve resource allocation and thereby increase national income. Some households are expected to suffer a welfare loss while others are expected to gain. The government could in principle provide lump-sum transfers to losers and levy lump-sum taxes on those who gain. The resources left over after these compensations have been made are thus a measure of the pure efficiency gain from corn liberalization. Efficiency gains from corn liberalization are computed as the discounted sum of efficiency gains in each period.

## Results

The model was used to simulate the welfare and efficiency effects of corn liberalization. Results are shown in table 5 for each of six policy experiments. Welfare for each of six household types are shown, measured as a percent of welfare in the base path (no FTA). The welfare measures shown are discounted

sums of welfare for each of the 10 years in the simulation period (1991-2000). Additionally, table 5 shows the discounted sum of efficiency gains to Mexico under each experiment, in billions of 1989 U.S. dollars. Results of Experiments 1 and 6 are discussed below. Experiment 1 considers immediate corn liberalization, while Experiment 6 integrates the entire package of policy changes that the authors argue would lessen the adverse effects of immediate corn liberalization on some groups.

## Experiment 1

Liberalization of corn over a one-year period would lead to large efficiency gains for Mexico ($42.44 billion in present value terms or $1.22 billion per annum).[39] However, welfare measures for four of six household types would fall: subsistence farmers, landless rural workers, rain-fed farmers, and urban workers. Losses to rural groups stem from reduced rain-fed land values (see table 6) as well as lower rural wages. Decreased demand for rural workers induces rural-urban migration, thereby lowering wages of urban workers as well.

[39] Liberalization of corn improves the allocation of resources in Mexico and frees up some resources each year. The present value of efficiency gains adds together the value of resources freed up each year, discounting dollar values in future years back to the present.

## Table 5
## Welfare and efficiency effects in policy experiments

| Welfare effects:[1] | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Subsistence farmer | 96.7 | 97.1 | 100.7 | 101.1 | 101.3 | 101.5 |
| Landless rural worker | 98.4 | 98.5 | 99.3 | 99.5 | 100.0 | 100.1 |
| Rain-fed farmer | 94.3 | 94.9 | 99.6 | 100.1 | 100.0 | 100.3 |
| Irrigated farmer | 102.8 | 102.4 | 101.9 | 101.5 | 102.8 | 102.5 |
| Urban worker | 98.4 | 98.6 | 99.3 | 99.5 | 100.0 | 100.1 |
| Urban capitalist | 101.8 | 101.7 | 101.3 | 101.2 | 100.7 | 100.6 |
| Efficiency gains:[2] | 42.44 | 40.08 | 51.96 | 49.57 | 44.81 | 43.18 |

[1] Welfare in each policy experiment is expressed as a percent of welfare in the base path. The experiments are defined as follows:

> Experiment 1: corn liberalization in one year.
> Experiment 2: corn liberalization in five years.
> Experiment 3: corn liberalization in one year; investment program for rain-fed land.
> Experiment 4: corn liberalization in five years; investment program for rain-fed land.
> Experiment 5: corn liberalization in five years; investment program for rain-fed land; U.S. fresh fruits & vegetables liberalization.
> Experiment 6: corn liberalization in six years; investment program for rain-fed land early; U.S. fresh fruits & vegetables liberalization.

[2] The present value of efficiency gains under each experiment are expressed in billions of 1989 U.S. dollars.

Source: Levy and van Wijnbergen, USITC symposium, February 24-25, 1992.

## Experiment 6

Corn liberalization is phased in over five years in Experiment 6. However, the beginning of this phase-in period is delayed one year. Public irrigation and infrastructure investment programs are enacted over a five-year period. Finally, U.S. tariffs on fresh fruits and vegetables are assumed liberalized over a five-year period.

This combination of policy changes raises the welfare, appropriately discounted, for each of the six groups. Phasing in the corn liberalization moderates the reduction in rain-fed land prices (compare Experiments 1 and 2 in table 6). Combining a five-year phase-in of corn liberalization with irrigation investment and liberalization of the U.S. fresh fruits and vegetables market ensures that no group suffers a loss in the discounted sum of welfare (see Experiment 5 in table 5). However, welfare for subsistence farmers, landless rural workers, and rain-fed farmers, still fall in the first few periods, compared to welfare in the base path. By delaying corn liberalization for one year, it is possible to prevent welfare decline of subsistence farmers and rural workers in the early years.

## Conclusions

The authors draw the following conclusions from their results. Immediate liberalization of Mexican corn is expected to yield substantial aggregate gains for Mexico. Unfortunately, liberalization would also lead to welfare losses, especially for owners of rain-fed land. In addition, reduced demand for corn would displace large numbers of rural workers and thereby put downward pressure on urban wages. It is therefore important to consider the timing of corn liberalization and whether other policies are needed to facilitate adjustment out of corn.

Standard adjustment assistance programs would not work in this case because they provide incentives for workers to remain in the rural sector without improving employment opportunities there. An alternative would be to invest in improving rain-fed land via irrigation projects and infrastructure improvement. This would increase the value of land held by subsistence and rain-fed farmers. In addition, demand for rural labor would increase directly due to the land improvement projects and indirectly because farming on irrigated land is more labor-intensive than farming on rain-fed land.

The timing and credibility of policy changes are also important. Land improvements should precede corn liberalization so that landless rural workers and rain-fed farmers can afford the initial losses associated with corn liberalization. The Mexican Government must be assured that, if it goes ahead with irrigation projects, corn liberalization will indeed take place. The FTA would appear to solve this commitment problem. In addition, the Government's promise to continue land improvement after the FTA is in place must be credible. Credibility of this promise could be increased if a multilateral organization were to provide financing during the process of adjustment to the FTA contingent on the promised irrigation projects. Also, a program of public credit guarantees to farmers would make it more costly for the Government to renege on its commitment to land improvement.

## Table 6
## Land values and land holdings

| | Base path: | Policy experiments:[1] | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Land values:[2] | | | | | | | |
| Rain-fed land | 12.065 | 9.231 | 9.443 | 9.180 | 9.390 | 9.608 | 9.726 |
| Irrigated land | 40.169 | 40.800 | 40.725 | 40.668 | 40.597 | 42.175 | 42.137 |
| Land holdings:[2] | | | | | | | |
| Subsistence and rain-fed farmers | 12.065 | 9.231 | 9.443 | 11.499 | 11.703 | 12.030 | 12.141 |
| Irrigated farmers | 40.169 | 40.800 | 40.725 | 40.668 | 40.597 | 42.175 | 42.137 |

[1] The policy experiments are defined as follows:
    Experiment 1: corn liberalization in one year.
    Experiment 2: corn liberalization in five years.
    Experiment 3: corn liberalization in one year; investment program for rain-fed land.
    Experiment 4: corn liberalization in five years; investment program for rain-fed land.
    Experiment 5: corn liberalization in five years; investment program for rain-fed land; U.S. fresh fruits & vegetables liberalization.
    Experiment 6: corn liberalization in six years; investment program for rain-fed land early; U.S. fresh fruits & vegetables liberalization.

[2] Figures below represent the discounted value of all current and future rental income, expressed in millions of 1989 pesos per hectare.

Source: Levy and van Wijnbergen, USITC symposium, February 24-25, 1992.

8. **Robert K. McCleery, "An Intertemporal, Linked, Macroeconomic CGE Model of the United States and Mexico Focussing on Demographic Change and Factor Flows"**

## Abstract

The analysis presented in this paper addresses many important issues omitted from other models. In particular, the author incorporates population changes, investment flows, and technology transfer. In the model, there are two countries (Mexico and the United States), two goods (manufacturing and nonmanufacturing), a rest-of-world, and some additional features designed to capture the issues enumerated above.

The model is used to generate a depiction of the economy that assumes no FTA, with results reported for 1993 and 2000. Labor force growth rates are assumed to slow in the United States and to remain higher in Mexico over the 1991-2000 period. A free trade scenario is first examined in which Mexican and U.S. tariffs and NTBs are eliminated over a 10-year period. A second free-trade scenario is examined that is designed to capture the investment flows into Mexico that may result from increased investor confidence under a FTA. A final scenario adds technology transfer and associated increases in Mexican economic growth.

In the first scenario (FTA only), Mexico and the United States both gain: Mexican real GDP expands by $2.7 billion, while U.S. real GDP expands by $13.5 billion, between 1991 and 2000. However, Mexico gains more as a percent of real GDP. In the second scenario, the FTA and increased investor confidence induce an additional flow of direct foreign investment into Mexico of $46 billion, or $5 billion per year between 1991 and 2000, as compared to a FTA only. This yields increased benefits of free trade for the United States as a whole ($38.2 billion) and it improves the situation for Mexico considerably ($17.7 billion). In the third scenario, the FTA, increased investor confidence, and technology transfer lead to an increase in the rate of Mexican economic growth, thereby yielding the largest total benefits for both countries ($55.0 billion for Mexico and $65.2 billion for the United States).

## Technical Summary

### Introduction

This paper presents a two-good model of the Mexican and U.S. economies. The model is constructed to account for demographic change, induced investment flows, and dynamic gains from trade. Mexico and the United States produce traded and nontraded goods, roughly corresponding to manufactured products and the nonmanufacturing

sector. The model is dynamic, generating baseline and experimental solution paths for 1991 through 2000.

The important dynamic features driving the model and its results are the incorporation of assumptions regarding demographic change in Mexico and the United States, a treatment of investment flows based on exogenous reductions in the riskiness of investment in Mexico, and exogenous shocks to the rate at which increased output of capital goods translates into productivity change. Three experimental scenarios are constructed. The first is a simple elimination of tariff barriers and NTBs over a 10-year period. The second introduces increased investment in Mexico via increased investor confidence. The third adds dynamic gains from trade.

### Model

The CGE model used in this paper is an extension of the model developed in McCleery (1988); the model was subsequently modified in Hinojosa and McCleery (1991) by specifying a bargaining game between labor and capital owners.[40] The current paper differs from the author's prior work by: (1) allowing for international capital mobility in the form of direct foreign investment; (2) allowing for endogenous growth due to learning-by-doing; and (3) setting international labor migration to zero.

The model used in this paper incorporates Mexico and the United States. Each country produces traded and nontraded goods. The traded sector in Mexico includes manufacturing and irrigated commercial agriculture, while the nontraded sector in Mexico includes services and subsistence agriculture. The traded good is produced by capital and high-wage labor using an imported intermediate good. The nontraded good is produced by capital, low- and high-wage labor, and a fixed factor called land. In the United States, the traded good is a composite manufactured good produced by capital and high-wage labor, and the nontraded service is produced with capital and low- and high-wage labor. The manufactured product is consumed in the United States and exported to Mexico for use as the intermediate input in its manufacturing sector. In both countries, labor in the traded sector is undifferentiated but high wage; while it consists of distinct high- and low-wage components in the nontraded sector.

Capital is assumed to be internationally mobile. The level of foreign investment in Mexico is endogenous; its source is assumed to be the United States, with half diverted from investment in the rest of the world and half from U.S. domestic investment. Capital is allocated between U.S. sectors and

[40] See Robert K. McCleery, "U.S.-Mexico Economic Linkages: A General Equilibrium Model of Migration, Trade, and Capital Flows," unpublished Ph.D. dissertation, Stanford University, 1988; and Raul Hinojosa-Ojeda and Robert K. McCleery, "U.S.-Mexico Interdependence, Social Pacts, and Policy Alternatives: A Computable General Equilibrium Approach," Working Paper No. 596, Department of Agricultural and Resource Economics, University of California, Berkeley, March 1991.

corresponding Mexican sectors in response to intercountry differences in expected rates of return; actual returns differ by a risk premium. These risk premiums are exogenous and do not vary over time, at least in the status quo solution path. One implication of this specification is that, within each country, equilibrium rates of return may differ between sectors. Furthermore, the direct foreign investment flows are largely determined by differences in rates of return, which are chosen by the modeler.

Labor is internationally immobile; specifically, there is assumed to be no undocumented labor migration from Mexico to the United States. Labor force growth rates within both countries are assumed to drop over the 1988-2000 period, from 1.65 percent to 1.05 percent in the United States and from 3.0 percent to 2.1 percent in Mexico. New labor force entrants are allocated between high- and low-wage jobs based on what are referred to as "incremental capital-labor ratios." By setting these ratios, the modeler determines how many new workers get trained for high-paying positions in response to an extra dollar of investment in a sector. The idea is that entry into high-paying jobs is restricted due to some form of labor-market rigidity, such as a minimum wage or a union.

## Results

### Experiment 1

The first scenario removes trade restrictions equivalent to a Mexican average tariff of 10.8 percent and a U.S. average tariff of 7.4 percent. These rates implicitly include the tariff equivalents of NTBs, and are removed gradually over a 10-year period.[41]

The present discounted value of the change in aggregate welfare under this scenario, through the year 2000, is $2.8 billion for Mexico and $13.5 billion for the United States, in 1988 dollars. The United States has an increase of $11 billion in real GDP by the year 2000. Most of Mexico's real GDP increase comes at the beginning, with Mexican real GDP falling to nearly its baseline level by the year 2000.

Mexico experiences a large increase in capital-good imports and direct foreign investment from the United States in the first few years. This leads to early growth in Mexican real GDP. However, massive outflows of direct foreign investment in later years, the cause of which is not explained, reduce Mexican growth. These changes are incremental ones and are due to trade liberalization alone; they may have been influenced by the modeler's choice of differences between Mexican and U.S. rates of return.

There are slight welfare losses for Mexican and U.S. manufacturing labor and for high-wage labor in

the Mexican nonmanufacturing sector. Approximately 350,000 U.S. workers are "upgraded" from low-wage to high-wage jobs by the year 2000; 50,000 in the tradeable sector and 300,000 in the nontraded sector. Given this, returns to unskilled labor rise and returns to tradeable-sector (primarily manufacturing) and nontraded-sector skilled labor fall. These changes may have resulted from the modeler's choice of incremental capital-labor ratios.

### Experiment 2

The second experiment builds on the first by modeling increased flows of capital into Mexico on top of the elimination of trade barriers treated by the first experiment. Induced capital flows are modeled by reducing the risk premiums demanded by the market for investment in Mexico by 1.0 percentage point in manufacturing and by 0.7 percentage points in nonmanufacturing, over 10 years, beginning in 1991.

This leads to an increase in direct foreign investment, relative to free trade alone, of $46 billion over the 1991-2000 period. Real GDP in the United States is $17 billion above the baseline in the year 2000, or $6 billion over its level in Experiment 1. Mexican real GDP is $9 billion over its baseline value in the year 2000. The return on capital in the United States increases, but the change in the return to manufacturing labor is still slightly negative, and small but positive for nonmanufacturing labor. The present value of U.S. aggregate welfare gains in this scenario is $38 billion. The biggest winners are the low-wage workers in Mexico, with a five percent increase in real income. The present value of aggregate welfare gains for Mexico under this scenario is $18 billion.

### Experiment 3

The third experiment incorporates learning-by-doing by making the rate of technical progress depend on the level of output of capital goods. It is then assumed that the rate by which an increase in capital goods production translates into technical progress is increased. For U.S. manufacturing, the coefficient used to translate capital goods production into technical progress is increased by one percent; for the nonmanufacturing sector, the coefficient is increased by one-half of one percent. Mexican adjustments are assumed to be half those specified for the United States.

These changes add $10 billion to U.S. real GDP by the year 2000, with the present value of welfare gains equal to $65 billion. In the long run, manufacturing wages fall slightly (less than one percent), and nonmanufacturing wages rise slightly. Mexico gains $55 billion in welfare under this scenario; more than one million high-wage jobs are created, and the real wages of the remaining low-wage workers increase by 14 percent.

## Conclusions

This paper incorporates demographic changes, induced capital flows into Mexico and dynamic gains

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[41] The free trade only scenario also appears to include some changes to the aforementioned incremental capital-labor ratios. See the last equation in section 9.1 of McCleery's Annotated Equation List.

from trade into a CGE model of Mexico-U.S. trade liberalization. Compared to static CGE models, these additional channels of influence yield significantly larger gains from a FTA. It is important to bear in mind, however, that the economic effects of increased investor confidence and faster learning-by doing are a direct result of some ad hoc changes in the parameters of the model. While an effort has been made to incorporate some important channels through which a NAFTA would influence Mexico and the United States, further research is needed to improve the modeling of these effects.

## 9. Sherman Robinson, Mary E. Burfisher, Raul Hinojosa-Ojeda, and Karen E. Thierfelder, "Agricultural Policies and Migration in a U.S.-Mexico Free Trade Area: A Computable General Equilibrium Analysis"

### Abstract

An 11-sector, two-country, economy-wide model is developed to analyze alternative scenarios for the formation of a Mexico-U.S. FTA. The analysis explicitly incorporates agricultural programs and labor migration.

There are tradeoffs between bilateral trade growth, labor migration, and agricultural program expenditures, under alternative FTA scenarios. Trade liberalization in agriculture greatly increases rural-urban migration within Mexico (290,000 additional migrants) and migration from Mexico to the United States (238,000 additional migrants). Migration is reduced if Mexico grows relative to the United States, a major goal of the FTA, and also if Mexico retains farm support programs. Timing, however, is crucial. Increased growth needed to absorb the displaced labor takes time, while the increase in rural emigration is immediate.

The authors argue that Mexico will need a lengthy transition period and should allocate resources to agriculture during the transition. Undue haste in introducing free trade in agriculture and eliminating Mexican agricultural support programs may not be desirable for either country when the social and economic costs associated with increased migration are weighed against the benefits of increased trade growth.

## Technical Summary

### Introduction

This paper uses a CGE model of the Mexican and U.S. economies to assess the economic effects of the proposed FTA. It extends and refines an earlier paper by Hinojosa and Robinson (1991) and focuses on two main aspects of the FTA. First, the model provides detailed estimates of the effects of a FTA on agricultural sectors in both Mexico and the United States. Second, the model examines the potential impact of a FTA on the flow of migrants between Mexico and the United States. In the United States, many supporters of a FTA contend that trade liberalization will slow the flow of migrants from Mexico to the United States since an agreement would narrow the gap between wages in the two countries.

### Model

The model used in this paper is an 11-sector static CGE model of Mexico, the United States, and the rest of the world. Both Mexico and the United States are modeled in detail, while the rest of the world is treated more simply. Given the emphasis on agriculture, the model contains five agricultural sectors: food corn, program crops, fruits and vegetables, other agriculture, and food processing. The remaining six sectors include: other light manufacturing, oil and refining, intermediates, consumer durables, and capital goods.

The model includes substantial detail concerning the labor market. Four types of labor are explicitly considered: rural, urban unskilled, urban skilled, and professional. In addition to these, the model considers capital and agricultural land as primary factor inputs. Capital and all types of labor are mobile across sectors.

### Migration

Three types of migration flows are present in the model. First, the model allows migration of rural workers in Mexico to the U.S. rural labor market. Second, urban unskilled labor in Mexico can move to the urban unskilled market in the United States. Finally, migration within Mexico is permitted between the rural and unskilled labor markets. It is assumed that migration flows are sufficient to maintain a fixed differential between real wages for a given labor type, measured in a common currency. The migration flows generated by the model should be considered as additional to the existing flow of migrants.

The following example will illustrate the operation of migration flows in this model. Liberalization of Mexican corn would reduce the demand for Mexican rural labor. Mexican rural workers are assumed to migrate both to the Mexican urban unskilled labor market and to the U.S. rural labor market. Once rural workers enter the Mexican urban unskilled labor market, excess supply of labor there induces further migration into the U.S. urban unskilled labor market. If migration were not permitted in the model, corn liberalization would put downward pressure on Mexican rural wages, relative to urban-unskilled wages in both Mexico and the United States. With both rural-to-urban migration within Mexico and rural-to-rural as well as urban-unskilled-to-urban-unskilled migration between Mexico and the United States, migration proceeds until pre-existing wage gaps are restored.

This migration structure has two strong implications. First, migration bears the entire burden of restoring equilibrium in the labor market; relative wages do not adjust to restore demand-supply balance.

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This implies very large migration flows in response to trade or agricultural policy changes. Second, exchange rate changes alone will lead to migration because wage gaps are held constant in a common currency. These implications are sufficiently strong that the migration results should be viewed as provisional.

## Agricultural Programs

Since the main focus of the paper is on the effects of a FTA on agriculture, the model includes a great deal of detail on the specifics of modeling the programs that support agriculture in both countries. Expenditure on such programs amounted to $1.6 billion in 1988 in Mexico, and $11.5 billion in the United States in 1987.

The model explicitly includes six types of agricultural support policies in Mexico. For the four agricultural sectors, these include: input subsidies, import tariffs, and import quotas. In the food processing sector, these include direct subsidies and price subsidies. The model also includes the low income or "tortilla" subsidy. In the model, these policies are treated as either ad valorem price wedges or income transfer payments.

For the United States, the model includes two types of agricultural support programs: the deficiency payments program and the export enhancement program (EEP). For the feed grain, wheat, rice, and cotton sectors, the government pays the producer a subsidy equal to the difference between the market price and an exogenously determined target price. The EEP program is modeled as an ad valorem export subsidy.

## Data

Data for all variables are obtained by selecting 1987 as a base year for the United States (to avoid effects of the 1988 drought) and 1988 as a base year for Mexico, but trade flows representing 1988 are included. Tariffs and tariff equivalents of import quotas are 1988 trade-weighted rates.

## *Results*

Using the model, the authors calculate potential outcomes for six policy scenarios. The first experiment, Scenario 1, simulates the effect of removing all nonagricultural trade barriers between Mexico and the United States, leaving all agricultural support programs in place. The nonagricultural protection includes tariffs and quotas. As a result of this experiment, bilateral trade between Mexico and the United States increases. U.S. exports to Mexico rise 6.1 percent, while Mexican exports to the United States rise 4.1 percent. Mexico does experience some trade diversion as exports from the rest of the world to Mexico fall by 2.0 percent. In the United States, the largest export gains come from the oil and refining and consumer durables sectors; in Mexico, the largest gains come from the food-processing sector. Real wages for all types of labor remain unchanged in the United

States while real wages rise in Mexico. Despite this implied convergence in the real wage, the model predicts that labor migration from Mexico to the United States would increase slightly. This result seems counterintuitive, and may result from the inclusion of exchange rate terms in the migration functions. The Mexican exchange rate depreciates while the U.S. exchange rate remains unchanged. A depreciation of the peso would lead to a lower Mexican wage measured in U.S. dollars. Thus, workers in Mexico would have an incentive to move to the United States.

Scenario 2 simulates the effects of removing all tariffs and quotas, including those in agriculture, along with removal of the portion of the EEP affecting exports to Mexico. The results of this experiment show slightly larger increases in U.S. exports to Mexico and Mexican exports to the United States, compared with the first experiment. Despite removal of the EEP, U.S. exports rise. Presumably this occurs because removal of high Mexican barriers results in an expansion in exports which outweighs the removal of the EEP. Surprisingly, migration of Mexican urban workers to the U.S. urban unskilled labor market is substantial: 212,000 workers, compared to only 7,000 in the first experiment. In the United States, real wages for rural workers and urban unskilled workers fall absolutely and relative to real wages in Mexico for the same labor categories, yet the model predicts a substantial increase in migration flows from Mexico to the United States. Evidently, this result occurs because of the depreciation of the peso.

Scenario 3 takes Scenario 2 and adds the elimination of all agricultural support programs in Mexico. Results are very similar to Scenario 2 but larger in magnitude. In Mexico, the food corn and program crops sectors suffer severe reductions in output. The effects on migration are the largest: 610,000 migrants move to the United States. In terms of changes in real wages, this scenario produces the largest reduction in real wages for the rural and urban unskilled categories in the United States.

In Scenario 4, the authors remove all tariffs and quotas and, at the same time, suppose that Mexico adopts a deficiency payment program for corn and program crops. The intent of this experiment is to determine the consequences for Mexico of protecting producers through domestic programs rather than trade restrictions. As a result, bilateral trade flows increase, while Mexico suffers some trade diversion from the rest of the world. Real wages in Mexico rise for all labor categories, but real wages decline in the United States for rural and urban unskilled workers. For the United States, sectoral output effects range from a 3.3 percent increase in food corn to a 0.1 percent decline in the output of fruits and vegetables; yet U.S. exports of fruits and vegetables rise by 14.4 percent. In Mexico, the food corn and program crops sectors contract while the output of fruits and vegetables rise 4.6 percent and exports increase 18.0 percent. In general, the adoption of a deficiency payments program in Mexican

agricultural sectors mitigates the contraction in agricultural outputs that would otherwise occur.

Scenario 5 is labeled partial trade liberalization. In this experiment, Mexican quotas in corn and the program crops sectors are converted to tariffs at a value equal to one-half of their tariff equivalent in the base year. This experiment also includes a deficiency payment program for Mexican corn, but leaves all remaining programs intact. The results are more moderate in magnitude compared to Scenario 4. Once again, output of fruits and vegetables in the United States contracts but exports to Mexico rise 14.8 percent. In Mexico, both output and exports of fruits and vegetables rise.

Finally, Scenario 6 takes Scenario 5 and adds a 10 percent increase in Mexico's capital stock. Mexican subsidies for corn are cut in half and the deficiency payment program is removed. Not surprisingly, U.S. exports to Mexico rise by the largest amount under this growth scenario, as do Mexican exports to the United States. The interesting feature here is that this is the only case in which U.S. exports to the rest of the world fall. This is also the case which produces a dramatic increase in Mexican exports to the rest of the world, 17.2 percent, which is more than three times the increase calculated in any other experiment. It is also the only case in which Mexico does not suffer any trade diversion; exports from the rest of the world to Mexico actually increase 6.5 percent. Real wages for all labor categories rise in Mexico and either increase or experience no change in the United States. In this experiment, real wages rise in Mexico relative to the United States and the Mexican peso appreciates. Consequently, the model predicts no change in rural migration from Mexico to the United States; it does show that some urban unskilled workers currently living in the United States would return to Mexico.

## Conclusions

This model makes an important contribution to the debate surrounding a Mexico-U.S. FTA by providing detailed estimates of a possible agreement on agricultural sectors and labor migration. In all cases considered, the paper shows an increase in bilateral trade between Mexico and the United States as a result of trade liberalization. In all cases except the growth scenario, Mexico suffers some trade diversion while the United States does not.

The most controversial results concern the effects of a FTA on labor migration. It could be argued that a FTA would reduce the flow of migrants from Mexico into the United States if the gap between Mexican and U.S. real wages were to narrow. Results from the model used in this paper show just the opposite tendency: migration from Mexico to the United States actually rises as a result of trade liberalization. This increased migration from Mexico occurs in all cases but one, the growth scenario, and occurs despite the increase in real wages in Mexico relative to the United States present in each experiment.

Notwithstanding its controversial migration structure, the paper highlights some considerations that the authors argue are important to keep in mind when designing a mix of policies to be included in an actual agreement. Mexico could slow labor migration to the United States by adopting agricultural support programs similar to those used in the United States to support farm income. The simulation results in this paper show that the inclusion of a deficiency payments program reduces emigration over what it would be without the program, but overall migration to the United States still increases as a result of more liberalized trade. The dilemma identified in these experiments is that, although adoption of support programs might slow migration, this leads to greater fiscal expenditures that must be financed. Increased growth in Mexico is the only scenario considered in this paper that would actually reduce the flow of labor migration to the United States.

## 10. David Roland-Holst, Kenneth A. Reinert, and Clinton R. Shiells, "North American Trade Liberalization and the Role of Nontariff Barriers"

### Abstract

Average tariff rates in North America are relatively low by world standards, having declined significantly with unilateral reductions undertaken by Mexico since 1983. Despite this move toward a more liberal trade regime, however, it is apparent that NTBs and other deterrents still exert a pervasive influence on trade. One reason why NTBs have persisted is that there is relatively little information on their restrictiveness, especially in Mexico.

In this paper, three different sources of information are used to examine the role of NTBs in North American trade. First, a review of the literature is used to construct best guesses for the price equivalents of NTBs in each of 26 broad sectors, following the practice of other North American trade modelers. Next, a detailed set of NTB measures is constructed based on the UNCTAD-GATT data base for 1989. There are ten different measures, in each of 26 sectors, for Canada, Mexico, and the United States. Finally, price comparison data for each of the 26 sectors in each country are compiled based on the UN, OECD, and University of Pennsylvania International Comparison Project (ICP).

The UNCTAD-GATT information on NTBs and other data sources on tariffs are then used to simulate the effects of North American trade liberalization. Bilateral trade flows in each sector and between each country are distinguished. Simulation results indicate that Canada, Mexico, and the United States could realize substantial gains from a more comprehensive approach to trade liberalization and that the process of adjustment to full liberalization differs in important ways from adjustment to tariff liberalization alone.

# Technical Summary

## Introduction

This paper shows that welfare gains and sectoral adjustments associated with a NAFTA depend crucially on the inclusion of NTBs. The authors use a static, CGE model of the North American economy. The model addresses both production and trade in 26 sectors of Canada, Mexico, and the United States under different assumptions regarding market structure and firm behavior. Liberalization of both tariffs and NTBs result in much greater welfare and resource allocation effects than tariff liberalization alone. The specification of pricing behavior under increasing returns to scale also significantly affects the model results.

## Model

The model is based on a 26-sector social accounting matrix (SAM) of North America for the year 1988. For each of the 26 sectors, the North American SAM includes: interindustry transactions within each country; consumption transactions of an aggregate household within each country; factor payment transactions of each production sector in each country; trade transactions among the three North American economies; and trade transactions between each of the three North American economies and the rest of the world.[42]

The CGE is a three-country model with domestic production, consumption, and bilateral trade for Canada, Mexico, the United States, and the rest of the world jointly determined at the 26 sector level of aggregation. Imports and exports are assumed to be different from domestic goods, so the model is able to explain intraindustry trade rather than only net trade.[43] Capital stocks and aggregate real wages are held fixed. The latter assumption implies that total employment in the model adjusts to clear the labor market.

The model allows for increasing returns to scale. These are modeled with a cost disadvantage ratio, which measures the degree to which average cost exceeds marginal cost. Two alternative pricing rules are used. First, Cournot behavior generates a markup of price over marginal cost. Firms may enter or exit the industry at zero cost. Second, the contestable markets hypothesis assumes that the representative firm prices at average cost to deter potential entry. The model is calibrated to the 26-sector 1988 SAM with behavioral parameters taken from a number of sources.

## Results

The North American SAM is first used to describe the structure of the North American economy. Canada is shown to be relatively trade-dependent, its strongest trade relations being with the United States. The United States is shown to be relatively trade-independent, its strongest trade relations being with the rest of the world. The U.S. economy is somewhat more oriented towards services than the Canadian economy. Mexico is also relatively trade-dependent, although slightly less so than Canada. The Mexican economy is more oriented towards primary production (agriculture and mining) than the other two North American economies.

The authors provide four measurements of restraints on North American trade: tariff rates, ad valorem equivalents of NTBs taken from public and private sources, NTB coverage ratios from the UNCTAD-GATT data base, and intercountry price comparison data from the International Comparison Project. The last three data sources indicate that NTBs do have a significant influence on North American trade.

The paper then turns to the following four simulation experiments: (1) tariff removal with constant returns to scale and competitive pricing; (2) tariff and NTB removal with constant returns to scale and competitive pricing; (3) tariff and NTB removal with increasing returns to scale and Cournot behavior; and (4) tariff and NTB removal with increasing returns to scale and contestable markets. In each of the last three experiments, NTBs are measured using coverage ratios from the UNCTAD-GATT data base.[44]

North American trade liberalization proves to be beneficial to the regional economies in each of the four simulations (see table 7). Under tariffs-only liberalization (Experiment 1), welfare gains are small, ranging from 0.07 percent for the United States to 0.24 percent for Canada. Under tariff and NTB liberalization (Experiments 2-4) welfare gains are much greater. The highest welfare gains occur under increasing returns to scale and the contestable market assumption (Experiment 4), ranging from 2.55 percent for the United States to 6.75 percent for Canada. Welfare gains are more or less equal under tariff and NTB liberalization under constant returns to scale (Experiment 2) and under increasing returns to scale and Cournot pricing behavior (Experiment 3).[45]

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[42] The North American SAM is presented in detail in Kenneth A. Reinert, David W. Roland-Holst, and Clinton R. Shiells, "Social Accounts and the Structure of the North American Economy," unpublished paper, February 1992.

[43] This specification also implies that changes in import restraints will not be fully passed through into changes in domestic prices.

[44] As the authors point out, using coverage ratios as ad valorem equivalents of NTBs is problematic. However, estimating the ad valorem equivalents correctly is a very difficult task for 26 sectors and three countries. The coverage ratio simulations are presented not for the purpose of providing accurate estimates of NTB liberalization outcomes, but to indicate the potential differences between tariff and NTB liberalization.

[45] Cournot behavior results in lower welfare gains than the contestable market assumption because firm entry in the former case prevents the full realization of economies of scale.

**Table 7**
**Aggregate effects of North American trade liberalization**

*(Percentage changes)*

| | Experiment 1:<br>CRTS,[1] Tariffs only | | | Experiment 2:<br>CRTS, Tariffs, NTBs | | | Experiment 3:<br>IRTS,[1] Cournot, T/NTBs | | | Experiment 4: IRTS,<br>Contestable, T/NTBs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Canada | Mexico | U.S. | Canada | Mexico | U.S. | Canada | Mexico | U.S. | Canada | Mexico | U.S. |
| Welfare[2] .......... | 0.24 | 0.11 | 0.07 | 4.87 | 2.28 | 1.67 | 4.08 | 2.47 | 1.58 | 6.75 | 3.29 | 2.55 |
| Exchange rate .... | 0.69 | −0.21 | −0.09 | 4.51 | −3.51 | −0.37 | 3.11 | −2.71 | −0.25 | 6.89 | −4.20 | −1.04 |
| Total exports ...... | 1.20 | 1.12 | 0.27 | 29.43 | 13.06 | 8.05 | 26.25 | 14.36 | 7.87 | 39.83 | 16.72 | 10.43 |
| Total imports ...... | 0.64 | 1.15 | 0.36 | 19.54 | 14.74 | 8.95 | 18.71 | 15.01 | 8.31 | 24.18 | 17.70 | 12.34 |
| NAFTA exports .... | 1.14 | 1.99 | 1.34 | 42.76 | 14.23 | 27.17 | 39.25 | 15.51 | 26.31 | 55.22 | 17.29 | 32.47 |
| NAFTA imports .... | 1.29 | 1.56 | 1.33 | 28.98 | 21.12 | 36.13 | 27.87 | 21.25 | 33.71 | 35.07 | 23.82 | 46.44 |

[1] CRTS denotes constant returns to scale; IRTS denotes increasing returns to scale. NTBs are nontariff barriers.
[2] Welfare is measured by equivalent variation.

Source: Roland–Holst et al., USITC symposium, February 24–25, 1992.

The paper also presents sectoral results for Experiments 3 and 4. For the United States, output expands in 24 of the 26 sectors, with most sectors expanding by more than one percentage point. The transport equipment sector experiences the greatest increase in output due to increases in domestic and external demand. Canada's sectoral changes are more dramatic than those of the United States due to its greater regional trade dependency and higher initial protection levels. With the exception of agriculture, output expands in every sector, sometimes very dramatically. For example, under the Cournot pricing behavior, output of the transport equipment sector expands by 55 percent. For Mexico, there is the important result that agricultural output declines by more than 9 percent. However, there are substantial increases in output in the Mexican petroleum and transport equipment sectors as well as moderate increases in output across the remainder of the economy.

## Conclusions

Tariff distortions in North America are moderate by world standards; the data presented in this paper on NTBs and price comparisons indicate that NTBs operate in almost every sector of the three economies and that this results in significant distortions in prices. Based on the model simulations, the authors demonstrate that a NAFTA involving complete NTB liberalization would involve larger welfare gains and sectoral adjustments than a NAFTA based on tariff liberalization alone. Indeed, North American tariff liberalization alone would lead to very small increases in welfare in each of the three economies.

## 11. Horacio E. Sobarzo, "A General Equilibrium Analysis of the Gains from Trade for the Mexican Economy of a North American Free Trade Agreement"

### Abstract

*In this paper, the author evaluates the effects that a NAFTA would have on the Mexican economy. The estimated effects depend crucially on the extent to which Mexican firms are currently operating at smaller-than-efficient production levels, the amount by which production costs per unit of output would fall with trade liberalization, and by how much Mexican firms would lower their prices. These important factors are incorporated into the analysis of Mexico developed in this paper.*

*Simulations were performed under a variety of assumptions regarding the flow of investment between countries as well as the response of the exchange rate and wages to a NAFTA. Mexican real income is estimated to increase by 2.0 to 2.4 percent. A NAFTA would lead to expanded production in all sectors except petroleum, which is a regulated industry. Aggregate Mexican*

*employment is expected to increase by 5.1 to 5.8 percent as a result of a NAFTA. Exports increase in most sectors, especially to other countries in North America, in sectors such as leather, wearing apparel, electrical machinery, and rubber. Changes in Mexican imports are less pronounced, and moreover, some shift in the source of imports may occur in favor of North America.*

*Mexican investment inflows, induced by a NAFTA, are potentially of great importance. If investment flows freely between countries, the estimated increase in Mexican real GDP more than quadruples (from nearly two to eight percent) compared to estimates obtained under the assumption that Mexico's supply of capital is fixed.*

## Technical Summary

### Introduction

The paper evaluates the effects that a NAFTA would have on the Mexican economy, in the presence of economies of scale and imperfect competition in Mexican industry. The estimated effects of a NAFTA on Mexico depend crucially on the extent to which Mexican firms are currently operating at smaller-than-efficient scales, the amount by which the average cost of production would fall with trade liberalization, and by how much Mexican firms would lower their prices. These important factors are incorporated into the model of Mexico developed in this paper, using a model similar to that used by Cox and Harris to analyze a NAFTA.[46]

### Model

Sobarzo's CGE model includes 27 production sectors, each producing a single commodity, of which 21 are traded and six are nontraded. There are two factors of production, capital and labor, which are mobile between sectors. The model consists of a single representative consumer and three regions: Mexico, the rest of the world, and North America. However, only the Mexican economy is explicitly modeled. The two other regions, North America and the rest of the world, are represented through import supply and export demand.

Two crucial elements of Sobarzo's model are the assumptions of increasing returns to scale and imperfect competition. Economies of scale are specified by declining long-run average cost over the entire range of production for noncompetitive industries. Therefore, as output increases through trade liberalization, gains in efficiency are obtained.[47]

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[46] David Cox and Richard G. Harris, "North American Free Trade and its Implications for Canada: Results from a CGE Model of North American Trade," USITC symposium, February 24-25, 1992. See also Harris (1984) for further discussion of increasing returns and imperfect competition within the framework of CGE models.

[47] Sobarzo defines three types of industries in his analysis: competitive, noncompetitive, and regulated. For competitive industries, constant returns are assumed. For

Imperfect competition is captured in two assumptions about the pricing behavior of firms: (1) the extent to which domestic prices deviate from marginal cost; and (2) the extent to which collusion among Mexican firms allows domestic prices to fall after liberalization.[48] A consequence of these assumptions is that fewer firms serve a larger market at lower cost per unit after liberalization.

In addition, estimated effects of a NAFTA on Mexico were performed under a variety of assumptions about how the economy would react to liberalization (i.e., closure rules). These assumptions, which included varying capital mobility between countries as well as exchange rate and wage flexibility, are summarized in table 8. Three versions of trade liberalization were conducted, where liberalization took the form of tariff elimination between Mexico and the rest of North America.

In brief, the first two versions attempt to determine the effects of a NAFTA assuming excess capacity in the labor market and a fixed capital stock. The aggregate real wage is fixed and the labor market clears by adjustments in the level of employment. Since capital is fixed in both versions, the capital market clears through adjustments in the price of capital. The main difference between Version 1 and 2 is how changes in domestic and foreign prices are accommodated. In the first version, the trade balance is fixed while the exchange rate varies; in the second, the opposite holds.

In Version 3, the price of capital is fixed and the capital market clears through adjustments in the level of the capital stock. It is assumed that capital is mobile not only between sectors but between countries.

47—Continued
the sole regulated sector, petroleum, the price and level of output are fixed independently. See table 2 in Sobarzo's paper for a list of these sectors.
[48] Sobarzo's pricing behavior assumptions are identical to those used by Harris (1984) and Cox and Harris (1992). As noted above, the first assumption, a Chamberlin-Cournot monopolistic competition model, determines the difference between price and marginal cost. The second assumption, based on the Eastman-Stykolt model, reflects collusive behavior in an industry and determines the extent to which domestic prices will fall as a result of liberalization. Sobarzo found the results of his model to be very sensitive to the weight placed on the Eastman-Stykolt rule. Changes in GDP varied from one to 15 percent over the entire range of possible weights.

Mexicans are assumed to have a fixed endowment of capital; therefore, increases in the Mexican capital stock that result from liberalization are assumed to be owned by foreigners. The assumption of capital mobility between countries requires that the exchange rate remain fixed while the trade balance varies. Finally, employment is fixed and the aggregate real wage varies.

## Aggregate Results

Table 9 summarizes the main aggregate effects in each of the three versions. Mexican economic welfare is estimated to increase by 2.0 to 2.4 percent while aggregate Mexican employment is expected to increase by 5.1 to 5.8 percent. In general, the differences between the aggregate results of Versions 1 and 2 are not very large. The most significant difference between Versions 1 and 2 results from the variable trade-balance assumption: under Version 2, the trade balance changes by 5.6 percent.[49]

Version 3 shows significantly larger results than the other two versions. In particular, GDP increases by 8.0 percent under Version 3, while increasing by less than two percent under Versions 1 and 2. Given such an increase in GDP, a proportionate increase in welfare might be expected; yet this does not turn out to be the case. The modest increase in welfare under Version 3 results from the assumption that the capital endowment for Mexicans is fixed. Therefore, the income generated by the use of additional capital is received by foreigners rather than Mexicans.

## Sectoral Results

A NAFTA would lead to expanded production in all sectors except petroleum, which is a regulated industry. Exports increase in most sectors, especially to other countries in North America, and especially in sectors such as leather, wearing apparel, electrical machinery, and rubber. Changes in imports are smaller. Imports from North America generally increase while imports from the rest of the world decrease for some sectors, which suggests that trade diversion may occur in favor of North America. The sectoral effects for each of the individual versions are summarized below.

[49] The size of the change is not untenable, given that the average tariff level is higher in Mexico than in Canada and the United States.

**Table 8**
**Assumptions adopted in different versions of Sobarzo's model**

| Model Assumptions | Version 1 | Version 2 | Version 3 |
| --- | --- | --- | --- |
| Capital stock .................. | Fixed | Fixed | Variable |
| Exchange rate ................. | Variable | Fixed | Fixed |
| Trade balance ................. | Fixed | Variable | Variable |
| Real wage .................... | Fixed | Fixed | Variable |

Source: Sobarzo, USITC symposium, February 24-25, 1992.

**Table 9**
**Aggregate effects of trade liberalization in Mexico**

*(Percent changes)*

| Item | Version 1 | Version 2 | Version 3 |
|---|---|---|---|
| Welfare | 2.0 | 2.3 | 2.4 |
| GDP | 1.7 | 1.9 | 8.0 |
| Wage | 0.0 | 0.0 | 16.2 |
| Employment | 5.1 | 5.8 | 0.0 |
| Rate of profit | 6.2 | 6.6 | 0.0 |
| Trade balance | 0.0 | 5.6 | 18.3 |
| Trade balance (North America) | 0.0 | 7.1 | 18.9 |
| Trade balance (Rest of world) | 0.0 | 2.1 | 17.1 |
| Exchange rate (North America) | 3.0 | 0.0 | 0.0 |
| Exchange rate (Rest of world) | 0.3 | 0.0 | 0.0 |

Source: Sobarzo, USITC symposium, February 24-25, 1992.

## Versions 1 and 2

Under Version 1, production expands in all sectors except petroleum. Increases range from 0.1 to 5.3 percent, with the largest increases occurring for transport equipment, electrical machinery, and nonelectric machinery. All sectors demand more labor, especially the manufacturing sectors. The manufacturing sectors are most likely to realize economies of scale. Although the aggregate Mexican capital stock remains fixed, shifts between sectors do take place. Use of capital increases in 21 of the 27 sectors, while use of capital declines in mining, construction, electricity, and other services.

In Version 1, the increase in exports to North America is very strong; in fact, most sectors showed increases of greater than 10 percent. Exports to the rest of the world also increase in many sectors, although by a smaller magnitude. An important element explaining the increase in exports is the potential for realization of scale economies in export-oriented Mexican production. Imports from North America increase in all sectors but by smaller magnitudes than exports. The largest increases in North American imports occurred for agriculture, wearing apparel, and leather.

The sectoral results of Version 2 are very similar to Version 1. However, export changes are less pronounced in Version 2.

## Version 3

The sectoral effects under Version 3 are significantly different from those in 1 and 2. First, the expansion of output is larger, especially for sectors with higher capital-labor ratios. The maximum increase in output, 38.4 percent, occurred for construction. Other sectors with large increases in output are nonelectric machinery, iron and steel, and transport equipment.

In the factor markets, the allocation of resources is also different from Versions 1 and 2. The demand for

labor showed large intersectoral shifts, while capital rose by large magnitudes in all sectors. The largest increase in capital, which occurred for construction, was 52.8 percent.

Trade effects exhibited a similar pattern to those in Version 2, where the trade balance was also variable. In this case, however, the increase in exports was larger.

## Conclusions

While increasing returns and imperfect competition are not assumptions unique to Sobarzo's analysis, the importance of these two modeling features is a point that the author highlights. Aside from the theorist's preference for inclusion of increasing returns and imperfect competition, the empirical evidence strongly supports this approach. Previous research indicates that a large portion of the Mexican economy consists of imperfectly competitive industries with high levels of concentration.[50] Therefore, aside from the traditional gains from liberalization due to differences in factor endowments, there are significant additional efficiency gains resulting from the exploitation of scale economies. Under the NAFTA, a smaller number of Mexican firms would serve a larger market and use factors more efficiently.

In addition, Mexican capital inflows induced by a NAFTA are potentially of great importance. If capital is internationally mobile, the estimated increase in Mexican GDP more than quadruples when compared to estimates obtained under the assumption that Mexico's capital stock is fixed.

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[50] J. Casar, C. Marques, S. Marvan, G. Rodriguez, and J. Ros, La Organizaion Industrial en Mexico, Siglo XXI and ILET, Mexico City, Mexico, 1990. In general, Mexican industry can be characterized as imperfectly competitive with a few large firms producing the most sophisticated intermediate, capital, and durable goods. Usually, the less sophisticated the commodity, the larger the number of firms in the sector.

**12. Leslie Young and Jose Romero, "Steady Growth and Transition in a Dynamic Dual Model of the North American Free Trade Agreement"**

## Abstract

This paper presents an economy-wide analysis of Mexico. The authors apply the model to estimate the possible effects of the proposed NAFTA on Mexican GDP over a 10 year period. The Young and Romero analysis of a NAFTA improves on other such analyses in two ways. First, capital is separated into three sectors (buildings, machines, and vehicles). Second, producers examine possible future profits when choosing the amounts of capital to purchase.

These are important features for a country like Mexico that imports a lot of capital goods under significant tariffs. One important effect of a NAFTA may be to lower the tariff on capital goods, which would induce Mexican producers to increase their levels of investment, especially in those sectors that rely more heavily on capital goods. Increased investment would lead to higher output and, hence, to greater gains from trade liberalization over time, as additional investment accumulates into higher capital stocks. Analyses that are based on a single year and that do not distinguish between different types of capital will thus underestimate the gains in Mexican production induced by a NAFTA.

At real interest rates of 10 percent, the long-run effect of a NAFTA is a 2.6 percent increase in Mexican real GDP at world prices. These benefits are substantially higher if NAFTA reduces real interest rates; if the real interest rate falls to 7.5 percent, then real GDP increases by 8.1 percent in the long run. These estimated benefits of a NAFTA are higher than estimates from other single-period, economy-wide analyses.

## Technical Summary

### Introduction

A multiperiod CGE model of the Mexican economy is constructed in order to examine the long-run effects of a NAFTA on Mexican GDP. The motivation and departure point for the CGE model is a two-period theoretical model previously developed by the authors.[51] The theoretical model recognizes that there is a tradeoff between the use of current resources to produce for current consumption and the use of current resources to provide for future consumption by producing capital goods in the current period.

This framework is relevant to the Mexican economy and the NAFTA for two reasons. First, traded capital goods are subject to relatively high tariff protection in Mexico. Young and Romero report that tariffs on these items range from 16 to 20 percent. Second, real interest rates are high in Mexico. Both of these factors tend to increase the cost of capital to Mexican producers, acting like a tax on capital accumulation and having a cumulative effect over time in the form of a reduced level of output per worker and diminished levels of future consumption.

### Model

The CGE model has 12 sectors: three capital goods sectors (buildings, machines, and vehicles) and nine consumption/intermediate goods sectors (agriculture, mining, petroleum, food, textiles, chemicals, metals, services, and miscellaneous industries). The authors assume that Mexican products in each sector except buildings are perfect substitutes for foreign products in the sector. This necessitates the assumption that, in each sector, there are either imports or exports but not both (i.e., no cross-hauling). Since this assumption does not match conditions in Mexico, the authors work with a net trade model. Another implication of the perfect substitutes assumption is that domestic prices are equal to the world price plus the tariff. Consequently, domestic prices adjust fully to tariff reductions. This property sets the Young and Romero model apart from many other CGE models of the NAFTA and would be expected to contribute to larger impacts in their model.[52]

Since domestic prices in the model are determined by world prices and tariffs, Young and Romero can bypass explicit modeling of Mexican consumer behavior. Instead, the authors focus on developing a model of Mexican production which highlights the role of capital and intermediate goods. In what can be considered a first stage of production in each sector, a collection of the nine intermediate/consumption goods are combined into a composite intermediate good. Similarly, the three capital goods are combined into a composite capital good. In the second stage of production, labor, the composite intermediate good, and the composite capital good are combined to form the sector's output. The two processes of combining inputs to make the the composite capital good and the output good are represented by transcendental logarithmic unit cost functions. The process of combining inputs to make the composite intermediate good is represented by a Cobb-Douglas unit cost function. The cost functions are estimated

[51] See Leslie Young and Jose Romero, "International Investment and the Positive Theory of International Trade," Journal of International Economics 29, November 1990, pp. 333-49.

[52] A typical assumption in CGE models is that domestic products are imperfect substitutes for foreign products. This approach is described by Jaime de Melo and Sherman Robinson, "Product Differentiation and the Treatment of Foreign Trade in Computable General Equilibrium Models of Small Economies," Journal of International Economics 27, August 1989, pp. 47-67. Evidence of cross-hauling between Mexico and the United States can be found in Reinert et al. (1992).

econometrically by the authors before being incorporated into the CGE model.[53]

The model is solved in two stages. First, a steady-state growth path is established in which each sector's output, labor input, and capital input increases at a fixed rate corresponding to the population growth rate and in which relative product prices are constant. The steady-state growth path is calculated in both the presence and absence of a NAFTA so that the effects of a NAFTA on steady-state GDP can be isolated. In the second stage, the capital stocks for year 2002 are taken from the steady-state results and used in a model of the transition from 1991 to 2002. Given these terminal capital stocks, the initial capital stocks, and the population growth rate, the model is solved to trace its path from initial to terminal positions.

## Results

The model is run under two assumptions regarding real interest rates in Mexico. Under the first scenario, tariffs are eliminated and real interest rates in Mexico are held fixed at 10 percent. In the second scenario, tariffs are eliminated and real interest rates are assumed to fall to 7.5 percent as a result of a NAFTA. Comparison of the steady-state outcomes in the presence and absence of a NAFTA reveal that, in the first scenario, GDP increases by 2.6 percent as a result of a NAFTA. In the second scenario with lower real

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[53] A cost function gives the minimum cost of production given input prices, the level of output, and the production technology. The Cobb-Douglas cost function is given in Hal R. Varian, Microeconomic Analysis, New York: W.W. Norton & Company, Inc., 1984, pp. 28-29. The transcendental logarithmic cost function is also given in Varian, p. 181.

interest rates, GDP increases by 8.1 percent as a result of a NAFTA. With regard to the transition from initial to terminal states, the results indicate that the drop in real interest rates from 10 to 7.5 percent causes substantial increases in GDP in all but the first period.

## Conclusions

Most CGE models of a NAFTA only address what are known as the *static* gains, which would occur in the base period if everything were held constant except for the removal of import restraints called for by a NAFTA. The Young and Romero model addresses the *dynamic* gains for Mexico of a NAFTA, which occur over time as a result of increased investment by Mexican firms that face lower capital costs due to tariff reductions on imported capital and intermediate goods, lowered real interest rates, and increased opportunities to supply Canadian and U.S. markets.

The Young and Romero model has some limitations. Most notable are its single-country framework and its assumption of perfect substitution between domestic and foreign goods, with its consequent net trade focus. The former characteristic probably leads it to underestimate somewhat the gains from a NAFTA, while the latter characteristic probably leads it to overestimate the gains from a NAFTA by exaggerating the effects of tariff reductions on domestic prices. Nevertheless, the model alerts the policy maker to some important dynamic processes that are likely to occur in Mexico. The dynamic GDP effects of a NAFTA for Mexico are also relevant to the United States due to the fact that Mexicans obtain approximately 70 percent of their total imports from the United States. Increases in Mexican GDP will translate into increased imports into Mexico from the United States.

# APPENDIX A
# REQUEST LETTER

'91 AUG -6 P5:04

The Honorable Anne E. Brunsdale
Acting Chairman
U.S. International Trade Commission
500 E Street, S.W.
Washington, D.C. 20436

DOCKET NUMBER

JUL 24 1991

_1637_

Office of the
Secretary
Int'l Trade Commission

Dear Madam Chairman:

We have entered into trilateral negotiations with Mexico and
Canada, the goal of which is to conclude a North American free
trade agreement (NAFTA). There has been great interest in the
scope and implications of such an agreement, and new and numerous
issues have been raised in the ongoing public debate on the
likely economic impact and benefits of a NAFTA, or alternatively,
a free trade agreement (FTA) with Mexico.

To properly assess the issues raised regarding such agreements,
it is essential that the Administration have a better
understanding of recent economic research involving economy-wide
analysis of a NAFTA or an FTA with Mexico, its implications, and
its relevance. To assist us in this matter, under authority
delegated by the President and pursuant to section 332 (g) of the
Tariff Act of 1930, as amended, I request that the Commission
institute an investigation for the purpose of providing a
critical report on the major findings of economy-wide modeling of
the economic implications of an FTA with Mexico and a NAFTA with
Mexico and Canada.

The Commission's investigation should be confined to studies
recently completed or currently being developed that meet
recognized academic standards for state of the art economy-wide
policy modelling. Economy-wide models allow for explicit
analysis of the complex interactions inherent in comprehensive
economic policy changes, such as free trade agreements, even when
the focus of such analysis is on sectoral issues. Most economy-
wide models recently completed or currently being developed in
the analysis of a NAFTA or an FTA take into account the effects
on the following factors in the U.S. economy in general and in
major economic sectors: production, income, trade, employment,
and price effects. Additional work has also concentrated on the
effects on investment flows, immigration, and specific regions of
the United States. An objective summary and critical assessment

A-2

of these findings would be a valuable contribution to the public understanding of a NAFTA and an FTA.

In conducting this investigation, I request that the Commission arrange a public symposium in which economic researchers using economy-wide models would be invited to present their findings on the economic impact and benefits of a NAFTA and an FTA. Such economic experts would be drawn from academic and private research institutions and government research facilities in Canada, Mexico, and the United States. Through this process we wish to demonstrate the serious commitment of the Administration to consider all qualified research results pertaining to valid arguments raised by all parties involved in the current policy debate. To promote a proper understanding and assessment of the general merits of such analyses, it is important that all papers presented in the symposium be transparent about the technical methods employed to obtain the results presented and are required to provide technical details about the methods and data employed to obtain those results.

To promote an objective critical assessment of this research, economic researchers recognized as experts in their fields should be invited to provide a critical assessment of the merits and shortcomings of the methods and data employed in the research. For balance, there should be a minimum of two such critiques for each invited paper submitted in the symposium.

I would envisage a report on this investigation consisting of three parts: (1) a compilation of the technical papers as submitted in the symposium, together with any revisions or comments the authors may make in response to the critiques received in the symposium, (2) a compilation of the technical critiques of those papers, and (3) a concise summary and overview by the Commission of the results of the papers.

Although the research papers presented will likely be of a technical nature, the Commission's summary would address a broader, non-technical audience. The summary should focus on the major economic findings of the research presented, as well as on any underlying patterns suggested by the body of research results. It should identify areas of broad consensus as well as areas of differences. Such a summary will be invaluable to the Administration in assessing the issues raised in the ongoing public debate on the likely impact and benefits of a NAFTA and an FTA with Mexico.

We expect our negotiations to proceed expeditiously. I therefore request that the symposium be held as early as possible this fall so that we may gain insight from the analytical work during the negotiating process. I recognize that the papers presented in the symposium will likely not be in their final form and that the authors may want to incorporate points raised in the symposium in

their final versions. I request that the Commission inform me of the earliest date for the release of a final report on this investigation, reflecting any revisions to the papers presented.

In view of the outstanding instruction to the Commission on the security classification of reports prepared by the Commission at the request of the U.S. Trade Representative, I request that all reports on this investigation be made available to the public at the same time they are submitted to my office.

The Commission's assistance in this matter is greatly appreciated.

Sincerely,

Carla A. Hills

**APPENDIX B**
**FEDERAL REGISTER NOTICES**

## 3. Public comments

The meeting will be open to the public. Any member of the public may file with the Commission a written statement concerning the matters to be discussed. Persons wishing further information concerning this meeting, or who wish to submit written statements, may contact Thomas O. Hobbs, Superintendent, C&O Canal National Historical Park, P.O. Box 4, Sharpsburg, Maryland 21782.

Minutes of the meeting will be available for public inspection six (6) weeks after the meeting at Park Headquarters, Sharpsburg, Maryland.

Dated: November 21, 1991.

**Ronald N. Wrye,**

*Acting, Regional Director,*

*National Capital Region*

[FR Doc. 91–28550 Filed 11–27–91; 8:45 am]

**BILLING CODE 4310-70-M**

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## National Register of Historic Places; Notification of Pending Nominations

Nominations for the following properties being considered for listing in the National Register were received by the National Park Service before November 16, 1991. Pursuant to § 60.13 of 36 CFR part 60 written comments concerning the significance of these properties under the National Register criteria for evaluation may be forwarded to the National Register, National Park Service, P.O. Box 37127, Washington, DC 20013–7127. Written comments should be submitted by December 16, 1991.

**Carol D. Shull,**

*Chief of Registration, National Register.*

### CONNECTICUT

**Hartford County**

*Treadway, Townsend G., House,* 100 Oakland St., Bristol, 91001871

### IDAHO

**Caribou County**

*Largilliere, Edgar Walter Sr., House,* 30 West Second South St., Soda Springs, 91001870

### INDIANA

**Bartholomew County**

*Hope Historic District,* Roughly bounded by Haw Cr., Grand St., Walnut St. and South St., Hope, 91001864

**Hamilton County**

*Noblesville Commercial Historic District,* Roughly bounded by Clinton, 10th, Maple and 8th Sts., Noblesville, 91001862

*Potter's Covered Bridge,* Allisonville Rd. across the White R., Noblesville vicinity, 91001866

**Henry County**

*New Castle Commercial Historical District,* Roughly bounded by Fleming and 11 Sts.,

Central Ave. and the Norfolk & Western RR tracks, New Castle, 91001868

**Jackson County**

*First Presbyterian Church,* 301 N. Walnut St., Seymour, 91001867

**Johnson County**

*Masonic Temple,* 135 N. Main St., Franklin, 91001863

**Kosciusko County**

*Zimmer, Justin, House,* 2513 E. Center St., Warsaw, 91001865

### NEW YORK

**Dutchess County**

*Bloomvale Historic District,* Jct. of NY 82, Co. Rd. 13 and E. Branch Wappingers Cr., Pleasant Valley and Washington Townships, Salt Point vicinity, 91001874

*Bykenhulle,* 21 Bykenhulle Rd., Hopewell Junction vicinity, 91001872

**Westchester County**

*Hastings Prototype House,* 546 Farragut Pkwy., Hastings-on-Hudson, 91001873

### NORTH CAROLINA

**Moore County**

*Southern Pines Historic Districts,* Bounded by Saylor St., New Jersey Ave., Illinois Ave. and Massachusetts Ave. Ext., Southern Pines, 91001875

### WISCONSIN

**Richland County**

*Syttende Mai Site,* Address Restricted, Richland vicinity, 91001869

[FR Doc. 91–28637 Filed 11–27–91; 8:45 am]

**BILLING CODE 4310-70-M**

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## INTERNATIONAL TRADE COMMISSION

[Investigation No. 332–317]

### Economy-Wide Modeling of the Economic Implications of a FTA With Mexico and a NAFTA With Canada and Mexico

**AGENCY:** United States International Trade Commission.

**ACTION:** Institution of investigation, call for papers, scheduling of symposium, and hearing notification.

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**SUMMARY:** Following receipt on July 24, 1991 of a request from the U.S. Trade Representative (USTR), the Commission instituted investigation No. 332–317, Economy-Wide Modeling of the Economic Implications of a FTA with Mexico and a NAFTA with Canada and Mexico, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)). As requested, the investigation will seek to provide an objective critical report based on a symposium to be held by the Commission, on the technical merits and

major findings of economy-wide modeling of the economic implications of a FTA with Mexico and a NAFTA with Mexico and Canada. Particular emphasis will be placed on the technical merits of the analyses. The Commission will confine the investigation to studies that are already underway or have been recently completed. The Commission will offer the opportunity for all economic researchers using economy-wide models to present their findings on the economic impact and benefits of a FTA with Mexico or a NAFTA with Canada and Mexico at the symposium. To promote an objective, critical assessment of this research, economic researchers recognized as experts in their fields will also be contracted with to provide a critical assessment of the technical merits and shortcomings of the methods and data employed in the research. A preliminary report, containing the papers to be discussed at the symposium, will be issued prior to the symposium. The final report will be submitted to USTR approximately three months after the symposium. The final report will consist of: (1) A compilation of the technical papers as submitted in the symposium, together with any revisions or comments the authors may make in response to the critiques received in the symposium; (2) a compilation of the technical critiques of those papers; and (3) a critical summary and overview of the results of the papers.

**EFFECTIVE DATE:** October 28, 1991.

**CALL FOR PAPERS:** The Commission encourages all parties currently engaged in economy-wide modeling of the economic effects of a NAFTA to present their work at the symposium. The purpose of the symposium is to examine critically, through peer review by recognized experts, studies recently completed or currently being developed that meet recognized academic standards for state of the art economy-wide policy modelling. Papers presented at the symposium must meet the following criteria:

(1) The research described in the papers must be economy-wide in scope. Economy-wide models include all sectors of the economy, though with varying degrees of disaggregation, and allow for explicit analysis of the complex interactions inherent in comprehensive economic policy changes, such as free trade agreements, even when the focus of such analysis is on a particular sector. Research within the scope of this investigation includes both (i) computable general equilibrium (CGE) trade policy modelling; and (ii)

economy-wide, multi-sector macroeconomic models. The research should take into account the effects of a NAFTA or FTA with Mexico on production, income, trade, employment, and prices.

(2) The papers must be transparent about technical methods employed to obtain the results presented. Papers must provide technical details about the methods employed and data employed to obtain results. This requirement is critical because the purpose of the symposium is to submit the methods and data to peer review.

Because scheduling will be tight, parties interested in presenting papers or participating as discussants should submit a curriculum vitae and description of the relevant research to Joseph Francois (202-205-3223) or Clinton Shiells (202-205-3223), Research Division, Office of Economics, U.S. International Trade Commission, before December 20, 1991. Funding has been made available for reimbursement of travel expenses and per diem, contingent on demonstrated need.

Discussants will be contracted with to provide detailed, written critiques of the papers reviewed. Papers must meet recognized academic standards for state of the art economy-wide policy modelling. It is also required that all papers be technically transparent, and provide technical details about the methods and data employed to obtain results. The final scheduling of papers and discussants will be made by Commission staff and will be published in a subsequent Federal Register notice. All papers must be provided to the Commission in a form ready for distribution 45 days prior to the symposium, and must meet the criteria outlined above.

**SYMPOSIUM:** The symposium will be held on February 24 and 25, 1992, at the U.S. International Trade Commission, 500 E Street, SW., Washington, DC. Members of the public may attend the symposium and there will be an opportunity for brief technical comments on the papers from the audience.

**PUBLIC HEARING:** Following the symposium, the Commission will hold a public hearing. The hearing will be held approximately 30 days after the symposium. The hearing date will be published in the Federal Register notice. The hearing will be held at the U.S. International Trade Commission, 500 E Street, SW., Washington, DC. The symposium is meant to provide a technical assessment of economy-wide modelling of a NAFTA or FTA with Mexico. The purpose of the hearing is to allow the public and discussants

additional opportunity to provide technical comments on the papers that have been discussed at the symposium. These papers will be contained in a preliminary report to be issued by the Commission prior to the symposium. Public submissions on the papers contained in the preliminary report should be received prior to the hearing.

**FOR FURTHER INFORMATION CONTACT:** Edward Carroll (202-205-1819), Office of Public Affairs, U.S. International Trade Commission.

Hearing impaired person may obtain information on this investigation by contacting the Commission's TDD terminal on (202-205-1810).

Issued: November 20, 1991.

By order of the Commission.

**Edward G. Carroll,**
*Acting Secretary.*

[FR Doc. 91-28535 Filed 11-27-91; 8:45 am]

**BILLING CODE 7020-02-M**

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**[332-316]**

**Shipbuilding Trade Reform Act of 1991; Likely Economic Effects of Enactment**

**AGENCY:** United States International Trade Commission.

**ACTION:** Institution of investigation and scheduling of public hearing.

**EFFECTIVE DATE:** November 19, 1991.

**FOR FURTHER INFORMATION CONTACT:** Ms. Kathleen Lahey, Office of Industries (202-205-3409), or Mr. Gerald Berg, Office of Economics (202-205-3233), U.S. International Trade Commission, Washington, DC 20436.

**Background and Scope of Investigation**

On November 19, 1991, the Commission instituted investigation No. 332-316, following receipt on October 30, 1991, of a request from the Committee on Ways and Means of the U.S. House of Representatives for an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) concerning the likely economic effects of enactment of H.R. 2056, the Shipbuilding Trade and Reform Act of 1991, as amended by the Committee on Ways and Means.

As requested by the Committee, the Commission will seek to provide in its report:

(1) An overview of the issues being addressed in the OECD shipbuilding negotiations, and a comparison of the differences between the approach being taken in the negotiations and the approach of H.R. 2056, as amended;

(2) An overview of conditions in the U.S. shipbuilding and repair industry, including an assessment of government

assistance provided, either directly or indirectly, to this industry under U.S. law;

(3) An overview of conditions in the U.S. carrier industry, including an assessment of government assistance provided, either directly or indirectly, to this industry under U.S. law; and

(4) An evaluation and comparison of the likely economic effects of H.R. 2056, as amended, with the likely economic effects of an international agreement to eliminate unfair trading practices (modeled after the current OECD discussions), on those sectors affected by the elimination of unfair trading practices in shipbuilding, including the shipbuilding and repair industry, the carrier industry, U.S. ports, and U.S. exporters and importers.

As requested by the Committee, the Commission intends to submit its report no later than April 27, 1992.

**Public Hearing**

A public hearing in connection with this investigation will be held in the Commission Hearing Room, 500 E Street, SW, Washington, DC 20436, beginning at 9:30 a.m. on January 24, 1992. All persons will have the right to appear by counsel or in person, to present testimony, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade commission, 500 E Street, SW., Washington, DC, 20436, no later than noon, January 6, 1992. Persons testifying at the hearing are encouraged to file prehearing briefs or statements; the deadline for filing such briefs or statements (a signed original and 14 copies) is January 6, 1992; and the deadline for filing posthearing briefs or statements is February 4, 1992. Any confidential business information included in such briefs or statements must be filed in accordance with the procedures outlined in the next paragraph.

**Written Submissions**

In lieu of or in addition to participating in the hearing, interested persons are invited to submit written statements concerning the matters to be addressed in the report. Commercial or financial information that a party desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. (Generally, submission of separate confidential and public versions of the submission would be appropriate.) All submissions requesting confidential treatment must conform with the requirements of § 201.6

) the Superintendent. Cape Cod
lational Seashore. Headquarters
uilding. Marconi Station. South
Vellfleet. Massachusetts 02663. during
ıe public review period from February
1. 1992 through March 15. 1992. A
ublic meeting to discuss the
ssessment alternatives will be held on
hursday. March 5. 1992 in
rovincetown. Massachusetts (time and
te location to be announced in local
edia).

Limited copies of the document are
/ailable to the public upon request by
riting to the above address or calling
n Killian at (508) 349–3785. Full size
awings of Alternatives 3 and 4 are
so available at the Park Headquarters.

Dated February 5. 1992.

**iven H. Lewis.**

*:ting Regional Director.*

ℜ Doc. 92–3321 Filed 2–11–92: 8:45 am|

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**iENCY FOR INTERNATIONAL
:VELOPMENT**

**ıblic Information Collection
ıquirements Submitted to OMB for
·view**

ſhe Agency of International
velopment (A.I.D) submitted the
lowing public information collection
ıuirements to OMB for review and
arance under the Paperwork
juction Act of 1980. Public Law 96–
.. Comments regarding these
ɔrmation collections should be
ıressed to the OMB reviewer listed at
end of the entry no later than ten
ıs after publication. Comments may
ɔ be addressed to. and copies of the
missions obtained from the Reports
nagement Officer. Fred D. Allen.
)) 875–1573. FA/AS/ISS, room 1209B.
-14. Washington. DC 20523–1413.

ɪote *Submitted:* January 31. 1992.
*ubmitting Agency:* Agency for
:rnational Development.
ɪMB *Number:* None Assigned.
orm *Number:* None Assigned.
ɪype *of Submission:* New Collection.
*itle:* The Microenterprise Monitoring
ıem Project (MEMS).
*urpose:* The Agency for International
elopment (A.I.D.) provides funds to
ous organizations worldwide to
y out activities in support of
ɔentrepreneurs. These activities
; from the provision of technical
tance to the creation of credit
;rams for the very poor. As a part of
ılation A.I.D. has been directed to
rt annually to the Congress on its
ɔenterprise program. It has also

been instructed to implement a
monitoring system which will enable the
Agency to provide very detailed data on
the outputs and beneficiaries of the
microenterprise programs.

*Annual Reporting Burden*
Respondents: 485; annual responses: 1;
average hours per response: 21.1; burden
hours: 10.290.

*Reviewer:* Lin Liu (202) 395–7340.
Office of Management and Budget. room
3208. New Executive Office Building.
Washington. DC 20503.

Dated: February 3. 1992.

**Elizabeth Baltimore.**

*Information Support Services Division.*

[FR Doc. 92–3233 Filed 2–11–92: 8:45 am|

**ᴮɪʟʟɪɴɢ ᴄᴏᴅᴇ 6116-01-ᴍ**

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## Notice of Meeting

Pursuant to the Federal Advisory
Committee Act. notice is hereby given of
a meeting of the Advisory Committee on
Voluntary Foreign Aid (ACVFA)
Tuesday. February 25. 1992 and
Wednesday. February 26. 1992.

Date: February 25. 1992. (9 a.m. to 5
p.m.); February 26. 1992. (9 a.m. to 1
p.m.).

Place: State Department.

The purpose of the meeting will be to
focus on the dramatic changes occurring
in the former Soviet Union and the
evolving A.I.D./PVO role that these
changes suggest. The two-day meeting
will revolve around discussions of two
broad issues: the operational challenges
which PVOs face in the region; and. the
move from emergency humanitarian
relief efforts to long range technical
assistance development programs.

The meeting is free and open to the
public. However. notification by
February 20. 1992. through the Advisory
Committee Headquarters is required.

Persons wishing to attend the meeting
must call Theresa Graham or Susan
Saragi (703) 351–0203. or facsimile (703)
351–0212. Persons attending must
include their name. organization. birth
date and social security number for
security purposes.

Dated: January 30. 1992.

**Sally H. Montgomery.**

*Deputy Assistant Administrator. Private and
Voluntary Cooperation. Food and
Humanitarian Assistance.*

[FR Doc. 92–3234 Filed 2–11–92: 8:45 am|

**ᴮɪʟʟɪɴɢ ᴄᴏᴅᴇ 6116-01-ᴍ**

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## INTERNATIONAL TRADE COMMISSION

[Investigation No. 332-317]

**Economy-Wide Modeling of the
Economic Implications of a FTA With
Mexico and a NAFTA With Canada and
Mexico**

**AGENCY:** United States International
Trade Commission.

**ACTION:** Date of public hearing.

**SUMMARY:** The public hearing in
connection with this investigation will
be held in the Commission Hearing
Room. 500 E Street. SW.. Washington.
DC. beginning at 9:30 a.m. on March 26.
1992. All persons with an interest in the
investigation have the right to appear in
person or by counsel. to present
information. and to be heard. Persons
wishing to appear at the hearing should
file prehearing briefs or statements
(original and 14 copies) with the
Secretary. United States International
Trade Commission. 500 E Street. SW..
Washington. DC. not later than the close
of business on March 12. 1992. Any
posthearing briefs or statements must be
filed by April 9. 1992.

The hearing is being held as a
followup to a symposium on the
technical merits and major findings of
economy-wide modeling of the
economic implications of a FTA with
Mexico and a NAFTA with Mexico and
Canada. The symposium is scheduled
for February 24–25. also at the
Commission in Washington. The
purpose of the hearing is to allow the
public and discussants additional
opportunity to provide technical
comments on the papers that were to
have been discussed at the symposium.
These papers will be contained in a
preliminary report to be issued by the
Commission on February 10. 1992. The
preliminary report can be obtained by
contacting William Bishop (202–205–
1806). Office of the Secretary. U.S.
International Trade Commission.

As stated in the Commission's notice
of investigation. which was published in
the Federal Register of November 29.
1991 (56 FR 61048). the investigation is
being conducted under section 332(g) of
the Tariff Act of 1930 (19 U.S.C. 1332(g))
pursuant to a request received on July
24. 1991. from the U.S. Trade
Representative. In that notice the
Commission issued a call for papers.
The Commission has now selected the
papers to be presented and. as indicated
above. these papers will be made
available in a preliminary report to be
issued by the Commission prior to the
symposium.

**EFFECTIVE DATE:** February 4, 1992.

**FOR FURTHER INFORMATION CONTACT:**
Edward Carroll (202-205-1819), Office of Public Affairs, U.S. International Trade Commission. Hearing impaired persons can obtain information on this study by contacting the Commission's TDD terminal on (202-205-1810).

Issued: February 7, 1992.

By Order of the Commission.

Kenneth R. Mason,
*Secretary.*
[FR Doc. 92-3360 Filed 2-11-92; 8:45 am].
BILLING CODE 7020-02-M

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[Investigation No. 337-TA-331]

**Certain Microcomputer Memory Controllers, Components Thereof and Products Containing Same; Commission Determination Not To Review an Initial Determination Granting in Part Complainant's Motion for Summary Determination on the Issue of Domestic Industry**

**AGENCY:** U.S. International Trade Commission.

**ACTION:** Notice.

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**SUMMARY:** Notice is hereby given that the U.S. International Trade Commission has determined not to review an initial determination (ID) issued by the presiding administrative law judge (ALJ) granting in part complainant's motion for summary determination on the existence of a domestic industry in the above-captioned investigation.

**ADDRESSES:** Copies of the ID and all other nonconfidential documents filed in connection with this investigation are available for public inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, SW., Washington, DC 20436, telephone 202-205-2000.

**FOR FURTHER INFORMATION CONTACT:**
Daniel Hopen, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, DC 20436, telephone 202-205-3108.

Hearing-impaired individuals are advised that information about this matter can be obtained by contacting the Commission's TDD terminal, 202-205-1810.

**SUPPLEMENTARY INFORMATION:** On November 19, 1991, complainant Chips and Technologies, Inc. filed a motion for summary determination on the issue of the existence of a domestic industry. The motion was opposed by respondents Sun Electronics

Corporation, OPTi Computer, Inc., ETEQ Microsystems, Inc., and Elite Microelectronics, Inc. The Commission investigative attorney filed a response in support of a partial summary determination. On January 9, 1992, the presiding ALJ issued an ID granting the motion in part. The ALJ determined that, assuming complainant is selling products that in fact practice each of the patent claims in issue, there is substantial exploitation of the patents in issue and an industry exists in the United States as to each patent claim. No petitions for review were received.

This action is taken under the authority of section 337 of the Tariff act of 1930 (19 U.S.C. 1337) and section 210.53 of the Commission's Interim Rules of Practice and Procedure (19 CFR 210.53).

Issued: February 5, 1992.

By order of the Commission.

Kenneth R. Mason,
*Secretary.*
[FR Doc. 92-3358 Filed 2-11-92; 8:45 am]
BILLING CODE 7020-02-M

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[Investigation No. 337-TA-333]

**Certain Woodworking Accessories; Change of Commission Investigative Attorney**

Notice is hereby given that, as of this date, James M. Gould, Esq., of the Office of Unfair Import Investigations is designated as the Commission investigative attorney in the above-cited investigation instead of James M. Gould, Esq. and Gabrielle Siman, Esq.

The Secretary is requested to publish this Notice in the Federal Register.

Dated: February 3, 1992.

Respectfully submitted,

Lynn I. Levine,
*Director, Office of Unfair Import Investigations, 500 E Street SW., Washington, DC 20436.*
[FR Doc. 92-3359 Filed 2-11-92; 8:45 am]
BILLING CODE 7020-02-M

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**DEPARTMENT OF JUSTICE**

**Lodging of Consent Decrees Pursuant to the Clean Air Act**

In accordance with Departmental policy, 28 CFR 50.7, notice is hereby given that on January 29, 1992 a proposed Consent Decree in *United States v. Gary Hodges d/b/a Blue Ridge Exhaust* (W.D. Va.), Civil Action No. 89-0936(R), was lodged with the United States District Court for the Western District of Virginia. The proposed Consent Decree (the "Decree") concerns

violations of section 203(a)(3) of the Clean Air Act, 42 U.S.C. 7522(a)(3), with respect to Defendant's provision of nonfunctioning, empty catalytic converter shells to an automotive repair facility which installed the shells on automobiles in place of functioning catalytic converters that are designed to control automobile emissions. The Decree requires Defendant to comply with section 203(a)(3) of the Clean Air Act, to refrain from supplying automotive shops with empty catalytic converter shells, and to pay a $10,000.00 civil penalty.

The Department of Justice will receive comments relating to the proposed Decree for a period of thirty (30) days from the date of this publication. Comments should be addressed to the Assistant Attorney General of the Environment and Natural Resources Division, Department of Justice, Washington, DC 20530, and should refer to *United States v. Gary Hodges d/b/a Blue Ridge Exhaust,* D.J. No. 90-5-2-1-1421.

The proposed Decree may be examined at the office of the United States Attorney for the Western District of Virginia, Poff Federal Building, room 456, 210 Franklin Road, SW., Roanoke, Virginia 24011. The proposed Decree may also be examined at the Environmental Enforcement Section Document Center, 1333 F Street, NW., suite 600, Washington, DC 20004, 202-347-7829. A copy of the proposed Decree may be obtained in person or by mail from the Document Center. In requesting a copy, please enclose a check payable to Consent Decree Library in the amount of $2.00 (25 cents per page reproduction costs).

John C. Cruden,
*Chief, Environmental Enforcement Section.*

**Consent Decree**

*Whereas,* Plaintiff, the United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a Complaint in this matter against Defendant Gary Hodges doing business as Blue Ridge Exhaust (Gary Hodges and Blue Ridge Exhaust are collectively referred to hereinafter as "Hodges"), a used automotive parts salvage dealer located at Route 2, Galax, Virginia, seeking civil penalties for alleged violations of section 203(a)(3)(B) of the Clean Air Act (the "Act"), 42 U.S.C. 7522(a)(3)(B), which prohibits tampering and causing tampering with automobile emissions control devices; and

*Whereas,* Hodges was served with the United States' Complaint and, on July

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# INTERNATIONAL TRADE COMMISSION

**[Investigation No. 701-TA-312 (Final)]**

## Softwood Lumber From Canada

**AGENCY:** United States International Trade Commission

**ACTION:** Institution and scheduling of a final countervailing duty investigation.

**SUMMARY:** The Commission hereby gives notice of the institution of final countervailing duty investigation No. 701-TA-312 (Final) under section 705(b) of the Tariff Act of 1930 (19 U.S.C. 1671d(b)) (the act) to determine whether an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Canada of softwood lumber, [1] provided for in subheadings 4407.10.00, 4409.10.10, 4409.10.20, and 4409.10.90 of the Harmonized Tariff Schedule of the United States (HTS).

For further information concerning the conduct of this investigation, hearing procedures, and rules of general application, consult the Commission's Rules of Practice and Procedure, part 201, subparts A through E (19 CFR part 201), and part 207, subparts A and C (19 CFR part 207).

**EFFECTIVE DATE:** March 6, 1992.

**FOR FURTHER INFORMATION CONTACT:** Jim McClure (202-205-3191). Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired persons can obtain information on this matter by contacting the Commission's TD terminal on 202-205-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-205-2000.

**SUPPLEMENTARY INFORMATION:**

*Background:* This invesitgation is being instituted as a result of an affirmative preliminary determination

by the Department of Commerce that certain benefits which constitute subsidies within the meaning of section 703 of the act (19 U.S.C. 1671b) are being provided to manufacturers, producers, or exporters in Canada of softwood lumber. The investigation was self-initiated on October 31, 1991, by the U.S. Department of Commerce.

*Participation in the investigation and Public service list:* Persons wishing to participate in the investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in § 201.11 of the Commission's rules, not later than twenty-one (21) days after publication of this notice in the Federal Register. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to this investigation upon the expiration of the period for filing entries of appearance.

*Limited disclosure of business proprietary information (BPI) under an administrative protective order (APO) and BPI service list:* Pursuant to § 207.7(a) of the Commission's rules, the Secretary will make BPI gathered in this final investigation available to authorized applicants under the APO issued in the investigation, provided that the application is made not later than twenty-one (21) days after the publication of this notice in the Federal Register. A separate service list will be maintained by the Secretary for those parties authorized to receive BPI under the APO.

*Staff report:* The prehearing staff report in this investigation will be placed in the nonpublic record on May 11, 1992, and a public version will be issued thereafter, pursuant to § 207.21 of the Commission's rules.

*Hearing:* The Commission will hold a hearing in connection with this investigation beginning at 9:30 a.m. on May 28, 1992, at the U.S. International Trade Commission Building. Requests to appear at the hearing should be filed in writing with the Secretary to the Commission on or before May 15, 1992. A nonparty who has testimony that may aid the Commission's deliberations may request permission to present a short statement at the hearing. All parties and nonparties desiring to appear at the hearing and make oral presentations should attend a prehearing conference to be held at 9:30 a.m. on May 20, 1992, at the U.S. International Trade Commission Building. Oral testimony and written materials to be submitted at the public hearing are governed by §§ 201.6(b)(2), 201.13(f), and 207.23(b) of the Commission's rules.

*Written submissions:* Each party is encouraged to submit a prehearing brief to the Commission. Prehearing briefs must conform with the provisions of § 207.22 of the Commission's rules; the deadline for filing is May 21, 1992. Parties may also file written testimony in connection with their presentation at the hearing, as provided in § 207.23(b) of the Commission's rules, and posthearing briefs, which must conform with the provisions of § 207.24 of the Commission's rules. The deadline for filing posthearing briefs in June 5, 1992; witness testimony must be filed no later than three (3) days before the hearing. In addition, any person who has not entered an appearance as a party to the investigation may submit a written statement of information pertinent to the subject of the investigation on or before June 5, 1992. All written submissions must conform with the provisions of § 201.8 of the Commission's rules; any submissions that contain BPI must also conform with the requirements of §§ 201.6, 207.3, and 207.7 of the Commission's rules.

In accordance with §§ 201.16(c) and 207.3 of the rules, each document filed by a party to the investigation must be served on all other parties to the investigation (as identified by either the public or BPI service list), and a certificate of service must be timely filed. The Secretary will not accept a document for filing without a certificate of service.

**Authority:** This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.20 of the Commission's rules.

By order of the Commission.

Issued: March 20, 1992.

**Stephen McLaughlin,**
*Acting Secretary.*

[FR Doc. 92-6945 Filed 3-25-92; 8:45 am]

**BILLING CODE 7020-02-M**

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**[Investigation No. 332-317]**

## Economy-Wide Modeling of the Economic Implications of a FTA With Mexico and a NAFTA With Canada and Mexico; Hearing

**AGENCY:** United States International Trade Commission.

**ACTION:** Cancellation of hearing.

**SUMMARY:** On October 28, 1991, following receipt of a request from the U.S. Trade Representative (USTR), the Commission instituted Investigation No. 332-317, under section 332(g) of the

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[1] For purposes of this investigation, "softwood lumber" means coniferous wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6 mm, provided for in subheading 4407.10.00 of the HTS; and coniferous wood siding, flooring and other goods (except coniferous wood moldings and wood dowel rods; but including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated [rabbeted], chamfered, V-jointed, beaded, molded, rounded or the like) along any of its edges or faces, whether or not planed, sanded or finger-jointed, provided for in HTS subheadings 4409.10.10, 4409.10.20 and 4409.10.90.

Tariff Act of 1930. On February 4, 1992. the Commission scheduled a public hearing in connection therewith for March 26, 1992. On March 17, 1992, the Commission received notice of withdrawal from the only scheduled witness for the hearing scheduled for March 26, 1992. Therefore, the public hearing in connection with this investigation (scheduled to be held beginning at 9:30 a.m. on March 26, 1992, at the U.S. International Trade Commission Building, 500 E Street. SW., Washington DC), is cancelled.

**EFFECTIVE DATE:** March 20, 1992.

**FOR FURTHER INFORMATION CONTACT:** Edward Carroll (202-205-1819), Office of Public Affairs. U.S. International Trade Commission. Hearing impaired persons can obtain information on this study by contacting the Commission's TDD terminal on (202-205-1810).

By order of the Commission.

Dated: March 24, 1992.

Kenneth R. Mason,
*Secretary.*

[FR Doc. 92-7160 Filed 3-25-92: 8:45 am]
**BILLING CODE 7020-02-M**

## INTERSTATE COMMERCE COMMISSION

**[Finance Docket No. 32016]**

## Sioux & Western Railroad Co.— Construction Exemption—Charles County, Mo; Notice

**AGENCY:** Interstate Commerce Commission.
**ACTION:** Notice of exemption.

**SUMMARY:** Pursuant to 49 U.S.C. 10505, the Interstate Commerce Commission conditionally exempts from the prior approval requirements of 49 U.S.C. 10901 the construction by the Sioux & Western Railroad Company of approximately 2 miles of rail line between the Sioux Plant and a Union Pacific Railroad Company line in Charles County, MO.

**DATES:** The exemption will not become effective until the environmental process is completed. At that time, the Commission will issue a further decision addressing the environmental matters and establishing an effective date for the exemption, if appropriate. Petitions to reopen must be filed by April 15, 1992.

**ADDRESSES:** Send pleadings referring to Finance Docket No. 32016 to:

(1) Office of the Secretary. Case Control Branch, Interstate Commerce Commission. Washington, DC 20423.
(2) Petitioner's representative: John R. Molm. Esquire. Troutman, Sanders, Lockerman and Ashmore. 1400 Candler Building. 127 Peachtree Street, NE., Atlanta, GA 30303.

**FOR FURTHER INFORMATION CONTACT:** Joseph H. Dettmar. (202) 927-5660. (TDD for hearing impaired: (202) 927-5712.

**SUPPLEMENTARY INFORMATION:** Additional information is contained in the Commission's decision. To purchase a copy of the full decision. write to, call, or pick up in person from: Dynamic Concepts, Inc., room 2229, Interstate Commerce Commission Building. Washington. DC 20423. Telephone: (202) 289-4357/4359. (Assistance for the hearing impaired is available through TDD services (202) 927-5721.)

Decided: March 11, 1992.

By the Commission. Chairman Philbin, Vice Chairman McDonald. Commissioners Simmons. Phillips, and Emmett.

Sidney L. Strickland, Jr.,
*Secretary.*

[FR Doc. 92-7017 Filed 3-25-92: 8:45 am]
**BILLING CODE 7035-01-M**

## DEPARTMENT OF JUSTICE

## Drug Enforcement Administration

**[Docket No. 86-22]**

## Marijuana Scheduling Petition; Denial of Petition; Remand

**AGENCY:** Drug Enforcement Administration, Justice.
**ACTION:** Final order.

**SUMMARY:** This is a final order of the Administrator of the Drug Enforcement Administration (DEA) concluding the plant material marijuana has no currently accepted medical use and denying the petition of the National Organization for Reform of Marijuana Laws (NORML) to reschedule marijuana from Schedule I to Schedule II of the Controlled Substances Act.

**EFFECTIVE DATE:** March 26, 1992.

**FOR FURTHER INFORMATION CONTACT:** Office of Congressional and Public Affairs, 202-307-7363.

**SUPPLEMENTARY INFORMATION:**

### Background

On December 21, 1989, the former Administrator of DEA, following rulemaking on the record, which included a hearing before an administrative law judge, issued a final order concluding the plant material marijuana has no currently accepted medical use, and denying the petition of NORML to reschedule marijuana from Schedule I to Schedule II of the Controlled Substances Act. 54 FR 63767. On April 26, 1991, the United States Court of Appeals for the District of Columbia Circuit remanded the matter to the Administrator for clarification of

DEA's interpretation of the term "currently accepted medical use in treatment in the United States." *Alliance for Cannabis Therapeutics v. DEA.* 930 F.2d 936.

Following a review of the entire record in this matter, and a comprehensive re-examination of the relevant statutory standard. I conclude that marijuana has no currently accepted medical use and must remain in Schedule I. Further hearings are unnecessary since the record is extraordinarily complete, all parties had ample opportunity and wide latitude to present evidence and to brief all relevant issues, and the narrow question on remand centers exclusively on this Agency's legal interpretation of a statutorily-created standard.

### Summary of the Decision

Does the marijuana plant have any currently accepted medical use in treatment in the United States, within the meaning of the Federal Controlled Substances Act. 21 U.S.C. 801, *et seq.?* Put simply, is marijuana good medicine for illnesses we all fear, such as multiple sclerosis (MS), glaucoma and cancer?

The answer might seem obvious based simply on common sense. Smoking causes lung cancer and other deadly diseases. Americans take their medicines in pills, solutions, sprays, shots, drops, creams and sometimes in suppositories, but never by smoking. No medicine prescribed for us today is smoked.

With a little homework, one can learn that marijuana has been rejected as medicine by the American Medical Association, the National Multiple Sclerosis Society, the American Glaucoma Society, the American Academy of Ophthalmology the American Cancer Society. Not one American health association accepts marijuana as medicine.

For the last half century, drug evaluation experts at the United States Food and Drug Administration (FDA) have been responsible for protecting Americans from unsafe and ineffective new medicines. Relying on the same scientific standards used to judge all other drugs, FDA experts repeatedly have rejected marijuana for medical use.

Yet claims persist that marijuana has medical value. Are these claims true. What are the facts?

Between 1987 and 1988, DEA and NORML, under the guidance of an administrative law judge, collected all relevant information on this subject. Stacked together it stands nearly five feet high. Is there reliable scientific evidence that marijuana is medically

**APPENDIX C**
**SYMPOSIUM PROGRAM**

# "ECONOMY-WIDE MODELING OF THE ECONOMIC IMPLICATIONS OF A FTA WITH MEXICO AND A NAFTA WITH CANADA AND MEXICO"

### ALJ Courtroom A
### United States International Trade Commission
### 500 E Street, SW
### Washington, DC 20436

## SYMPOSIUM PROGRAM

**Monday, February 24, 1992**

*8:45-9:00*    Opening Remarks:  Joseph F. Francois, International Trade Commission

*9:00-10:00*    Chair:  Joseph F. Francois, International Trade Commission

Linda Hunter (San Diego State University), James R. Markusen (University of Colorado), and Thomas F. Rutherford (University of Western Ontario), "Trade Liberalization in a Multinational-Dominated Industry:  A Theoretical and Applied General Equilibrium Analysis."

Discussants:    Florencio Lopez-de-Silanes, Harvard University
Joseph F. Francois, International Trade Commission

*10:15-11:15*    Chair:  Kenneth A. Reinert, International Trade Commission

Leslie Young (University of Texas) and Jose Romero (El Colegio de Mexico), "Steady Growth and Transition in a Dynamic Dual Model of the North American Free Trade Agreement."

Discussants:    A. Hughes Hallett, University of Strathclyde
Timothy J. Kehoe, University of Minnesota

*11:30-12:30*    Chair:  Clinton R. Shiells, International Trade Commission

Drusilla K. Brown (Tufts University), "Properties of Computable General Equilibrium Trade Models with Monopolistic Competition and Foreign Direct Investment."

Discussants:    Douglas Irwin, University of Chicago
James R. Markusen, University of Colorado

*12:30-2:00*    Lunch

*2:00-3:00*    Chair:  John W. Suomela, International Trade Commission

Timothy J. Kehoe (University of Minnesota), "Modeling the Dynamic Impact of North American Free Trade."

Discussants:    Lance Taylor, MIT*
John W. Suomela, International Trade Commission

*3:15-4:15*    Chair:  Hugh M. Arce, International Trade Commission

Horacio E. Sobarzo (El Colegio de Mexico), "A General Equilibrium Analysis of the Gains from Trade for the Mexican Economy of a North American Free Trade Agreement."

Discussants:    Robert K. McCleery, East-West Center
William E. Spriggs, Economic Policy Institute

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    * Lance Taylor did not appear at the symposium. Instead, he submitted written comments that    were read by the session chair.

## Monday, February 24, 1992

*4:30-5:30*   *Chair:  Stephen Tokarick, International Trade Commission*

David Cox (University of Waterloo) and Richard Harris (Simon Fraser University), "North American Free Trade and its Implications for Canada:  Results from a CGE Model of North American Trade."

Discussants:   Morris Morkre, Federal Trade Commission
Elisabet Rutstrom, University of South Carolina


## Tuesday, February 25, 1992

*9:00-10:00*   *Chair:  John W. Suomela, International Trade Commission*

Santiago Levy (Boston University) and Sweder van Wijnbergen (World Bank and CEPR), "Transition Problems in Economic Reform:  Agriculture in the Mexico-U.S. Free Trade Agreement."

Discussants:   Sherman Robinson, Berkeley
Leslie Young, University of Texas

*10:15-11:15*   *Chair:  Kyle Johnson, International Trade Commission*

Sherman Robinson (Berkeley), Mary E. Burfisher (U.S. Department of Agriculture), Raul Hinojosa-Ojeda (UCLA), and Karen E. Thierfelder (U.S. Department of Agriculture), "Agricultural Policies and Migration in a U.S.-Mexico Free Trade Area:  A Computable General Equilibrium Analysis."

Discussants:   Joseph W. Glauber, Council of Economic Advisers
Will Martin, World Bank

*11:30-12:30*   *Chair:  Joseph F. Francois, International Trade Commission*

David Roland-Holst (Mills College), Kenneth A. Reinert (U.S. International Trade Commission), and Clinton R. Shiells (U.S. International Trade Commission), "North American Trade Liberalization and the Role of Nontariff Barriers."

Discussants:   Drusilla K. Brown, Tufts University
Kenneth Hanson, U.S. Department of Agriculture

*12:30-2:00*   *Lunch*

*2:00-3:00*   *Chair:  Kenneth A. Reinert, International Trade Commission*

Robert K. McCleery (East-West Center), "An Intertemporal, Linked, Macroeconomic CGE Model of the United States and Mexico, Focussing on Demographic Change and Factor Flows."

Discussants:   Ellen E. Meade, Federal Reserve Board
Shantayanan Devarajan, World Bank and Harvard University

**Tuesday, February 25, 1992**

*3:15-4:15*    *Chair:  Joseph F. Francois, International Trade Commission*

Clopper Almon (University of Maryland), "The INFORUM-CIMAT Study of the Potential Effects of a U.S.A.-Mexico Free Trade Agreement."**

Discussants:    Jaime Marquez, Federal Reserve Board
Richard Boltuck, Office of Management and Budget

*4:30-5:30*    *Chair:  Clinton R. Shiells, International Trade Commission*

Carlos Bachrach (KPMG Peat Marwick) and Lorris Mizrahi (KPMG Peat Marwick), "The Economic Impact of a Free Trade Agreement between the United States and Mexico: A CGE Analysis."

Discussants:    Robert M. Feinberg, American University and ITC
Kan H. Young, U.S. Department of Commerce

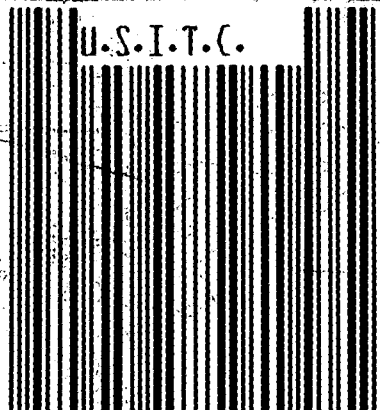*5:30-5:45*    *Closing Remarks:  Clinton R. Shiells, International Trade Commission*

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** Clopper Almon made a presentation at the symposium but did not submit a paper.

*Revised February 26, 1992*

R.P.S. Shipper

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