RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

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

Discussion Paper No. 468

CGE Modeling and Analysis of Multilateral and Regional Negotiating Options

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To be published in Robert M. Stern (ed.), *Issues and Options for U.S.-Japan Trade Policies,* University of Michigan Press, Ann Arbor, forthcoming.

Abstract

We have used the Michigan Model of World Production and Trade to simulate the economic effects on the United States, Japan, and other major trading countries/regions of: the Uruguay Round of multilateral trade negotiations completed in 1993-94; a prospective new round of WTO multilateral trade negotiations; and a variety of regional/bilateral free trade agreements (FTAs) involving the United States and Japan. We estimate that the Uruguay Round negotiations increased global economic welfare by $75.1 billion annually, with gains of $12.9 billion for the United States and $15.6 billion for Japan. An assumed reduction of all post-Uruguay Round tariffs on agricultural and industrial products and of all services barriers by 33 percent in a new WTO trade round is estimated to increase world welfare by $613.0 billion, with gains of $177.3 billion for the United States and $123.7 billion for Japan. If there were global free trade with all post-Uruguay Round trade barriers completely removed, then world welfare would increase by $1.9 trillion, with gains of $537.2 billion (5.9 percent of GNP) for the United States and $374.8 billion (5.8 percent of GNP) for Japan.

Elimination of APEC-member country bilateral post-Uruguay Round tariffs on agricultural and industrial products and services barriers is estimated to increase world welfare by $764.4 billion, with gains of $294.7 billion for the United States and $283.1 billion for Japan and losses of $7.0 billion for the European Union/EFTA and $1.0 billion for South Asia. Separate bilateral FTAs involving Japan with Singapore, Mexico, South Korea, and Chile and an ASEAN Plus-3 FTA involving Japan, China/Hong Kong, and South Korea would have positive, though generally small, welfare effects, but potentially disruptive sectoral employment shifts in some member countries. Depending on the agreement, there may be detrimental welfare effects on some nonmembers. The welfare gains from multilateral trade liberalization are therefore considerably greater than the gains from preferential trading arrangements and more uniformly positive for all countries.

January 23, 2001

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I. Introduction

The United States and Japan are two of the key players in the global trading system even though they have at times been at odds regarding each other's trade and domestic policies. What we wish to explore in this paper are the options that the two nations have in prospective trade negotiations at the multilateral and regional levels. For this purpose, we use the Michigan Model of World Production and Trade to provide some quantitative assessments of the economic effects of different options. 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 multilateral and regional trade policies.

In Section II we first analyze the multilateral trade liberalization provisions of the Uruguay Round Agreements. For this purpose, we use a 20-country/18-sector version of our CGE model. Then, in Section III, we consider 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 IV, we analyze regional negotiating options of interest to the United States and Japan. These options include the removal of trade barriers between members of the Asia Pacific Economic Cooperation (APEC) forum and possible bilateral free trade agreements between Japan and Singapore, Japan and Mexico, Japan and Korea, and Japan and Chile. We also consider a possible ASEAN Plus-3 free trade agreement involving the ASEAN member countries together with Japan, China/Hong Kong, and South Korea. Conclusions and implications for policy are discussed in Section V.

II. Computational Analysis of Multilateral Trade Liberalization in the Uruguay Round

In this section we analyze the trade liberalization provisions in the Uruguay Round. As mentioned, we will use CGE model-based simulation analysis to assess the potential economic effects arising from the implementation of the liberalization provisions. The computational experiments consist of simulating the economic effects of reductions of tariffs and nontariff barriers on the countries/regions included in the 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. 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.[1] Agriculture is modeled as perfectly competitive and all other sectors as monopolistically competitive with free entry and exit of 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 requires intermediate inputs in fixed proportions. In the second stage, expenditure on monopolistically

[1] 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. RME is the Rest of the Middle East, consisting of Morocco, Turkey, and the Rest of North Africa.

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.[2] 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 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, the 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.

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

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.
1. Input-output tables for the 20 countries/regions, excluding ROW
2. Components of final demand along with sectoral contributions for the 20 countries/regions, excluding ROW
3. Gross value of output and value added at the sectoral level for the 20 countries/regions, excluding ROW
4. Bilateral import tariffs by sector among the 20 countries/regions
5. Elasticity of substitution between capital and labor by sector
6. Bilateral export-tariff 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*.[3]

[3] 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.

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.[4]

We have projected the GTAP-4 1995 database to the year 2005 by extrapolating the labor availability in different countries/regions by 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 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*.[5]

Computational Scenarios

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. Accordingly, 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. The scaled-up database for 2005 is then readjusted to mimic the world as it might look in the post-UR implementation. In Section III following, we use these re-adjusted data as the starting point to carry out some liberalization scenarios for a forthcoming WTO negotiating round, involving possible reductions in tariffs on agricultural products and manufactures and reductions of barriers to trade in services.

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[4] We also need data on supply elasticities from ROW, which have been taken from the Michigan Model database.

In this section, we report on the following four scenarios:

UR-1 *The Agreement on Textiles and Clothing (ATC) is analyzed by simulating the effects of phase-out of the Multi-Fiber Arrangement (MFA) under the Uruguay-Round (UR) agreement. This is done by assuming complete elimination of the MFA export-tax equivalents on textiles and wearing apparel for the developing countries/regions subject to the MFA and other quotas imposed on their exports to the industrialized countries.*

UR-2 *Agricultural liberalization is modeled according to the percentage reductions in import tariffs and export subsidies for the industrialized and developing countries as agreed upon in the Uruguay Round. Agricultural import tariffs were reduced by 20 percent for the industrialized countries and by 13 percent for the developing countries. Agricultural export subsidies were reduced by 36 percent for the industrialized countries and by 24 percent for the developing countries.*

UR-3 *All the countries/regions in the model are assumed to reduce their bilateral import tariffs as per the UR Agreement on mining and manufactured products.*[6]

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

Computational Results

Table 1 provides aggregate, or economy-wide, results from the scenarios listed above for the countries/regions that have been modeled. Disaggregated sectoral results for the **UR-4** scenario for the United States and for Japan are reported in tables 2-3.

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

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[5] See Hertel and Martin (1999) and Hertel (2000) for a more elaborate and detailed procedure for calculating year 2005 projections.

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

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[6] See Francois and Strutt (1999) for details on the post-UR tariff rates.

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.

A final point to note about our model is the modeling and role of nontariff barriers, such as those applying to textiles and apparel. These are quantitative restrictions, captured in the model by endogenous tariff equivalents that rise and fall with changing supplies and demands for trade. The tariff equivalents generate quota rents that accrue to whatever group is granted the rights to trade under the restriction, which in the case of the MFA are the countries that export textiles and wearing apparel. Liberalization of these nontariff barriers reduces or eliminates these quota rents, and this can be costly to those who possessed them disproportionately beforehand. Therefore, it is not the case that exporting countries necessarily benefit from relaxation of these trade barriers, since their loss of quota rents can more than outweigh their gains from increased exports. Indeed, the exports of particular countries can actually decline, along with their national welfare, if increased exports from other countries displace them in world markets.

In the real world, all of these 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

As already mentioned, table 1 reports various economy-wide changes for each of the countries/regions of the model. These include changes in exports and imports in millions of dollars, changes in terms of trade, real wage rate and real return to capital in percentages, and changes in economic welfare measured by equivalent variation, both in millions of dollars and as percent of country GDP. The terms of trade is the world price of a country's exports relative to its imports. The equivalent variation is the amount of money that, if given to the country's consumers at initial prices, would be equivalent in terms of their level of welfare to the effects of the assumed liberalization. In general, as discussed above, a worsening (fall) in a country's terms of trade has an adverse effect on its consumers' welfare. But this can be outweighed by the other gains from trade due to increased economic efficiency and the other benefits modeled by the New Trade theory.

UR-1: Elimination of the MFA Quota Constraints – The results for the Uruguay Round elimination of the MFA quota and other bilateral constraints on developing country exports of textiles and apparel, shown in Scenario UR-1 of table 1, indicate an increase in global welfare of $11.3 billion. In interpreting the results, it should be noted that, with increased exports of these goods to world markets, their prices will fall and the terms of trade of the MFA exporting countries and possibly their economic welfare should deteriorate. This can be seen in column (3) in table 1, with the exception of Singapore and Taiwan that had minimal quota premiums to be removed. It is interesting that the Rest of Asia, which

includes mainly India and Sri Lanka, shows a welfare gain indicating that their exports are stimulated and efficiency is enhanced. The developed countries gain from MFA elimination, except for Japan, which did not maintain MFA quotas and thus is faced with higher world prices for its imports when the quotas are removed.

Changes in returns to labor and capital are mostly small.

UR-2: Agricultural Liberalization – This scenario includes the reductions in both tariffs on agricultural imports and in export subsidies that were negotiated as part of the Uruguay Round Agreement. The results shown for Scenario UR-2 in table 1 indicate that world welfare falls by $26.2 billion. The decline in welfare in Japan is $1.6 billion and in the United States, $6.7 billion. In the underlying results, which are not presented here but are available on request, the reductions in agricultural import tariffs are welfare enhancing in most countries as consumer prices fall and resources are reallocated. Thus, for example, Japan's welfare rises by $2.5 billion. It is noteworthy though that U.S. welfare declines by $2.2 billion, which in this case reflects the negative scale economies experienced in the nonagricultural sectors as resources are shifted to permit the expansion of agricultural output. In the case of export subsidies, their effect is to reduce the consumer price below the producer price, whereas the import tariff raises the consumer price above the producer price. Since tariff rates are generally larger than export-subsidy rates, the nature of the distortion is that consumer prices are too high relative to producer prices. Thus, in order to take a step towards efficiency, the consumer price needs to come down relative to the producer price. That is, the percent change in the ad valorem equivalent separating these two prices has to be negative. In the simulations that we have done, it turns out that the agricultural export subsidies were reduced at almost twice the rate as the agricultural import tariffs. Consequently, the ad valorem equivalent separating consumer and producer prices actually increased, taking us away from the optimum. In this event, Japan experiences a welfare decline of $4.1 billion when agricultural export subsidies are reduced, and U.S. welfare declines by $4.5 billion. It turns out, then, that when the reductions in agricultural import tariffs are combined with reductions in export subsidies, the overall

effect as shown in Scenario UR-2 is welfare reducing for most countries, the European Union (EU)/EFTA being an exception.

UR-3: Liberalization of Industrial Products – Scenario UR-3 covers the reductions in import tariffs on mining and manufactured products that were negotiated in the Uruguay Round. Global economic welfare increases by $90.3 billion and the gains are positive for all countries/regions. The largest welfare increases noted are for EU/EFTA ($31.9 billion), Japan ($17.8 billion), and the United States ($12.0 billion). The effects on returns to labor and capital are uniformly positive.

UR-4: Combined Liberalization Effects (UR-1 + UR-2 + UR-3) – The combined effects of the Uruguay Round liberalization are indicated in Scenario UR-4 of table 1. As noted, this table is the linear combination of UR-1, UR-2, and UR-3. Japan's welfare gain is $15.6 billion and the U.S. gain is $12.9 billion. The other industrialized countries/regions gain, as do the Asian developing countries, except for Hong Kong and Indonesia. Mexico, other Western Hemisphere developing countries (CCS), and the Rest of Middle East (RME) show welfare declines.

Sectoral Results

A major contribution that this sort of CGE modeling can make is to identify those sectors that will expand and those that will contract as a result of various patterns of trade liberalization, as well as the sizes of these changes. Given our assumption that expenditure adjusts within each country to maintain a constant level of total employment, it is necessarily the case that each country experiences a mixture of expansions and contractions at the industry level. This must be true of employment, and it is likely to be true as well for industry output. To report these sectoral results in any detail is tedious, since there are 18 sectors in each country/region. We therefore report the sectoral results only for Japan and the United States in tables 2-3, both for the Combined Liberalization of the Uruguay Round Scenario UR-4. The sectoral results for the other countries/regions are available from the authors on request.

For Japan, in table 2, there are declines in output in agriculture, food, beverages, & tobacco, textiles, and wearing apparel, and increases in all other sectors. The changes in employment mirror these

changes in output. Thus, the declines in the numbers of workers are: agriculture, -39,859; food, beverages, & tobacco, -8,262; textiles, -1,672; and wearing apparel, -11,162. There are employment increases in the remaining manufacturing sectors and also in services. For the United States, in table 3, there are notable increases in employment in agriculture (60,893) and other manufactures (25,707) and decreases in textiles (-26,604), wearing apparel (-69,387), and government services (-11,689). The results for the EU/EFTA, which are not reproduced here but are available on request, show reductions in output and employment especially for agriculture, food, beverages, & tobacco, textiles, wearing apparel, leather and footwear, and other manufactures, and increases for the other manufacturing and services sectors. There is evidence of positive scale effects for most of the sectors.

III. Computational Analysis of the Prospective WTO Round of Multilateral Trade Negotiations

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, 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 (January 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.*[7]

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

[7] 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.

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.*

Data

As noted in Section II, our basic data source is the GTAP-4 Database, supplemented with employment data, and projected to 2005, which is when the Uruguay Round will have been fully implemented. The projected database has in turn been readjusted to include the results of the Uruguay Round implementation as analyzed above.

While services issues were addressed in the Uruguay Round, the main accomplishment was the creation of the General Agreement on Trade in Services (GATS), which is an umbrella agreement setting out the rules governing the four modes of providing services transactions. 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 (2000) 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.[8] 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

[8] 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 breakdowns as is being used here. They also make

table 4 for construction, trade & transport, 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 this country can be considered to be freely open to foreign firms. The excess in any other country above the 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. We further assume for purposes of our analysis here that we can interpret this cost increase as an ad valorem equivalent tariff on 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.

Aggregate Results[9]

The aggregate results of the individual Millennium Round scenarios are presented in tables 5-6, and the sectoral results of the combined scenarios (**MR-4**) for Japan and the United States are presented in tables 7 and 8.

MR-1: Agricultural Liberalization -- The assumed 33 percent reduction in post-Uruguay Round agricultural-import tariffs is shown in table 5 to increase global welfare by $10.8 billion. Japan experiences a welfare increase of $4.3 billion, while the United States records a welfare decline of $4.1 billion. As was the case in our analysis of agricultural liberalization in the Uruguay Round, the expansion of U.S. agriculture has the effect of drawing resources away from the monopolistically competitive, non-

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allowance for international flows of FDI and increases in capital stocks in response to the multilateral trade liberalization that they analyze.

[9] 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.

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. As was the case for the Uruguay Round, liberalization of manufactures in a new trade round is seen to increase welfare in all of the countries/regions listed and to have positive effects as well on real wages and the return to capital. The largest welfare gain is for EU/EFTA ($63.3 billion), while Japan's gain is $57.8 billion and the U.S. gain is $31.3 billion. While the welfare gains for the developing countries/regions are much smaller in absolute terms, the percentage gains range from 0.5 percent for China to 3.5 percent for the Philippines. There are also sizable percentage increases in the real factor returns in the Asian developing economies.

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 and as shown in table 4. These estimates of services barriers are intended to be indirect approximations of what the actual barriers may in fact be. Assuming that the ad valorem equivalents of these barriers are reduced by 33 percent, it can be seen in table 5 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. For

the smaller industrialized and developing countries, the percentage increases in welfare and factor returns are noteworthy.

MR-4: Combined Liberalization Effects (MR-1 + MR-2 + MR-3) – The results for **MR-4** are a linear combination of the other three scenarios. Overall, in table 5, global welfare rises by $613.0 billion. Among the industrialized countries, 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 and increases in returns to factors 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 6, 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), and Japan, $374.8 billion (5.8 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 results for MR-4 for Japan and the United States are presented in tables 7-8. As was the case for the Uruguay Round scenarios, the negative employment effects, in numbers of workers, for Japan are concentrated in agriculture (-75,703), food, beverages & tobacco (-28,763), textiles (-1,195), wearing apparel (31,606), leather products & footwear (-3,227), and trade & transport (-14,735). The largest employment increases are in metal products, durable manufactures, and construction. For the United States, there are employment declines in textiles (-18,826), wearing apparel (-47,605), leather products & footwear (-9,042), trade & transport (-43,126) and other private services (-92,052). The largest employment increases for the United States are in agriculture (132,608), durable manufactures, and construction. The sectoral employment results for global free trade in Scenario MR-5, which are not shown here, are three times the amounts shown in tables 7-8.

Conclusion

The foregoing computational results suggest that there are substantial benefits to be realized from a new WTO multilateral negotiating round, especially for industrial products and services and for both the industrialized and developing countries. 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.

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 occurs at one time. 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 be realized from a new WTO multilateral negotiating round and, if it were possible, from a movement to global free trade.[10]

IV. Analysis of Regional Negotiating Options

Both the United States and Japan are engaged in a number of regional arrangements. For the United States, this includes the North American Free Trade Agreement (NAFTA), which became effective in January 1994,[11] and ongoing discussions and negotiations for a Free Trade Area for the Americas (FTAA). Both the United States and Japan are members of the Asia Pacific Economic

[10] Brown and Stern 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 movements 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 that 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.

[11] See Krueger (2000) for a preliminary assessment of the trade and related effects of NAFTA since its inception in 1994.

Cooperation (APEC) forum. In an especially noteworthy change in its trade policy, Japan is currently (January 2001) negotiating a free trade agreement (FTA) with Singapore and is actively discussing similar arrangements with Mexico, South Korea, Chile, and possibly other countries.[12] There has also been some discussion of a so-called ASEAN Plus-3 arrangement in which Japan, China/Hong Kong, and South Korea would join together with the ASEAN nations in a FTA.

Scenarios

In what follows, we use the Michigan Model to investigate the following regional scenarios that involve both the United States and Japan in the case of APEC, as well as Japan's new regional initiatives mentioned above. Japan's FTA initiatives will certainly cover many other issues besides bilateral removal of existing trade barriers. In the absence of detailed information about the different initiatives, it is nonetheless of interest to consider how the preferential trade liberalization per se in the different arrangements may affect the economic welfare of the member and non-member countries. Accordingly, we have used the Michigan Model to carry out the following Regional Agreement (RA) scenarios:[13]

RA-1: *APEC trade liberalization – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers among APEC member countries.*[14]

RA-2: *Japan-Singapore FTA – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers between Japan and Singapore.*

RA-3: *Japan-Mexico FTA – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers between Japan and Mexico.*

RA-4: *Japan-South Korea FTA – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers between Japan and South Korea.*

RA-5: *Japan-Chile FTA – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers between Japan and Chile.*

RA-6: *ASEAN-Plus-3 FTA – elimination of all bilateral post-Uruguay Round agriculture and manufactures tariffs and services barriers among the ASEAN countries*[15] *plus China/Hong Kong, Japan, and South Korea.*

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[12] See METI, White Papers/Reports (2000a, b, c).
[13] For an earlier computational analysis of an East Asian trading bloc, see Brown, Deardorff, and Stern (1996).
[14] The membership of APEC is as follows: Australia; Canada; Chile; China; Hong Kong; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Philippines; Singapore; Taiwan; Thailand; and United States.
[15] Taken here to include Singapore, Indonesia, Malaysia, Philippines, and Thailand.

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 III preceding. Four scenarios have been carried out for each of the six 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, …, RA-6C. The results of the other scenarios are available on request.

Results

RA-1C: APEC Trade Liberalization – This scenario treats APEC as a FTA and does not take into make allowance for the "open regionalism" that APEC purportedly offers to non-members. If open regionalism were to be pursued, it would mean in effect that APEC liberalization would be extended to non-members who wished to become associated with or to joint APEC. But presumably these non-members would then themselves be required to eliminate their own trade barriers vis-à-vis the APEC members. Since we cannot determine a priori how non-members of APEC would respond, we take the closest approximation to open regionalism to correspond with our global free-trade scenario MR-5 in table 5 above.

In table 9, the complete elimination of (post-Uruguay Round) APEC bilateral tariffs and services barriers increases global welfare by $764.4 billion. Japan's welfare increases by $283.1 billion (4.4 percent of GNP) and U.S. welfare increases by $294.7 billion (2.2 percent of GNP). There is some evidence of trade diversion for EU/EFTA amounting to $7.0 billion and Rest of Asia, $1.0 billion, which reflects trade diversion in manufactures being offset against trade creation in agriculture and services. It is interesting then to compare the bilateral removal of APEC trade barriers with the removal of all global trade barriers in Scenario MR-5 noted above. The welfare gain from global free trade, indicated earlier in table 6, is $1.9 trillion, which compares to a gain of $764.4 billion if all tariffs and services barriers were removed bilaterally among the APEC member countries. The gains for Japan and the United States from

global free trade are $374.8 and $537.2 billion, respectively, compared to $283.1 and $294.7 billion, respectively, for complete APEC bilateral liberalization. The detailed sectoral results for Japan, which are not shown here, indicate that, for complete APEC bilateral liberalization, the numbers of workers decline in agriculture, food, beverages & tobacco, wearing apparel, leather products & footwear, and trade & transport services, and increase in all other manufacturing sectors, particularly in metal products, machinery and equipment, and other private services. For the United States, employment declines in most manufacturing sectors, especially textiles, wearing apparel, leather products & footwear, other manufactures, trade & transport, and government services. The main U.S. employment increase is in agriculture.

RA-2C: Japan-Singapore Free Trade Agreement (JSFTA) – As shown in table 10, the combined removal of bilateral tariffs on agricultural products and manufactures and services barriers would increase global economic welfare by $15.4 billion. Japan's welfare rises by $10.9 billion (0.17 percent of GNP), and Singapore's welfare rises by $1.8 billion (2.4 percent of GNP). While not shown here, agricultural liberalization is of no consequence in this case, while manufactures liberalization alone would increase Japan's welfare by $1.0 billion and Singapore's welfare by $176 million. Thus, most of the potential welfare gains would come from services liberalization, $9.8 billion for Japan and $1.6 billion for Singapore. A JSFTA appears to be trade diverting for the other ASEAN economies, as is evident in the declines in economic welfare, real wages, and the return to capital in Indonesia, Malaysia, the Philippines, and Thailand. The other industrialized countries show increases in welfare and a negligible decline in real wages for the United States, Canada, Australia, and New Zealand. The real returns to labor and capital rise by 0.02 and 0.04 percent, respectively, in Japan, and by 4.1 and 3.0 percent, respectively, in Singapore. The sectoral results, which are not included here, indicate that employment rises by relatively small amounts in all sectors in Japan, except trade & transport services. For Singapore, there are relatively substantial employment declines in virtually all manufacturing sectors and increases in employment in trade & transport (20,521) and other private services (5,160). A Japan-Singapore FTA

thus appears to shift employment in Japan especially towards durable manufactures and employment in Singapore away from manufactures towards services sectors.

RA-3C: Japan-Mexico Free Trade Agreement (JMFTA) – As indicated in table 11, the combined removal of bilateral trade barriers for agricultural products, manufactures, and services in a JMFTA increases global welfare by $7.3 billion. Japan's welfare increases by $6.3 billion (0.10 percent of GNP) and Mexico's welfare by $1.9 billion (0.54 percent of GNP). The details, which are not reproduced here, indicate that, while removal of agricultural barriers has negligible effects, the gains from removal of manufactures and services barriers are $2.5 and $3.8 billion, respectively, for Japan, and $0.4 and $1.5 billion, respectively, for Mexico. There are indications that a JMFTA would be trade diverting for the United States (-$750 million), Canada (-$33 million), EU/EFTA (-$121 million), and in small amounts for several of the Asian and other Western Hemisphere (CCS) economies. The real returns to labor and capital labor rise by 0.01 and 0.02 percent, respectively, in Japan and by 0.28 and 0.26 percent, respectively, in Mexico. The sectoral results, which are not shown here, indicate relatively small employment declines for Japan in agriculture, food, beverages & tobacco, textiles, wearing apparel, leather products & footwear, and trade & transport services and increases especially in durable manufactures. In Mexico, there are relatively small employment declines in agriculture and all manufactures sectors, and employment increases in trade & transport and other private services.

RA-4C: Japan-South Korea Free Trade Agreement (JSKFTA) – In table 12, a JSKFTA for all sectors combined increases global welfare by $30.3 billion. Japan's economic welfare increases by $27.4 billion (0.42 percent of GNP), and South Korea's welfare increases by $3.2 billion (0.57 percent of GNP). The unreported details for sector liberalization reveal that the bilateral removal of agricultural tariffs has negligible effects. Removal of bilateral tariffs on manufactures increases Japan's welfare by $11.4 billion (0.18 percent of GNP) and reduces South Korea's welfare by -$1.3 billion (-.23 percent of GNP), apparently because of a decline in South Korea's terms of trade associated with bilateral tariff removal. Bilateral removal of services barriers increases Japan's welfare by $15.8 billion (0.24 percent of GNP) and South Korea's welfare by $4.5 billion (0.80 percent of GNP). There is evidence of trade

diversion from a JSKFTA for the United States (-$207 million), EU/EFTA (-$214 million), and smaller amounts for several of the Asian developing countries. The real returns to both labor and capital rise negligibly in Japan and by 1.0 percent and 0.88 percent, respectively, in South Korea, and fall in several of the other countries/regions noted in table 12. The sectoral results, which are not shown here, indicate that there are relatively small employment declines in Japan in agriculture, labor-intensive manufactures, and trade & transport services, and increases in employment in durable manufactures, construction, and other private services. For South Korea, employment falls in chemicals, durable manufactures, and services, except for trade & transport. Employment rises in South Korea's agriculture and labor-intensive manufactures.

RA-5C: Japan-Chile Free Trade Agreement (JCFTA) – A JCFTA covering all sectors is shown in table 13 to increase global welfare by $4.9 billion. Japan's welfare rises by $4.3 billion (.07 percent of GNP) and Chile's welfare rises by $688 million (0.86 percent). While not shown here, the effects of removing bilateral agricultural tariffs are negligible. Bilateral tariff removal for manufactures increases Japan's welfare by $720 million (0.01 percent of GNP) and Chile's welfare by $61 million (.08 percent of GNP). Bilateral removal of services barriers increases Japan's welfare by $3.6 billion (.06 percent of GNP) and Chile's welfare by $630 million (0.78 percent of GNP). There is evidence of small, negative welfare effects due to trade diversion for the smaller industrialized countries and for all of the Asian economies, except Hong Kong. There are negligible increases in the real returns to labor and capital in Japan, while these returns increase by 0.91 and 0.70 percent, respectively, in Chile. The sectoral results, which are not included here, indicate relatively small employment declines for Japan in agriculture, food, beverages, & tobacco, trade & transport, and other private services, and employment increases in all other manufacturing sectors. In Chile, employment falls in mining, all manufacturing sectors, and in services except other private services.

RA-6C: ASEAN Plus-3 – Table 14 contains the results of a FTA involving the members of ASEAN together with China/Hong Kong, Japan, and South Korea. Complete removal of all bilateral tariffs on agriculture and manufactures and services barriers increases global welfare by $224.7 billion.

Japan's welfare rises by $160.8 billion, and there are welfare increases for the ASEAN members as well as for China/Hong Kong and South Korea. There is evidence of trade diversion for the EU/EFTA (-$2.6 billion), Rest of Asia (-$58 million), and Mexico (-$55 million). In a scenario not shown here, if Hong Kong were to be excluded from this FTA, it would experience a welfare decline of -$366 million. The underlying scenarios, which are available on request, indicate that removal of agricultural tariffs would increase Japan's welfare by $717 million, China's by $1.6 billion, and South Korea's by $429 million. There are pervasive welfare declines, however, especially for agricultural exporting countries. For elimination of tariffs on manufactures, Japan's welfare rises by $89.9 billion, Hong Kong's by $2.3 billion, and Korea's by $9.6 billion. China's welfare declines in this case by -$5.9 billion because its terms of trade deteriorate by 4.4 percent as its export prices fall. The ASEAN members all experience increases in welfare, as do some outside countries, but there is some evidence of trade diversion for EU/EFTA, Rest of Asia, and Mexico. Removal of services barriers increases Japan's welfare by $70.2 billion, China's by $7.6 billion, Hong Kong's by $3.0 billion, Korea's by $7.2 billion, and the ASEAN members' by between $2.0 billion for the Philippines and $3.8 billion for Thailand. There are small welfare declines for Rest of Asia, Chile, and Rest of Middle East. The real returns to labor and capital noted in table 14 rise in Japan by 0.58 and 0.80 percent, respectively, and by sizable percentages in the other member countries of this FTA grouping.

The sectoral results, which are not shown here, indicate employment declines for Japan in agriculture (-31,523), food, beverages, & tobacco (-25,669), textiles (-2,724), wearing apparel (-67,761), leather products & footwear (-6,492), and trade & transport services (-51,285). Employment rises in all other sectors in Japanese manufacturing and services. The sectoral employment effects in China (excluding Hong Kong) are sizable in several sectors. There are declines in textiles (-687,516), wood & wood products (-44,933), chemicals (-359,236), metal products (-55,436), transportation equipment (-141,735), machinery & equipment (-357,464), construction (-614,990), trade & transport (-368,438), and government services (-489,436). There are employment increases in China in agriculture (218,916), mining (92,230), food, beverages & tobacco (148,193), wearing apparel (1,476,032), leather products &

footwear (535,672), other manufactures (310,678), and other private services (282,858). For South Korea, there are relatively sizable employment declines in agriculture, durable manufactures, and services, and employment increases especially in textiles, wearing apparel, leather products & footwear, and other manufactures.

Conclusion

Based on the foregoing six scenarios, it appears that there are sizable welfare gains for both Japan and the United States with complete APEC bilateral liberalization, but these gains are considerably smaller than what would be obtained from global free trade. APEC liberalization also would involve some trade diversion especially vis-à-vis the EU/EFTA. The analysis of four FTAs involving Japan with Singapore, Mexico, South Korea, and Chile suggests that Japan would experience most of the gains in welfare compared to these other, smaller economies. But these gains for Japan are relatively small in terms of percentages of GNP and increases in real wages and the returns to capital. The major employment effects in Japan appear to be concentrated in agriculture and labor-intensive manufactures and to some extent in services. The employment effects in the partner FTA countries mirror these employment effects with expansion in agriculture and labor-intensive manufactures and declines especially in durable manufactures. An ASEAN Plus-3 FTA produces sizable welfare increases for the member countries but, in some cases, significant intersectoral shifts in output and employment that could prove disruptive.

The downside of the FTAs is that there are indications of trade diversion in each case, although the global welfare gains are positive. Japan's gains are greater for an ASEAN Plus-3 FTA, but, as in the case of APEC liberalization, these gains are notably smaller than the gains to be had from multilateral liberalization in a new trade round.

Because our computational analysis has been confined to the removal of tariffs on agriculture and manufactures and services barriers, we are not taking into account other features of the FTAs, such as the negotiation of explicit rules and development of new institutional and cooperative arrangements that

could be beneficial to the countries involved.[16] 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. It is therefore not obvious that Japan's interests are being well served altogether by its shift towards bilateral and preferential trading arrangements. It also appears that the benefits to Japan's FTA partner countries are limited, and, in some cases, could be disruptive, as workers would be shifted away from durable manufactures and towards agriculture and labor-intensive manufactures. What is clear from our results in the preceding sections is that the successful pursuit of a new round of multilateral trade negotiations promises significant benefits for Japan and for the economies of its major trading partners and the world as whole. There is some danger accordingly that Japan's shift away from multilateralism could jeopardize the realization of the benefits of multilateral liberalization.

V. 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 negotiated in the Uruguay Round of multilateral trade negotiations that was completed in 1993-94, of a prospective new trade round to be conducted under WTO auspices, and of a variety of regional and preferential trading arrangements. While our focus has been on the United States and Japan, we have also provided results for the effects on the other major trading countries/regions in the global trading system. The overriding conclusion that emerges from our model simulations is that multilateral trade liberalization has positive and often sizable impacts on the economic welfare and real returns to labor and capital in both the industrialized and developing countries/regions covered in the Michigan Model. This is the case both for the Uruguay Round liberalization and for a prospective WTO negotiating round. A second conclusion of our analysis is that regional and bilateral free trade agreements (FTAs) may be welfare enhancing for the member countries involved. But these

[16] The prospective Japan-Singapore FTA is to be referred to as the "Japan-Singapore Economic Agreement for a New Age Partnership." Details of the proposed agreement are set out in MITI (2000a).

welfare gains are considerably smaller than those resulting from multilateral trade liberalization, and, in some cases, disruptive employment shifts might occur. It is also the case that the FTAs involve elements of trade diversion and are therefore detrimental to some non-member countries.

While our research is by no means the last word on the subject, our computational results nonetheless strongly support the case for swift multilateral action to be taken by the United States, Japan, and other WTO member countries to move ahead with a new trade round to reduce or remove completely existing tariffs on agricultural products and manufactures as well as barriers to international services transactions.

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TABLE 1

SUMMARY RESULTS OF THE URUGUAY ROUND

CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND THE REAL RETURN TO CAPITAL AND LABOR

PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
UR-1: Elimination of the Multi-Fiber Arrangement							
Industrialized Countries							
Japan	268.1	465.1	-0.031	-0.009	-589.5	0.004	0.016
United States	5,320.9	3,528.5	0.137	0.083	7,556.2	0.056	0.076
Canada	690.2	601.0	0.068	0.149	1,084.9	0.047	0.103
Australia	90.7	74.6	0.017	0.002	7.2	0.006	0.021
New Zealand	14.4	12.5	0.011	0.004	2.6	0.006	0.011
EU and EFTA	2,123.7	1,880.5	0.047	0.030	3,296.3	0.023	0.039
Developing Countries							
Asia							
Hong Kong	2,208.0	2,405.3	-0.208	-0.099	-127.7	1.027	-0.103
China	2,393.9	3,304.0	-0.354	-0.020	-183.7	0.067	-0.028
Korea	436.7	436.0	-0.001	-0.006	-35.7	0.037	-0.019
Singapore	-333.8	-378.4	0.030	-0.106	-78.5	0.021	0.031
Taiwan	285.3	286.6	0.002	-0.093	-324.6	-0.010	-0.098
Indonesia	157.9	217.0	-0.087	-0.071	-180.8	0.030	-0.038
Malaysia	-39.3	-3.1	-0.034	-0.163	-195.1	0.150	-0.035
Philippines	199.1	276.4	-0.240	-0.020	-17.5	0.228	-0.012
Thailand	189.0	298.7	-0.133	-0.058	-118.6	0.188	-0.008
Rest of Asia	2,055.1	2,703.4	-0.813	0.307	1,757.1	0.123	0.204
Other							
Chile	15.4	15.5	0.000	0.038	30.3	0.005	0.012
Mexico	-42.5	12.8	-0.026	-0.059	-208.5	-0.012	-0.011
CCS	-161.9	-136.4	-0.030	-0.041	-681.2	-0.001	-0.007
RME	159.7	171.1	-0.007	0.034	289.8	-0.012	0.084
Total	**16,030.6**	**16,171.1**			**11,282.9**		

TABLE 1 (continued)
SUMMARY RESULTS OF THE URUGUAY ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
UR-2: Agricultural Trade Liberalization - Import Tariffs and Export Subsidies							
Industrialized Countries							
Japan	589.4	1,449.8	-0.185	-0.024	-1,552.3	0.043	0.058
United States	1,135.5	996.7	0.063	-0.074	-6,724.8	-0.048	-0.048
Canada	-138.4	-346.4	0.041	-0.054	-395.0	-0.039	-0.041
Australia	78.3	-111.5	0.274	-0.082	-358.4	-0.058	-0.063
New Zealand	-50.2	-130.0	0.351	0.247	181.4	0.198	0.242
EU and EFTA	-2,822.1	-4,788.8	0.150	0.023	2,555.2	0.034	0.048
Developing Countries							
Asia							
Hong Kong	-265.5	-77.2	-0.058	-0.226	-290.5	-0.085	-0.072
China	-248.4	-382.3	-0.022	-0.085	-769.2	-0.003	-0.034
Korea	34.8	297.2	-0.132	-0.187	-1,062.2	0.028	0.032
Singapore	-108.3	-27.0	-0.040	-0.209	-155.1	-0.096	-0.116
Taiwan	169.2	220.6	-0.082	0.067	233.2	0.088	0.190
Indonesia	-410.1	-345.4	-0.150	-0.956	-2,417.7	-0.067	-0.161
Malaysia	-70.3	-52.5	-0.047	-0.216	-258.4	0.036	0.034
Philippines	-264.4	-157.0	-0.134	-1.082	-955.0	-0.092	-0.096
Thailand	-603.0	-909.7	0.417	0.141	290.3	-0.949	0.244
Rest of Asia	-81.9	21.1	-0.079	-0.182	-1,042.0	-0.018	-0.082
Other							
Chile	-21.0	-27.0	0.022	-0.223	-178.8	-0.031	-0.091
Mexico	-354.8	-363.5	-0.078	-0.367	-1,294.0	-0.005	-0.084
CCS	-438.4	-272.9	-0.001	-0.313	-5,229.3	-0.103	-0.142
RME	-2,666.3	-1,869.0	-0.339	-0.787	-6,791.9	-0.082	-0.385
Total	**-6,535.7**	**-6,875.0**			**-26,214.3**		

TABLE 1 (continued)
SUMMARY RESULTS OF THE URUGUAY ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
UR-3: Mining and Manufactures Trade Liberalization							
Industrialized Countries							
Japan	7,549.2	7,527.0	0.004	0.274	17,763.3	0.066	0.092
United States	11,296.0	12,329.8	-0.125	0.133	12,029.2	0.086	0.074
Canada	1,213.1	1,446.1	-0.074	0.084	615.8	0.132	0.100
Australia	2,246.9	2,136.5	0.142	0.357	1,566.2	0.345	0.348
New Zealand	635.5	393.6	1.112	1.006	738.3	0.438	0.340
EU and EFTA	14,885.8	13,646.7	0.119	0.291	31,919.5	0.080	0.086
Developing Countries							
Asia							
Hong Kong	617.4	372.3	0.239	0.294	379.2	0.243	0.260
China	3,191.9	1,789.8	0.518	0.454	4,116.1	0.205	0.207
Korea	2,277.2	2,176.7	0.055	0.627	3,568.3	0.212	0.219
Singapore	2,414.4	2,430.4	-0.017	1.207	897.4	1.528	1.745
Taiwan	1,297.7	774.1	0.323	0.531	1,863.6	0.260	0.258
Indonesia	884.2	870.3	0.026	0.314	795.1	0.303	0.216
Malaysia	2,179.1	2,746.0	-0.518	0.956	1,142.9	1.272	1.454
Philippines	2,197.4	2,771.9	-1.749	1.598	1,410.3	1.422	1.530
Thailand	1,436.9	1,105.4	0.378	0.899	1,853.1	0.839	0.176
Rest of Asia	7,658.8	10,719.6	-3.848	0.119	679.1	0.681	0.761
Other							
Chile	165.6	78.8	0.380	0.311	249.9	0.147	0.127
Mexico	168.2	256.7	-0.056	0.104	365.9	0.044	0.042
CCS	4,257.2	3,615.3	0.381	0.206	3,444.5	0.080	0.032
RME	2,620.3	2,036.1	0.263	0.572	4,940.4	0.188	0.340
Total	**69,192.9**	**69,223.1**			**90,338.0**		

TABLE 1 (continued)
SUMMARY RESULTS OF THE URUGUAY ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
UR-4: Uruguay Round Combined Liberalization							
Industrialized Countries							
Japan	8,400.3	9,437.4	-0.213	0.240	15,600.5	0.112	0.166
United States	17,743.8	16,852.3	0.075	0.142	12,853.0	0.095	0.103
Canada	1,742.2	1,701.4	0.026	0.182	1,328.6	0.145	0.168
Australia	2,414.3	2,098.7	0.433	0.277	1,214.6	0.293	0.307
New Zealand	599.8	276.1	1.475	1.256	922.2	0.642	0.592
EU and EFTA	14,176.1	10,731.0	0.307	0.344	37,744.8	0.137	0.174
Developing Countries							
Asia							
Hong Kong	2,559.2	2,700.0	-0.027	-0.031	-39.4	1.185	0.085
China	5,296.4	4,654.6	0.148	0.330	2,994.2	0.267	0.136
Korea	2,749.1	2,910.2	-0.078	0.434	2,469.5	0.277	0.231
Singapore	1,971.4	2,024.0	-0.027	0.892	663.2	1.452	1.660
Taiwan	1,752.6	1,281.4	0.243	0.505	1,770.9	0.338	0.350
Indonesia	632.2	742.1	-0.211	-0.713	-1,804.0	0.265	0.018
Malaysia	2,068.9	2,690.0	-0.599	0.576	688.6	1.458	1.452
Philippines	2,131.8	2,891.0	-2.122	0.496	437.4	1.558	1.422
Thailand	1,022.9	494.2	0.662	0.982	2,023.9	0.078	0.412
Rest of Asia	9,631.9	13,443.9	-4.740	0.243	1,391.4	0.787	0.883
Other							
Chile	150.5	53.9	0.420	0.108	86.8	0.113	0.029
Mexico	-255.0	-127.2	-0.152	-0.334	-1,178.1	0.028	-0.064
CCS	3,639.0	3,179.9	0.355	-0.152	-2,531.7	-0.026	-0.120
RME	113.8	338.0	-0.082	-0.181	-1,564.6	0.094	0.039
Total	**78,541.2**	**78,372.9**			**75,071.6**		

TABLE 2
URUGUAY ROUND LIBERALIZATION
PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, SCALE AND EMPLOYMENT
JAPAN

Product	**Exports** (Percent)	**Imports** (Percent)	**Output** (Percent)	**Scale** (Percent)	**Employment** (Percent)	# Workers
Agriculture	-11.78	11.44	-0.97	0.00	-0.96	-39,859.1
Mining	1.49	-0.30	1.11	0.21	1.00	679.1
Food, Beverages & Tobacco	1.83	5.72	-0.16	0.22	-0.25	-8,261.8
Textiles	2.57	2.44	-0.20	0.09	-0.22	-1,671.7
Wearing Apparel	-2.89	4.70	-0.78	0.08	-0.80	-11,162.5
Leather Products & Footwear	1.27	0.08	0.21	0.14	0.10	109.7
Wood & Wood Products	2.04	0.52	0.12	0.13	0.02	432.6
Chemicals	1.69	1.28	0.14	0.08	0.13	2,030.0
Non-metallic Min. Products	1.95	0.55	0.17	0.08	0.13	1,752.3
Metal Products	2.43	-0.15	0.36	0.11	0.29	7,312.9
Transportation Equipment	0.80	4.78	0.11	0.12	0.08	448.1
Machinery & Equipment	1.77	0.95	0.52	0.14	0.43	9,982.5
Other Manufactures	2.31	0.73	0.52	0.13	0.42	2,157.0
Elec., Gas & Water	0.56	-0.13	0.13	0.12	0.09	3,071.1
Construction	1.26	-0.03	0.07	0.07	0.06	5,025.3
Trade & Transport	0.60	-0.66	0.13	0.10	0.07	12,327.9
Other Private Services	0.93	-0.30	0.12	0.10	0.08	14,788.9
Government Services	0.70	-0.02	0.03	0.03	0.02	837.9
Average	**1.52**	**1.57**	**0.11**		**0.00**	**0.0**

TABLE 3
URUGUAY ROUND LIBERALIZATION
PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, SCALE AND EMPLOYMENT
UNITED STATES

Product	**Exports** (Percent)	**Imports** (Percent)	**Output** (Percent)	**Scale** (Percent)	**Employment** (Percent)	# Workers
Agriculture	9.28	0.55	1.51	0.00	1.51	60,893.1
Mining	1.52	-0.88	0.43	0.11	0.32	2,229.4
Food, Beverages & Tobacco	6.38	9.35	0.14	0.12	0.03	799.1
Textiles	-0.14	8.80	-2.16	-0.02	-2.15	-26,604.5
Wearing Apparel	1.18	19.69	-5.67	0.40	-5.99	-69,387.3
Leather Products & Footwear	0.94	0.02	0.05	0.07	0.00	-4.5
Wood & Wood Products	1.25	0.42	0.07	0.07	0.03	1,169.7
Chemicals	1.33	2.03	-0.05	0.07	-0.11	-3,109.4
Non-metallic Min. Products	1.10	3.44	-0.20	0.06	-0.23	-1,804.7
Metal Products	1.50	0.91	0.13	0.11	0.03	906.8
Transportation Equipment	1.87	-0.27	0.41	0.14	0.28	5,508.8
Machinery & Equipment	1.12	1.46	0.03	0.12	-0.04	-1,300.5
Other Manufactures	5.20	-0.42	1.49	0.08	1.43	25,707.2
Elec., Gas & Water	0.05	-0.01	-0.02	-0.01	-0.01	-295.6
Construction	0.84	-0.21	-0.01	0.00	-0.01	-1,241.4
Trade & Transport	0.68	-1.67	0.06	0.04	0.03	9,973.6
Other Private Services	0.78	-0.55	0.08	0.07	0.02	8,249.0
Government Services	0.50	-0.30	-0.07	-0.03	-0.04	-11,688.8
Average	**1.83**	**1.63**	**0.03**		**0.00**	**0.0**

Table 4
Average Gross Operating Margins of Services Firms
Listed on National Stock Exchanges,
1994-96 (Percent)

	Construction	Trade & Transportation	Other Private Services	Government Services	Average
Japan	14	23	27	43	27
United States	20	35	46	40	40
Canada	14	21	42	15	33
Mexico	26	35	47		39
Chile	69	32			41
Australia	15	8*	15*		13
New Zealand	15	21	27		21
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
EU/EFTA	20	24	34	38	29
Rest of Asia	23	23	34		27
Rest of W. Hemis.	29	40	49	32	38
Rest of Middle East	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 5
SUMMARY RESULTS OF THE MILLENIUM ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
MR-1: 33 Percent Reduction in Agricultural Tariffs							
Industrialized Countries							
Japan	3,405.0	4,449.4	-0.193	0.066	4,301.9	0.102	0.136
United States	4,651.0	3,502.0	0.157	-0.045	-4,062.8	-0.057	-0.064
Canada	170.9	-107.2	0.073	0.009	66.8	-0.043	-0.049
Australia	508.4	298.7	0.282	-0.043	-188.8	-0.118	-0.162
New Zealand	28.3	1.7	0.108	-0.041	-29.8	-0.093	-0.113
EU and EFTA	2,076.7	1,942.0	-0.026	0.020	2,193.6	0.019	0.024
Developing Countries							
Asia							
Hong Kong	139.0	153.4	0.038	0.016	20.0	0.060	0.052
China	748.9	593.6	0.028	0.176	1,598.9	0.037	0.038
Korea	1,106.5	1,511.0	-0.214	0.164	933.9	0.247	0.258
Singapore	299.8	338.7	-0.019	0.124	92.2	0.267	0.258
Taiwan	1,098.1	1,331.4	-0.170	0.714	2,502.3	0.370	0.804
Indonesia	154.0	118.1	0.038	0.055	140.1	0.029	-0.003
Malaysia	484.9	561.8	-0.085	0.275	328.3	0.226	0.276
Philippines	206.6	253.8	-0.080	0.197	173.8	0.073	0.166
Thailand	321.5	300.8	0.053	0.031	64.4	0.276	-0.075
Rest of Asia	446.5	474.5	-0.018	0.398	2,280.1	0.025	0.058
Other							
Chile	6.8	-5.9	0.053	-0.053	-42.3	-0.034	-0.107
Mexico	23.5	-82.5	0.044	0.032	111.1	0.017	-0.039
CCS	812.5	590.6	0.175	-0.029	-485.5	-0.060	-0.102
RME	539.7	562.0	-0.005	0.091	789.3	0.017	0.040
Total	**17,228.7**	**16,787.9**			**10,787.2**		

TABLE 5 (continued)
SUMMARY RESULTS OF THE MILLENIUM ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
MR-2: 33 Percent Reduction in Manufacturing Tariffs							
Industrialized Countries							
Japan	26,163.0	22,288.2	0.655	0.890	57,818.6	0.261	0.369
United States	28,638.2	27,341.3	0.083	0.345	31,289.1	0.245	0.268
Canada	2,997.1	3,288.8	-0.081	0.382	2,787.2	0.290	0.302
Australia	4,244.9	4,135.9	0.127	0.558	2,450.2	0.638	0.658
New Zealand	1,408.4	1,001.0	1.838	1.883	1,382.8	1.060	0.819
EU and EFTA	36,312.4	34,161.2	0.235	0.578	63,333.0	0.208	0.228
Developing Countries							
Asia							
Hong Kong	3,747.5	2,497.8	1.130	1.559	2,007.9	1.348	1.028
China	21,400.1	24,846.5	-1.256	0.539	4,882.4	1.094	1.081
Korea	9,551.2	9,597.4	-0.031	1.404	7,990.4	0.990	0.711
Singapore	5,202.8	4,618.9	0.362	2.854	2,122.3	3.432	3.629
Taiwan	8,423.5	7,458.8	0.582	1.584	5,554.2	1.067	0.561
Indonesia	154.0	118.1	0.038	0.055	140.1	0.029	-0.003
Malaysia	4,792.1	5,443.1	-0.580	1.988	2,376.6	2.994	2.888
Philippines	4,191.7	5,122.1	-2.615	3.525	3,110.8	2.906	2.799
Thailand	4,509.4	4,946.9	-0.529	1.468	3,025.1	2.139	1.147
Rest of Asia	12,262.9	15,109.9	-3.002	0.904	5,173.9	1.093	1.108
Other							
Chile	978.8	1,009.5	-0.131	1.286	1,032.5	0.910	0.932
Mexico	921.1	1,170.6	-0.191	0.323	1,139.1	0.170	0.173
CCS	10,459.6	11,436.3	-0.627	0.307	5,121.3	0.216	0.106
RME	8,982.6	10,219.9	-0.566	0.922	7,962.2	0.417	1.007
Total	**195,341.1**	**195,812.0**			**210,699.6**		

TABLE 5 (continued)
SUMMARY RESULTS OF THE MILLENIUM ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
MR-3: 33 Percent Reduction in Services Barriers							
Industrialized Countries							
Japan	14,330.2	16,743.0	-0.328	0.948	61,570.1	0.199	0.232
United States	33,320.6	35,501.0	-0.306	1.653	150,047.9	0.434	0.464
Canada	5,832.0	6,646.3	-0.248	1.461	10,649.6	0.695	0.787
Australia	1,252.7	784.4	0.534	0.648	2,845.6	0.498	0.402
New Zealand	419.0	411.5	0.048	1.201	882.1	0.856	0.857
EU and EFTA	30,839.3	25,607.1	0.499	0.943	103,416.1	0.201	0.207
Developing Countries							
Asia							
Hong Kong	3,672.5	2,647.3	0.871	1.784	2,297.0	1.900	2.170
China	3,821.5	4,528.4	-0.190	0.786	7,118.3	0.205	0.206
Korea	3,725.0	3,534.4	0.085	0.911	5,182.9	0.606	0.608
Singapore	813.2	615.5	0.109	2.618	1,947.4	3.459	2.497
Taiwan	1,830.6	1,956.4	0.006	0.487	1,706.0	0.400	0.362
Indonesia	820.2	926.8	-0.128	0.793	2,005.7	0.201	0.168
Malaysia	782.9	888.9	-0.063	0.545	651.4	0.318	0.325
Philippines	1,267.4	1,320.0	-0.266	1.683	1,485.3	1.169	1.167
Thailand	2,205.4	2,396.4	-0.300	1.122	2,311.4	0.765	0.600
Rest of Asia	1,152.4	779.8	0.372	0.474	2,712.4	0.201	0.233
Other							
Chile	438.3	425.1	0.062	1.171	940.7	0.651	0.612
Mexico	2,374.4	2,670.4	-0.169	1.486	5,244.0	0.470	0.551
CCS	5,034.4	5,170.5	-0.151	1.134	18,928.0	0.269	0.270
RME	4,427.7	5,093.5	-0.306	0.884	7,636.9	0.470	0.446
Total	**118,359.8**	**118,646.8**			**389,578.8**		

TABLE 5 (continued)
SUMMARY RESULTS OF THE MILLENIUM ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
MR-4: Millenium Round Combined Liberalization							
Industrialized Countries							
Japan	43,898.2	43,480.6	0.134	1.905	123,690.6	0.563	0.737
United States	66,609.7	66,344.2	-0.066	1.953	177,274.3	0.622	0.668
Canada	9,000.1	9,827.9	-0.256	1.853	13,503.6	0.942	1.039
Australia	6,006.0	5,218.9	0.943	1.163	5,107.1	1.018	0.898
New Zealand	1,855.7	1,414.2	1.994	3.044	2,235.1	1.823	1.563
EU and EFTA	69,228.5	61,710.3	0.708	1.541	168,942.6	0.428	0.458
Developing Countries							
Asia							
Hong Kong	7,559.0	5,298.4	2.039	3.359	4,324.8	3.307	3.250
China	25,970.5	29,968.6	-1.418	1.501	13,599.6	1.336	1.325
Korea	14,382.7	14,642.8	-0.161	2.479	14,107.2	1.843	1.578
Singapore	6,315.9	5,573.1	0.453	5.596	4,161.8	7.158	6.384
Taiwan	11,352.2	10,746.7	0.419	2.784	9,762.5	1.838	1.727
Indonesia	3,951.5	4,026.9	-0.082	1.651	4,175.0	1.080	0.645
Malaysia	6,059.8	6,893.8	-0.728	2.807	3,356.3	3.537	3.489
Philippines	5,665.6	6,695.9	-2.962	5.405	4,769.9	4.148	4.132
Thailand	7,036.3	7,644.1	-0.776	2.621	5,400.8	3.181	1.672
Rest of Asia	13,861.8	16,364.3	-2.648	1.776	10,166.4	1.319	1.399
Other							
Chile	1,423.9	1,428.6	-0.016	2.404	1,930.9	1.527	1.437
Mexico	3,319.0	3,758.5	-0.315	1.841	6,494.3	0.658	0.685
CCS	16,306.4	17,197.5	-0.603	1.412	23,563.8	0.425	0.274
RME	13,950.0	15,875.4	-0.877	1.898	16,388.4	0.903	1.494
Total	**333,752.9**	**334,110.6**			**612,954.9**		

TABLE 6
SUMMARY RESULTS OF THE MILLENIUM ROUND
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
MR-5: Complete Liberalization in All Sectors							
Industrialized Countries							
Japan	133,024.7	131,759.5	0.407	5.772	374,820.1	1.705	2.234
United States	201,847.7	201,043.1	-0.199	5.918	537,194.8	1.884	2.023
Canada	27,273.1	29,781.5	-0.777	5.615	40,919.9	2.856	3.149
Australia	18,200.0	15,815.0	2.858	3.525	15,476.1	3.085	2.722
New Zealand	5,623.4	4,285.4	6.042	9.225	6,773.0	5.525	4.735
EU and EFTA	209,783.3	187,000.9	2.146	4.668	511,947.3	1.297	1.389
Developing Countries							
Asia							
Hong Kong	22,906.0	16,055.8	6.180	10.177	13,105.5	10.022	9.848
China	78,698.5	90,813.8	-4.296	4.549	41,210.9	4.050	4.016
Korea	43,583.9	44,372.0	-0.487	7.513	42,749.0	5.585	4.781
Singapore	19,138.9	16,888.1	1.372	16.958	12,611.5	21.691	19.346
Taiwan	34,400.6	32,565.8	1.269	8.437	29,583.3	5.569	5.234
Indonesia	11,974.2	12,202.7	-0.247	5.002	12,651.6	3.272	1.954
Malaysia	18,363.1	20,890.3	-2.207	8.507	10,170.5	10.718	10.573
Philippines	17,168.5	20,290.7	-8.974	16.380	14,454.2	12.570	12.521
Thailand	21,322.2	23,163.9	-2.353	7.943	16,366.1	9.640	5.066
Rest of Asia	42,005.4	49,588.7	-8.025	5.382	30,807.4	3.998	4.240
Other							
Chile	4,314.8	4,329.2	-0.047	7.285	5,851.1	4.626	4.353
Mexico	10,057.6	11,389.4	-0.955	5.578	19,679.7	1.994	2.075
CCS	49,413.5	52,113.6	-1.826	4.277	71,405.4	1.289	0.831
RME	42,272.9	48,107.2	-2.657	5.751	49,661.7	2.737	4.527
Total	**1,011,372.3**	**1,012,456.4**			**1,857,439.1**		

TABLE 7
MILLENIUM ROUND LIBERALIZATION
PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, SCALE AND EMPLOYMENT
JAPAN

Product	**Exports** (Percent)	**Imports** (Percent)	**Output** (Percent)	**Scale** (Percent)	**Employment** (Percent)	# Workers
Agriculture	6.22	18.80	-1.87	0.00	-1.85	-75703.0
Mining	1.57	1.59	-0.42	0.56	-0.68	-464.2
Food, Beverages & Tobacco	14.92	19.41	-0.61	0.67	-0.86	-28762.8
Textiles	11.93	7.79	0.02	0.48	-0.16	-1195.9
Wearing Apparel	4.63	16.48	-2.10	0.50	-2.30	-31606.0
Leather Products & Footwear	5.05	11.48	-2.25	0.79	-2.95	-3227.3
Wood & Wood Products	7.73	1.42	0.55	0.60	0.07	1296.5
Chemicals	6.63	3.20	0.84	0.52	0.71	10880.1
Non-metallic Min. Products	7.41	2.02	0.83	0.61	0.38	5208.9
Metal Products	7.84	0.68	1.50	0.66	1.00	25089.4
Transportation Equipment	7.71	1.92	2.94	0.61	2.73	15959.5
Machinery & Equipment	5.28	0.84	1.91	0.68	1.42	33395.6
Other Manufactures	4.96	2.97	1.21	0.65	0.66	3421.5
Elec., Gas & Water	1.62	-0.13	0.65	0.60	0.30	10854.8
Construction	9.57	0.87	0.38	0.40	0.25	22699.6
Trade & Transport	10.43	11.31	0.34	0.61	-0.09	-14735.6
Other Private Services	15.21	19.94	0.39	0.52	0.14	24929.5
Government Services	11.92	25.20	0.11	0.15	0.04	1959.4
Average	**6.91**	**8.09**	**0.54**		**0.00**	**0.0**

TABLE 8
MILLENIUM ROUND LIBERALIZATION
PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, SCALE AND EMPLOYMENT
UNITED STATES

Product	**Exports** (Percent)	**Imports** (Percent)	**Output** (Percent)	**Scale** (Percent)	**Employment** (Percent)	# Workers
Agriculture	16.23	3.55	3.23	0.00	3.23	132608.1
Mining	2.44	0.61	0.81	0.75	0.08	577.1
Food, Beverages & Tobacco	14.57	11.53	0.92	0.66	0.29	9112.9
Textiles	2.79	9.40	-1.33	0.48	-1.55	-18826.0
Wearing Apparel	7.51	12.59	-3.69	0.87	-4.37	-47604.7
Leather Products & Footwear	4.22	7.15	-5.13	1.36	-6.21	-9042.5
Wood & Wood Products	3.40	1.24	0.53	0.54	0.13	5764.7
Chemicals	5.06	2.58	0.89	0.70	0.27	7792.4
Non-metallic Min. Products	4.28	4.97	0.22	0.53	-0.13	-1019.4
Metal Products	3.91	1.80	0.76	0.67	0.17	4792.7
Transportation Equipment	3.88	1.31	0.86	0.74	0.18	3496.5
Machinery & Equipment	3.65	1.96	0.99	0.57	0.63	18216.2
Other Manufactures	5.88	2.67	0.87	0.60	0.47	8533.7
Elec., Gas & Water	0.31	0.01	0.33	0.35	0.19	8918.9
Construction	10.15	6.16	0.21	0.27	0.10	13048.8
Trade & Transport	9.78	17.91	0.38	0.65	-0.14	-43126.5
Other Private Services	11.02	28.05	0.31	0.66	-0.25	-92051.8
Government Services	20.87	24.07	0.17	0.30	0.00	-1191.1
Average	**7.09**	**6.01**	**0.47**		**0.00**	**0.0**

TABLE 9
SUMMARY RESULTS OF APEC LIBERALIZATION
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-1C: Complete Elimination of APEC Bilateral Tariffs and Services Barriers							
Industrialized Countries							
Japan	101,907.8	100,500.0	0.269	4.359	283,091.1	1.324	1.747
United States	105,090.3	100,811.6	0.367	3.246	294,663.3	0.918	0.975
Canada	19,801.9	20,886.3	-0.392	4.211	30,690.6	2.165	2.371
Australia	14,755.1	12,191.6	3.163	2.986	13,108.8	2.452	2.100
New Zealand	3,204.8	2,527.8	3.025	6.093	4,473.8	3.856	3.553
EU and EFTA	-339.8	21.3	0.021	-0.064	-7,047.2	0.002	0.016
Developing Countries							
Asia							
Hong Kong	19,128.7	13,615.2	5.263	8.105	10,436.4	8.411	8.304
China	56,333.4	67,387.5	-4.106	2.167	19,635.0	2.823	2.870
Korea	31,764.1	33,001.4	-0.684	5.096	28,996.8	4.081	3.470
Singapore	13,147.1	11,561.9	0.995	11.848	8,811.4	16.206	14.035
Taiwan	28,671.5	26,170.1	1.496	6.323	22,172.0	4.495	3.658
Indonesia	7,886.0	7,725.8	0.239	3.519	8,901.2	2.258	1.655
Malaysia	12,523.0	14,616.8	-1.905	5.318	6,357.2	7.763	7.699
Philippines	12,675.0	14,989.2	-6.415	11.520	10,165.3	9.600	9.709
Thailand	13,865.7	15,059.8	-1.424	5.177	10,665.9	7.202	3.378
Rest of Asia	-666.9	-562.9	-0.126	-0.176	-1,009.8	-0.111	0.019
Other							
Chile	2,036.4	2,152.5	-0.503	3.911	3,141.2	2.399	2.292
Mexico	7,031.2	7,848.4	-0.732	3.945	13,917.2	1.458	1.505
CCS	177.8	40.7	0.025	-0.005	-85.3	0.002	-0.027
RME	2,422.0	1,895.8	0.229	0.387	3,338.6	-0.002	0.399
Total	**451,415.4**	**452,440.6**			**764,423.7**		

TABLE 10
SUMMARY RESULTS OF A JAPAN-SINGAPORE FTA
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-2C: Japan-Singapore FTA Elimination of Agricultural and Manufacturing Tariffs and Services Barriers							
Industrialized Countries							
Japan	2,801.7	3,449.6	-0.099	0.167	10,857.4	0.022	0.039
United States	69.3	-118.2	0.016	0.017	1,560.8	-0.002	0.000
Canada	24.2	25.5	0.001	0.016	114.0	-0.001	0.003
Australia	40.8	24.5	0.015	0.028	124.9	-0.004	-0.001
New Zealand	6.8	5.1	0.009	0.025	18.5	-0.004	0.000
EU and EFTA	132.9	-24.8	0.016	0.011	1,249.0	0.000	0.000
Developing Countries							
Asia							
Hong Kong	-18.8	-25.3	0.001	0.007	9.2	-0.129	-0.145
China	-24.1	-27.0	0.007	-0.008	-72.6	-0.003	0.000
Korea	56.1	29.8	0.013	0.009	53.4	0.006	0.004
Singapore	901.0	863.9	0.023	2.431	1,807.8	4.141	3.016
Taiwan	45.2	3.1	0.031	0.018	64.5	-0.010	0.001
Indonesia	-17.1	-30.7	0.022	-0.017	-42.3	-0.019	-0.028
Malaysia	-417.3	-501.4	0.073	-0.335	-401.1	-0.328	-0.390
Philippines	-26.0	-39.0	0.029	-0.026	-22.5	-0.043	-0.047
Thailand	-50.7	-63.6	0.011	-0.014	-27.9	-0.027	-0.058
Rest of Asia	-35.3	-58.0	0.023	0.005	29.7	-0.015	-0.011
Other							
Chile	-3.2	-2.0	-0.005	-0.002	-1.6	-0.005	-0.004
Mexico	22.2	16.0	0.008	0.015	51.7	-0.001	0.002
CCS	-6.0	-14.0	0.002	0.003	52.7	-0.001	0.000
RME	-36.9	-33.7	-0.002	-0.001	-7.0	0.000	-0.009
Total	**3,464.8**	**3,479.8**			**15,418.6**		

TABLE 11
SUMMARY RESULTS OF A JAPAN-MEXICO FTA
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-3C: Japan-Mexico FTA Complete Elimination of Agricultural and Manufacturing Tariffs and Services Barriers							
Industrialized Countries							
Japan	1,318.9	1,185.1	0.022	0.098	6,343.4	0.014	0.019
United States	-220.5	-192.1	-0.004	-0.008	-750.1	-0.003	-0.004
Canada	-8.5	-9.1	0.001	-0.005	-33.4	-0.002	-0.002
Australia	4.9	3.3	0.002	0.002	8.6	0.001	0.001
New Zealand	1.0	0.7	0.001	0.003	2.4	0.002	0.002
EU and EFTA	-57.2	-37.9	-0.001	-0.001	-120.7	0.000	0.000
Developing Countries							
Asia							
Hong Kong	-8.6	-5.0	-0.003	-0.003	-4.5	-0.003	-0.002
China	0.6	2.8	-0.001	0.000	0.2	0.000	-0.001
Korea	-12.4	-8.1	-0.002	-0.002	-12.7	-0.001	-0.002
Singapore	-17.2	-15.2	-0.001	-0.004	-2.7	-0.001	-0.003
Taiwan	-17.5	-12.0	-0.004	-0.007	-26.2	-0.003	-0.006
Indonesia	0.6	1.0	-0.001	0.002	4.8	0.000	0.001
Malaysia	-13.2	-9.4	-0.004	-0.008	-9.9	-0.003	-0.005
Philippines	-2.4	-1.6	-0.002	-0.001	-0.8	-0.001	-0.001
Thailand	-1.1	0.7	-0.002	0.000	1.0	0.002	-0.001
Rest of Asia	-2.5	-1.4	-0.001	-0.001	-3.2	0.000	0.000
Other							
Chile	1.1	0.4	0.003	-0.001	-0.9	0.000	-0.001
Mexico	947.6	1,022.4	-0.069	0.542	1,911.9	0.280	0.257
CCS	-4.0	-7.0	0.001	-0.001	-21.1	-0.001	-0.001
RME	9.2	7.3	0.001	0.002	15.5	0.000	0.001
Total	**1,918.8**	**1,924.9**			**7,301.6**		

TABLE 12
SUMMARY RESULTS OF A JAPAN-SOUTH KOREA FTA
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-4C: Japan-South Korea FTA Elimination of Agricultural and Manufacturing Tariffs and Services Barriers							
Industrialized Countries							
Japan	9,151.4	8,356.2	0.134	0.421	27,365.1	0.104	0.132
United States	-246.3	-256.5	-0.003	-0.002	-206.6	-0.005	-0.005
Canada	15.2	13.9	0.004	0.005	35.6	-0.001	0.000
Australia	27.5	14.6	0.013	0.012	50.6	-0.002	0.000
New Zealand	4.2	2.1	0.010	0.010	7.2	-0.005	-0.006
EU and EFTA	-256.6	-186.9	-0.001	-0.002	-214.1	-0.002	-0.002
Developing Countries							
Asia							
Hong Kong	9.3	-0.7	-0.002	0.008	10.7	-0.015	-0.016
China	9.3	18.3	0.003	-0.003	-29.5	-0.001	-0.002
Korea	7,552.9	8,474.4	-0.507	0.568	3,232.3	1.006	0.876
Singapore	-97.4	-113.6	0.009	-0.042	-31.2	-0.040	-0.046
Taiwan	-78.2	-60.5	-0.009	-0.033	-116.9	-0.015	-0.024
Indonesia	18.8	13.8	0.009	0.014	34.5	0.000	0.004
Malaysia	-36.0	-35.5	0.001	-0.032	-38.5	-0.020	-0.021
Philippines	-4.6	-7.0	0.001	-0.001	-0.5	-0.005	-0.004
Thailand	-3.3	-5.9	0.001	-0.001	-3.0	0.010	-0.013
Rest of Asia	10.9	-0.1	0.009	0.003	16.8	-0.001	0.001
Other							
Chile	8.4	3.6	0.021	0.015	12.2	0.006	0.003
Mexico	8.3	9.4	0.004	0.005	17.9	-0.001	0.000
CCS	38.1	7.7	0.011	0.003	44.6	0.000	-0.001
RME	64.2	40.0	0.010	0.012	105.3	-0.003	0.007
Total	**16,196.1**	**16,287.3**			**30,292.4**		

TABLE 13
SUMMARY RESULTS OF A JAPAN-CHILE FTA
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-5C: Japan-Chile FTA Elimination of Agricultural and Manufacturing Tariffs and Services Barriers							
Industrialized Countries							
Japan	558.7	627.3	-0.011	0.067	4,340.9	0.007	0.009
United States	-14.1	-11.5	0.000	-0.001	-46.0	0.000	0.000
Canada	-2.5	-2.4	0.000	-0.001	-4.4	-0.001	0.000
Australia	2.3	1.6	0.001	0.000	1.6	0.000	0.001
New Zealand	0.2	0.1	0.001	-0.001	-0.4	0.000	0.000
EU and EFTA	-47.5	-39.7	-0.001	0.000	-51.8	-0.001	-0.001
Developing Countries							
Asia							
Hong Kong	0.9	-0.1	0.000	0.000	-0.5	0.001	0.000
China	2.1	2.0	0.000	0.000	-4.0	0.000	0.000
Korea	-19.1	-16.1	-0.002	-0.003	-17.9	-0.002	-0.003
Singapore	-0.4	-0.7	0.000	-0.001	-0.8	0.000	0.000
Taiwan	-9.6	-9.1	0.000	-0.002	-7.7	-0.001	-0.001
Indonesia	0.6	0.1	0.001	0.000	-0.7	0.000	0.000
Malaysia	-1.3	-1.3	0.000	-0.002	-2.0	0.000	0.001
Philippines	0.1	-0.2	0.000	-0.001	-0.8	0.000	0.000
Thailand	-0.4	-0.6	0.000	-0.002	-3.6	0.002	0.000
Rest of Asia	0.4	0.2	0.000	0.000	-1.9	0.000	0.000
Other							
Chile	434.8	360.5	0.325	0.857	688.5	0.906	0.698
Mexico	-4.9	-3.7	-0.001	-0.002	-8.2	-0.001	-0.001
CCS	-5.5	-9.7	0.004	0.001	16.0	-0.002	-0.001
RME	7.9	6.3	0.001	0.001	6.5	0.000	0.001
Total	**902.7**	**903.2**			**4,902.7**		

TABLE 14
SUMMARY RESULTS OF AN FTA OF ASEAN, HONG KONG, CHINA, JAPAN AND SOUTH KOREA
CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND
THE REAL RETURN TO CAPITAL AND LABOR
PERCENT CHANGE AND MILLIONS OF U.S. DOLLARS

Country	Imports	Exports	Terms of Trade	Welfare		Real Wage	Return to Capital
	(Millions)	(Millions)	(Percent)	(Percent)	(Millions)	(Percent)	(Percent)
Scenario RA-6C: Elimination of Agricultural and Manufacturing Tariffs and Services Barriers							
Industrialized Countries							
Japan	55,097.9	48,859.3	1.058	2.475	160,750.4	0.582	0.804
United States	2,707.3	1,028.0	0.124	0.025	2,296.9	0.042	0.050
Canada	440.8	304.4	0.085	0.041	296.1	0.049	0.060
Australia	604.5	401.7	0.224	0.198	870.1	0.115	0.189
New Zealand	71.3	48.5	0.110	0.226	165.8	0.134	0.192
EU and EFTA	-327.5	-140.0	0.041	-0.023	-2,559.5	0.002	0.013
Developing Countries							
Asia							
Hong Kong	10,554.6	7,579.9	2.755	4.150	5,344.4	4.439	4.817
China	41,659.3	54,442.6	-4.709	0.359	3,252.4	2.088	2.144
Korea	18,729.8	18,586.7	0.074	3.031	17,248.7	2.239	1.891
Singapore	10,432.4	9,217.2	0.764	8.465	6,295.7	11.058	10.164
Taiwan	17,580.6	14,904.6	1.602	1.966	6,893.3	1.997	-0.160
Indonesia	5,367.3	5,432.9	-0.087	2.154	5,449.7	1.566	1.245
Malaysia	9,082.8	10,512.7	-1.303	3.336	3,988.5	5.813	5.861
Philippines	7,463.9	9,058.2	-4.430	6.160	5,435.4	5.792	5.949
Thailand	9,965.6	10,665.0	-0.825	2.757	5,681.1	5.982	1.903
Rest of Asia	-269.6	-262.9	-0.027	-0.010	-58.2	-0.055	0.025
Other							
Chile	161.4	111.0	0.224	0.381	306.0	0.101	0.093
Mexico	39.4	63.3	0.009	-0.016	-55.3	-0.019	-0.019
CCS	211.9	100.1	0.016	0.047	776.8	0.017	0.001
RME	1,491.7	1,131.5	0.155	0.267	2,307.4	0.010	0.253
Total	**191,065.3**	**192,044.7**			**224,685.7**		