RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

School of Public Policy
The University of Michigan
Ann Arbor, Michigan 48109-1220

Discussion Paper No. 471

# Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

**Drusilla K. Brown**

Tufts University

**Alan V. Deardorff and Robert M. Stern**

University of Michigan

June 15, 2001

Recent RSIE Discussion Papers are available on the World Wide Web at:
http://www.spp.umich.edu/rsie/workingpapers/wp.html

# Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

**Drusilla K. Brown, Tufts University**
**Alan V. Deardorff, University of Michigan**
**Robert M. Stern, University of Michigan**

**For presentation at Industry Canada conference, "North American Linkages: Opportunities and Challenges," June 20-22, 2001, Delta Bow Valley Hotel, Calgary.**

**June 15, 2001**

**Address correspondence to:**
**Robert M. Stern**
**Gerald R. Ford School of Public Policy**
**University of Michigan**
**Ann Arbor, MI 48109-1220**

**Tel. 734-764-2373**
**Fax 810-277-4102**
**E-mail: rmstern@umich.edu**
**www.umich.edu/~rmstern/**

**Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs**

**Drusilla K. Brown, Tufts University**
**Alan V. Deardorff, University of Michigan**
**Robert M. Stern, University of Michigan**

## Abstract

We have used the Michigan Model of World Production and Trade to simulate the economic effects on the NAFTA member countries and other major trading countries/regions of a prospective new round of WTO multilateral trade negotiations, the variety of free trade agreements (FTAs) that the NAFTA members have negotiated or are considering, and the adoption of a system of common external tariffs by the NAFTA members.

We estimate that an assumed reduction of post-Uruguay Round tariffs on agricultural and industrial products and services barriers by 33 percent in a new WTO trade round would increase world welfare by $613.0 billion, with gains of $177.3 billion for the United States, $13.5 billion for Canada, $6.5 billion for Mexico, and significant gains for all other industrialized and developing countries. If there were global free trade, world welfare would increase three-fold to $1.9 trillion and the country/region gains would be similarly larger.

Regional FTAs such as an expansion of NAFTA to include Chile and a Western Hemisphere FTA would increase global and member-country welfare but much less than a new WTO multilateral trade round would. Separate bilateral FTAs negotiated or being considered by Canada, Mexico, and the United States would have positive, though generally small, welfare effects on the partner countries, but potentially disruptive sectoral employment shifts in some countries. There would be trade diversion and detrimental welfare effects on some nonmember countries for both the regional and bilateral FTAs analyzed.

If the NAFTA members were to adopt a system of common external tariffs to replace their existing differentiated external tariffs, a system based on trade weights would have less distortive effects on trade and welfare than a system based on simple averages or production-weighted tariffs.

# Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

**Drusilla K. Brown, Tufts University**
**Alan V. Deardorff, University of Michigan**
**Robert M. Stern, University of Michigan**

## I. Introduction

The purpose of our paper is to assess how the members of the North American Free Trade Area (NAFTA) – Canada, Mexico, and the United States – may be impacted by: (1) a new round of multilateral trade negotiations to be carried out under the auspices of the World Trade Organization (WTO); (2) the variety of free trade agreements (FTAs) that the NAFTA countries have actually negotiated and some others currently being considered; and (3) the adoption of a common external tariff that would replace each country's national tariffs and do away with rules of origin. In the foregoing assessments, we rely on the Michigan Model of World Production and Trade. The Michigan Model is a multi-country, multi-sector computational general equilibrium (CGE) model that we have used now for more than 25 years to analyze changes in trade policies.

In Section II, we first analyze the potential economic effects of the liberalization of trade in agricultural products and services, which are currently in the early negotiation stages of a new WTO trade round as part of the built-in agenda mandated in the Uruguay Round. We also consider the liberalization of trade in industrial products, which is yet to be decided pending agreement among the WTO members on the agenda for a new trade round. In Section III, we analyze regional negotiating options of interest to the present NAFTA member countries. These options include the expansion of NAFTA to include Chile and what we refer to as a Western Hemisphere FTA (WHFTA), which is an approximation of the Free Trade Area of the Americas (FTAA). In Section IV, we analyze several bilateral FTAs that each of the NAFTA members has already carried out or is currently considering. Section V contains an analysis of

the economic effects of the harmonization of NAFTA's external tariffs. Conclusions and implications for policy are discussed in Section VI.

## II. Computational Analysis of the Prospective WTO Round of Multilateral Trade Negotiations

In this section we analyze the economic effects of the trade liberalization that may occur in a new negotiating round. As mentioned, we will use CGE model-based simulation analysis to assess these effects. We begin by providing a brief overview of the Michigan Model.

### Overview of the Michigan CGE Model

The distinguishing feature of the Michigan Model is that it incorporates some aspects of the New Trade Theory, including increasing returns to scale, monopolistic competition, and product heterogeneity. Some details follow.[1] A more complete description of the formal structure and equations of the model can be found on line at www.Fordschool.umich.edu/rsie/model/.

#### Sectors and Market Structure

The version of the model to be used here consists of 20 countries/regions (plus rest-of-world) and 18 production sectors. The country/region and sectoral coverage are indicated in the tables below.[2] Agriculture is modeled as perfectly competitive with product differentiation by country of origin, and all other sectors as monopolistically competitive with free entry and exit of differentiated-product firms.

#### Expenditure

Consumers and producers are assumed to use a two-stage procedure to allocate expenditure across differentiated products. In the first stage, expenditure is allocated across goods without regard to the country of origin or producing firm. At this stage, the utility function is Cobb-Douglas, and the production function

[1] Readers not interested in the model details may proceed directly to the computational results.

[2] The individual countries listed in table 1 below, and the industries in table 2, are self-explanatory, as is the European Union (EU). EFTA is the European Free Trade Association and here includes Iceland, Norway, and Switzerland. Rest of Asia is India, Sri Lanka, and Vietnam. CCS is Caribbean, Central and South America, consisting of Argentina, Brazil, Colombia, Uruguay, Venezuela, and the Rest of the Andean Pact. The Middle East and North Africa consists of Morocco, Turkey, and the Rest of North Africa.

requires intermediate inputs in fixed proportions. In the second stage, expenditure on monopolistically competitive goods is allocated across the competing varieties supplied by each firm from all countries. In the case of sectors that are perfectly competitive, since individual firm supply is indeterminate, expenditure is allocated over each country's industry as a whole, with imperfect substitution between products of different countries. The aggregation function in the second stage is a Constant Elasticity of Substitution (CES) function.

Production

The production function is separated into two stages. In the first stage, intermediate inputs and a primary composite of capital and labor are used in fixed proportion to output.[3] In the second stage, capital and labor are combined through a CES function to form the primary composite. In the monopolistically competitive sectors, additional fixed inputs of capital and labor are required. It is assumed that fixed capital and fixed labor are used in the same proportion as variable capital and variable labor so that production functions are homothetic.

Supply Prices

To determine equilibrium prices, perfectly competitive firms operate such that price is equal to marginal cost, while monopolistically competitive firms maximize profits by setting price as an optimal mark-up over marginal cost. The numbers of firms in sectors under monopolistic competition are determined by the condition that there are zero profits.

Capital and Labor Markets

Capital and labor are assumed to be perfectly mobile across sectors within each country. Returns to capital and labor are determined so as to equate factor demand to an exogenous supply of each factor. The aggregate supplies of capital and labor in each country are assumed to remain fixed so as to abstract from

[3] Intermediate inputs include both domestic and imported varieties.

macroeconomic considerations (e.g., the determination of investment), since our microeconomic focus is on the intersectoral allocation of resources.

### World Market and Trade Balance

The world market determines equilibrium prices such that all markets clear. Total demand for each firm or sector's product must equal total supply of that product. It is also assumed that trade remains balanced for each country/region, that is, any initial trade imbalance remains constant as trade barriers are changed. This assumption reflects the reality of mostly flexible exchange rates among the countries involved. Moreover, this is a way of abstracting from the macroeconomic forces and policies that are the main determinants of trade imbalances.

### Trade Policies and Rent/Revenues

We have incorporated into the model the import tariff rates and export taxes/subsidies as policy inputs that are applicable to the bilateral trade of the various countries/regions with respect to one another. These have been computed using the "GTAP–4 Database" provided in McDougall et al. (1998). The export barriers have been estimated as export-tax equivalents. We assume that revenues from both import tariffs and export taxes, as well as rents from NTBs on exports, are redistributed to consumers in the tariff- or tax-levying country and are spent like any other income. When tariffs are reduced, this means that income available to purchase imports falls along with their prices, and there is no bias towards expanding or contracting overall demand.

### Model Closure and Implementation

We assume in the model that aggregate expenditure varies endogenously to hold aggregate employment constant. This closure is analogous to the Johansen closure rule (Deardorff and Stern, 1990). The Johansen closure rule consists of keeping the requirement of full employment while dropping the consumption function. This means that consumption can be thought of as adjusting endogenously to ensure

full employment. However, in the present model, we do not distinguish consumption from other sources of final demand. That is, we assume instead that total expenditure adjusts to maintain full employment.

The model is solved using GEMPACK (Harrison and Pearson, 1996). When policy changes are introduced into the model, the method of solution yields percentage changes in sectoral employment and certain other variables of interest. Multiplying the percentage changes by the levels projected for the year 2005, which is when the Uruguay Round provisions will have been fully implemented, yields the absolute changes, positive or negative, which might result from the various liberalization scenarios.

## The Data

Needless to say, the data needs of this model are immense. Apart from numerous share parameters, the model requires various types of elasticity measures. Like other CGE models, most of our data come from published sources.

As mentioned above, the main data source is "The GTAP-4 Database" of the Purdue University Center for Global Trade Analysis Project (McDougall et al., 1998). The reference year for this database is 1995. From this source, we have extracted the following data, aggregated to our sectors and regions:

1. Bilateral trade flows among 20 countries/regions, decomposed into 18 sectors. Trade with the rest-of-world (ROW) is included to close the model.
2. Input-output tables for the 20 countries/regions, excluding ROW
3. Components of final demand along with sectoral contributions for the 20 countries/regions, excluding ROW
4. Gross value of output and value added at the sectoral level for the 20 countries/regions, excluding ROW
5. Bilateral import tariffs by sector among the 20 countries/regions
6. Elasticity of substitution between capital and labor by sector
7. Bilateral export-tax equivalents among the 20 countries/regions, decomposed into 18 sectors

The monopolistically competitive market structure in the non-agricultural sectors of the model imposes an additional data requirement of the number of firms at the sectoral level. These data have been drawn from the United Nations, *International Yearbook of Industrial Statistics, 1998*.[4]

We also need estimates of sectoral employment for the countries/regions of the model. These data have been drawn from: UNIDO, 1995, *International Yearbook of Industrial Statistics*, and the World Bank, 1997, *World Development Report*. The employment data have been aggregated according to our sectoral/regional aggregation to obtain sectoral estimates of workers employed in manufactures. The *World Development Report* was used to obtain data for the other sectors.[5]

We have projected the GTAP-4 1995 database to the year 2005 by extrapolating the labor availability in different countries/regions using an average weighted population growth rate of 1.2 per cent per annum. This figure was computed from the growth-rate forecasts for the period 1997-2010 provided for various countries in table 2.3 of the World Bank's 1999 *World Development Indicators*. All other major variables have also been projected, using an average weighted growth rate of GDP of 2.5 per cent per annum, for all of the countries/regions of our model during the period 1990-1997, as per table 11 of the 1989/99 *World Development Report*.[6]

The projected database provides us with an approximate picture of what the world could be expected to look like in 2005 if the Uruguay Round (UR) negotiations had not occurred. The UR reductions in trade barriers were implemented beginning in 1995 and will be completed by 2005. In Brown, Deardorff, and Stern (2001), we have analyzed the impact of the UR-induced changes that are expected to occur over the course of the 10-year implementation period as a consequence of the negotiated reductions in tariffs and non-tariff barriers. We then readjusted the scaled-up database for 2005 to mimic the world as it might look in the post-UR implementation. In what follows, we use these re-adjusted data as the starting point to carry out the liberalization scenarios for a forthcoming WTO

[4] This source does not provide number-of-firms data for all countries. We have used the number-of-firms data for similar countries in these cases.
[5] We also need data on supply elasticities from ROW, which have been taken from the Michigan Model database.
[6] See Hertel and Martin (1999) and Hertel (2000) for a more elaborate and detailed procedure for calculating year 2005 projections.

negotiating round, involving possible reductions in tariffs on agricultural products and manufactures and reductions of barriers to trade in services.

**Computational Scenarios**

As already mentioned, the built-in agenda of the Uruguay Round mandated that multilateral negotiations under WTO auspices would commence for agriculture and services in 2000. It had been expected that the agenda for a broader WTO negotiating round would be approved at the WTO Ministerial Meeting held in Seattle in December 1999. However, because of the lack of consensus in Seattle among the WTO members,[7] decisions on the details of the negotiating agenda for a new round were put off until some future date. Although at the time of writing (June 2001) nothing definite yet has been decided, it may nonetheless be instructive to use the Michigan Model to assess the magnitudes of the economic effects that may result from a new round. Accordingly, we have run what we refer to as the Millennium Round liberalization scenarios. These scenarios assume 33 percent reductions in post-Uruguay Round tariffs and services barriers, as follows:

***MR-1*** *Agricultural liberalization is modeled as a 33 percent reduction in post-Uruguay Round agricultural import tariffs.*[8]

***MR-2*** *Liberalization of industrial products is modeled as a 33 percent reduction in post-Uruguay Round tariffs on mining and manufactured products.*

***MR-3*** *Services liberalization is modeled as a 33 percent reduction in estimated post-Uruguay Round services barriers.*

***MR-4*** *This combines* ***MR-1, MR-2, and MR-3****.*

In addition to the foregoing scenarios, we thought it would be of interest to run a scenario of global free trade, as follows:

***MR-5*** *Global free trade is modeled as complete removal of all post-Uruguay Round tariffs on agricultural products and industrial products as well as services barriers.*

[7] See Deardorff and Stern (2001) for discussion of the differences that prevented consensus in Seattle.
[8] Reductions in post-Uruguay Round agricultural export subsidies will presumably also be negotiated in a new trade round, but they are not included in this scenario.

With regard to MR-3, services liberalization, we may note that, while services issues were addressed in the Uruguay Round, the main accomplishment was the creation of the General Agreement on Trade in Services (GATS). The GATS is an umbrella agreement setting out the rules governing the four modes of providing services transactions internationally. These modes are: (1) cross-border services (e.g., telecommunications); (2) services provided in the country of consumption (e.g., tourism); (3) services requiring a domestic presence in the form of foreign direct investment (FDI); and (4) movement of natural persons. In an earlier study, Brown and Stern (2001) developed a new version of the Michigan Model for the purpose of analyzing the behavior of multinational firms, which are major providers of services, both intra-firm as well as in the production and sales of foreign affiliates located in host countries.[9] To approximate existing services barriers, Brown and Stern used estimates of barriers to FDI provided by Hoekman (2000), based on the gross operating margins of services firms listed on national stock exchanges for the period, 1994-96. These gross operating margins, which were calculated as the differences between total revenues and total operating costs, are indicated in percentage form in table 1 for construction, trade & transportation, other private services, and government services.

Some of the differences between total revenues and costs are presumably attributable to fixed cost. Given that the gross operating margins vary across countries, a portion of the margins can also be attributed to barriers to FDI. For this purpose, we have selected as a benchmark for each sector the country with the smallest gross operating margin, on the assumption that operations in that country can be considered to be freely open to foreign firms. The excess in any other country above this lowest benchmark is then taken to be due to barriers to establishment by foreign firms. That is, the barrier is modeled as the cost increase attributable to an increase in fixed cost borne by multinational corporations attempting to establish an enterprise locally in a host country. In this paper, we further assume for purposes of analysis that we can interpret this cost increase as an ad valorem equivalent tariff on

[9] Because of computer-capacity constraints, Brown and Stern use a 3-sector aggregation consisting of agriculture, manufactures, and services and the same 20-country/region breakdown as is being used here. They also differ from the present analysis by making allowance for international flows of FDI and increases in capital stocks in response to the multilateral trade liberalization that they analyze.

international services transactions generally. Our simulation MR-3 assumes then that these services barriers are to be reduced by 33 percent in a new trade round.

**Computational Results**

To help the reader interpret the results, it is useful first to review the features of the model that serve to identify the various economic effects that are being captured in the different scenarios. Although the model includes the aforementioned features of the New Trade Theory, it remains the case that markets respond to trade liberalization in much the same way that they would with perfect competition. That is, when tariffs or other trade barriers are reduced in a sector, domestic buyers (both final and intermediate) substitute toward imports, and the domestic competing industry contracts production while foreign exporters expand. With multilateral liberalization reducing tariffs and other trade barriers simultaneously in most sectors and countries, each country's industries share in both of these effects, expanding or contracting depending primarily on whether their protection is reduced more or less than in other sectors and countries. At the same time, countries with larger average tariff reductions than their trading partners tend to experience a real depreciation of their currencies in order to maintain a constant trade balance, so that all countries therefore experience mixtures of both expanding and contracting sectors.

Worldwide, these changes cause increased international demand for all sectors, with world prices rising most for those sectors where trade barriers fall the most. This in turn causes changes in countries' terms of trade that can be positive or negative. Those countries that are net exporters of goods with the greatest degree of liberalization will experience increases in their terms of trade, as the world prices of their exports rise relative to their imports. The reverse occurs for net exporters in industries where liberalization is slight -- perhaps because it already happened in previous trade rounds.

The effects on the welfare of countries arise from a mixture of these terms-of-trade effects, together with the standard efficiency gains from trade and also from additional benefits due to elements of the New Trade Theory. Thus, we expect on average that the world will gain from multilateral liberalization, as resources are reallocated to those sectors in each country where there is a comparative

advantage. In the absence of terms-of-trade effects, these efficiency gains should raise national welfare measured by the equivalent variation for every country, although some factor owners within a country may lose, as will be noted below. However, it is possible for a particular country whose net imports are concentrated in sectors with the greatest liberalization to lose overall, if the worsening of its terms of trade swamps these efficiency gains.

On the other hand, although the New Trade Theory is perhaps best known for introducing new reasons why countries may lose from trade, in fact its greatest contribution is to expand the list of reasons for gains from trade. It is these that are the dominant contribution of the New Trade Theory in our model. That is, trade liberalization permits all countries to expand their export sectors at the same time that all sectors compete more closely with a larger number of competing varieties from abroad. As a result, countries as a whole gain from lower costs due to increasing returns to scale, lower monopoly distortions due to greater competition, and reduced costs and/or increased utility due to greater product variety. All of these effects make it more likely that countries will gain from liberalization in ways that are shared across the entire population.

In perfectly competitive trade models such as the Heckscher-Ohlin Model, one expects countries as a whole to gain from trade, but the owners of one factor – the "scarce factor" – to lose through the mechanism first explored by Stolper and Samuelson (1941). The additional sources of gain from trade due to increasing returns to scale, competition, and product variety, however, are shared across factors, and we routinely find in our CGE modeling that both labor and capital gain from liberalization. That is often the case here.

In the real world, all of the foregoing effects occur over time, some of them more quickly than others. Our model is however static, based upon a single set of equilibrium conditions rather than relationships that vary over time. Our results therefore refer to a time horizon that is somewhat uncertain, depending on the assumptions that have been made about which variables do and do not adjust to changing market conditions, and on the short- or long-run nature of these adjustments. Because our elasticities of supply and demand reflect relatively long-run adjustments and because we assume that

markets for both labor and capital clear within countries, our results are appropriate for a relatively long time horizon of several years – perhaps two or three at a minimum.

On the other hand, our model does not allow for the very long-run adjustments that could occur through capital accumulation, population growth, and technological change. Our results should therefore be thought of as being superimposed upon longer-run growth paths of the economies involved. To the extent that these growth paths themselves may be influenced by trade liberalization, therefore, our model does not capture that.

Aggregate Results[10]

The aggregate effects on economic welfare of the individual Millennium Round scenarios (MR-1-MR-4) and global free trade (MR-5) are presented in table 2,[11] and the sectoral employment results of scenario MR-4 for Canada, Mexico, and the United States are presented in table 3.

**MR-1: Agricultural Liberalization** – The assumed 33 percent reduction in post-Uruguay Round agricultural-import tariffs is shown in table 2 to increase global welfare by $10.8 billion. The welfare increases for Canada ($67 million) and Mexico ($111 million) are relatively small, whereas the United States records a welfare decline of $4.1 billion. The expansion of U.S. agriculture apparently has the effect of drawing resources away from the monopolistically competitive, non-agricultural sectors, thereby producing negative scale effects in these sectors. Similar negative welfare effects are also noted for Australia and New Zealand, both of which are net exporters of agricultural products.

**MR-2: Liberalization of Industrial Products** –The assumed 33 percent reduction of post-Uruguay Round manufacturing tariffs results in an increase in global welfare of $210.7 billion, which is considerably greater than the $90.3 billion welfare gain from the Uruguay Round liberalization of manufacturing tariffs noted in Brown, Deardorff, and Stern (2001). Liberalization of manufactures in a

[10] The potential gains from a new WTO trade round are also analyzed in Hertel (2000), based on the GTAP CGE model, which is a widely used modeling structure. The version used by Hertel assumes perfect competition in all sectors. It also assumes national product differentiation (i.e., the Armington assumption), which may tend to exaggerate terms-of-trade effects.

[11] The aggregate results for the effects on exports, imports, and the returns to capital and labor, are available in Brown, Deardorff, and Stern (2001).

new trade round is seen to increase welfare in all of the countries/regions listed. While not noted in the table, there are positive effects as well on real wages and the return to capital. There are welfare gains of $63.3 billion for EU/EFTA, $57.8 billion for Japan, $31.3 billion for the United States, $2.8 billion for Canada, and $1.1 billion for Mexico. While the welfare gains for the developing countries/regions are much smaller in absolute terms, the percentage gains tend to be larger, ranging from 0.5 percent for China to 3.5 percent for the Philippines.

**MR-3: Services Liberalization** – As noted above, the Uruguay Round negotiations on services resulted in creation of the GATS, but no significant liberalization of services barriers occurred. Following the conclusion of the Uruguay Round, there have been successful multilateral negotiations to liberalize telecommunications and financial services. While it would be desirable to assess the economic effects of these sectoral agreements, we cannot do so here because of lack of data. What we have done then is to use the estimates of services barriers based on the calculations of gross operating margins for services firms in the countries/regions in our model, as already described above and as shown in table 1. These estimates of services barriers are intended to be indirect approximations of what the actual barriers may be and thus should not be taken literally. Assuming that the ad valorem equivalents of these barriers are reduced by 33 percent, it can be seen in table 2 that global economic welfare rises by $389.6 billion, which exceeds the $210.7 billion welfare increase for manufactures liberalization. All of the countries/regions listed experience positive welfare gains as well as increases in real wages and returns to capital. The United States has the largest welfare gain of $150.0 billion, compared to $103.4 billion for EU/EFTA and $61.6 billion for Japan. Canada's welfare gain is $10.6 billion and Mexico's gain is $5.2 billion. For several of the smaller industrialized and developing countries, the percentage increases in welfare are noteworthy.

**MR-4: Combined Liberalization Effects (MR-1 + MR-2 + MR-3)** – The results for **MR-4** are the sum of the other three scenarios. Overall, in table 2, global welfare rises by $613.0 billion. Canada's welfare gain is $13.5 and Mexico's gain is $6.5 billion. The United States has a welfare gain of $177.3

billion, EU/EFTA a gain of $168.9 billion, and Japan a gain of $123.7 billion. The percentage welfare gains are sizable in most of the smaller industrialized countries and in the developing countries.

**MR-5: Global Free Trade** – Since our model is linear, the effects of removal of all tariffs and services barriers would then be some three times the results of MR-4. Thus, in table 2, global free trade would increase global welfare by $1.9 trillion. The welfare gains for the United States are $537.2 billion (5.9 percent of GNP), EU/EFTA, $511.9 billion (4.7 percent of GNP), Japan, $374.8 billion (5.8 percent of GNP), Canada, $40.9 billion (5.6 percent of GNP), and Mexico, $19.6 billion (5.6 percent of GNP). The gains as a percentage of GNP for the other industrialized countries and the developing countries are also sizable, ranging from 3.5 percent for Australia to 17.0 percent for Singapore.

**Sectoral Results**

The sectoral employment results for MR-4 for Canada, Mexico, and the United States are presented in table 3.[12] For all three NAFTA countries, there are notable employment declines in textiles, wearing apparel, leather products and footwear, and in some service sectors, while employment increases especially in agriculture and most of the remaining manufactures sectors. The sectoral employment results for global free trade in Scenario MR-5, which are not shown here, are some three times the amounts shown in table 3.

**Conclusion**

The foregoing computational results suggest that there are substantial welfare gains for the NAFTA countries and the other industrialized and developing countries to be realized from a new WTO multilateral negotiating round. The sectoral employment increases for the NAFTA countries are concentrated in agriculture and the relatively more capital-intensive industries, and there are sectoral employment decreases in the relatively labor-intensive industries. This is the case for the assumed 33 percent reductions in the post-Uruguay Round tariffs and barriers to services, and even more so if there were global free trade.

[12] Sectoral results for percentage changes in exports, imports, output, and scale economies are given in Brown, Deardorff, and Stern (2001).

We should note, as discussed above, that our computational model is based on a comparative static approach, meaning that we move from an initial position to a new equilibrium in which all of the liberalization and adjustment to it is complete. That is, we abstract from a variety of dynamic and related effects that may occur through time, especially with the international mobility of real capital, increases in capital accumulation via real investment, and technological improvements. Our results should thus be interpreted as a lower limit to the economic benefits that may ultimately be realized from a new WTO multilateral negotiating round and, if it were possible, from a movement to global free trade.[13]

## III. Analysis of Regional Negotiating Options

In this section, we consider two regional negotiating options that are actively being pursued by the NAFTA member countries. These include an expansion of NAFTA to include Chile, and an approximation to the Free Trade Area of the Americas (FTAA) that we refer to as a Western Hemisphere FTA (WHFTA) that involves the NAFTA countries. These scenarios are:

***RA-1:*** *NAFTA-Chile FTA – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers between the NAFTA members and Chile.*

***RA-2:*** *Western Hemisphere FTA (WHFTA) – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers among the NAFTA members and Chile and an aggregate of countries comprising Central America and Caribbean and Other South America (CCS).*[14]

---

[13] Brown and Stern (2001) have used their 3-sector, 20-country CGE model that incorporates the behavior of multinational corporations (MNCs) and their foreign affiliates and international mobility of FDI-related capital to assess the effects of 33 percent reductions in post-Uruguay Round tariffs and services barriers. Making allowance for imperfect mobility of real international capital and fixed world capital stocks, they estimate that the combined reductions in tariffs and services barriers would increase global welfare by $193.2 billion. The welfare increase for Japan is $3.1 billion and for the United States, $45.8 billion. When allowance is made for increases in the world capital stock of 2 percent in response to the assumed liberalization, the increase in world economic welfare rises to $612.4 billion, with an increase for Japan of $80.2 billion and for the United States, $178.4 billion. International capital mobility combined with an increase in capital accumulation may therefore generate welfare changes that are different in size and geographical distribution as compared to the results generated in the more disaggregated, sectoral version of the Michigan Model used here, which abstracts from the behavior of MNCs in response to trade liberalization. Time and resource constraints have thus far prevented Brown and Stern from expanding the sectoral coverage of their FDI model to analyze the more detailed responses to trade liberalization for the world's major trading countries and regions.

[14] The CCS aggregate comprises: Central America and Caribbean; Venezuela; Colombia; Rest of Andean Pact; Argentina; Brazil; Uruguay; and Rest of South America.

In each of these cases, our reference point is the post-Uruguay Round, 2005 database described above together with the post-Uruguay Round tariff rates on agricultural products and manufactures and the specially constructed measures of services barriers used in the Millennium Round scenarios in Section II preceding. Four scenarios have been carried out for each of the two arrangements noted: (A) removal of agricultural tariffs; (M) removal of manufactures tariffs; (S) removal of services barriers; and (C) combined removal of agricultural and manufactures tariffs and services barriers. Because of space constraints, we report only the latter combined results, denoted RA-1C and RA-2C.

**RA-1C: NAFTA-Chile FTA** – Table 4, column (1), indicates the results of a FTA involving the NAFTA member countries and Chile.[15] The complete removal of all post-Uruguay Round bilateral tariffs on agriculture and manufactures and services barriers vis-à-vis Chile increases global welfare by $5.5 billion. The welfare of the NAFTA members rises, with a gain of $4.2 billion for the United States, $290 million for Canada, and $411 million for Mexico. Chile's welfare increases by $740 million, which is 0.92% of its GNP. There is some evidence of trade diversion for a number of countries, including the aggregate of Central America and Caribbean and Other South American (CCS) countries. The sectoral employment effects for the NAFTA members and for Chile are shown in columns (1)-(4) of table 5. The U.S. employment effects are negligible, as are those for Canada and Mexico. The employment effects for Chile are noticeably larger, with increases in agriculture, mining, metal products, and other private services, and reductions in textiles and wearing apparel, some other manufacturing sectors, and trade and transport and government services.

**RA-2C: Western Hemisphere Free Trade Agreement (WHFTA) –** Discussions have been ongoing for several years to create a Free Trade Area of the Americas (FTAA).[16] The most recent efforts to move forward in achieving a FTAA were made at a Summit of the Americas meeting of the 34 member nations in Quebec City in April 2001. Since the country detail in our model does not include the individual members of the FTAA, we have chosen to approximate it by combining the United States,

[15] For a more comprehensive analysis of the accession of Chile to the NAFTA, see Brown, Deardorff, and Stern (2000).
[16] See Office of the United States Trade Representative (20001a).

Canada, Mexico, and Chile with an aggregate of the Central American and Caribbean and Other South American (CCS) nations into what we refer to as a Western Hemisphere Free Trade Agreement (WHFTA). The complete removal of all bilateral tariffs on agriculture and manufactures and services barriers can be seen in table 4, column (2), to increase global welfare by $77.9 billion. The welfare of the NAFTA members rises by $52.7 billion for the United States, $2.8 billion for Canada, and $2.8 billion for Mexico. The welfare of Chile rises by $2.0 billion and the CCS aggregate by $18.4 billion. There is evidence of trade diversion for Australia, New Zealand, EU/EFTA, some Asian developing countries, and the Middle East and North Africa. The sectoral employment effects are indicated in columns (5)-(9) of table 5. The United States shows relatively small employment declines in agriculture, mining, food, beverages, and tobacco, and other private and government services, and increases in all other sectors. While the employment effects for Canada are also small, the absolute employment increases for Mexico, Chile, and the CCS aggregate are noteworthy. This suggests that the smaller countries would experience more employment adjustments than the largest countries in a WHFTA.

## IV. Analysis of Bilateral Negotiating Options

As already mentioned, the NAFTA countries are currently engaged in or are considering a number of bilateral trading arrangements. For Canada, these include negotiation of a FTA with Chile and possible consideration of an FTA with the European Union (EU). Mexico has concluded FTAs with Chile, the EU, and several other Latin American countries, and it is considering an FTA with Japan. The United States has recently concluded a bilateral FTA with Jordan and is actively considering FTAs with Chile, Singapore, and Korea.[17] In what follows, we analyze the effects on economic welfare and sectoral employment of the following bilateral arrangements:

**C-ChFTA:** *Canada-Chile FTA*
**C-EUFTA:** *Canada-European Union FTA*[18]

[17] See Office of the United States Trade Representative (2001b,c) and United States International Trade Commission (2001) for information on the U.S. FTA initiatives.
[18] Since in our model, the EU is combined with the (much smaller) EFTA countries, this and other scenarios listed below as involving FTAs with the EU are actually modeled to include EFTA as well.

**M-ChFTA:** *Mexico-Chile FTA*
**M-EUFTA:** *Mexico-European Union FTA*
**M-JFTA:** *Mexico-Japan FTA*

**US-ChFTA**: *U.S.-Chile FTA*
**US-SFTA**: *U.S.-Singapore FTA*
**US-KFTA**: *U.S.-Korea FTA*

As with the regional scenarios, we report only the results of the combined removal of agricultural and manufactures tariffs and services barriers, denoted by C-ChFTA-C, etc. The results for the separate removal of the agricultural, manufactures, and services barriers are available on request. We should emphasize that our computational analysis does not take into account other features of the various FTAs, such as the negotiation of explicit rules and the development of new institutional and cooperative arrangements (e.g., covering investment, labor standards and the environment) that could be beneficial to the countries involved. These factors do not lend themselves readily to quantification, however. By the same token, we have not made allowance for rules of origin that may be negotiated as part of each FTA and that could be designed with protectionist intentions.

**C-ChFTA-C: Canada-Chile Free Trade Agreement** – The welfare effects of a Canada-Chile FTA are noted in column (1) of table 6. Global economic welfare rises by $354 million, with Canada's welfare rising by $257 million and Chile's welfare by $124 million. The sectoral employment effects for both countries, which are available on request, are negligible.

**C-EUFTA-C: Canada-European Union Free Trade Agreement** – As noted in column (2) of table 6, a Canada-EU/EFTA FTA increases global welfare by $22.6 billion. Canada's welfare increases by $6.9 billion (0.95 percent of GNP), and EU/EFTA welfare increases by $16.9 billion (0.15 percent of GNP). There is some evidence of trade diversion for Mexico, the United States, Japan, and several Asian countries. The sectoral employment effects are noted in table 7. For Canada, there are employment increases especially in agriculture, food, beverages, and tobacco, and most manufactures sectors, and employment declines in mining, labor-intensive manufactures, trade and transport, and other private services. The employment changes for EU-EFTA tend to be the obverse of those for Canada, but they are relatively very small.

**M-ChFTA-C: Mexico-Chile Free Trade Agreement** – In table 8, column (1), it can be seen that a Mexico-Chile FTA increases global welfare by $466 million, with an increase of $416 million for Mexico and $138 million for Chile. Both the Mexican and Chilean gains are relatively small percentages of GNP. The sectoral employment changes, which are available on request, are negligible for both countries.

**M-EUFTA-C: Mexico-European Union Free Trade Agreement** – In table 8, column (2), a Mexico-EU/EFTA FTA increases global welfare by $10.2 billion, Mexico's welfare by $3.6 billion, and EU/EFTA welfare by $7.3 billion. There is small evidence of trade diversion for a number of countries. The sectoral employment effects are indicated in table 9, column (1). There are employment increases in Mexico in agriculture, labor-intensive and durable manufactures, and employment declines in the services sectors. The employment changes in the EU/EFTA are the obverse but are relatively very small.

**M-JFTA-C: Mexico-Japan Free Trade Agreement** – In table 8, column (3), a Mexico-Japan FTA increases global welfare by $7.3 billion, Mexico's welfare by $1.9 billion, and Japan's welfare by $6.3 billion. The sectoral employment results in table 9, column (2) indicate employment increases for Mexico in trade and transport and other private services and employment declines in all other sectors. While relatively very small, the sectoral employment effects for Japan are negative for agriculture and labor-intensive manufactures and positive for durable manufactures and services except for trade and transport.

**USCFTA-C: U.S.-Chile Free Trade Agreement** – To supplement the regional scenario noted for the expansion of NAFTA to include Chile, the results of a U.S.-Chile FTA are indicated in column (1) of table 10. Global welfare increases by $4.7 billion, with U.S. welfare increasing by $4.2 billion and Chile's welfare by $479 million. The sectoral results for the United States are shown in column (1) of table 11 and indicate relatively small employment declines in U.S. agriculture, mining, food, beverages, and tobacco, wearing apparel, leather products and footwear, and other private services, and employment increases in the other sectors. The sectoral employment effects for Chile show employment increases in agriculture, mining, metal products, and other private services and employment declines in several

manufacturing sectors and services. A number of these sectoral changes for Chile are relatively large and indicate the adjustments that may occur with a U.S.-Chile FTA.

**USSFTA-C: U.S.-Singapore Free Trade Agreement** – The welfare effects of a U.S.-Singapore FTA are noted in column (2) of table 10. Global welfare rises by $20.6 billion, with U.S. welfare rising by $16.7 billion and Singapore's welfare by $2.0 billion. The sectoral employment effects for the United States are indicated in column (2) of table 11. There are positive, but relatively small, employment increases in all U.S. sectors, except for wearing apparel, trade and transport, and other private services. For Singapore, there are relatively large sectoral employment increases in wearing apparel and trade and transport services and declines in most other sectors.

**USKFTA-C: U.S.-Korea Free Trade Agreement** – The welfare effects of a U.S.-Korea FTA are shown in column (3) of table 10. Global welfare rises by $38.8 billion, with U.S. welfare rising by $29.2 billion and Korean welfare by $8.2 billion. A U.S.-Korea FTA shows no evidence of trade diversion. The sectoral employment effects are indicated in column (3) of table 11. U.S. employment increases notably in agriculture and food, beverages, and tobacco and declines in most of the manufacturing and services sectors. For Korea, there are noteworthy employment declines in agriculture, food, beverages, and tobacco, non-metallic mineral products, construction, and other private services and increases in most manufacturing sectors and trade and transport services.

## V. Harmonization of NAFTA's External Tariffs

In this section, we suppose that NAFTA is turned into a customs union, with a common external tariff and elimination of rules of origin and other types of restrictions. Ideally for this purpose we should use the highly disaggregated tariff schedules of Canada, Mexico, and the United States. But time and resource constraints prevent us from doing so. Instead, as an approximation, we will use the sectoral tariff averages that are contained in our model database. The problem here is that these tariff rates, which have been calculated as part of the GTAP database, are themselves import-weighted averages from lower levels of aggregation. In any event, what we have done is to calculate a vector of common external tariffs

by sector for the three NAFTA countries on the following alternative assumptions: (1) simple arithmetic average; (2) import-weighted average; and (3) production-weighted average. We then use our model to calculate the effects of changing existing post-Uruguay Round tariffs to these common external ones.

The existing post-Uruguay Round average tariff rates for the NAFTA countries are given in table 12 together with the calculated harmonized rates. It should be noted that these are the averages for all trading partners, whereas in the model there is one set of tariff rates for each trading partner. Nonetheless, these average rates provide some indication of the heights of the tariffs for the individual sectors in the NAFTA countries. We should note also that the estimated services barriers have not been included in the harmonization experiment, since these barriers have been imputed from cost-price margins and should therefore not be interpreted in the same manner as the statutory import tariffs on traded goods.

**Computational Results**

The aggregate effects on economic welfare for the NAFTA countries and other countries/regions covered in our model are indicated in table 13. With the simple average tariffs that are higher than each of the weighted schemes, it turns out that the United States would in this case have to raise its tariffs. The end result is a rather large decline in the volume of trade for the United States and most non-NAFTA countries, whereas the trade of Canada and Mexico expands. As noted in table 13, column (1), U.S. economic welfare rises by $13.5 billion due in large measure to improved terms of trade. Canada's welfare rises by $1.9 billion and Mexico's welfare by $2.3 billion due to the pervasive trade diversion.

Tariff changes are smaller with the trade-weighted and production-weighted harmonized tariffs. There are accordingly larger tariff reductions for Canada and Mexico and both experience a deterioration in the terms of trade. In table 13, columns (2) and (3), it can be seen that Canada's welfare declines while Mexico's welfare rises insofar as the efficiency effects outweigh Mexico's worsened terms of trade. Global welfare increases by $134.5 million for the import-weighted tariffs and declines by $2.4 billion for the production-weighted tariffs. It thus appears that the adoption of a trade-weighted common external

tariff is much less disruptive to trade and welfare than a simple average or the production-weighted system.

The sectoral employment effects are shown in table 14. For all three countries, the signs and magnitudes of the effects for the simple-average tariffs in column (1) do not correspond well with the trade- and production-weighted tariff effects in columns (2) and (3). For Canada, there are negative employment effects with the trade- and production-weighted tariffs in mining, textiles, wearing apparel, leather products & footwear, and services, and increases in employment in the remaining sectors. The sectoral employment effects for Mexico with the trade- and production-weighted tariffs are relatively small, except for machinery and equipment and other manufactures. Finally, for the United States, the sectoral employment effects for the trade- and production-weighted tariffs appear relatively small. It can be concluded therefore that the adoption of a common external tariff based on trade or production weights would by and large have minimal employment impacts in the NAFTA countries.

## VI. Conclusions and Implications for Policy

We have used the Michigan Model of World Production and Trade to simulate the economic effects of the trade liberalization that may be negotiated in a new trade round to be conducted under WTO auspices, as well as a variety of regional and preferential trading arrangements. We have also analyzed the economic effects of the harmonization of NAFTA's external tariffs. The overriding conclusion that emerges from our model simulations of a new trade round is that multilateral trade liberalization has positive and often sizable impacts on the economic welfare of the NAFTA countries as well as on all of the other industrialized and developing countries/regions covered in the Michigan Model.

A second conclusion is that while regional and bilateral FTAs may be welfare enhancing for the member countries directly involved, these welfare gains are considerably smaller than those resulting from multilateral trade liberalization, even comparing the complete elimination of regional and bilateral tariffs to reduction of multilateral tariffs by only one third. Thus, the benefits of FTAs to the developing country partners appear somewhat limited, and, in some cases, could be disruptive because of

intersectoral shifts in output and employment, depending on how rapidly the FTAs would be implemented. It is also the case that most of the regional and bilateral FTAs involve elements of trade diversion and are therefore detrimental to some non-member countries.

Finally, the effects of adopting a common external tariff for the NAFTA member countries will depend on the method of calculation. A trade-weighted harmonized tariff appears to be less disruptive to trade and welfare than a simple average or production-weighted average. There would be relatively small sectoral employment impacts with both trade- and production-weighted tariffs.

**References**

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 2000. "Computational Analysis of the Accession of Chile to the NAFTA and Western Hemisphere Integration," *The World Economy* 23:145-74.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 2001. "CGE Modeling and Analysis of Multilateral and Regional Negotiating Options," in Robert M. Stern (ed.), *Issues and Options for U.S.-Japan Trade Policies*, University of Michigan Press, forthcoming.

Brown, Drusilla K. and Robert M. Stern. 2001. "Measurement and Modeling of the Economic Effects of Trade and Investment Barriers in Services," *Review of International Economics*, forthcoming.

Deardorff, Alan V. and Robert M. Stern. 2001. "What the Public Should Know about Globalization and the World Trade Organization," *Review of International Economics*, forthcoming.

Hertel, Thomas W. and Will Martin. 1999. "Would Developing Countries Gain from Inclusion of Manufactures in the WTO Negotiations?" Presented at the Conference on the "WTO and the Millennium Round," Geneva, September 20-21.

Hertel, Thomas W. 2000. "Potential Gains from Reducing Trade Barriers in Manufacturing, Services and Agriculture," *Federal Reserve Bank of St. Louis Review* 82:77-99.

Hoekman, Bernard. 2000. "The Next Round of Services Negotiations: Identifying Priorities and Options," *Federal Reserve Bank of St. Louis Review* 82:31-47.

McDougall, Robert et al. 1998. *Global Trade: Assistance and Protection: GTAP-4 Database*, Purdue University, W. Lafayette, IN.

Office of the United States Trade Representative (USTR). 2001a. "Accomplishments of the FTAA Ministerial," Fact Sheet (April 7).

Office of the United States Trade Representative (USTR). 2001b. "Joint Declaration of the Proposed U.S.-Singapore Free Trade Agreement," Press Release 00-08 (January 17).

Office of the United States Trade Representative (USTR). 2001c. "United States and Chile Free Trade Agreement: Third Negotiating Round," Press Release 01-19 (April 2).

Stolper, Wolfgang and Paul A. Samuelson. 1941. "Protection and Real Wages," *Review of Economic Studies* 9:58-73.

United States International Trade Commission (USITC). 2001. "ITC to Analyze Impact of a U.S.-Korean Free Trade Agreement," News 01-003, Inv. No. 332-425 (January 11).

**Table 1**
**Average Gross Operating Margins of Services Firms**
**Listed on National Stock Exchanges, 1994-96**
**(Percent)**

| | Construction | Trade & Transportation | Other Private Services | Government Services | Average |
|---|---|---|---|---|---|
| **NAFTA Countries** | | | | | |
| United States | 20 | 35 | 46 | 40 | 40 |
| Canada | 14 | 21 | 42 | 15* | 33 |
| Mexico | 26 | 35 | 47 | | 39 |
| **Industrialized Countries** | | | | | |
| Japan | 14 | 23 | 27 | 43 | 27 |
| Australia | 15 | 8* | 15* | | 13 |
| New Zealand | 15 | 21 | 27 | | 21 |
| EU/EFTA | 20 | 24 | 34 | 38 | 29 |
| **Developing Countries** | | | | | |
| **Asia** | | | | | |
| Hong Kong | 14 | 16 | 23 | | 19 |
| China | 42 | 36 | 72 | 75 | 49 |
| Korea | 15 | 24 | 41 | | 24 |
| Singapore | 11* | 13 | 21 | 26 | 18 |
| Taiwan | 21 | 28 | 50 | | 35 |
| Indonesia | 23 | 32 | 58 | | 44 |
| Malaysia | 19 | 17 | 22 | 26 | 18 |
| Philippines | 41 | 42 | 50 | | 45 |
| Thailand | 38 | 42 | 49 | 41 | 45 |
| Rest of Asia | 23 | 23 | 34 | | 27 |
| **Other** | | | | | |
| Chile | 69 | 32 | | | 41 |
| Cent., Carib., & S. Amer. | 29 | 40 | 49 | 32 | 38 |
| Middle East & N. Africa | 40 | 35 | 48 | | 39 |
| Rest of World | 12 | 19 | 32 | 19 | 22 |
| **Average** | **22** | **27** | **35** | **36** | |

*Taken as benchmark country

Source: Adapted from Hoekman (2000).

## Table 2
## Global Welfare Effects of Multilateral Trade Liberalization
## (Percent of GNP and Billions of Dollars)

| | WTO Millennium Round – 33% Reductions in: | | | | | | | | Global Free Trade | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Agricultural Tariffs—MR-1 (1) | | Manufactures Tariffs—MR-2 (2) | | Services Barriers—MR-3 (3) | | Combined Liberalization—MR-4 (4) | | All Barriers Removed—MR-5 (5) | |
| **NAFTA Countries** | | | | | | | | | | |
| Canada | 0.01% | $0.1 | 0.38% | $2.8 | 1.46% | $10.6 | 1.85% | $13.5 | 5.62% | $40.9 |
| Mexico | 0.03 | 0.1 | 0.32 | 1.1 | 1.49 | 5.2 | 1.84 | 6.5 | 5.58 | 19.6 |
| United States | -0.04 | -4.1 | 0.34 | 31.3 | 1.65 | 150.0 | 1.95 | 177.3 | 5.92 | 537.2 |
| | | | | | | | | | | |
| **Industrialized Countries** | | | | | | | | | | |
| Japan | 0.07% | 4.3 | 0.89% | 57.8 | 0.95% | 61.6 | 1.90% | 123.7 | 5.77% | 374.8 |
| Australia | -0.04 | -0.2 | 0.56 | 2.5 | 0.65 | 2.8 | 1.16 | 5.1 | 3.52 | 15.5 |
| New Zealand | -0.04 | -0.0 | 1.88 | 1.4 | 1.20 | 0.8 | 3.04 | 2.2 | 9.22 | 6.8 |
| EU and EFTA | 0.02 | 2.2 | 0.58 | 63.3 | 0.94 | 103.4 | 1.54 | 168.9 | 4.67 | 511.9 |
| | | | | | | | | | | |
| **Developing Countries** | | | | | | | | | | |
| **Asia** | | | | | | | | | | |
| Hong Kong | 0.02 | 0.0 | 1.56 | 2.0 | 1.78 | 2.3 | 3.36 | 4.3 | 10.18 | 13.1 |
| China | 0.18 | 1.6 | 0.54 | 4.9 | 0.79 | 7.1 | 1.50 | 13.6 | 4.55 | 41.2 |
| Korea | 0.16 | 0.9 | 1.40 | 8.0 | 0.91 | 5.2 | 2.48 | 14.1 | 7.51 | 42.7 |
| Singapore | 0.12 | 0.1 | 2.85 | 2.1 | 2.62 | 1.9 | 5.60 | 4.2 | 16.96 | 12.6 |
| Taiwan | 0.71 | 2.5 | 1.58 | 5.6 | 0.49 | 1.7 | 2.78 | 9.8 | 8.44 | 29.6 |
| Indonesia | 0.06 | 0.1 | 0.06 | 0.1 | 0.79 | 2.0 | 1.65 | 4.2 | 5.00 | 12.7 |
| Malaysia | 0.28 | 0.3 | 1.99 | 2.4 | 0.54 | 0.6 | 2.81 | 3.4 | 8.51 | 10.2 |
| Philippines | 0.20 | 0.2 | 3.52 | 3.1 | 1.68 | 1.5 | 5.40 | 4.8 | 16.38 | 14.5 |
| Thailand | 0.03 | 0.1 | 1.47 | 3.0 | 1.12 | 2.3 | 2.62 | 5.4 | 7.94 | 16.4 |
| Rest of Asia | 0.40 | 2.3 | 0.90 | 5.2 | 0.47 | 2.7 | 1.78 | 10.2 | 5.38 | 30.8 |
| | | | | | | | | | | |
| **Other** | | | | | | | | | | |
| Chile | -0.05 | -0.0 | 1.29 | 1.0 | 1.17 | 0.9 | 2.40 | 1.9 | 7.28 | 5.9 |
| Cent., Carib., S. Amer. | -0.03 | -0.5 | 0.31 | 5,.1 | 1.13 | 18.9 | 1.41 | 23.6 | 4.28 | 71.4 |
| Middle East & N. Africa | 0.09 | 0.8 | 0.92 | 8.0 | 0.88 | 7.6 | 1.90 | 16.4 | 5.75 | 49.7 |
| | | | | | | | | | | |
| **Total** | | **10.8** | | **210.7** | | **389.6** | | **613.0** | | **1,857.4** |

Note: These numbers have been rounded.

**Table 3**
**Sectoral Employment Effects for Canada, Mexico, and the United States of 33 Percent Reductions in Post-Uruguay Round Agricultural and Manufactures Tariffs and Services Barriers**
**(Percent of Employment and Number of Workers)**

| Sector | Canada (1) | | Mexico (2) | | United States (3) | |
|---|---|---|---|---|---|---|
| Agriculture | 2.96% | 18,705 | 0.33% | 31,653 | 3.23% | 132,608 |
| Mining | -0.44 | -834 | 0.26 | 438 | 0.08 | 577 |
| Food, Beverages & Tobacco | 1.05 | 5208 | 0.05 | 270 | 0.29 | 9,113 |
| Textiles | -3.71 | -1,275 | -0.31 | -858 | -1.55 | -18,826 |
| Wearing Apparel | -7.86 | -11,324 | -1.71 | -3,241 | -4.37 | -47,605 |
| Leather Products & Footwear | -9.36 | -702 | -1.56 | -2,023 | -6.21 | -9,042 |
| Wood & Wood Products | 1.08 | 5,256 | 0.04 | 156 | 0.13 | 5,765 |
| Chemicals | 0.53 | 2,129 | 0.21 | 523 | 0.27 | 7,792 |
| Non-metallic Min. Products | 0.17 | 135 | 0.06 | 1,895 | -0.13 | -1,019 |
| Metal Products | 0.75 | 2,108 | 1.02 | 2,968 | 0.17 | 4,792 |
| Transportation Equipment | 0.41 | 779 | 0.76 | 993 | 0.18 | 3,496 |
| Machinery & Equipment | 1.03 | 1,459 | 1.05 | 2,187 | 0.63 | 18,216 |
| Other Manufactures | -0.48 | -279 | -1.74 | -436 | 0.47 | 8,534 |
| Elec., Gas & Water | 0.21 | 1,599 | 0.08 | 651 | 0.19 | 8,919 |
| Construction | 0.13 | 2,122 | -0.13 | -2,340 | 0.10 | 13,049 |
| Trade and Transport | 0.10 | 4,284 | 0.22 | 26,328 | -0.14 | -43,127 |
| Other Private Services | -0.86 | -28,571 | -0.98 | -52,116 | -0.25 | -92,052 |
| Government Services | -0.04 | -800 | -0.24 | -7,050 | -0.00 | -1,191 |
| **Total** | | **0.0** | | **0.0** | | **0.0** |

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

**Table 4**
**Global Welfare Effects of Regional Negotiating Options**
**(Percent of GNP and Billions of Dollars)**

| | NAFTA-Chile FTA (1) | | WHFTA (2) | |
|---|---|---|---|---|
| **NAFTA Countries** | | | | |
| Canada | 0.040 | $0.3 | 0.383 | $2.8 |
| Mexico | 0.116 | 0.4 | 0.806 | 2.8 |
| United States | 0.046 | 4.2 | 0.581 | 52.7 |
| | | | | |
| **Industrialized Countries** | | | | |
| Japan | 0.002% | 0.1 | 0.006% | 0.4 |
| Australia | -0.003 | -0.0 | -0.009 | -0.0 |
| New Zealand | -0.001 | -0.0 | -0.004 | -0.0 |
| EU and EFTA | -0.001 | -0.1 | -0.008 | -0.9 |
| | | | | |
| **Developing Countries** | | | | |
| **Asia** | | | | |
| Hong Kong | 0.003 | 0.0 | -0.034 | -0.0 |
| China | -0.002 | -0.0 | -0.008 | -0.1 |
| Korea | -0.004 | -0.0 | -0.028 | -0.2 |
| Singapore | 0.004 | 0.0 | 0.036 | 0.0 |
| Taiwan | 0.003 | 0.0 | 0.015 | 0.1 |
| Indonesia | -0.001 | -0.0 | -0.002 | -0.0 |
| Malaysia | 0.005 | 0.0 | 0.069 | 0.1 |
| Philippines | 0.005 | 0.0 | 0.013 | 0.0 |
| Thailand | 0.002 | 0.0 | -0.003 | -0.0 |
| Rest of Asia | 0.001 | 0.0 | -0.001 | -0.0 |
| | | | | |
| **Other** | | | | |
| Chile | 0.922 | 0.7 | 2.478 | 2.0 |
| Cent., Carib., S. Amer. | -0.010 | -0.2 | 1.103 | 18.4 |
| Middle East & N. Africa | -0.003 | -0.0 | -0.017 | -0.1 |
| | | | | |
| **Total** | | **5.5** | | **77.9** |

Note: These numbers have been rounded.

# Table 5
# Sectoral Employment Effects of a NAFTA-Chile FTA and WHFTA
# (Percent of Employment and Number of Workers)

| | NAFTA-Chile FTA | | | | | | | | WHFTA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sector | U.S. (1) | | Canada (2) | | Mexico (3) | | Chile (4) | | U.S. (5) | | Canada (6) | | Mexico (7) | | Chile (8) | | CCS (9) | |
| Agriculture | -0.02% | -656 | -0.02% | -110 | -0.03% | -2907 | 0.45% | 4896 | -0.48% | -19640 | -0.20% | -1254 | -0.16% | -15595 | 0.71% | 7728 | 0.97% | 216949 |
| Mining | 0.00 | 14 | 0.01 | 17 | -0.02 | -33 | 1.24 | 1196 | -0.20 | -1400 | -0.49 | -946 | -0.12 | -191 | -1.18 | -1138 | 0.64 | 7179 |
| Food, Bev. & Tobacco | -0.01 | -193 | -0.01 | -52 | -0.01 | -47 | -0.04 | -99 | -0.34 | -10610 | -0.05 | -251 | 0.02 | 75 | -0.37 | -838 | 0.67 | 28096 |
| Textiles | 0.02 | 198 | -0.01 | -2 | 0.13 | 364 | -1.28 | -467 | 0.47 | 5685. | -0.40 | -137 | 0.61 | 1660 | -1.21 | -439 | 0.14 | 1746 |
| Wearing Apparel | -0.02 | -204 | -0.02 | -25 | -0.03 | -52 | 0.26 | 157 | 0.53 | 5778 | -0.63 | -906 | -1.15 | -2179 | 0.72 | 429 | 2.10 | 35488 |
| Leather Prod. & Footwear | -0.03 | -42 | -0.07 | -5 | -0.01 | -11 | 0.62 | 27 | -0.41 | -604 | -1.52 | -114 | -0.33 | -426 | 0.08 | 4 | 2.92 | 9996 |
| Wood & Wood Products | 0.00 | 187 | -0.02 | -86 | -0.03 | -118 | 0.21 | 89 | 0.09 | 3884 | -0.08 | -385 | -0.32 | -1384 | 0.28 | 120 | -0.91 | -12007 |
| Chemicals | 0.02 | 511 | 0.00 | -15 | 0.04 | 98 | -1.97 | -1577 | 0.13 | 3784 | 0.18 | 730 | 0.31 | 772 | -1.36 | -1087 | -0.42 | -10756 |
| Non-metallic Min. Products | 0.00 | 37 | 0.00 | -2 | 0.01 | 399 | -0.55 | -50 | 0.04 | 321 | 0.01 | 9 | 0.36 | 12221 | -1.53 | -139 | -0.66 | -1730 |
| Metal Products | 0.00 | -109 | -0.01 | -42 | 0.06 | 163 | 1.72 | 1902 | 0.04 | 1092 | -0.04 | -100 | -0.25 | -724 | 2.47 | 2731 | -0.48 | -8372 |
| Transportation Equipment | 0.02 | 340 | -0.02 | -29 | 0.25 | 322 | -2.89 | -296 | 0.15 | 2995 | 0.52 | 986 | 1.25 | 1638 | 4.89 | 501 | -1.45 | -13332 |
| Machinery & Equipment | 0.02 | 468 | 0.06 | 86 | -0.05 | -105 | -5.27 | -760 | 0.38 | 11145 | 0.19 | 273 | -0.46 | -954 | -3.33 | -480 | -3.00 | -34525 |
| Other Manufactures | 0.00 | 68 | 0.00 | -1 | -0.04 | -11 | -1.92 | -20 | 0.68 | 12358 | -0.27 | -159 | -0.46 | -114 | 0.66 | 7 | -1.33 | -1394 |
| Elec., Gas & Water | 0.01 | 268 | 0.00 | 17 | 0.01 | 94 | 0.04 | 101 | 0.07 | 3137 | 0.02 | 163 | 0.02 | 134 | 0.01 | 20 | -0.22 | -11475 |
| Construction | 0.00 | 488 | 0.00 | 70 | 0.01 | 256 | -0.05 | -284 | 0.04 | 5444 | 0.05 | 846 | 0.10 | 1809 | 0.19 | 1086 | -0.27 | -26865 |
| Trade and Transport | 0.00 | 323 | 0.01 | 240 | 0.01 | 1340 | -0.54 | -7756 | 0.00 | 1066 | 0.05 | 1917 | 0.05 | 6231 | -0.71 | -10226 | -0.49 | -105770 |
| Other Private Services | 0.00 | -1597 | 0.00 | -96 | 0.00 | 10 | 0.59 | 5466 | -0.03 | -12453 | -0.01 | -325 | -0.06 | -3462 | 0.59 | 5474 | -0.22 | -48196 |
| Government Services | 0.00 | -100 | 0.00 | 36 | 0.01 | 238 | -0.42 | -2525 | -0.04 | -11983 | -0.02 | -348 | 0.02 | 490 | -0.62 | -3752 | -0.16 | -25030 |
| | | | | | | | | | | | | | | | | | | |
| **Total** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** |

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

**Table 6**
**Global Welfare Effects of Canadian FTA Initiatives**
**(Percent of GNP and Millions of Dollars)**

| | Canada-Chile FTA (1) | | Canada-EU/EFTA FTA (2) | |
|---|---|---|---|---|
| **NAFTA Countries** | | | | |
| Canada | 0.04% | $257 | 0.95% | $6,912 |
| Mexico | -0.00 | -0 | -0.03 | -96 |
| United States | 0.00 | 1 | -0.01 | -899 |
| | | | | |
| **Other Industrialized Countries** | | | | |
| EU and EFTA | -0.00 | -6 | 0.15 | 16,937 |
| Japan | 0.00 | 1 | -0.00 | -165 |
| Australia | -0.00 | -1 | 0.00 | 0 |
| New Zealand | -0.00 | -0 | -0.00 | -2 |
| | | | | |
| **Developing Countries** | | | | |
| **Western Hemisphere** | | | | |
| Chile | 0.15 | 124 | 0.01 | 8 |
| Central America, Caribbean, and Rest of South America | -0.00 | -16 | 0.00 | 2 |
| | | | | |
| **Asia** | | | | |
| Hong Kong | 0.00 | 0 | 0.01 | 11 |
| China | -0.00 | -2 | -0.01 | -64 |
| Korea | -0.00 | -1 | -0.00 | -1 |
| Singapore | 0.00 | 0 | -0.01 | -6 |
| Taiwan | -0.00 | -0 | -0.01 | -44 |
| Indonesia | -0.00 | -0 | -0.00 | -12 |
| Malaysia | 0.00 | 0 | -0.02 | -28 |
| Philippines | 0.00 | 0 | -0.00 | -4 |
| Thailand | 0.00 | 0 | 0.01 | 14 |
| Rest of Asia | -0.00 | -0 | 0.00 | 25 |
| | | | | |
| **Middle East and North Africa** | 0.00 | -2 | -0.00 | -29 |
| | | | | |
| **Total** | | **354** | | **22,560** |

Note: These numbers have been rounded.

**Table 7**
**Sectoral Employment Effects of a Canada-EU/EFTA FTA**
**(Percent of Employment and Number of Workers)**

| Sector | Canada (1) | | EU/EFTA (2) | |
|---|---|---|---|---|
| Agriculture | 1.35% | 8,546 | -0.07% | -6,145 |
| Mining | -1.75 | -3,352 | 0.48 | 4,513 |
| Food, Beverages & Tobacco | 0.73 | 3,594 | -0.02 | -1,193 |
| Textiles | -0.18 | -63 | 0.04 | 619 |
| Wearing Apparel | -0.10 | -147 | 0.05 | 974 |
| Leather Products & Footwear | -2.14 | -160 | 0.23 | 876 |
| Wood & Wood Products | 0.87 | 4,212 | -0.07 | -2,608 |
| Chemicals | 0.59 | 2,352 | 0.01 | 676 |
| Non-metallic Min. Products | 0.10 | 80 | -0.01 | -205 |
| Metal Products | 1.45 | 4,075 | -0.02 | -1,221 |
| Transportation Equipment | 1.87 | 3,517 | -0.04 | -1,018 |
| Machinery & Equipment | 2.36 | 3,341 | -0.08 | -3,523 |
| Other Manufactures | 1.37 | 800 | -0.04 | -686 |
| Elec., Gas & Water | 0.13 | 975 | 0.01 | 570 |
| Construction | 0.06 | 919 | 0.01 | 820 |
| Trade and Transport | -0.09 | -3,615 | -0.01 | -1,568 |
| Other Private Services | -0.77 | -25,741 | 0.03 | 12,905 |
| Government Services | 0.03 | 668 | -0.01 | -3,786 |
| **Total** | | **0.0** | | **0.0** |

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

**Table 8**
**Global Welfare Effects of Mexican FTA Initiatives**
**(Percent of GNP and Millions of Dollars)**

| | Mexico-Chile FTA (1) | | Mexico-EU/EFTA FTA (2) | | Mexico-Japan FTA (3) | |
|---|---|---|---|---|---|---|
| **NAFTA Countries** | | | | | | |
| Canada | -0.00% | $-0 | -0.01% | $-65 | -0.01% | $-33 |
| Mexico | 0.12 | 416 | 1.02 | 3,615 | 0.54 | 1,912 |
| United States | -0.00 | -30 | -0.00 | -476 | -0.01 | -750 |
| **Other Industrialized Countries** | | | | | | |
| EU and EFTA | -0.00 | -18 | 0.07 | 7,341 | -0.00 | -121 |
| Japan | -0.00 | -6 | -0.00 | -178 | 0.10 | 6,343 |
| Australia | -0.00 | -1 | 0.00 | 5 | 0.00 | 9 |
| New Zealand | -0.00 | -0 | -0.00 | -1 | 0.00 | 2 |
| | | | | | | |
| **Developing Countries** | | | | | | |
| **Western Hemisphere** | | | | | | |
| Chile | 0.17 | 138 | 0.01 | 9 | -0.00 | -1 |
| Central America, Caribbean, | -0.00 | -25 | 0.00 | 22 | -0.00 | -21 |
| and Rest of South America | | | | | | |
| **Asia** | | | | | | |
| Hong Kong | 0.00 | 0 | 0.00 | 5 | -0.00 | -4 |
| China | -0.00 | -2 | -0.00 | -18 | 0.00 | 0 |
| Korea | -0.00 | -4 | -0.00 | -17 | -0.00 | -13 |
| Singapore | 0.00 | 0 | -0.01 | -6 | -0.00 | -3 |
| Taiwan | 0.00 | 2 | -0.01 | -35 | -0.01 | -26 |
| Indonesia | -0.00 | -1 | -0.00 | -5 | 0.00 | 5 |
| Malaysia | 0.00 | 1 | -0.02 | -22 | -0.01 | -10 |
| Philippines | 0.00 | 0 | -0.00 | -4 | -0.00 | -1 |
| Thailand | -0.00 | -0 | 0.00 | 6 | 0.00 | 1 |
| Rest of Asia | -0.00 | -0 | 0.00 | 20 | -0.00 | -3 |
| **Middle East and North Africa** | -0.00 | -5 | 0.00 | 17 | 0.00 | 16 |
| | | | | | | |
| **Total** | | **466** | | **10,211** | | **7,302** |

**Table 9**
**Sectoral Employment Effects of a Mexico-EU/EFTA FTA and a Mexico-Japan FTA**
**(Percent of Employment and Number of Workers)**

| Sector | Mexico-EU/EFTA FTA (1) | | | | Mexico-Japan FTA (2) | | | |
|---|---|---|---|---|---|---|---|---|
| | Mexico | | EU/EFTA | | Mexico | | Japan | |
| Agriculture | 0.46% | 43,777 | -0.04% | -3,639 | -0.07% | -6,833 | -0.02% | -746 |
| Mining | 0.09 | 145 | -0.04 | -418 | -0.12 | -200 | -0.12 | -80 |
| Food, Beverages & Tobacco | 0.28 | 1,400 | -0.02 | -809 | -0.03 | -168 | -0.01 | -367 |
| Textiles | 0.29 | 785 | -0.02 | -356 | -0.40 | -1,080 | -0.01 | -41 |
| Wearing Apparel | 0.11 | 211 | -0.01 | -192 | -0.39 | -736 | -0.01 | -109 |
| Leather Products & Footwear | -0.03 | -41 | -0.04 | -162 | -0.20 | -264 | -0.02 | -20 |
| Wood & Wood Products | -0.03 | -146 | -0.00 | -42 | -0.26 | -1,157 | -0.00 | -32 |
| Chemicals | -0.09 | -237 | 0.01 | 544 | -0.34 | -848 | 0.01 | 200 |
| Non-metallic Min. Products | -0.37 | -12,375 | 0.01 | 298 | -0.23 | -7,844 | 0.00 | 47 |
| Metal Products | 1.00 | 2,918 | 0.01 | 297 | -0.29 | -858 | 0.02 | 560 |
| Transportation Equipment | 0.83 | 1,089 | 0.02 | 594 | -0.61 | -793 | 0.05 | 318 |
| Machinery & Equipment | 1.99 | 4,156 | 0.01 | 295 | -0.07 | -136 | 0.06 | 1,397 |
| Other Manufactures | 0.95 | 238 | -0.01 | -248 | -1.22 | -305 | 0.05 | 277 |
| Elec., Gas & Water | 0.10 | 852 | 0.00 | 176 | -0.05 | -414 | 0.01 | 262 |
| Construction | -0.34 | -6,044 | 0.01 | 1,328 | -0.03 | -531 | 0.01 | 607 |
| Trade and Transport | -0.10 | -11,756 | 0.00 | 566 | 0.21 | 24,374 | -0.02 | -2,730 |
| Other Private Services | -0.40 | -21,238 | 0.00 | 2,237 | 0.03 | 1,722 | 0.00 | 405 |
| Government Services | -0.13 | -3,735 | -0.00 | -467 | -0.13 | -3,930 | 0.00 | 53 |
| **Total** | | **0.0** | | **0.0** | | **0.0** | | **0.0** |

Note: These numbers have been rounded.

**Table 10**
**Global Welfare Effects of United States FTA Initiatives**
**(Percent of GNP and Millions of Dollars)**

| | U.S.-Chile FTA (1) | | U.S.-Singapore FTA (2) | | U.S.-Korea FTA (3) | |
|---|---|---|---|---|---|---|
| **NAFTA Countries** | | | | | | |
| Canada | 0.005% | $34 | -0.012% | $-90 | 0.035% | $252 |
| Mexico | -0.001 | -5 | -0.015 | -53 | 0.017 | 61 |
| United States | 0.046 | 4,215 | 0.184 | 16,724 | 0.322 | 29,226 |
| **Other Industrialized Countries** | | | | | | |
| EU and EFTA | -0.000 | -42 | 0.009 | 956 | 0.002 | 196 |
| Japan | 0.002 | 130 | 0.018 | 1,180 | 0.004 | 268 |
| Australia | -0.002 | -10 | 0.032 | 140 | 0.002 | 10 |
| New Zealand | -0.001 | -1 | 0.026 | 19 | 0.003 | 2 |
| | | | | | | |
| **Developing Countries** | | | | | | |
| **Western Hemisphere** | | | | | | |
| Chile | 0.596 | 479 | 0.014 | 11 | 0.008 | 6 |
| Central America, Caribbean, | -0.008 | -129 | -0.002 | -32 | 0.008 | 135 |
| and Rest of South America | | | | | | |
| **Asia** | | | | | | |
| Hong Kong | 0.003 | 4 | -0.021 | -27 | 0.061 | 78 |
| China | -0.001 | -11 | -0.006 | -57 | 0.005 | 42 |
| Korea | -0.003 | -17 | 0.017 | 96 | 1.436 | 8,172 |
| Singapore | 0.004 | 3 | 2.701 | 2,009 | 0.022 | 16 |
| Taiwan | 0.002 | 7 | -0.003 | -10 | 0.000 | 0 |
| Indonesia | -0.001 | -3 | 0.007 | 17 | 0.013 | 34 |
| Malaysia | 0.004 | 5 | -0.204 | -244 | 0.013 | 16 |
| Philippines | 0.004 | 4 | -0.035 | -31 | 0.014 | 12 |
| Thailand | 0.002 | 4 | 0.003 | 6 | 0.005 | 11 |
| Rest of Asia | 0.001 | 4 | -0.005 | -28 | 0.014 | 82 |
| **Middle East and North Africa** | -0.002 | -16 | 0.003 | 24 | 0.023 | 200 |
| | | | | | | |
| **Total** | | **4,652** | | **20,612** | | **38,821** |

Note: These numbers have been rounded.

**Table 11**
**Sectoral Employment Effects of U.S. FTAs with Chile, Singapore, and Korea**
**(Percent of Employment and Number of Workers)**

| Sector | U.S.-Chile FTA (1) | | | | U.S.-Singapore FTA (2) | | | | U.S.-Korea FTA (3) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | United States | | Chile | | United States | | Singapore | | United States | | Korea | |
| Agriculture | -0.02% | -730 | 0.30% | 3,258 | 0.09% | 3,794 | -2.71% | -127 | 1.28% | 52,508 | -3.93% | -111,888 |
| Mining | -0.00 | -10 | 1.14 | 1,094 | 0.08 | 586 | -2.97 | -18 | -0.10 | -707 | 0.67 | 207 |
| Food, Beverages & Tobacco | -0.01 | -206 | -0.11 | -251 | 0.04 | 1,118 | -5.23 | -2,796 | 0.12 | 3,958 | -0.92 | -4,836 |
| Textiles | 0.02 | 216 | -0.77 | -280 | 0.05 | 614 | -4.91 | -223 | -0.45 | -5,429 | 4.86 | 31,653 |
| Wearing Apparel | -0.02 | -203 | 0.24 | 144 | -0.03 | -372 | 15.28 | 8,411 | -0.68 | -7,452 | 8.68 | 50,828 |
| Leather Products & Footwear | -0.03 | -40 | 0.36 | 16 | 0.18 | 263 | -5.40 | -139 | -0.78 | -1,131 | 7.03 | 7,398 |
| Wood & Wood Products | 0.00 | 49 | 0.08 | 35 | 0.03 | 1,145 | -4.63 | -1,944 | -0.03 | -1,317 | 0.08 | 298 |
| Chemicals | 0.02 | 507 | -1.74 | -1,395 | 0.06 | 1,649 | -5.87 | -8,483 | 0.01 | 223 | 0.24 | 1,540 |
| Non-metallic Min. Products | 0.00 | 27 | -0.46 | -42 | 0.04 | 304 | -3.33 | -545 | -0.02 | -154 | -0.67 | -2,764 |
| Metal Products | -0.00 | -95 | 1.41 | 1,556 | 0.07 | 1,975 | -7.13 | -2,989 | -0.06 | -1,568 | 0.71 | 6,888 |
| Transportation Equipment | 0.02 | 373 | -2.15 | -220 | 0.06 | 1,151 | -5.43 | -202 | -0.08 | -1,546 | 0.24 | 376 |
| Machinery & Equipment | 0.02 | 515 | -5.20 | -749 | 0.15 | 4,296 | -4.42 | -3,067 | 0.01 | 194 | 1.37 | 6,708 |
| Other Manufactures | 0.00 | 78 | -1.95 | -21 | 0.18 | 3,270 | -4.69 | -1,355 | -0.34 | -6,164 | 4.74 | 23,587 |
| Elec., Gas & Water | 0.01 | 269 | 0.03 | 89 | 0.02 | 694 | -0.79 | -298 | 0.01 | 294 | 0.24 | 2,310 |
| Construction | 0.00 | 514 | -0.05 | -263 | 0.00 | 482 | -0.05 | -98 | -0.00 | -218 | -0.08 | -2,812 |
| Trade and Transport | 0.00 | 341 | -0.41 | -5,927 | -0.07 | -21,804 | 1.89 | 14,225 | -0.06 | -17,633 | 0.61 | 22,198 |
| Other Private Services | -0.00 | -1,568 | 0.54 | 5,011 | -0.00 | -206 | 0.60 | 1,911 | -0.00 | -650 | -0.87 | -31,933 |
| Government Services | -0.00 | -38 | -0.34 | -2,055 | 0.00 | 1,041 | -1.60 | -2,265 | -0.05 | -13,210 | 0.01 | 241 |
| **Total** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** |

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

**Table 12**
**NAFTA Post-Uruguay Round External Tariff Rates**
**and Calculated Harmonized Tariff Rates**
**(Percentage)**

| | Average Tariff Rates | | | Harmonized Rates | | |
|---|---|---|---|---|---|---|
| **Sector** | **United States** | **Canada** | **Mexico** | **Simple Average** | **Trade Weighted** | **Production Weighted** |
| Agriculture | 4.5 | 1.2 | 2.8 | 2.8 | 4.1 | 3.9 |
| Mining | 0.3 | 13.5 | 8.3 | 7.3 | 1.5 | 3.2 |
| Food, Beverages & Tobacco | 18.8 | 6.8 | 5.0 | 10.2 | 17.2 | 17.3 |
| Textiles | 9.9 | 17.9 | 13.6 | 13.8 | 11.0 | 10.7 |
| Wearing Apparel | 11.3 | 22.2 | 17.0 | 16.8 | 12.1 | 12.2 |
| Leather Products & Footwear | 8.3 | 14.1 | 17.4 | 13.3 | 8.9 | 10.7 |
| Wood & Wood Products | 2.1 | 3.9 | 9.8 | 5.3 | 2.5 | 2.7 |
| Chemicals | 5.2 | 7.0 | 8.7 | 7.0 | 5.5 | 5.6 |
| Non-metallic Min. Products | 8.2 | 5.7 | 15.1 | 9.7 | 8.2 | 8.5 |
| Metal Products | 3.8 | 6.0 | 9.3 | 6.3 | 4.2 | 4.2 |
| Transportation Equipment | 2.7 | 6.2 | 12.6 | 7.2 | 3.2 | 3.4 |
| Machinery & Equipment | 3.2 | 3.2 | 9.4 | 5.3 | 3.4 | 3.5 |
| Other Manufactures | 2.9 | 3.0 | 15.0 | 7.0 | 3.2 | 3.7 |

**Table 13**
**Global Welfare Effects of NAFTA Tariff Harmonization**
**(Percent of GNP and Millions of Dollars)**

| | Simple Average (1) | | Trade Weighted (2) | | Production Weighted (3) | |
|---|---|---|---|---|---|---|
| **NAFTA Countries** | | | | | | |
| Canada | 0.261% | $1,899.1 | -0.108% | $-789.4 | -0.084% | $-612.7 |
| Mexico | 0.639 | 2,255.2 | 0.164 | 579.8 | 0.202 | 713.1 |
| United States | 0.148 | 13,468.9 | 0.008 | 764.0 | 0.017 | 1,567.5 |
| **Other Industrialized Countries** | | | | | | |
| EU and EFTA | -0.092 | -10,116.3 | -0.003 | -328.9 | 0.005 | 597.5 |
| Japan | -0.187 | -12,167.5 | -0.001 | -49.0 | -0.008 | -542.1 |
| Australia | -0.059 | -260.4 | -0.010 | -44.9 | -0.039 | -169.4 |
| New Zealand | -0.185 | -135.7 | -0.002 | -1.8 | -0.002 | -1.5 |
| | | | | | | |
| **Developing Countries** | | | | | | |
| **Western Hemisphere** | | | | | | |
| Chile | -0.253 | -203.4 | -0.001 | -0.5 | -0.015 | -12.1 |
| Central America, Caribbean, | -0.206 | -3,438.6 | 0.005 | 82.1 | -0.057 | -950.0 |
| and Rest of South America | | | | | | |
| **Asia** | | | | | | |
| Hong Kong | -0.491 | -632.3 | -0.006 | -7.6 | -0.011 | -14.0 |
| China | -0.283 | -2,565.7 | -0.003 | -30.5 | -0.048 | -435.6 |
| Korea | -0.339 | -1,927.9 | -0.005 | -27.1 | -0.018 | -103.5 |
| Singapore | -0.614 | -456.4 | -0.002 | -1.4 | -0.046 | -34.0 |
| Taiwan | -0.715 | -2,506.7 | -0.004 | -15.7 | -0.025 | -86.9 |
| Indonesia | -0.278 | -703.8 | 0.004 | 9.7 | -0.039 | -99.9 |
| Malaysia | -1.381 | -1,651.1 | -0.008 | -9.9 | -0.064 | -76.5 |
| Philippines | -1.267 | -1,118.1 | 0.005 | 4.5 | -0.119 | -104.9 |
| Thailand | -0.540 | -1,113.2 | 0.004 | 7.4 | -0.069 | -141.4 |
| Rest of Asia | -0.316 | -1,807.4 | -0.003 | -15.7 | -0.012 | -70.0 |
| **Middle East and North Africa** | -0.642 | -5,544.4 | 0.001 | 9.5 | -0.216 | -1,863.4 |
| **Total** | | **-28,725.8** | | **134.5** | | **2,439.7** |

**Table 14**
**Sectoral Employment Effects for Canada, Mexico, and the United States of NAFTA Tariff Harmonization**
**(Percent of Employment and Number of Workers)**

| | (1) Simple Average | | | | | | (2) Trade Weighted | | | | | | (3) Production Weighted | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Canada** | | **Mexico** | | **U.S.** | | **Canada** | | **Mexico** | | **U.S.** | | **Canada** | | **Mexico** | | **U.S.** | |
| | | | | | | | | | | | | | | | | | | |
| Agriculture | -0.66% | -4,168 | -0.19% | -17,723 | -1.19% | -48,627 | 0.59% | 3,711 | 0.02% | 1,747 | -0.08% | -3,474 | 0.47 | 2,986 | 0.00% | -21 | -0.20% | -8,034 |
| Mining | -1.05 | -2,013 | -0.07 | -120 | 2.33 | 16,532 | -2.11 | -4,029 | -0.08 | -138 | 0.50 | 3,564 | -1.83 | -3,510 | 0.02 | 25 | 1.20 | 8,504 |
| Food, Beverages & Tobacco | 0.21 | 1,063 | 0.13 | 651 | -0.67 | -21,199 | 1.24 | 6,135 | 0.20 | 1,004 | -0.11 | -3,329 | 1.25 | 6,188 | 0.21 | 1,032 | -0.11 | -3,437 |
| Textiles | -2.41 | -828 | -0.05 | -146 | 1.15 | 13,946 | -3.64 | -1,251 | -0.17 | -465 | 0.25 | 3,020 | -3.93 | -1,350 | -0.21 | -580 | 0.11 | 1,320 |
| Wearing Apparel | -3.06 | -4,403 | 0.93 | 1,753 | 3.28 | 35,772 | -6.09 | -8,770 | -0.01 | -19 | 0.46 | 5,013 | -6.29 | -9,062 | 0.00 | -1 | 0.43 | 4,657 |
| Leather Products & Footwear | 0.52 | 39 | 0.24 | 309 | 5.14 | 7,486 | -4.99 | -374 | -0.67 | -863 | 0.45 | 648 | -2.01 | -151 | -0.23 | -294 | 3.28 | 4,772 |
| Wood & Wood Products | -0.47 | -2,302 | -0.15 | -678 | 0.10 | 4,408 | 0.15 | 725 | -0.30 | -1,328 | -0.01 | -638 | 0.07 | 339 | -0.31 | -1,345 | -0.02 | -715 |
| Chemicals | 0.61 | 2,420 | -0.28 | -700 | -0.11 | -3,066 | 0.54 | 2,170 | -0.32 | -786 | -0.01 | -260 | 0.58 | 2,318 | -0.29 | -726 | -0.05 | -1,485 |
| Non-metallic Min. Products | 1.03 | 814 | -0.14 | -4,702 | -0.06 | -431 | 0.92 | 727 | -0.16 | -5,423 | -0.05 | -398 | 0.98 | 770 | -0.15 | -4,972 | -0.02 | -137 |
| Metal Products | 0.61 | 1,730 | 0.07 | 211 | 0.01 | 213 | 0.66 | 1,859 | 0.35 | 1,023 | -0.07 | -1,789 | 0.59 | 1,650 | 0.27 | 797 | -0.11 | -3,124 |
| Transportation Equipment | 1.85 | 3,476 | 1.08 | 1,408 | 0.46 | 9,078 | 1.06 | 1,988 | 0.41 | 537 | -0.09 | -1,824 | 1.06 | 1,993 | 0.44 | 579 | -0.07 | -1,333 |
| Machinery & Equipment | 0.59 | 843 | 2.09 | 4,356 | -0.54 | -15,545 | 0.61 | 862 | 1.87 | 3,891 | -0.14 | -3,936 | 0.50 | 714 | 1.81 | 3,764 | -0.26 | -7,403 |
| Other Manufactures | 3.09 | 1,808 | -1.15 | -288 | 2.04 | 37,049 | 0.82 | 481 | -2.75 | -688 | 0.10 | 1,744 | 1.16 | 682 | -2.48 | -620 | 0.42 | 7,721 |
| Elec., Gas & Water | 0.10 | 747 | 0.12 | 979 | -0.03 | -1,595 | 0.01 | 97 | 0.04 | 362 | -0.01 | -520 | 0.02 | 188 | 0.05 | 414 | -0.02 | -984 |
| Construction | 0.11 | 1,848 | 0.12 | 2,165 | 0.03 | 3,558 | 0.00 | -38 | 0.02 | 346 | 0.00 | 116 | 0.01 | 144 | 0.03 | 546 | 0.00 | 161 |
| Trade and Transport | -0.05 | -2,049 | 0.06 | 7,062 | -0.09 | -27,877 | 0.00 | 10 | 0.05 | 6,440 | 0.00 | -1,016 | -0.01 | -254 | 0.05 | 6,210 | -0.01 | -3,991 |
| Other Private Services | -0.02 | -720 | 0.08 | 4,364 | -0.08 | -29,723 | -0.04 | -1,167 | -0.02 | -999 | 0.00 | 124 | -0.03 | -1,084 | -0.01 | -632 | 0.00 | -1,340 |
| Government Services | 0.08 | 1,693 | 0.04 | 1,099 | 0.07 | 20,021 | -0.14 | -3,136 | -0.16 | -4,642 | 0.01 | 2,956 | -0.11 | -2,561 | -0.14 | -4,177 | 0.02 | 4,848 |
| **Total** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** | | **0.0** |

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.