RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

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

Discussion Paper No. 379

Computational Analysis of Goods and Services Liberalization in the Uruguay Round

Drusilla K. Brown
Tufts University

Alan V. Deardorff
University of Michigan

Alan K. Fox
University of Michigan

Robert M. Stern
University of Michigan

August 23, 1995 (Third Revision)

Paper prepared for Conference on "The Uruguay Round and the Developing Countries,"
The World Bank, Washington, D.C., January 26-27, 1995

Computational Analysis of Goods and Services Liberalization in the Uruguay Round

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

Conference on
The Uruguay Round and the Developing Countries

The World Bank, Washington, D.C.
January 26-27, 1995

August 23, 1995 (Third Revision)

Address Correspondence to:

Robert M. Stern
Institute of Public Policy Studies
University of Michigan
Ann Arbor, MI 48109-1220

Tel. 313-764-2373
FAX 313-763-9181
E-Mail rmstern@umich.edu

Computational Analysis of Goods and Services Liberalization in the Uruguay Round

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

I. Introduction

In this paper, we use a specially constructed version of the Michigan Brown-Deardorff-Stern (BDS) Computational General Equilibrium (CGE) Model of World Production and Trade to estimate the potential economic effects of the reductions in tariffs on industrial products that were negotiated in the Uruguay Round of Multilateral Trade Negotiations as well as the effects that might be realized from services-sector liberalization in the post-Uruguay Round period. The model provides measures for individual countries/regions of the effects of liberalization on the trade, output, and employment for the goods and for the services sectors. We also calculate the effects on economic welfare and on real returns to labor and capital for the individual countries/regions.

The paper proceeds as follows. In Section II, we outline some essential features of the Michigan BDS CGE model. The data on the pre- and post-Uruguay Round tariffs on industrial and agricultural products as well as estimates of bilateral services trade and services trade barriers for our model countries are discussed in Section III. The various scenarios investigated using the model are presented in Section IV together with the aggregate results of the model simulations. The sectoral results are presented in Section V. Section VI contains our conclusions and implications for further research and policy.

II. The Michigan BDS CGE Trade Model[1]

The CGE model used in this paper is an extension of the model first constructed by Brown and Stern (1989) to analyze the economic effects of the Canada-U.S. Trade Agreement (CUSTA), and later expanded by Brown, Deardorff, and Stern (BDS) (1992a,b, 1994, 1995) to analyze the NAFTA, the extension of the NAFTA to some major trading countries in South America, and the formation of an East Asian trading bloc. For purposes of the present paper, the 34 countries of our database were grouped into the following countries/regions: United States (US), Canada (CND), Mexico (MEX), Europe (EUR), Japan (JPN), Asian Newly Industrializing Countries (ANIC), Australia/New Zealand (ANZ), and a group of Other Major Trading Nations (OTN).[2] All remaining countries of the world are consigned to a residual rest-of-world to close the model. The sectoral coverage in each country/region includes 29 sectors, with 23 "tradable" (import-export) product categories covering agriculture and manufacturing and 6 "tradable" categories covering services and government.[3]

The agricultural sector in the model is characterized as being perfectly competitive and the manufacturing and services sectors are taken to be monopolistically competitive with free entry.[4] Agricultural products are differentiated

---

[1]Readers who are not concerned with the technical details of the model may wish to proceed to the results of the analysis reported in the sections immediately following.

[2]Europe includes the 15 members of the European Union plus Norway and Switzerland; the Asian NICs include Hong Kong, South Korea, Singapore, and Taiwan; and the Other Major Trading Nations include Argentina, Brazil, Chile, Colombia, India, Israel, Turkey, and Venezuela.

[3]It should be noted that this is the first time that we have treated all 29 model sectors as tradable. As will become clear below, this will enable us to analyze the effects and interaction of liberalization of both merchandise trade and trade in services.

[4]Issues of the modeling of market structure are discussed in Brown and Stern (1989), where a variety of different imperfectly competitive market structures are used in analyzing the economic effects of the CUSTA. As noted, for the current model, we use a structure of monopolistic competition, following Helpman and Krugman (1985), for all of the manufacturing and service sectors. There is free entry of firms, each producing a different variety of a good/service, and producing it with a fixed cost and constant marginal cost in terms of primary and intermediate inputs. In his conference commentary, Sherman Robinson pointed out that our treatment of monopolistic competition may not be appropriate for all sectors and may therefore exaggerate the importance of scale and variety effects. In principle, we could make allowance for different market structures in the sectors in our model countries/regions. But this would

by country of production. The products of the manufacturing and services sectors are assumed to be differentiated by firm to correspond to the imperfectly competitive market structure.[5] The reference year for the data base of the model is 1990. The input-output relations used in the model refer to various years, depending on the availability of national input-output tables.[6] The data base and documentation as well as a full statement and description of the equations and parameters of the model are available from the authors on request.[7]

There are several important assumptions that either are built into the model or are implemented by the model for the present analysis. It is important that these be understood in interpreting the results to be reported below.

Full Employment -- The analysis assumes throughout that the aggregate, or economy-wide, level of employment is held constant in each country. The effects of the Uruguay Round are therefore not permitted to change any country's overall rates of employment or unemployment. This assumption is made because overall employment is determined by macroeconomic forces and policies that are not contained in the model and are not themselves to be included in a negotiated agreement. The focus here is on the composition of employment across sectors as determined

---

require considerable empirical detail that is for the most part not readily available.

[5]Varieties enter via a Dixit-Stiglitz (1977) aggregation function into both utility and production functions, with the implication that greater variety reduces cost and increases utility. As discussed in BDS (1995), this structure introduces a potential instability into markets, since expansion of an industry via entry adds varieties and thus makes the product of the industry as a whole more desirable. To avoid this instability, we have introduced a damping parameter that reduces by 50% the beneficial effects of variety compared to the original Dixit-Stiglitz formulation.

[6]It is always a problem to use completely up-to-date input-output tables because of ongoing changes in technology and productivity that would alter the input-output coefficients for particular sectors. However, our CGE model relies mainly on the intermediate input-value shares and the shares of primary factors as data. These shares tend to be more stable over time than physical input requirements. For more discussion of this point, see Deardorff and Stern (1990, pp. 61-79).

[7]The sectoral data for merchandise trade, production, and employment come primarily from United Nations sources and to a lesser extent from national sources. The model parameters are constructed from the trade and input-output data for the countries included in the model and from published studies of trade and capital/labor substitution elasticities. More details for the data on agricultural and industrial tariffs and trade and trade barriers for services are provided in the following section. See also Deardorff and Stern (1990, pp. 37-45).

by the microeconomic interactions of supply and demand resulting from the Uruguay Round and future liberalization of trade in goods and services.

Balanced Trade -- It is assumed that trade remains balanced for each country, or more accurately that any initial trade imbalance remains constant, as trade barriers are changed. This assumption is intended to reflect the reality of mostly flexible exchange rates among the countries involved. It also, like the full employment assumption, is appropriate as a way of abstracting from the macroeconomic forces and policies that are the main determinants of trade balances.

Rents and Revenues -- Revenues from tariffs are assumed to be redistributed to consumers in the tariff-levying country and spent like any other income. Similarly, the rents from NTBs (and the tariff equivalents of services barriers to be introduced below) are also assumed to remain within the importing country and to be spent like other income. When tariffs and tariff equivalents are reduced, this means that income available to purchase imports falls along with their prices, and there is no overall bias towards expanding or contracting demand.

Fixed Relative Wages -- While the economy-wide wage in each country is permitted to adjust so as to maintain full employment, the wages across sectors are held fixed relative to one another. This permits the analysis to focus on the labor-market adjustments that might be required, independently of any relative wage changes that may facilitate those adjustments.[8]

Fixed Labor Supply -- The total labor supply in each country is assumed to be held fixed in the analysis, and cross-border movement of labor is not permitted. This is not to say that changes in labor supply will not occur in the course of a phase-in of the Uruguay Round liberalization, but only that such changes are assumed not to be the result of the agreement.

The policy inputs into the model are the pre- and post-Uruguay Round tariffs and tariff equivalents applied

---

[8] In effect then, we do not distinguish workers according to their skill characteristics and therefore how the wages and employment of different skill groups may be affected by the Uruguay Round liberalization.

to the bilateral trade of the countries/regions being modeled explicitly with respect to each other.[9] Because our model is static, we will assume that the reduction or removal of tariffs and tariff equivalents takes place all at one time rather than in stages. When the policy changes are introduced into the model, the method of solution yields percentage changes in variables of interest for each country/region. Multiplying the percentage changes by the actual (1990) levels given in the data base yields the absolute changes, positive or negative, that might result from the liberalization.

We should further mention that we do not take account in our model of changes in foreign direct investment and the cross-border movement of workers that might occur as a result of changes in the rate of return on capital and changes in real wages. We also do not make any allowance for dynamic efficiency changes and economic growth. We are aware that the Uruguay Round involved much more than negotiated reductions and/or removal of tariffs and NTBs. There were numerous changes and clarifications of existing agreements covering antidumping and subsidy/countervailing duty procedures, new agreements covering trade-related intellectual property rights (TRIPs) and investment measures (TRIMs), and the implementation of the World Trade Organization designed in part to strengthen dispute settlement procedures. While these various features of the Uruguay Round may be of great importance, it is difficult to quantify the roles they will play. Our treatment only of the effects of liberalizing trade in industrial products and services and our abstraction from dynamic changes in efficiency and economic growth mean therefore that our calculations of the consequences of the Uruguay Round are incomplete.[10]

---

[9]In the absence of tariff equivalents, we model NTBs in terms of the percentage of trade subject to NTBs, based primarily on the NTB inventory data assembled by the United Nations Conference on Trade and Development (UNCTAD). The NTB coverage ratios are used in the model to dampen the effects of tariff reductions undertaken when the NTBs are assumed to remain in place. It is important to emphasize that these measures of NTB trade coverage are *not* the same as the tariff equivalents of the NTBs. For further discussion, see Deardorff and Stern (1990, pp. 23-25). We shall say more on this below.

[10]We plan at a later point to analyze the effects of the agricultural liberalization package and the elimination of the Multi-Fibre Arrangement (MFA) that were part of the Uruguay Round negotiations.

III. Uruguay Round Policy Input Data

An indication of the overall weighted-average pre- and post-Uruguay Round tariff rates on industrial and agricultural products, and the "guesstimated" tariff equivalents of services trade barriers for the eight countries/regions being modeled is given in Table 1. Some remarks on these various rates follow.

Tariff Rates on Industrial Products

As noted in Martin (1994b), for analytical purposes, the preferred estimate of tariff reductions for industrial products should be based on differences between the Uruguay Round Base Rate and the Uruguay Round Final Offer Rate as contained in the GATT Integrated Data Base, which is the primary source of tariff data used in the Uruguay Round negotiations. For the advanced industrialized countries, it can be presumed that the Base Rate is the rate that has been notified officially to the GATT as being legally bound and that the Final Offer Rate will similarly be bound. Further, assuming that the Base Rate is the rate actually "applied" as of 1986, the measure of liberalization to be used is the difference between the Offer Rate and the Base Rate as long as this difference is negative. In case the difference is zero or positive, the tariff liberalization measure is to be set to zero. This procedure in effect excludes any changes in applied rates that industrialized countries may have implemented after 1986.

The situation is more complicated, however, for many developing countries, insofar as these countries may have been using applied rates that had not previously been bound. As noted in Martin (1994a) and Martin and Francois (1994), developing countries participated much more actively in the Uruguay Round than in previous rounds, with the result that the percentage of their industrial tariff lines that became bound increased from 22 to 72 percent. When tariffs are bound, it can be argued that this constitutes a liberalization of trade. This may be the case even if the applied rates are unchanged or if the rates are bound above the applied rate since the binding will obviate any future increase in tariffs beyond the bound rate.

As a practical matter, however, the choice for developing countries is either to measure liberalization as (1) the difference between the newly bound and the initial applied rate or, alternatively, (2) to use the difference between these

rates only when the bound rate is below the initial applied rate and set it to zero in case the bound rate is above the initial applied rate. The first measure is undesirable and misleading since it would imply an increase in protection if the bound rate were set above the applied rate. The second measure avoids this problem of misrepresenting restrictiveness and is therefore the one that has been used for our purposes.

The GATT Integrated Data Base contains the information for the pre- and post-Uruguay Round tariff rates on a detailed, line-item level, using the Harmonized System tariff classification. Since we have 23 tradable-goods sectors for each country/region in our model, we aggregated the detailed tariff lines using own-country imports as weights based on a concordance between the Harmonized System and our sectoral classification based on the International Standard Industrial Classification (ISIC). We recognize that own-country import weights introduce a downward bias into the aggregate measures since higher tariffs will induce less trade, but we have not corrected for such bias. The sectoral tariff rates used in our computational analysis reported in the following sections of the paper are available on request.

Tariff Rates on Agricultural Products

One of the accomplishments of the Uruguay Round was to convert all existing forms of agricultural protection into tariffs. These agricultural tariffs were not processed on the same basis as the industrial tariff rates in the GATT Integrated Data Base, however, and were constructed by Ingco (1995) based on information contained in the country schedules covering agricultural and related products. These tariffs were aggregated to correspond to our sectors for agriculture (ISIC 1) and food and related products (ISIC 310). Following Martin (1994b), the average tariff rate for a particular agricultural product category existing prior to the Uruguay Round was taken to represent the Base Rate. Agricultural liberalization was thus measured as the difference between the Base Rate and the lower Final Offer Rate. If the Final Offer tariff rate exceeded the Base Rate, the liberalization measure was set equal to zero.[11]

Services Trade

As already mentioned, this is the first occasion on which we have adapted our Michigan BDS CGE model to include traded services, having heretofore treated services as nontradable. To accomplish this, we sought to develop a set of 35 x 35 matrices of bilateral trade in the services sectors, ISIC 5-9, for the 34 model countries (plus rest-of-world) with a 1990 base year.[12] This was a problem because of the unavailability of sufficiently disaggregated data. That is, while there is published information for 1990 for the global services trade for all the countries of the model, the data available bilaterally and by sector are seriously deficient.

In order to construct the five bilateral services trade matrices that we needed for modeling purposes, we first assembled a set of 35-element vectors of total exports and imports for each of the five services sectors. We used these

---

[11]In addition to the tariffication of agricultural protection, the Uruguay Round calls for a 36% reduction in export subsidies by developed countries and a 24% reduction by developing countries together with a 20% reduction in domestic production subsidies by developed countries and a 13% reduction by developing countries.

[12]We thus have services data for 1990 for these ISIC sectors covering both gross output and employment as well as exports and imports. The ratios of services trade to gross output are relatively small, reflecting the fact that most service sector output is confined to domestic markets.

vectors as row and column totals of our target bilateral vectors and applied the rAs method to scale an underlying reference matrix to match.[13] For this purpose, we used our 35 x 35 data for 1990 bilateral merchandise trade as the underlying matrix that serves as the initial estimate of bilateral flows.[14] This gave us a set of 35 x 35 matrices of bilateral trade flows for each of the five services sectors.

The next step was to take advantage of more detailed bilateral services trade data where available. Here we had data assembled by the European Community's Statistical Office for intra-EC services trade and EC trade with the European Free Trade Area (EFTA) countries, the United States, and Japan. The EC merchandise trade data gave us total exports and imports for each EC member with one another. This allowed us to apply the rAs method to the smaller EC matrix separately and then to overlay the larger matrix with the result.[15] Likewise, EC merchandise trade with the EFTA countries, the United States, and Japan allowed us to scale properly those trade flows. We also included in the final matrix some bilateral services trade data for the United States that were published in the *U.S. Survey of Current Business*. The five ISIC sectoral 35 x 35 bilateral services trade matrices as well as additional technical details on their construction are available from the authors on request.

---

[13]Technical details relating to the rAs method can be found in Bacharach (1970).

[14] It should be pointed out that bilateral goods and services flows may not correspond well in cases in which countries are relatively more specialized in one or the other.

[15] We overlaid the larger matrix with these figures, rather than scaling them to better match the results of the larger rAs procedure, for two reasons. First, we had much more confidence in the quality of the selective bilateral trade data from the EU and other sources than we had in the total overall trade flows that came primarily from balance of payments sources. Therefore we were unwilling to scale the bilateral flows to make them consistent with the total flows. In addition, we understood that the bilateral trade measurements in many cases included types of services trade that are relatively new and that are likely to be absent from the balance of payments-based data. Because we believe that these new types of trade are likely to be concentrated among the developed countries, we also chose not to scale the other bilateral trade flows (up) to include them. Instead, therefore, we simply used the bilateral flows directly whenever they were available and used the (partial) results of applying the rAs procedure to the total flows whenever they were not.

Services Trade Barriers

Compared to trade barriers in goods, it is difficult to obtain systematic information on services trade barriers. One approach, which has been followed by Hoekman (1995), is to construct "guesstimates" of the relative restrictiveness across countries on the assumption that each country has "revealed" its policy stance in the commitments made in the Uruguay Round General Agreement on Trade in Services (GATS). Since we use Hoekman's guesstimates in our computational analysis below, it is important to understand how his calculations were done.

Hoekman's procedure was to classify each country's GATS commitments for each of 155 possible services sectors and each of four modes of supply[16] in terms of the extent to which they indicated restrictions on market access.[17] Values were assigned for each of these 4×155=620 cells for each of 97 countries: 1.0 for the absence of restrictions; 0.5 for the presence of restrictions to be bound under the GATS; and 0.0 for "unbound," i.e., no commitment to bind restrictions. For the major 2-digit ISIC service sectors he then calculated an index of trade coverage of restrictions equal to 1-x/y, where x is the sum of these values in the cells corresponding to the 2-digit sector and y is the number of such cells. The resulting numbers range between "0" and "1". Their interpretation is that "0" is analogous to "free access" (i.e., no restrictions), and "1" is equivalent to "no access" in the sense that every mode in every subsector is "unbound."

Tariff equivalent benchmarks were then assigned to each 2-digit sector on an assumed basis to reflect a country that is highly restrictive with respect to market access. A benchmark of 200 percent was assigned to sectors in which market access tended to be prohibited by most countries and which do not appear in most offers (e.g., maritime, cabotage, air transport, postal services, voice telecommunications, and life insurance). The remaining sectors were assigned tariff equivalent benchmarks between 20 and 50 percent. The procedure then was to multiply each coverage index (i.e., the

---

[16](1) cross-border delivery; (2) consumption abroad; (3) commercial presence (i.e., foreign direct investment); and (4) temporary entry of persons (e.g., professional, technical, sales personnel, etc.).

[17]Hoekman also classified commitments on national treatment, but left these out of the current calculations noting that they were highly correlated with market access commitments.

1-x/y measure) by the tariff equivalent benchmark guesstimate to obtain a country/sector-specific tariff equivalent.[18] Values for the 2-digit ISIC sectors were then aggregated to obtain the 1-digit guesstimates shown in Table 1. Hoekman's tariff equivalent guesstimates for ISIC sectors 5 and 6 tend to be relatively low, those for ISIC sector 7 relatively high for the reasons mentioned above, and those for ISIC sectors 8 and 9 in between. The detailed 2-digit ISIC guesstimates are available in Annex 2 of Hoekman (1995).

Hoekman is aware of the limitations of these judgmental estimates since it is not clear what the benchmark tariff vector for the "most restrictive" sector(s) should be, and the assumption that the coverage ratios of country offers are correlated with actual policy stances is quite heroic. More research in this area is urgently required. It was unfortunate that no efforts in this domain were initiated during the negotiations. As it stands, the GATS schedules are therefore the only source of cross-country information on policy regimes that is available. Given the arbitrariness of Hoekman's procedure, it is important to emphasize that our main objective here is to get a sense of the relative importance of barriers to services trade, and the types of interactions that may emerge between goods and services sectors if the latter are assumed to be tradable, and countries open their service markets to foreign competition. In this light, the results that we report below should be considered to be indicative at best.

The question then is how to proceed in using these guesstimates, arbitrary as they may appear. Hoekman has concluded that no liberalization of services was accomplished in the Uruguay Round, so that any benefits from liberalization will come in the future in the post-Uruguay Round period. What we can do therefore is to compare the effects of the liberalization associated with the reductions in tariff rates on industrial products that were accomplished in the Uruguay Round negotiations with what might result if comparable reductions in services tariff equivalents were to be undertaken in the future. This is the strategy that we have followed in implementing our liberalization scenarios, to which we now turn.

---

[18]To illustrate, Australia has a coverage ratio of 0.3 for construction (ISIC 5) and the tariff equivalent for this sector is set at 40 percent. In this case, then, Australia is assigned a tariff equivalent of 12 percent (i.e., $(0.3)\times(.40)\times(100)=12\%$).

IV. Computational Results: Aggregate Effects

The Scenarios

It is possible to use our CGE model to analyze various aspects of the Uruguay Round liberalization individually as well as in combination. As discussed in the preceding section, we have data on pre- and post-Uruguay Round nominal tariff rates for industrial and agricultural sectors as well as guesstimates of post-Uruguay Round ad valorem tariff equivalents of services barriers.

One question that immediately arises is what to assume about the reduction or elimination of NTBs negotiated during the Uruguay Round. Consonant with the spirit of the Uruguay Round negotiations, the most desirable way to handle NTBs would be to represent them in terms of their tariff equivalents and then to assume that these would be reduced to zero.[19] Unfortunately, we have been unable to obtain sufficient data to measure NTBs as tariff equivalents. There is also an issue of whether or not many of the existing NTBs will in fact be eliminated over whatever period may have been specified in the negotiations. That is, it is conceivable that countries may find ways to continue to impose their NTB restrictions in their present form or in some future alternative form yet to be determined. In such an event, the tariff equivalents of such NTBs should be only partially reduced and the quantitative restrictions should remain in place, so that the effects of the reduction or elimination of tariffs in these sectors would be diminished. Also, as already mentioned in our discussion of services, virtually no liberalization of services barriers occurred in the Uruguay Round. Services liberalization thus remains a post-Uruguay Round negotiating option.

We noted earlier that pre-Uruguay Round NTBs are represented in the data base of our model in the form of trade coverage ratios. If tariffs are reduced or removed and NTBs are assumed to stay in place, there would be a dampening of

---

[19]When NTBs remain in place during other trade liberalization, their presence is felt as a quantitative restriction that reduces the response of trade to price changes. However, when NTBs are removed, this is best modelled as the elimination of a tariff of equivalent size, capturing the restrictiveness of the NTB, but in the absence of any restraint on quantitative responses. That is, NTB elimination can be modelled in a way that mimics what is actually being attempted in agriculture: by conversion to tariff equivalents that are then removed.

the effects of the tariff liberalization. Alternatively, we could set our NTB coverage ratios equal to zero, thus assuming the tariff liberalization would not be dampened. Taking the Uruguay Round commitment to eliminate NTBs at face value, it is this strategy that we have followed in our various computational scenarios.

A further issue concerns the quality of the data on tariff rates. It would appear that the tariff rates on industrial products are measured with the greatest accuracy. There is some uncertainty involved, however, in calculating the pre-Uruguay Round tariff rates for agricultural products because of the need to represent a variety of different measures of agricultural protection and subsidies in tariff-equivalent form for individual agricultural products and product groups. Finally, the ad valorem tariff equivalents for services have some important limitations that have been noted.

One other issue we should mention concerns whether or not labor and capital are assumed to be mobile between sectors. It is common in the literature for some purposes to treat labor as perfectly mobile and capital as completely immobile, that is, sector specific. This may capture some of the short- and medium-run effects of trade liberalization as compared to the long run when all factors of production are mobile. In the conference version of our paper, we implemented the model with mobile labor and sector-specific capital. In this revised version, we treat both labor and capital as intersectorally mobile.

In light of the foregoing considerations, we have run the following scenarios:[20]

A. Reductions in Uruguay Round tariff rates on industrial products only, with NTB trade coverage ratios set equal to zero.[21]

B. Assumed 25 percent reduction in post-Uruguay Round services-sector ad valorem tariff equivalents, with NTB coverage ratios in the agricultural and manufacturing sectors set equal to zero.

C. Reductions in Uruguay Round tariff rates on industrial products combined with an assumed 25 percent reduction in post-Uruguay Round services-sector ad valorem tariff equivalents, with NTB trade coverage ratios set

---

[20]We also ran a scenario for agricultural liberalization. The results are not reported here but are available on request. As mentioned above, we plan at a later date to analyze the economic effects of the agricultural liberalization package.

[21]We are therefore not considering the effects of the elimination of the MFA that was negotiated in the Uruguay Round. We plan to address the MFA elimination in future research.

equal to zero.

An overview of results on the terms of trade, welfare, and factor payments from each of the scenarios is reported in Table 2. Of considerable interest in evaluating the scenarios is the impact on economic welfare, that is, the "equivalent variation" measure of the change in real gross domestic product (GDP).

Economic Welfare

In Scenario A, with Industrial Products Trade Liberalization, it is evident in column (2) that economic welfare rises for all the countries/regions. The largest welfare gains accrue to Europe (B$20.7, 0.3% of GDP); Japan (B$16.6, 0.6% of GDP); the United States (B$14.5, 0.3% of GDP); and the Asian NICs (B$12.2, 2.4% of GDP).[22]

We discussed earlier the procedure used by Hoekman (1995) in calculating the ad valorem tariff equivalents for the service sectors, also noting his conclusion that there was little, if any, liberalization of services barriers in the Uruguay Round. It is nonetheless interesting to determine what the effects might be in a post-Uruguay Round negotiating context if services barriers were reduced. Accordingly, we have used Hoekman's guesstimates of the relative restrictiveness for the individual sectors and countries and assumed in Scenario B that these tariff equivalents were reduced by 25%. The results in Table 2 indicate that Europe's welfare would rise by B$39.3 (0.6% of GDP), the United States by B$36.1 (0.7% of GDP), and Japan by B$23.7 (0.8% of GDP). Welfare also increases in all the other countries/regions shown.[23]

Finally, in Scenario C that combines Scenarios A and B, the welfare gains from the reductions in industrial tariffs

---

[22]More complete details on the absolute changes in welfare for the individual scenarios are available on request.

[23]As mentioned above, we also ran a scenario for agricultural liberalization. We had expected that the economic welfare of the agricultural exporting countries would rise as a consequence of these tariff reductions. It turned out, however, that welfare declined in the United States and Australia/New Zealand. Output and employment increased significantly in the agricultural sector in these countries and fell in practically all the manufacturing and services sectors. Because the contraction in output in manufacturing and services exceeded the decline in the number of firms, negative scale effects occurred. Economic welfare was reduced as a consequence. In Japan and the Asian NICs, where there was apparently a sizable reduction in agricultural tariff rates, output and employment declined in agriculture but increased in all other sectors. Our model is thus rather sensitive to specialization and scale effects when there are large changes in protection in important sectors such as agriculture. This is an issue to be addressed in our future research.

combined with services liberalization reach 0.9% of GDP (B$60.1) for Europe, 0.9% of GDP (B$50.6) for the United States, 1.4% of GDP (B$40.4) for Japan, 3.6% of GDP for the Asian NICs, and 2.0% GDP (B$11.5) for Canada. To the extent that Hoekman's guesstimates of services ad valorem tariff equivalents provide an indication of services barriers, our results suggest that there is considerable scope for gain from reducing these barriers in post-Uruguay Round negotiations.

In interpreting the foregoing results, it should be noted that positive welfare gains are not inevitable when trade is liberalized. There will of course be the traditional gains for consumers as tariff removal will lower prices and production can be specialized in the range of goods in which a country has a comparative advantage. However, a country's terms of trade could improve or deteriorate as a result of trade liberalization. If import prices rise and export prices fall, welfare gains stemming from specialization and exchange could be reversed. It can be seen in column (1) that there are a number of instances in the individual scenarios in which there are negative terms-of-trade effects. But these effects tend to be relatively small.

In addition to terms-of-trade effects on welfare, our model includes effects of economies of scale and of variety that can also raise or lower welfare. In industries where there are significant economies of scale and, therefore, declining average costs, the firm that charges a lower price may also have to increase output in order to break even. As the firm moves down its average total cost curve, the inputs required to produce a unit of output decline on average. If many of the firms in a country are forced by competitive pressure to economize on inputs in this way, then the country will be able to produce more than before the liberalization using the same inputs and technology. The gain from the realization of economies of scale enhances the more traditional gains from specialization and exchange. It is also possible that scale effects could be negative.[24] We shall have more to say about scale economies below.

[24]Our agricultural liberalization scenario mentioned above suggested this result for the United States and Australia/New Zealand.

Real Wages and Return to Capital

Having established the welfare effects of the different types of liberalization in our scenarios, we next turn to the distributional consequences. In particular, we are interested in which factors of production are likely to gain and which will lose. The percent changes in the real returns to labor and capital are reported in columns (3) and (4) of Table 2. The changes in wages and the return to capital are common to all sectors due to intersectoral labor and capital mobility. It can be seen in Scenario A, Industrial Products Trade Liberalization, that the real returns to both factors rise by relatively small percentages in the United States, Canada, Mexico, Europe, Australia/New Zealand, and the Other Trading Nations. In Japan and the Asian NICs, the real wage rises and the return to capital falls.

The result indicating that returns to both labor and capital may rise may seem inconsistent with the Stolper-Samuelson theorem. That is, from this theorem, we expect that trade liberalization will raise the return to the abundant factor in each country while making the other factor worse off. It is the case, however, that in the context of a differentiated products model with increasing returns to scale, like the one we are using, other forces may be at work undermining Stolper-Samuelson type mechanics.[25] That is, scale effects work very much like the relative price effects articulated in the Stolper-Samuelson theorem to determine the implications of trade liberalization for factor prices. Scale effects, like price effects, tend to accrue to one factor only. For example, it can be shown that an increase in output per firm in an industry raises the real return to the factor used intensively in that industry and lowers the return to the other factor. But price and scale effects differ in one important regard. If scale effects emerge across the board in nearly all industries, then both factors may gain. This is apparently the case in a number of instances in our model. But it is by no means a universal result, since, as noted, there are cases in which the changes in factor returns are opposite in sign.

We turn next to consider the sectoral results.

---

[25]For a further discussion of factor prices in a differentiated products model, see Brown, Deardorff, and Stern (1993).

V. Computational Results - Sectoral Effects

Table 3 reports sectoral results for employment in all countries/regions in Scenario A, reflecting trade liberalization in industrial products only. For Scenario B, reflecting the results of hypothetical liberalization in services, we report more detailed results for the United States, Europe, and Japan in Tables 4-6 respectively.

Scenario A

Considering first the sectoral employment results for Industrial Products Trade Liberalization, it can be seen in Table 3 that the Uruguay Round will cause relatively small percentage shifts of employment among sectors, with some sectors gaining employment and others losing, as indicated.[26] In the United States, for example, the largest percentage reductions in employment are reported for clothing and iron and steel, and the largest percentage increases are in footwear and leather products. The declines are never more than one percent, however. The largest absolute reductions in U.S. sectoral employment (not reported in the table) are in personal, community and social services (-12,500), clothing (-8,500), iron and steel products (-3,800), and textiles (-3,500), while the largest absolute increases are in agriculture (9,600), transportation services (8,100), transportation equipment (5,700), electrical machinery (4,700), and food and related products (3,900).

Because of the size of the United States and its relatively low initial tariffs, these percentage changes are as small as those reported for any of the other countries/regions, but similar results appear especially for Europe and Japan. Somewhat larger changes are reported for the small industrialized countries/regions of Canada, where employment in leather and footwear both decline by over 4%, and Australia/New Zealand, where employment levels in textiles and electrical machinery both decline by almost 4% and employment in miscellaneous manufactures increases by almost 7%. The largest percentage employment changes are found in the Asian NICs and the group of developing Other Trading Nations, but even here the percentage changes in

[26] Recall that total employment is assumed constant in each country in these scenarios.

sectoral employment remain in the single digits. Recalling that the results of the Uruguay Round are to be phased in over a period of up to ten years, these employment changes suggest only minimal disruption of domestic labor markets.

One pattern that emerges in the results for Scenario A is that employment declines in most of the services sectors in most countries.[27] This is a natural result of the fact that the scenario holds trade barriers constant in services while tariffs are being reduced throughout most of the rest of each economy. This is a result that we have observed before in models that did not include services trade. The presence of tariffs on industrial goods in most countries of the world acts much as a tax would in a closed economy, and the reduction in these tariffs therefore is similar to a cut in production taxes. Not surprisingly, resources are drawn into these sectors -- in this case industrial products -- and away from the sectors where liberalization has not occurred. There are exceptions, of course, but it is interesting that this phenomenon appears in our results even in the presence of trade in services.

Scenario B

Turning now to the results of hypothetical liberalization of trade in services in Scenario B, sectoral results are reported for the United States, Europe, and Japan in Tables 4-6. For each country/region, the percent changes in total exports and imports are reported in columns (1) and (2). The percent changes in sectoral output and number of firms are listed in columns (3) and (4). One can determine the change in output per firm, and thus the extent to which economics of scale have been realized, by subtracting column (4) from (3). The percent and absolute changes in employment are listed in columns (5) and (6). The sectoral results for the remaining

[27] This is unfortunately not evident in Table 3, where negative numbers of less than one percent have been rounded to zero by one program that processed these results and then reported as positive by a second. We ask the reader to trust us that many of the results that appear as "0.0" were in fact negative.

countries/regions and for Scenario C are available from the authors on request.[28]

In Scenario B, we assume a 25% reduction in the guesstimated ad valorem tariff equivalents for the services sectors, ISIC 5-9. It will be recalled that the transportation sector (ISIC 7) had the highest protection, construction (ISIC 5) and wholesale and retail trade (ISIC 6) had the lowest protection, and financial services (ISIC 8) and personal, community, and social services (ISIC 9) were in between. The results for the United States are indicated in Table 4. In column (1), total exports decline in the goods sectors by relatively small percentages while service-sector exports rise significantly. Total imports rise in almost all sectors. Employment rises in transportation (53,900) and in financial services (7,300) and falls in most other sectors.

Very similar results are shown for Europe in Table 5. Again it is the transportation sector, with its high assumed level of protection, that experiences by far the greatest expansion of both trade and employment. Trade again expands substantially in both financial services and personal services, but in Europe it is the personal service sector that expands substantially in absolute terms rather than financial services. As in the United States, services liberalization causes the industrial sectors to experience small percentage declines in both exports and employment, while imports in these sectors expand slightly.

The story is somewhat different in Japan. Here too both exports and imports expand significantly in all of the services sectors, but in industrial products Japan's exports also expand and imports contract. The reason for this may be inferred from the changes in output and employment, both of which contract in most of Japan's services sectors. Evidently Japan's comparative advantage is not in services, and services trade liberalization therefore causes Japan to shift resources out of services and into industrial products. This is a message that should be kept in mind as trade liberalization in services gets underway, especially if political interest in trade continues to focus on balances of trade in goods only.

The results for the United States and the other countries/regions suggest that liberalization of trade in

---

[28] As are the results for variables other than employment for Scenario A.

services causes output and trade in these sectors to expand in most countries. What is more surprising, however, is that in many cases employment nonetheless contracts in some of these sectors. The reason is that there are increases in output per firm that accompany the expansion of trade, and this permits greater output to be produced with fewer workers.

There is also a relationship between services trade and goods trade, though as just seen it is not consistent across countries. In the United States, Europe, and the Asian NICs, the expansion of trade in services leads to declines in exports of goods, but in all of the other countries/regions, exports of goods expand. Thus services trade can either substitute for goods trade or it can complement it, depending, presumably, on patterns of comparative advantage in services as well as on the roles that services play as inputs to production of goods. The latter enter the model through the various national input output tables.

Scenario C

This scenario combines the liberalization of industrial products and services that have been shown separately above in Scenarios A and B. The joint effects can be determined by adding these scenarios. Tables containing these combined results are available from the authors on request.

VI. Conclusions and Implications for Research and Policy

The original intent of this study was to examine the effects of the liberalization in services trade that would have come out of the Uruguay Round. However, the consensus seems to be that little or no actual liberalization was achieved, and that the accomplishment of the services negotiations was more to put into place the institutional structure for negotiating future liberalization than to accomplish it right away. Therefore our focus has shifted to the more hypothetical one of examining what the effects of services liberalization might turn out to be once it finally occurs. For this purpose we have used Hoekman's guesstimates of the size of trade barriers in services, and we have calculated the effects of an assumed 25% reduction in these barriers, which is a reduction that we hope represents a plausible guess of the order of magnitude that may eventually actually be achieved. To put these results in context, we have also calculated the effects of the liberalization in industrial products that actually was negotiated. Several results emerge from our analysis.

First, the effects of services trade liberalization look to be of the same order of magnitude as the liberalization in goods. Even though trade in services is itself small compared to trade in goods, this is more than made up for by the sizes of the services sectors and, especially, by the sizes of their barriers to trade. Thus liberalization of trade in services, because it is only starting on a process that in the goods sectors began fifty years ago and is now almost complete, has substantial scope for expanding trade and welfare in the world's economies. The decision to include services in the Uruguay Round negotiations was therefore not misplaced.

Second, by including trade in services in our model, we were able for the first time to examine the effects of goods-market trade liberalization on trade in services. There we found a mixture of effects, services trade expanding in some countries and sectors and contracting in others. We found further that these effects on services trade did not change the results of earlier analysis that trade liberalization in goods -- because it acts as a tax cut in these sectors -- tends to reduce employment in services.

Finally, we found that the sectoral effects of services trade liberalization would be substantial in the services sectors themselves. This is true in spite of the fact that services trade is relatively small compared to

outputs there, and again it is the result of the size of the barriers that are assumed to be reduced. Services liberalization also has some notable effects on trade in goods, though whether the two are substitutable or complementary varies across countries.

References

Bacharach, Michael. 1970. *Biproportional Matrices and Input-Output Change*. Cambridge: Cambridge University Press.

Brown, Drusilla K. and Robert M. Stern. 1989. "Computable General Equilibrium Estimates of the Gains from U.S.-Canadian Trade Liberalization," in David Greenaway, Thomas Hyclak, and Robert J. Thornton (eds.), *Economic Aspects of Regional Trading Arrangements*. London: Harvester Wheatsheaf.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 1992a. "A North American Free Trade Agreement: Analytical Issues and a Computational Assessment," *The World Economy* 15:15-29.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 1992b. "North American Economic Integration," *Economic Journal* 102:1507-18.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 1993. "Protection and Real Wages: Old and New Trade Theories and Their Empirical Counterparts," Research Forum on International Economics, University of Michigan, Discussion Paper No. 331 (May).

Brown, Drusilla K., Alan V. Deardorff, David L. Hummels, and Robert M. Stern. 1994. "An Assessment of Extending NAFTA to Other Major Trading Countries in South America," University of Michigan, in process.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 1995. "Computational Analysis of the Economic Effects of an East Asian Preferential Trading Bloc," in process.

Deardorff, Alan V. and Robert M. Stern. 1990. *Computational Analysis of Global Trading Arrangements*. Ann Arbor: University of Michigan Press.

Dixit, Avinash K. and Joseph E. Stiglitz. 1977. "Monopolistic Competition and Optimum Product Diversity," *American Economic Review* 67:297-308.

Helpman, Elhanan and Paul R. Krugman. 1985. *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy*. Cambridge, MA: MIT Press.

Hoekman, Bernard. 1995. "Tentative First Steps: An Assessment of the Uruguay Round Agreement on Services," in process.

Ingco, Merlinda. 1995. "Agricultural Trade Liberalization in the Uruguay Round: One Step Forward, One Step Back?" in process.

Martin, Will. 1994a. "Draft Notes on 'Tariff Bindings as Trade Liberalization," in process (May).

Martin, Will. 1994b. "Methodology for Evaluating Tariff Reductions in the Round," in process (August).

Martin, Will and Joseph Francois. 1994. "Bindings and Rules as Trade Liberalization," presented at Festschrift, "Quite Pioneering: Robert M. Stern and His International Economic Legacy," Ann Arbor, MI, November 18-20, 1994.

Table 1
Weighted Average Tariffs on Industrial and Agricultural Products and "Guesstimated" Tariff Equivalents on Services in the Major Trading Countries/Regions
(Percentage)

	Industrial Products			Agricultural Products			Services
Country/Region	**Pre-UR**	**Post-UR**	**% Change**	**Pre-UR**	**Post-UR**	**% Changes**	**Post-UR**
United States	4,9	3.4	30.0	14.9	14.0	6.0	67.5
Canada	7.7	4.5	42.2	2.6	2.3	14.9	57.2
Mexico	11.9	11.9	0.1	35.3	35.3	0.0	76.9
Europe	6.9	4.8	30.4	13.2	11.7	11.1	79.2
Japan	6.0	3.9	36.2	60.9	35.1	42.4	61.2
Asian NICs	0.9	0.7	17.2	12.7	7.9	37.3	46.0
Australia/N.Z.	13.8	9.1	34.3	0.8	0.4	44.8	105.9
Other Trading Nations	28.9	21.0	27.2	18.6	17.6	5.3	107.4

Sources: Industrial products: World Bank Uruguay Round data base; agricultural products: Ingco (1995); and services: Hoekman (1995).

Table 2
Summary Results of the Uruguay Round:
Changes in Terms of Trade, Welfare
And Real Return to Labor and Capital
(Percent Change)

Country	Terms of Trade (1)	Equivalent Variation (2)	Real Wage Rate (3)	Real Return To Capital (4)
A. Industrial Products Trade Liberalization				
United States	-0.1	0.3	0.1	0.3
Canada	-0.2	0.4	0.2	0.3
Mexico	0.1	0.1	0.0	0.2
Europe	-0.1	0.3	0.1	0.3
Japan	0.1	0.6	0.3	-0.1
Asian NICs	0.9	2.4	1.3	-0.9
Australia-New Zealand	-1.0	1.2	0.3	1.0
Other Trading Nations	-1.6	0.0	0.2	1.7
B. Services Trade Liberalization				
United States	0.2	0.7	0.2	-0.1
Canada	-0.1	1.6	0.5	0.1
Mexico	-0.2	2.7	0.4	0.3
Europe	0.1	0.6	0.1	0.0
Japan	-0.5	0.8	0.2	0.4
Asian NICs	0.1	1.1	0.7	0.3
Australia-New Zealand	-0.4	2.8	0.3	0.5
Other Trading Nations	-0.3	1.0	0.3	0.4
C. Industrial Products and Services Liberalization				
United States	0.2	0.9	0.3	0.2
Canada	-0.3	2.0	0.7	0.4
Mexico	-0.1	2.8	0.4	0.5
Europe	0.0	0.9	0.3	0.3
Japan	-0.4	1.4	0.5	0.3
Asian NICs	1.0	3.6	2.1	-0.6
Australia-New Zealand	-1.4	3.9	0.6	1.6
Other Trading Nations	-1.9	1.0	0.5	2.1

Table 3
Scenario A: Industrial Products
Sectoral Employment Effects of the Uruguay Round
Percent Change

Sector	US (1)	CND (2)	MEX (3)	EUR (4)	JPN (5)	ANIC (6)	ANZ (7)	OTN (8)
1 Agriculture	0.3	0.6	0.0	0.1	-0.2	-1.5	0.9	0.2
310 Food	0.2	0.2	-0.0	0.0	-0.4	-3.0	0.9	0.0
321 Textiles	-0.3	-1.8	0.2	0.2	-0.1	2.0	-3.9	1.6
322 Clothing	-0.9	-2.9	0.1	-0.3	-2.2	5.2	-2.7	3.5
323 Leather Products	1.0	-4.2	-0.3	0.1	-0.2	-3.7	0.9	1.5
324 Footwear	2.1	-4.2	0.0	0.4	0.0	-5.6	-3.2	0.5
331 Wood Products	0.0	1.3	-0.1	-0.0	-0.3	1.6	-0.2	0.2
332 Furniture, Fixtures	-0.4	-1.0	0.0	0.2	-0.4	8.7	-1.4	-0.5
341 Paper Products	-0.1	2.9	-0.1	-0.1	-0.1	-0.3	-1.7	-0.1
342 Printing, Publishing	0.0	-0.2	-0.2	0.0	0.0	-0.4	0.0	-0.3
35A Chemicals	0.3	0.6	-0.0	0.3	-0.1	-0.0	-2.7	-1.1
35B Petroleum Products	0.0	0.0	0.1	0.1	-0.3	-0.5	0.6	-0.2
355 Rubber Products	0.1	0.0	-0.1	0.1	-0.1	-1.5	0.2	-0.5
36A Nonmetal Min. Prod.	-0.1	-1.2	0.0	0.2	-0.1	0.0	-0.3	-0.6
362 Glass Products	-0.1	-0.1	-0.1	0.2	0.1	1.8	-0.2	-0.8
371 Iron, Steel	-0.8	-1.5	0.1	0.5	0.4	0.8	-1.2	-1.8
372 Nonferrous Metals	0.0	3.1	-0.3	-0.0	-0.6	2.4	1.8	-0.1
381 Metal Products	-0.0	-0.4	-0.1	0.0	0.0	0.8	-0.5	-0.5
382 Nonelec. Machinery	-0.0	-0.6	-0.7	0.6	0.3	-1.7	-2.7	-3.4
383 Electrical Machinery	0.3	-1.6	-0.9	-0.7	0.8	6.9	-3.8	-3.2
384 Transport Equipment	0.2	-0.4	-0.4	0.1	-0.3	-2.7	-1.3	-1.2
38A Misc. Mfrs.	-0.1	2.6	-0.1	-0.2	0.4	1.1	6.7	-2.2
2 Mining, Quarrying	-0.3	0.8	0.7	-0.1	-2.2	-9.0	2.0	4.6
4 Utilities	0.0	0.3	0.0	0.0	0.0	0.4	0.1	-0.2
5 Construction	-0.1	-0.1	-0.0	-0.1	-0.0	-0.2	-0.2	-0.6
6 Wholesale Trade	0.0	-0.0	-0.0	-0.0	0.0	0.1	0.1	-0.3
7 Transportation	0.1	0.2	0.0	0.0	0.0	-2.7	0.8	0.4
8 Financial Services	-0.0	0.1	-0.0	-0.0	0.1	0.5	0.2	-0.4
9 Personal Services	-0.0	-0.1	0.0	-0.0	-0.0	-0.4	-0.2	-0.5
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 4
Scenario B: Services
Sectoral Effects on United States Of the Uruguay Round
Percent Change

Sector	Exports (1)	Imports (2)	Output (3)	No. Firms (4)	Change inEmployment	
					Percent (5)	1000s (6)
1 Agriculture	-0.3	0.4	-0.1	0.0	-0.1	-2.7
310 Food	-0.4	0.5	0.0	-0.1	-0.1	-2.3
321 Textiles	-0.4	0.3	0.0	-0.1	-0.1	-1.2
322 Clothing	-0.3	-1.0	0.2	0.1	0.1	0.7
323 Leather Products	-0.3	0.6	0.0	-0.2	-0.2	-0.1
324 Footwear	-0.1	-0.7	0.2	0.1	0.2	0.1
331 Wood Products	-0.6	0.0	0.0	-0.2	-0.1	-0.9
332 Furniture, Fixtures	-0.2	-0.1	0.0	-0.2	-0.1	-0.7
341 Paper Products	-0.3	0.1	0.0	-0.2	-0.2	-1.2
342 Printing, Publishing	-0.2	0.5	0.1	-0.1	-0.1	-1.3
35A Chemicals	-0.6	0.7	-0.1	-0.3	-0.3	-2.8
35B Petroleum Products	-0.3	0.6	0.1	-0.1	0.0	0.0
355 Rubber Products	-0.4	1.1	-0.1	-0.2	-0.2	-0.5
36A Nonmetal Min. Prod.	-0.2	0.5	0.0	-0.2	-0.1	-0.7
362 Glass Products	-0.4	0.6	-0.1	-0.3	-0.2	-0.3
371 Iron, Steel	-0.6	0.9	-0.2	-0.4	-0.4	-1.8
372 Nonferrous Metals	-0.6	0.4	-0.2	-0.4	-0.3	-1.0
381 Metal Products	-0.5	0.6	-0.1	-0.2	-0.2	-2.7
382 Nonelec. Machinery	-0.7	1.1	-0.2	-0.3	-0.3	-7.1
383 Electrical Machinery	-1.0	1.0	-0.5	-0.6	-0.5	-10.0
384 Transport Equipment	-0.8	1.7	-0.3	-0.4	-0.4	-9.2
38A Misc. Mfrs.	-0.8	0.7	-0.2	-0.3	-0.3	-6.7
2 Mining, Quarrying	-0.5	0.8	-0.1	-0.2	-0.2	-1.3
4 Utilities	0.5	-0.4	0.0	-0.1	-0.1	-1.2
5 Construction	4.5	4.3	0.1	-0.1	-0.0	-3.2
6 Wholesale Trade	6.1	3.6	0.0	-0.1	-0.0	-2.7
7 Transportation	40.4	34.9	1.0	0.7	0.8	53.9
8 Financial Services	14.2	13.5	0.1	0.0	0.1	7.3
9 Personal Services	16.9	18.5	0.0	0.0	-0.0	-0.4
Total	4.2	3.9	0.0	-0.2	0.0	0.0

Table 5
Scenario B: Services
Sectoral Effects on Europe Of the Uruguay Round
Percent Change

Sector	Exports (1)	Imports (2)	Output (3)	No. Firms (4)	Change inEmployment	
					Percent (5)	1000s (6)
1 Agriculture	-0.1	0.3	0.0	0.0	-0.0	-1.2
310 Food	-0.1	0.3	0.0	-0.1	-0.1	-2.9
321 Textiles	-0.2	0.3	0.0	-0.1	-0.1	-1.5
322 Clothing	0.0	-0.6	0.1	0.0	0.0	0.0
323 Leather Products	0.0	0.6	0.0	-0.1	-0.1	-0.1
324 Footwear	0.1	-0.7	0.1	0.0	0.0	0.0
331 Wood Products	-0.1	0.0	0.1	-0.1	-0.1	-0.4
332 Furniture, Fixtures	0.0	-0.1	0.0	-0.1	-0.1	-0.5
341 Paper Products	-0.1	0.1	0.0	-0.1	-0.1	-0.9
342 Printing, Publishing	-0.2	0.1	0.1	-0.1	-0.0	-0.6
35A Chemicals	-0.2	0.3	0.0	-0.1	-0.1	-3.3
35B Petroleum Products	0.1	0.2	0.1	0.0	0.0	0.0
355 Rubber Products	-0.1	0.7	0.0	-0.1	-0.1	-0.3
36A Nonmetal Min. Prod.	-0.1	0.4	0.1	-0.1	-0.1	-0.9
362 Glass Products	-0.2	0.4	0.0	-0.1	-0.1	-0.2
371 Iron, Steel	-0.1	0.4	0.0	-0.1	-0.1	-1.7
372 Nonferrous Metals	-0.2	0.5	0.0	-0.2	-0.1	-0.7
381 Metal Products	-0.1	0.2	0.0	-0.1	-0.1	-1.7
382 Nonelec. Machinery	-0.2	0.5	0.0	-0.1	-0.1	-4.4
383 Electrical Machinery	-0.2	0.3	0.0	-0.1	-0.1	-3.7
384 Transport Equipment	-0.2	0.6	0.0	-0.1	-0.1	-4.6
38A Misc. Mfrs.	-0.2	0.2	-0.1	-0.1	-0.1	-2.3
2 Mining, Quarrying	-0.2	0.3	-0.1	-0.1	-0.1	-1.0
4 Utilities	0.6	0.4	0.0	-0.1	-0.1	-0.7
5 Construction	3.3	7.6	0.1	-0.1	-0.0	-4.4
6 Wholesale Trade	6.1	6.7	0.0	0.0	-0.0	-2.7
7 Transportation	36.8	38.5	0.4	0.2	0.3	24.4
8 Financial Services	7.9	15.8	0.0	0.0	-0.0	-0.5
9 Personal Services	17.2	14.7	0.1	0.0	0.0	16.9
Total	3.2	3.3	0.0	-0.1	0.0	0.0

Table 6
Scenario B: Services
Sectoral Effects on Japan Of the Uruguay Round
Percent Change

Sector	Exports (1)	Imports (2)	Output (3)	No. Firms (4)	Change inEmployment	
					Percent (5)	1000s (6)
1 Agriculture	1.1	-0.8	0.1	0.0	0.2	7.3
310 Food	1.2	-1.1	0.0	-0.1	-0.0	-0.4
321 Textiles	1.2	-1.6	0.4	0.2	0.2	1.8
322 Clothing	2.5	-2.7	0.7	0.4	0.5	3.1
323 Leather Products	1.6	-1.3	0.4	0.2	0.3	0.2
324 Footwear	2.5	-2.5	0.6	0.4	0.4	0.2
331 Wood Products	1.4	-1.1	0.4	0.2	0.3	1.1
332 Furniture, Fixtures	1.6	-1.7	0.4	0.2	0.2	0.5
341 Paper Products	1.4	-1.2	0.4	0.2	0.2	0.8
342 Printing, Publishing	1.2	-1.2	0.1	-0.1	-0.0	-0.1
35A Chemicals	1.2	-1.4	0.4	0.2	0.3	1.4
35B Petroleum Products	1.1	-0.5	0.2	0.2	0.2	0.1
355 Rubber Products	1.3	-1.4	0.5	0.2	0.3	0.6
36A Nonmetal Min. Prod.	1.2	-0.9	0.2	0.0	0.0	0.1
362 Glass Products	1.3	-1.4	0.4	0.2	0.3	0.3
371 Iron, Steel	1.2	-1.4	0.5	0.3	0.4	1.7
372 Nonferrous Metals	1.8	-0.6	0.8	0.6	0.7	1.1
381 Metal Products	1.3	-1.5	0.2	0.0	0.1	1.0
382 Nonelec. Machinery	1.6	-1.8	0.6	0.3	0.3	6.0
383 Electrical Machinery	2.3	-2.6	0.9	0.7	0.7	17.5
384 Transport Equipment	1.7	-2.0	0.6	0.3	0.3	3.5
38A Misc. Mfrs.	2.1	-1.7	0.8	0.5	0.6	7.1
2 Mining, Quarrying	2.3	-0.4	1.5	1.3	1.4	0.8
4 Utilities	0.7	-0.5	0.2	0.1	0.1	0.4
5 Construction	4.7	2.5	0.1	-0.2	-0.1	-5.7
6 Wholesale Trade	6.2	2.1	0.1	-0.1	0.0	2.4
7 Transportation	33.8	34.5	-0.7	-1.0	-0.9	-33.2
8 Financial Services	10.3	15.5	-0.1	-0.2	-0.1	-4.8
9 Personal Services	15.0	17.0	-0.1	-0.2	-0.1	-14.6
Total	4.2	4.2	0.2	0.2	0.0	0.2