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# Multilateral, Regional, and Bilateral Trade-Policy Options for the United States and Japan

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## 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 Doha 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 an assumed reduction of post-Uruguay Round tariffs and other barriers on agricultural and industrial products and services by 33 percent in the Doha Round would increase world welfare by $686.4 billion, with gains of $164.0 billion for the United States, $132.6 billion for Japan, and significant gains for all other industrialized and developing countries/regions. If there were global free trade with all post-Uruguay Round trade barriers completely removed, world welfare would increase by $2.1 trillion, with gains of $497.0 billion (5.5 percent of GNP) for the United States and $401.9 billion (6.2 percent of GNP) for Japan.

Regional agreements such as an APEC FTA, an ASEAN Plus 3 FTA, and a Western Hemisphere FTA would increase global and member country welfare but much less so than the Doha multilateral trade round would. Separate bilateral FTAs involving Japan with Singapore, Mexico, Chile, and Korea and the United States with Chile, Singapore, and Korea would have positive, though generally small, welfare effects on the partner countries, but potentially disruptive sectoral employment shifts in some countries. There would be trade diversion and detrimental welfare effects on some nonmember countries for both the regional and bilateral FTAs analyzed. 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.

Keywords: WTO; Trade Liberalization
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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 ongoing and prospective trade negotiations at the multilateral, regional, and bilateral 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 model that we have used now for more than 25 years to analyze changes in trade policies.

In Section II, we first analyze the potential economic effects of the liberalization of trade in agricultural products and services, which are part of the built-in agenda mandated in the Uruguay Round. We also consider the liberalization of trade in industrial products, which is to be carried out in the WTO Doha Round that commenced in 2002. In Section III, 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 (APEC) forum, an ASEAN Plus 3 Free Trade Agreement, expansion of the North American Free Trade Agreement (NAFTA) to include Chile, and a Western Hemisphere Free Trade Agreement (WHFTA). In Section IV, we analyze bilateral FTAs that are being negotiated or actively considered by Japan and the United States. These include Japanese bilateral FTAs with Singapore, Korea, Mexico, and Chile, and U.S. bilateral FTAs with Chile, Singapore, and Korea. Conclusions and implications for policy are discussed in Section V.

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## II. Computational Analysis of the WTO Multilateral Doha Development Round

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. Subsequently, in November 2001, at the WTO Ministerial Meeting held in Doha, Qatar, agreement was reached on the negotiating agenda for a new round to commence in 2002. To provide some perspective on the economic effects that might result from the Doha Round, we thought it would be instructive to use the Michigan Model to assess the potential magnitudes involved.

### Overview of the Michigan Model

The version of the Michigan Model that we will use in this paper covers 18 economic sectors, including agriculture, manufactures, and services in each of 20 countries/regions. 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 variety. A complete description of the formal structure and equations of the model can be found on line at www.Fordschool.umich.edu/rsie/model. The model is implemented using GEMPACK software, as described in Harrison and Pearson (1996).

To help the reader interpret the results to follow, it is useful first to review the features of the model that serve to identify the various economic effects that are being captured in the different scenarios. Although the model includes the aforementioned features of the New Trade Theory, it remains the case that markets respond to trade liberalization in much the same way that they would with perfect competition. That is, when tariffs or other trade barriers are reduced in a sector, domestic buyers (both final and intermediate) substitute toward imports and the domestic competing industry contracts production while foreign exporters expand. With multilateral liberalization reducing tariffs and other trade barriers simultaneously in most sectors and countries, each country's industries share in both of these effects,

expanding or contracting depending primarily on whether their protection is reduced more or less than in other sectors and countries. At the same time, countries with larger average tariff reductions than their trading partners tend to experience a real exchange-rate 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. World prices rise most for those sectors where trade barriers fall the most.[1] 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,

[1] The U.S. dollar is the numeraire in the model, and there is a rest-of-world against which all other prices can rise.

countries as a whole gain from lower costs due to increasing returns to scale, lower monopoly distortions due to greater competition, and reduced costs and/or increased utility due to greater product variety. All of these effects make it more likely that countries will gain from liberalization in ways that are shared across the entire population.

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

In the real world, all of 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.

**Benchmark Data**

The main data source used in the model is "The GTAP-4 Database" of the Purdue University Center for Global Trade Analysis Project (McDougall et al., 1998). The reference year for this GTAP database is 1995. The monopolistically competitive market structure in the nonagricultural sectors of the

model imposes an additional data requirement of the numbers of firms at the sectoral level, and there is need also for estimates of sectoral employment. These data have been adapted from a variety of published sources and are available on request. We have projected the GTAP-4 1995 database to the year 2005, which is when the Uruguay Round liberalization will have been fully implemented. In this connection, we extrapolated the labor availability in different countries/regions by an average weighted population growth rate of 1.2 percent per annum. All other major variables have been projected, using an average weighted growth rate of GDP of 2.5 percent.[2]

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. In Brown, Deardorff, and Stern (2002a), we have analyzed the impact of the UR-induced changes expected to occur over the course of the 10-year implementation period as a consequence of the negotiated reductions in tariffs and non-tariff barriers. We then readjusted the scaled-up database for 2005 to mimic the world as it might look in the post-UR implementation. In what follows, we use these re-adjusted data as the starting point to carry out our liberalization scenarios for the Doha Round.

**Computational Scenarios**

To assess the economic effects of the Doha Round, we assume 33 percent reductions in post-Uruguay Round agricultural barriers, manufactures tariffs, and services barriers. The scenarios that we have run are as follows:

***DR-1*** *Agricultural liberalization is modeled as a 33 percent reduction in post-Uruguay Round agricultural import tariffs, export subsidies, and production subsidies.*

***DR-2*** *Liberalization of industrial products is modeled as a 33 percent reduction in post-Uruguay Round tariffs on manufactures.*

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

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

[2] The underlying data are drawn from World Bank sources and are available on request. For a more elaborate and detailed procedure for calculating year 2005 projections, see Hertel and Martin (1999) and Hertel (2000).

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

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

While services were addressed in the Uruguay Round, the main accomplishment was 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. Brown and Stern (2001) have 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.[3] 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.[4] These estimates are available on request.

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

[4] The gross operating margins are calculated as the differences between total revenues and total operating costs. Some of these differences are presumably attributable to fixed costs. Given that the gross operating margins vary across countries, a portion of the margin can also be attributed to barriers to FDI. For this purpose, we have selected as a benchmark for each sector the country with the smallest gross operating margin, on the assumption that operations in that country can be considered to be freely open to foreign firms. The excess in any other country above this lowest benchmark is then taken to be due to barriers to establishment by foreign firms. That is, the barrier is modeled as the cost-increase attributable to an increase in fixed cost borne by multinational corporations attempting to establish an enterprise locally in a host country. This abstracts from the possibility that fixed costs may differ among firms because of variations in market size, distance from headquarters, and other factors. We further assume that we can interpret this cost increase as an ad valorem equivalent tariff on services transactions generally.

**Aggregate Results**

The welfare effects, as measured by the equivalent variation, for the **DR-1** to **DR-4** scenarios are indicated in columns (1)-(4) of table 1.[5] As shown in column (1), the **DR-1** 33 percent reduction in post-Uruguay Round agricultural-import tariffs, export subsidies, and production subsidies reduces global welfare by $8.1 billion. Japan experiences a welfare increase of $0.7 billion. The United States records a welfare decline of $7.2 billion, which reflects the drawing of resources away from the monopolistically competitive, nonagricultural sectors, thereby producing negative scale effects in these sectors. The effects of agricultural liberalization according to our model thus appear fairly small and reflect a complex of differential and offsetting changes because both tariffs and subsidies are being reduced.[6] Similar negative welfare effects are also noted for Australia and New Zealand, both of which are net exporters of agricultural products.

The results of the **DR-2** 33 percent reduction of post-Uruguay Round manufactures tariffs are indicated in column (2) of table 1 and show an increase in global welfare of $267.3 billion. It is evident that welfare increases in all of the countries/regions listed. The largest welfare gain is $81.2 billion for EU/EFTA, while Japan's gain is $65.0 billion and the U.S. gain is $36.5 billion. The welfare gains for the developing countries/regions are much smaller in absolute terms, but, as a percentage of GNP, range from 0.33 percent for the aggregate of Central America, Caribbean, and South America to 4.40 percent for the Philippines.

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

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[5] The effects on imports, exports, terms of trade, real wages, and the return to capital are given in Brown, Deardorff, and Stern (2002a).

[6] In the model, the reductions in agricultural import tariffs will have the effects of tariff reductions already described. In the case of export subsidies, their effects will be to reduce world prices and raise domestic prices. When export subsidies are reduced, world prices would then rise and domestic prices in the subsidizing countries would fall, with the possible consequences that economic welfare may rise in the countries that reduce their export subsidies and fall in net-importing countries now facing higher world prices. Similarly, production subsidies will have the effect of reducing prices domestically and abroad.

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 mentioned above and assumed that these barriers are reduced by 33 percent.[7] In column (3) of table 1, it can be seen that global welfare rises by $427.2 billion, which exceeds the $267.3 billion welfare increase for manufactures liberalization. All of the countries/regions listed experience positive welfare gains. The United States has a welfare gain of $134.8 billion, compared to $142.5 billion for EU/EFTA and $66.9 billion for Japan. There are sizable percentage increases in welfare for the smaller industrialized and developing countries.

The results for the **DR-4** scenario are a linear combination of the other three scenarios. Overall, in column (4) of table 1, global welfare rises by $686.4 billion. The United States has a welfare gain of $164.0 billion, EU/EFTA a gain of $227.0 billion, and Japan a gain of $132.6 billion. As already noted, most of the smaller industrialized countries and the developing countries show sizable percentage increases in welfare.[8] Finally, **DR-5** involves the removal of all barriers and corresponds to what we consider as global free trade. Again, since our model is linear, the results for DR-5 are some three times larger than for **DR-4**. The welfare gains for the United States are $497.0 billion (5.48 percent of GNP), EU/EFTA, $688.0 billion (6.27 percent of GNP), and Japan, $401.9 billion (6.19 percent of GNP). The percentage welfare increases for the other countries shown range from 2.56 percent of GNP for Indonesia to 21.95 percent for Singapore.

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[7] It is important to emphasize that these estimates of services barriers are intended to be indirect approximations of what the actual barriers may be and thus should not be taken literally.

[8] It should be noted that our results differ from those obtained by Hertel, Hoekman, and Martin (2002, p. 121), who conclude that: "… the bulk of the gains go to developing countries, which are estimated to receive three quarters of the total gains from liberalizing manufacturing trade." The differences in our results compared to Hertel et al. most likely stem from the assumptions made in projecting the database for the model to 2005. That is, Hertel et al. project significantly greater expansions of the output and trade of the developing countries than in our simpler extrapolations noted above. Other differences may reflect the imperfectly competitive structure of the Michigan model and the use of cost-price measures of services barriers.

**Sectoral Employment Results**

The sectoral employment results for **DR-4** and **DR-5** for Japan and the United States are presented in table 2.[9] In column (1), the **DR-4** negative effects for Japan, measured in numbers of workers and percent of sectoral employment, are concentrated in agriculture (-103,919, -2.54%), food, beverages and tobacco (-27,740, -0.83%), textiles (-2,334, -0.31%), wearing apparel (-33,837, -2.46%), leather products and footwear (-3,270, -2.98%), and trade and transport (-4,106, -0.02%). The largest sectoral employment increases for Japan are in metal products, durable manufactures, and construction. For the United States, in column (3), there are employment declines in textiles (-21,870, -1.80%), wearing apparel (-51,891, -4.76%), leather products and footwear (-9,515, -6.54%), trade and transport (-30,051, -0.10%), and other private services (-99,939, -0.27%). The largest employment increases for the United States are in agriculture (91,966, 2.24%), durable manufactures, and construction. The sectoral employment results for global free trade in Scenario **DR-5** in table 2 are some three times larger than those shown for Scenario **DR-4**.

## III. Analysis of Regional Negotiating Options

Both the United States and Japan are engaged in a number of negotiations involving regional arrangements. For the United States, this includes expansion of the North American Free Trade Agreement (NAFTA) to include Chile 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 (APEC) forum. There has also been some discussion of a so-called ASEAN Plus 3 arrangement in which Japan, China/Hong Kong, and Korea would join together with the members of the Association of South East Nations (ASEAN) in an FTA. In this section, we report the results of regional scenarios that involve both the United States and Japan in the case of APEC, an ASEAN Plus 3 FTA that involves Japan, an

[9] Sectoral results for percentage changes in exports, imports, output, and scale economies are given in Brown, Deardorff, and Stern (2002a).

expansion of NAFTA to include Chile, and an approximation to the FTAA that we refer to as a Western Hemisphere FTA (WHFTA) that involves the United States.[10] These scenarios are:

***RA-1:*** *APEC trade liberalization – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers among APEC countries.*[11]

***RA-2:*** *ASEAN Plus 3 FTA – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers among the ASEAN countries*[12] *plus China/Hong Kong, Japan, and Korea.*

***RA-3:*** *NAFTA-Chile FTA – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers between the NAFTA members and Chile.*

***RA-4:*** *Western Hemisphere FTA (WHFTA) – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers among the NAFTA members and Chile and an aggregate of countries comprising Central America and Caribbean and Other South America (CCS).*[13]

**Results**

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 Doha Round scenarios in Section II preceding. Four scenarios have been carried out for each of the four arrangements noted: (A) removal of agricultural tariffs[14]; (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-4C**. The results of the other scenarios are available on request.

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[10] In an Op Ed article in the *Wall Street Journal*, November 4, 2002, p. A14, USTR Robert B. Zoellick has reported that the United States plans to begin negotiations with five nations in Central America, five nations in Southern Africa, and ASEAN members to establish regional trading arrangements.

[11] *The membership of APEC is taken here to include: Australia; Canada; Chile; China; Hong Kong; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Philippines; Singapore; Taiwan; Thailand; and United States.*

[12] *Taken here to include Indonesia, Malaysia, Philippines, Singapore, and Thailand.*

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

[14] These regional scenarios and the bilateral FTA scenarios in the next section make no allowance for reductions in agricultural export subsidies and agricultural production subsidies as was done in the multilateral scenario in the preceding section.

**RA-1C: APEC Trade Liberalization** – This scenario treats APEC as a FTA and does not 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 join 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 **DR-5** in table 1 above.

In table 3, the complete elimination of (post-Uruguay Round) APEC bilateral tariffs and services barriers increases global welfare by $824.2 billion. Japan's welfare increases by $318.1 billion (4.90 percent of GNP) and U.S. welfare increases by $244.2 billion (2.69 percent of GNP). There is little evidence of trade diversion. It is interesting then to compare the bilateral removal of APEC trade barriers with the removal of all global trade barriers in Scenario **DR-5** noted above. The welfare gain from global free trade, indicated earlier in table 1, is $2.19 trillion, which compares to a gain of $824.2 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 $401.9 and $497.0 billion, respectively, compared to $318.1 and $244.2 billion for complete APEC bilateral liberalization. The detailed sectoral results for complete APEC bilateral liberalization for Japan are indicated in column (1) of table 4. Thus, the numbers of workers decline in agriculture, food, beverages and tobacco, textiles, wearing apparel, leather products and footwear, and trade and transport services, and increase in all other manufacturing sectors, particularly metal products, machinery and equipment, and other private services. The sectoral employment results for the United States are shown in column (3) of table 4, indicating employment declines in most manufacturing sectors, especially textiles, wearing apparel, leather products and footwear, other manufactures, and in construction, trade and transport, and government services. The main U.S. employment increases are in agriculture, food, beverages, and tobacco, and wood & wood products.

**RA-2C: ASEAN Plus 3** – Table 3, column (2), contains the results of a FTA involving the members of ASEAN together with China/Hong Kong, Japan, and South Korea.[15] Complete removal of all bilateral tariffs on agriculture and manufactures and services barriers increases global welfare by $282.6 billion. Japan's welfare rises by $170.4 billion, and there are welfare increases for the ASEAN members as well as for China/Hong Kong and South Korea. There is little evidence of trade diversion. The sectoral results for Japan are shown in table 4, column (2), and indicate employment declines in agriculture, food, beverages, and tobacco, textiles, wearing apparel, leather products and footwear, and trade and transport services. Employment rises in all other sectors in Japanese manufacturing and services. The sectoral employment effects in China (excluding Hong Kong), which are quite large, are shown in column (1) of table 5. There are declines in textiles, wood and wood products, chemicals, metal products, transportation equipment, machinery and equipment, construction, trade and transport, and government services. There are employment increases in agriculture, mining, food, beverages and tobacco, wearing apparel, leather products and footwear, other manufactures, and the services sectors. The sectoral employment results for Korea are shown in column (2) of table 5. There are relatively sizable employment declines in food, beverages, and tobacco, durable manufactures, and services, and employment increases especially in textiles, wearing apparel, leather products and footwear, chemicals, and other manufactures.

**RA-3C: NAFTA-Chile FTA** – Table 3, column (3), indicates the results of a FTA involving the NAFTA member countries and Chile.[16] The complete removal of all post-Uruguay Round bilateral tariffs on agriculture and manufactures and services barriers vis-à-vis Chile increases global welfare by $5.8 billion. The welfare of the NAFTA members rises, with the largest absolute gain of $4.4 billion for the

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[15] For some background information on discussions relating to an ASEAN Plus 3 FTA, see Barry (2001). As reported by Amy Kazmin in the *Financial Times*, November 5, 2002, p. 6, the ASEAN members have signed a framework agreement with China to establish a comprehensive free trade area by 2010. The ASEAN members are also discussing a similar framework with Japan. However, according to a news report by Tom Wright in *Wall Street Journal*, December 2, 2002, p. 16, there is already mounting opposition in Southeast Asia to a FTA with China because of fears of import competition from Chinese goods..

[16] For a more comprehensive analysis of the accession of Chile to the NAFTA, see Brown, Deardorff, and Stern (2000).

United States. Chile's welfare increases by $840 million, which is 1.05 percent of its GNP. There is some evidence of trade diversion for a number of countries/regions. The sectoral employment effects for the NAFTA members and for Chile are shown in columns (1)-(4) of table 6. The U.S. employment effects are negligible, as are those for Canada and Mexico. The employment effects for Chile are noticeably larger, with increases in agriculture, mining, metal products, and other private services, and reductions in textiles and wearing apparel, some other manufacturing sectors, and trade and transport and government services.

**RA-4C: Western Hemisphere Trade Agreement (WHFTA) –** Discussions have been ongoing for several years to create a Free Trade Area for the Americas (FTAA).[17] The most recent efforts to move forward in achieving a FTAA were held at the 2002 Ministerial meeting in Quito, Ecuador, in November 2002. Since the country detail in our model does not include the individual members of the FTAA, we have chosen to approximate it by combining the United States, Canada, Mexico, and Chile with an aggregate of the Central American and Caribbean and Other South American (CCS) nations into what we refer to as a Western Hemisphere Free Trade Agreement (WHFTA). The complete removal of all bilateral tariffs on agriculture and manufactures and services barriers can be seen in table 3, column (4), to increase global welfare by $83.5 billion. The welfare of the NAFTA members rises by $55.8 billion for the United States, $3.1 billion for Canada, and $3.1 billion for Mexico. The welfare of Chile rises by $2.3 billion and the CCS aggregate by $19.2 billion. There is small evidence of trade diversion. The sectoral employment effects are indicated in columns (5)-(9) of table 6. The United States shows relatively small employment declines in agriculture, mining, food, beverages, and tobacco, and other private and government services, and increases in all other sectors. While the employment effects for Canada are also small, the absolute employment increases for Mexico, Chile, and the CCS aggregate are noteworthy. This suggests that the smaller countries would experience more employment adjustments than the largest countries in a WHFTA.

[17] See Office of the United States Trade Representative (20001a).

## IV. Analysis of Bilateral Negotiating Options

As already mentioned, both Japan and the United States are currently engaged in or are considering a number of bilateral trading arrangements. For Japan, these include negotiation of a FTA with Singapore and active consideration of FTAs with Mexico, Korea, Chile, and possibly other countries.[18] The United States has been a member of the NAFTA since its inception in 1994. It has recently concluded a bilateral FTA with Jordan and is actively considering FTAs with Chile, Singapore, and Korea.[19] In what follows, we analyze the effects on economic welfare and sectoral employment of these various bilateral arrangements.[20] The scenarios are as follows:

**JSFTA**: *Japan-Singapore FTA*
**JKFTA**: *Japan-Korea FTA*
**JCFTA**: *Japan-Chile FTA*
**JMFTA**: *Japan-Mexico FTA*

**USCFTA**: *U.S.-Chile FTA*
**USSFTA**: *U.S.-Singapore FTA*
**USKFTA**: *U.S.-Korea FTA*

As with the regional scenarios, we report only the results of the combined removal of agricultural and manufactures tariffs and services barriers, denoted by **JSFTA-C**, etc. The results for the separate removal of the agricultural, manufactures, and services barriers are available on request. We should emphasize that our computational analysis does not take into account other features of the various FTAs, such as the negotiation of explicit rules and development of new institutional and cooperative arrangements

[18] For more details, see: METI, White Papers/Reports (2000a,b,c); Institute of Developing Economies and JETRO (2000); Institute of Developing Economies, JETRO, and Korea Institute for International Economic Policy (2000); Korea Institute for International Economic Policy (2000); and Keidanren (1999, 2000). It remains to be seen how agriculture will be handled in the various Japanese FTA negotiations. In this connection, see Hijino and de Jonquières (2001).

[19] See Office of the United States Trade Representative (2002), United States International Trade Commission (2001a,b), and Millman (2002) for information on the U.S. FTA initiatives. As reported by Edward Alden in the *Financial Times*, November 1, 2002, p. 10, the United States is actively pursuing bilateral FTAs with Morocco, Australia, and individual ASEAN member countries. Several other Latin American countries have also approached the United States.

[20] See Brown, Deardorff, and Stern (2002b) for analysis of a Canada-Chile and Canada-EU FTA, and a Mexico-Chile and Mexico-EU FTA

that could be beneficial to the countries involved.[21] 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.

**JSFTA-C: Japan-Singapore Free Trade Agreement** – As shown in table 7, column (1), the combined removal of bilateral tariffs on agricultural products and manufactures and services barriers would increase global economic welfare by $20.1 billion. Japan's welfare rises by $12.0 billion (0.19 percent of GNP), and Singapore's welfare rises by $2.4 billion (3.17 percent of GNP). A JSFTA appears to be trade diverting for Malaysia. The other industrialized countries besides Japan show increases in welfare.[22] The sectoral results, which are shown in column (1) of table 8, indicate that employment rises by relatively small amounts in all sectors in Japan, except trade and transport services and government services.[23] For Singapore, as indicated in column (1) of table 9, there are relatively substantial employment declines in virtually all manufacturing sectors and increases in employment in trade and transport (22,098) and other private services (8,492). 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.

**JKFTA-C: Japan-Korea Free Trade Agreement** – In table 7, column (3), a JKFTA for all sectors combined increases global welfare by $34.6 billion. Japan's economic welfare increases by $29.5 billion (0.45 percent of GNP), and South Korea's welfare increases by $5.3 billion (0.94 percent of GNP). There is evidence of trade diversion from a JKFTA for the United States (-$292 million), EU/EFTA (-$264 million), and smaller amounts for some of the Asian developing countries. The sectoral results,

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[21] Thus, for example, the Japan-Singapore FTA is referred to as the "Japanese-Singapore Agreement for a New Age Partnership." Details of the agreement are set out in METI (2000a).

[22] See Hertel, Walmsley, and Itakura (2001) for a GTAP model-based analysis of the Japan-Singapore FTA that takes into account the proposed bilateral tariff reductions, implementation of uniform standards for e-commerce, services liberalization, the impact of automating customs procedures in Japan, and changes in foreign direct investment. They find that customs automization plays the most important role in driving increases in merchandise trade. They estimate global welfare gains of over $9 billion, most of these gains accruing to Japan. They find no evidence of trade diversion.

[23] Sectoral results for percentage changes in exports, imports, output, and scale economies for this and the following bilateral FTAs are available on request.

shown in table 8, column (2), indicate that there are relatively small employment declines in Japan in agriculture, labor-intensive manufactures, and trade and transport services, and increases in employment in durable manufactures, construction, and other private services. For Korea, as shown in Table 9, column (3), employment falls in wood and wood products, chemicals, durable manufactures, and services, except for trade and transport. Employment rises in Korea's agriculture and labor-intensive manufactures.[24]

**JCFTA-C: Japan-Chile Free Trade Agreement** – A JCFTA covering all sectors is shown in table 7, column (5), to increase global welfare by $5.0 billion. Japan's welfare rises by $4.4 billion (.07 percent of GNP), and Chile's welfare rises by $749 million (0.93 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. The sectoral results for Japan, which are shown in table 8, column (3), indicate relatively small employment declines in agriculture, food, beverages, and tobacco, trade and transport, and other private services, and employment increases in all other manufacturing sectors. In Chile, as indicated in column (5) of table 9, employment falls in mining, all manufacturing sectors, and in services except other private services.

**JMFTA-C: Japan-Mexico Free Trade Agreement** – As indicated in table 7, column (7), the combined removal of bilateral trade barriers for agricultural products, manufactures, and services in a JMFTA increases global welfare by $7.6 billion. Japan's welfare increases by $6.6 billion (0.10 percent of GNP) and Mexico's welfare by $2.0 billion (0.6 percent of GNP). There are indications that a JMFTA would be trade diverting for the United States (-$832 million), Canada (-$36 million), EU/EFTA (-$148 million), and in small amounts for several of the Asian and CCS economies. The sectoral results for Japan, which are shown in column (4) of table 8, indicate relatively small employment declines in agriculture, food, beverages and tobacco, textiles, wearing apparel, leather products and footwear, and

[24] See McKibbin, Lee, and Cheong (2002) for an analysis of a Japan-Korea FTA, using the Asia-Pacific G-Cubed Model. The GCubed model incorporates rational expectations and forward-looking intertemporal behavior of individual agents. The model takes into account the induced changes in expected rates of return to capital by sector and consequent structural adjustments. Allowance is also made for short-term wage stickiness or adjustment costs in allocating capital. The authors conclude that Japan and Korea gain from a FTA, but there is trade diversion for the United States, Australia, and other countries. Their results also suggest greater benefits from a rapid liberalization rather than a more gradual phasing.

trade and transport services and increases especially in durable manufactures. For Mexico, in table 9, column (7), the sectoral results show relatively small employment declines in agriculture and all manufactures sectors and employment increases in trade and transport and other private services.

**USCFTA-C: U.S.-Chile Free Trade Agreement** – To supplement the regional scenario noted for the expansion of NAFTA to include Chile and to permit comparison with a Japan-Chile FTA, the results of a U.S.-Chile FTA are indicated in column (6) of table 7.[25] Global welfare increases by $5.0 billion, with U.S. welfare increasing by $4.4 billion and Chile's welfare by $0.6 billion. These welfare increases are comparable to those indicated for the Japan-Chile FTA in column (5) of table 7, although the patterns of trade diversion differ somewhat between the U.S. and Japanese FTAs with Chile. The sectoral results for the United States are shown in column (5) of table 8 and indicate relatively small employment declines in U.S. agriculture, food, beverages, and tobacco, wearing apparel, leather products and footwear, and other private services, and employment increases in the other sectors. The sectoral employment effects for Chile are indicated in column (6) of table 9 and show employment increases in agriculture, mining, metal products, and other private services and employment declines in several manufacturing sectors and other services. The sectoral employment changes for Chile differ somewhat for the Japan and U.S. FTAs, as can be seen by comparing columns (5) and (6). Nonetheless, a number of these sectoral changes are relatively large and indicate the adjustments that may occur with the respective FTAs.

**USSFTA-C: U.S.-Singapore Free Trade Agreement** – The welfare effects of a U.S.-Singapore FTA are noted in column (2) of table 7. Global welfare rises by $25.1 billion, with U.S. welfare rising by $17.5 billion and Singapore's welfare by $2.5 billion. These welfare increases are somewhat larger than those shown for the Japan-Singapore FTA in column (1), although there are some differences in the pattern of trade diversion. The sectoral employment effects for the United States are indicated in column (6) of table 8. There are positive, but relatively small, employment increases in all U.S. sectors,

[25] Neil King, Jr. has reported in the *Wall Street Journal*, December 12, 2002, p. A3, that the United States has reached a FTA with Chile. The agreement had been delayed over whether Chile would be allowed to maintain its capital controls. In the end, Chile was permitted to do so for as long as a year. The Bush Administration plans to submit the Chile FTA to the U.S. Congress for approval by March 2003.

except for wearing apparel, trade and transport, and other private services. For Singapore, noted in column (2) of table 9, there are relatively large sectoral employment increases in wearing apparel, trade and transport services, and other private services and declines in most other sectors. These sectoral changes correspond for Singapore to those shown in column (1) of table 9 for the Japan-Singapore FTA and suggest sizable employment adjustments for Singapore that may occur in both FTA arrangements.

**USKFTA-C: U.S.-Korea Free Trade Agreement** – The welfare effects of a U.S.-Korean FTA are shown in column (4) of table 7.[26] Global welfare rises by $44.8 billion, with U.S. welfare rising by $30.1 billion and Korean welfare by $12.0 billion. These welfare effects are somewhat larger than for the Japan-Korea FTA noted in column (3) of table 7, and the U.S.-Korea FTA can be seen to have only slight evidence of trade diversion. The sectoral employment effects for the United States are indicated in column (7) of table 8. U.S. employment increases notably in agriculture and food, beverages, and tobacco and declines in most of the manufacturing and services sectors. It is interesting to compare these results with the results for the Japan-Korea FTA in column (2) of table 8 that indicate employment declines in Japan's agricultural sector, food, beverages, and tobacco, wearing apparel, and trade and transport services. The sectoral employment effects for Korea are indicated in column (4) of table 9. There are noteworthy employment declines in agriculture, food, beverages, and tobacco, non-metallic mineral products, construction, and other private services and increases in most manufacturing sectors and trade and transport services. The sectoral employment results for Korea with a Japan-Korea FTA, shown in column (3) of table 9, suggest quite different sectoral effects than for a U.S.-Korea FTA. The employment adjustments involved for Korea in both FTAs may therefore be significant in some sectors, although they could be offsetting.

## V. Conclusions and Implications for Policy

We have used the Michigan Model of World Production and Trade to simulate the economic effects of the multilateral trade liberalization that may be negotiated in the Doha Development Round, as

[26] For additional analysis, see USITC (2001b).

well as a variety of regional and bilateral 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 of the Doha Round is that multilateral trade liberalization has positive and often sizable impacts on economic welfare in all of the industrialized and developing countries/regions covered in the Michigan Model. A second conclusion is that while regional and bilateral FTAs may be welfare enhancing for the member countries directly involved, these welfare gains are considerably smaller than those resulting from multilateral trade liberalization, and, in any case, accrue in absolute terms primarily to the large industrialized countries. Thus, the benefits of FTAs to the developing country partners appear somewhat limited, and, in some cases, could be disruptive because of intersectoral shifts in output and employment, depending on how rapidly the FTAs would be implemented. It is also the case that the regional and bilateral 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 suggest that the interests of the United States, Japan, and other countries may not be well served altogether by the negotiation of regional and bilateral preferential trading arrangements. There is some danger accordingly that the realization of the very significant benefits of multilateral liberalization may be jeopardized by pursuing these arrangements.[27] It is imperative therefore for the United States, Japan, and other WTO member countries to move ahead expeditiously in concluding the Doha Development Round.

[27] In this connection, see de Jonquières (2002) for comment and analysis and a chart entitled, "Free trade the hard way," which depicts the global maze and pathways of the numerous bilateral and regional agreements concluded, under way or planned, and being proposed as of November 2002.

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**Table 1**
**Global Welfare Effects of Multilateral Negotiating Options**
**(Percent of GNP and Billions of Dollars)**

| | Doha Round - 33% Reduction in : | | | | | | | | Global Free Trade All Barriers Removed (5) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Agricultural Protection - DR-1 (1) | | Manufactures Tariffs - DR-2 (2) | | Services Barriers - DR-3 (3) | | Combined Liberalization - DR-4 (4) | | | |
| | % | Bil. | % | Bil. | % | Bil. | % | Bil. | % | Bil. |
| **Industrialized Countries** | | | | | | | | | | |
| **Japan** | 0.01 | 0.72 | 1.00 | 65.05 | 1.03 | 66.88 | 2.04 | 132.64 | 6.19 | 401.91 |
| **United States** | -0.08 | -7.23 | 0.40 | 36.52 | 1.48 | 134.75 | 1.81 | 164.04 | 5.48 | 497.04 |
| **Canada** | -0.01 | -0.05 | 0.43 | 3.17 | 0.87 | 6.33 | 1.30 | 9.46 | 3.93 | 28.66 |
| **Australia** | 0.30 | 1.30 | 0.77 | 3.36 | 0.80 | 3.50 | 1.86 | 8.17 | 5.64 | 24.75 |
| **New Zealand** | 0.09 | 0.07 | 2.14 | 1.57 | 1.53 | 1.12 | 3.76 | 2.76 | 11.39 | 8.37 |
| **EU and EFTA** | 0.03 | 3.36 | 0.74 | 81.23 | 1.30 | 142.46 | 2.07 | 227.05 | 6.27 | 687.98 |
| **Developing Countries** | | | | | | | | | | |
| **Asia** | | | | | | | | | | |
| **Hong Kong** | -0.15 | -0.20 | 1.73 | 2.23 | 3.66 | 4.71 | 5.23 | 6.74 | 15.86 | 20.43 |
| **China** | -0.27 | -2.46 | 1.52 | 13.78 | 1.31 | 11.87 | 2.56 | 23.19 | 7.75 | 70.26 |
| **Korea** | -0.14 | -0.78 | 2.07 | 11.79 | 1.22 | 6.95 | 3.16 | 17.96 | 9.56 | 54.42 |
| **Singapore** | -0.12 | -0.09 | 3.77 | 2.80 | 3.59 | 2.67 | 7.24 | 5.39 | 21.95 | 16.32 |
| **Taiwan** | 0.27 | 0.95 | 2.29 | 8.03 | 0.82 | 2.86 | 3.38 | 11.84 | 10.23 | 35.89 |
| **Indonesia** | -1.01 | -2.54 | 0.99 | 2.51 | 0.86 | 2.17 | 0.84 | 2.13 | 2.56 | 6.46 |
| **Malaysia** | -0.17 | -0.20 | 3.54 | 4.23 | 0.97 | 1.16 | 4.34 | 5.19 | 13.15 | 15.72 |
| **Philippines** | -0.88 | -0.77 | 4.40 | 3.88 | 1.89 | 1.67 | 5.42 | 4.78 | 16.41 | 14.48 |
| **Thailand** | 0.46 | 0.95 | 1.59 | 3.27 | 1.21 | 2.49 | 3.26 | 6.71 | 9.87 | 20.34 |
| **Rest of Asia** | 1.83 | 10.48 | 1.01 | 5.80 | 0.54 | 3.08 | 3.38 | 19.36 | 10.25 | 58.66 |
| **Other** | | | | | | | | | | |
| **Chile** | -0.29 | -0.24 | 1.51 | 1.22 | 1.33 | 1.07 | 2.55 | 2.05 | 7.73 | 6.21 |
| **Mexico** | -0.21 | -0.76 | 0.35 | 1.24 | 0.82 | 2.89 | 0.96 | 3.38 | 2.90 | 10.25 |
| **Cent., Carib., S. America** | -0.35 | -5.77 | 0.33 | 5.49 | 1.18 | 19.70 | 1.16 | 19.43 | 3.53 | 58.86 |
| **Middle East and N. Africa** | -0.56 | -4.81 | 1.17 | 10.08 | 1.03 | 8.86 | 1.64 | 14.14 | 4.96 | 42.83 |
| **Total** | | -8.06 | | 267.26 | | 427.20 | | 686.41 | | 2,079.83 |

**Table 2**
**Sectoral Employment Effects of Multilateral Negotiating Options for Japan and the United States**
**(Percent of Employment and Number of Workers)**

| Sector | Japan | | | | United States | | | |
|---|---|---|---|---|---|---|---|---|
| | Doha Round DR-4 (1) | | Global Free Trade DR-5 (2) | | WTO Millenium Round DR-4 (3) | | Global Free Trade DR-5 (4) | |
| | % | Workers | % | Workers | % | Workers | % | Workers |
| **Agriculture** | -2.54 | -103,919 | -7.69 | -314,875 | 2.24 | 91,966 | 6.79 | 278,658 |
| **Mining** | -0.12 | -83 | -0.37 | -250 | 0.27 | 1,912 | 0.82 | 5,794 |
| **Food Beverages & Tobacco** | -0.83 | -27,740 | -2.50 | -84,053 | 0.65 | 20,451 | 1.96 | 61,966 |
| **Textiles** | -0.31 | -2,334 | -0.95 | -7,073 | -1.80 | -21,870 | -5.47 | -66,265 |
| **Wearing Apparel** | -2.46 | -33,837 | -7.45 | -102,527 | -4.76 | -51,891 | -14.42 | -157,229 |
| **Leather Products & Footwear** | -2.98 | -3,270 | -9.04 | -9,908 | -6.54 | -9,515 | -19.81 | -28,829 |
| **Wood & Wood Products** | 0.25 | 4,630 | 0.77 | 14,028 | 0.36 | 15,502 | 1.08 | 46,971 |
| **Chemicals** | 0.52 | 8,081 | 1.59 | 24,485 | 0.32 | 9,184 | 0.98 | 27,828 |
| **Non-metallic Min. Products** | 0.52 | 7,221 | 1.58 | 21,879 | -0.05 | -378 | -0.15 | -1,146 |
| **Metal Products** | 1.13 | 28,168 | 3.41 | 85,349 | 0.27 | 7,318 | 0.81 | 22,174 |
| **Transportation Equipment** | 2.59 | 15,134 | 7.84 | 45,856 | 0.25 | 5,020 | 0.77 | 15,209 |
| **Machinery & Equipment** | 1.54 | 36,015 | 4.65 | 109,125 | 0.77 | 22,451 | 2.35 | 68,028 |
| **Other Manufactures** | 0.67 | 3,432 | 2.02 | 10,399 | 0.55 | 9,933 | 1.65 | 30,096 |
| **Elec., Gas & Water** | 0.37 | 13,270 | 1.11 | 40,207 | 0.05 | 2,497 | 0.16 | 7,566 |
| **Construction** | 0.14 | 12,952 | 0.44 | 39,244 | 0.01 | 929 | 0.02 | 2,814 |
| **Trade & Transport** | -0.02 | -4,106 | -0.07 | -12,442 | -0.10 | -30,051 | -0.29 | -91,056 |
| **Other Private Services** | 0.22 | 39,930 | 0.66 | 120,987 | -0.27 | -99,339 | -0.82 | -300,997 |
| **Government Services** | 0.14 | 6,459 | 0.44 | 19,572 | 0.10 | 25,881 | 0.29 | 78,418 |
| **Total** | | 0 | | 0 | | 0 | | 0 |

**Table 3**
**Global Welfare Effects of Regional Negotiating Options**
**(Percent of GNP and Billions of Dollars)**

| | APEC FTA (1) | | ASEAN+3 FTA (2) | | NAFTA-Chile (3) | | WHFTA (4) | |
|---|---|---|---|---|---|---|---|---|
| | % | Bil. | % | Bil. | % | Bil. | % | Bil. |
| **Industrialized Countries** | | | | | | | | |
| **Japan** | 4.90 | 318.09 | 2.62 | 170.39 | 0.00 | 0.14 | 0.01 | 0.55 |
| **United States** | 2.69 | 244.25 | 0.14 | 12.98 | 0.05 | 4.41 | 0.62 | 55.85 |
| **Canada** | 2.26 | 16.44 | 0.12 | 0.87 | 0.04 | 0.31 | 0.42 | 3.08 |
| **Australia** | 3.72 | 16.33 | 0.40 | 1.77 | 0.00 | -0.01 | -0.01 | -0.04 |
| **New Zealand** | 7.36 | 5.40 | 0.42 | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| **EU and EFTA** | 0.04 | 4.11 | 0.04 | 4.29 | 0.00 | -0.03 | 0.00 | -0.40 |
| **Developing Countries** | | | | | | | | |
| **Asia** | | | | | | | | |
| **Hong Kong** | 13.62 | 17.54 | 0.16 | 0.21 | 0.00 | 0.01 | -0.01 | -0.02 |
| **China** | 5.48 | 49.63 | 1.95 | 17.66 | 0.00 | -0.03 | 0.00 | -0.04 |
| **Korea** | 7.45 | 42.38 | 4.21 | 23.94 | 0.00 | -0.03 | -0.03 | -0.19 |
| **Singapore** | 16.34 | 12.15 | 10.66 | 7.93 | 0.01 | 0.00 | 0.05 | 0.04 |
| **Taiwan** | 9.41 | 32.98 | 3.08 | 10.80 | 0.00 | 0.02 | 0.03 | 0.09 |
| **Indonesia** | 4.15 | 10.49 | 2.29 | 5.80 | 0.00 | 0.00 | 0.00 | -0.01 |
| **Malaysia** | 10.18 | 12.17 | 6.44 | 7.70 | 0.01 | 0.01 | 0.09 | 0.11 |
| **Philippines** | 14.41 | 12.72 | 7.28 | 6.42 | 0.01 | 0.01 | 0.02 | 0.01 |
| **Thailand** | 5.69 | 11.71 | 2.60 | 5.36 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rest of Asia** | -0.10 | -0.58 | -0.04 | -0.22 | 0.00 | 0.00 | 0.00 | -0.01 |
| **Other** | | | | | | | | |
| **Chile** | 4.47 | 3.59 | 0.57 | 0.46 | 1.05 | 0.84 | 2.84 | 2.28 |
| **Mexico** | 1.83 | 6.44 | 0.00 | 0.00 | 0.12 | 0.43 | 0.87 | 3.07 |
| **Cent., Carib., S. America** | 0.08 | 1.41 | 0.10 | 1.66 | -0.01 | -0.20 | 1.15 | 19.24 |
| **Middle East and N. Africa** | 0.80 | 6.88 | 0.50 | 4.29 | 0.00 | -0.03 | -0.02 | -0.15 |
| **Total** | | 824.15 | | 282.61 | | 5.85 | | 83.47 |

**Table 4**
**Sectoral Employment Effects for Japan and the United States of Regional Negotiating Options**
**(Percent of Employment and Number of Workers)**

| | Japan | | | | United States | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APEC FTA (1) | | ASEAN +3 FTA (2) | | APEC FTA (3) | | ASEAN+3 FTA (4) | | NAFTA+Chile FTA (5) | | WHFTA (6) | |
| Sector | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers |
| **Agriculture** | -5.16 | -211,352 | -0.65 | -26,711 | 9.62 | 394,420 | 0.66 | 27,259 | -0.01 | -607 | -0.50 | -20,625 |
| **Mining** | 2.78 | 1,897 | -1.96 | -1,340 | -0.03 | -236 | -0.01 | -68 | 0.00 | 19 | -0.17 | -1,237 |
| **Food Beverages & Tobacco** | -2.57 | -86,405 | -0.93 | -31,228 | 1.10 | 34,811 | 0.11 | 3,401 | -0.01 | -190 | -0.33 | -10,533 |
| **Textiles** | -0.29 | -2,166 | -0.43 | -3,176 | -4.13 | -50,099 | -1.62 | -19,570 | 0.01 | 157 | 0.42 | 5,033 |
| **Wearing Apparel** | -5.93 | -81,604 | -4.84 | -66,654 | -9.87 | -107,610 | -3.54 | -38,570 | -0.02 | -169 | 0.62 | 6,716 |
| **Leather Products & Footwear** | -6.49 | -7,116 | -5.72 | -6,266 | -17.02 | -24,769 | -6.92 | -10,068 | -0.03 | -39 | -0.39 | -564 |
| **Wood & Wood Products** | 0.37 | 6,792 | 0.08 | 1,542 | 0.10 | 4,264 | 0.10 | 4,459 | 0.01 | 241 | 0.11 | 4,736 |
| **Chemicals** | 1.35 | 20,798 | 0.64 | 9,868 | -0.02 | -545 | -0.05 | -1,410 | 0.02 | 510 | 0.14 | 3,876 |
| **Non-metallic Min. Products** | 1.20 | 16,607 | 0.54 | 7,424 | -0.25 | -1,906 | 0.08 | 643 | 0.01 | 50 | 0.07 | 539 |
| **Metal Products** | 2.59 | 64,621 | 1.33 | 33,153 | -0.05 | -1,483 | 0.19 | 5,261 | 0.00 | -101 | 0.05 | 1,281 |
| **Transportation Equipment** | 5.27 | 30,833 | 2.39 | 13,976 | -0.08 | -1,587 | 0.08 | 1,518 | 0.02 | 322 | 0.14 | 2,817 |
| **Machinery & Equipment** | 3.48 | 81,714 | 1.59 | 37,251 | -0.37 | -10,699 | -0.03 | -870 | 0.02 | 481 | 0.40 | 11,581 |
| **Other Manufactures** | 1.61 | 8,323 | -0.05 | -259 | -2.25 | -40,992 | -1.31 | -23,864 | 0.00 | 88 | 0.71 | 12,833 |
| **Elec., Gas & Water** | 0.88 | 31,766 | 0.38 | 13,708 | -0.01 | -419 | 0.02 | 846 | 0.00 | 82 | 0.01 | 648 |
| **Construction** | 0.27 | 24,624 | 0.14 | 12,839 | -0.09 | -11,377 | 0.02 | 2,876 | 0.00 | 113 | 0.00 | -136 |
| **Trade & Transport** | -0.06 | -9,788 | -0.25 | -42,610 | -0.41 | -129,833 | 0.04 | 13,330 | 0.00 | 479 | 0.01 | 3,534 |
| **Other Private Services** | 0.55 | 100,701 | 0.23 | 42,745 | 0.00 | 105 | 0.05 | 18,333 | 0.00 | -1,454 | -0.03 | -10,311 |
| **Government Services** | 0.22 | 9,755 | 0.13 | 5,738 | -0.19 | -52,047 | 0.06 | 16,495 | 0.00 | 19 | -0.04 | -10,188 |
| **Total** | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

**Table 5**
**Sectoral Employment Effects of ASEAN Plus 3 FTA**
**Korea and China**
**(Percent of Employment and Number of Workers)**

| Sector | China (1) | | Korea (2) | |
|---|---|---|---|---|
| | % | Workers | % | Workers |
| Agriculture | 0.69 | 2,584,507 | 0.06 | 1,774 |
| Mining | 0.28 | 29,497 | -3.75 | -1,151 |
| Food Beverages & Tobacco | 0.79 | 92,702 | -1.03 | -5,444 |
| Textiles | -8.94 | -1,521,638 | 10.55 | 68,676 |
| Wearing Apparel | 23.81 | 1,139,818 | 3.40 | 19,930 |
| Leather Products & Footwear | 7.54 | 298,577 | 8.42 | 8,855 |
| Wood & Wood Products | -1.95 | -114,179 | -1.18 | -4,496 |
| Chemicals | -3.38 | -682,311 | 0.66 | 4,156 |
| Non-metallic Min. Products | -0.72 | 0 | -1.98 | -8,190 |
| Metal Products | -1.11 | -173,972 | -2.25 | -21,749 |
| Transportation Equipment | -4.37 | -179,590 | -1.12 | -1,780 |
| Machinery & Equipment | -2.31 | -510,376 | -3.36 | -16,465 |
| Other Manufactures | 3.55 | 188,816 | 1.06 | 5,274 |
| Elec., Gas & Water | -0.50 | -144,041 | 0.53 | 5,093 |
| Construction | -0.69 | -396,880 | -0.36 | -12,076 |
| Trade & Transport | -0.09 | -96,246 | 0.04 | 1,601 |
| Other Private Services | -0.19 | -74,163 | -0.84 | -30,719 |
| Government Services | -1.00 | -440,522 | -0.43 | -13,288 |
| Total | | 0 | | 0 |

## Table 6
## Sectoral Employment Effects of a NAFTA-Chile FTA and WHFTA
## (Percent of Employment and Number of Workers)

| | NAFTA-Chile FTA | | | | | | | | WHFTA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | United States (1) | | Canada (2) | | Mexico (3) | | Chile (4) | | United States (5) | | Canada (6) | | Mexico (7) | | Chile (8) | | CCS (9) | |
| | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers | % | Workers |
| **Agriculture** | -0.01 | -607 | -0.02 | -108 | -0.03 | -2,871 | 0.55 | 5,983 | -0.50 | -20,625 | -0.20 | -1,268 | -0.15 | -14,267 | 1.01 | 11,044 | 1.09 | 244,439 |
| **Mining** | 0.00 | 19 | 0.01 | 17 | -0.02 | -33 | 1.26 | 1,208 | -0.17 | -1,237 | -0.50 | -965 | -0.11 | -179 | -1.14 | -1,096 | 0.63 | 7,066 |
| **Food Beverages & Tobacco** | -0.01 | -190 | -0.01 | -56 | -0.02 | -86 | -0.26 | -599 | -0.33 | -10,533 | -0.06 | -311 | -0.06 | -291 | -0.93 | -2,113 | 0.53 | 22,196 |
| **Textiles** | 0.01 | 157 | -0.01 | -4 | 0.13 | 353 | -1.19 | -434 | 0.42 | 5,033 | -0.48 | -163 | 0.54 | 1,467 | -0.97 | -354 | 0.09 | 1,128 |
| **Wearing Apparel** | -0.02 | -169 | -0.02 | -26 | -0.03 | -64 | -0.02 | -9 | 0.62 | 6,716 | -0.62 | -887 | -1.23 | -2,329 | 0.06 | 34 | 2.05 | 34,549 |
| **Leather Products & Footwear** | -0.03 | -39 | -0.07 | -5 | -0.01 | -13 | 0.56 | 25 | -0.39 | -564 | -1.51 | -113 | -0.35 | -451 | -0.16 | -7 | 2.71 | 9,276 |
| **Wood & Wood Products** | 0.01 | 241 | -0.02 | -95 | -0.03 | -117 | 0.15 | 63 | 0.11 | 4,736 | -0.10 | -478 | -0.32 | -1,422 | 0.16 | 67 | -0.93 | -12,327 |
| **Chemicals** | 0.02 | 510 | 0.00 | -18 | 0.03 | 75 | -2.19 | -1,753 | 0.14 | 3,876 | 0.16 | 634 | 0.18 | 453 | -1.96 | -1,569 | -0.67 | -16,943 |
| **Non-metallic Min. Products** | 0.01 | 50 | 0.00 | 0 | 0.01 | 504 | -0.42 | -38 | 0.07 | 539 | 0.03 | 27 | 0.39 | 13,323 | -1.17 | -107 | -0.67 | -1,747 |
| **Metal Products** | 0.00 | -101 | -0.01 | -40 | 0.05 | 159 | 1.70 | 1,878 | 0.05 | 1,281 | -0.03 | -74 | -0.30 | -863 | 2.37 | 2,624 | -0.65 | -11,533 |
| **Transportation Equipment** | 0.02 | 322 | -0.01 | -28 | 0.25 | 330 | -2.50 | -256 | 0.14 | 2,817 | 0.54 | 1,016 | 1.29 | 1,686 | 5.69 | 584 | -1.63 | -15,058 |
| **Machinery & Equipment** | 0.02 | 481 | 0.06 | 84 | -0.05 | -108 | -5.07 | -731 | 0.40 | 11,581 | 0.18 | 262 | -0.47 | -984 | -2.86 | -412 | -3.03 | -34,821 |
| **Other Manufactures** | 0.00 | 88 | 0.00 | -1 | -0.05 | -12 | -1.81 | -19 | 0.71 | 12,833 | -0.26 | -154 | -0.50 | -124 | 0.95 | 10 | -1.34 | -1,412 |
| **Elec., Gas & Water** | 0.00 | 82 | 0.00 | 24 | 0.01 | 104 | 0.06 | 166 | 0.01 | 648 | 0.03 | 261 | 0.03 | 212 | 0.07 | 180 | -0.23 | -11,985 |
| **Construction** | 0.00 | 113 | 0.00 | 24 | 0.01 | 89 | -0.23 | -1,299 | 0.00 | -136 | 0.01 | 165 | 0.00 | -35 | -0.35 | -2,026 | -0.28 | -28,439 |
| **Trade & Transport** | 0.00 | 479 | 0.01 | 258 | 0.01 | 1,403 | -0.53 | -7,567 | 0.01 | 3,534 | 0.05 | 2,222 | 0.05 | 6,498 | -0.68 | -9,727 | -0.52 | -110,970 |
| **Other Private Services** | 0.00 | -1,454 | 0.00 | -75 | 0.00 | 38 | 0.62 | 5,720 | -0.03 | -10,311 | 0.00 | -19 | -0.06 | -3,310 | 0.66 | 6,132 | -0.22 | -46,536 |
| **Government Services** | 0.00 | 19 | 0.00 | 49 | 0.01 | 249 | -0.38 | -2,336 | -0.04 | -10,188 | -0.01 | -151 | 0.02 | 616 | -0.54 | -3,263 | -0.17 | -26,885 |
| **Total** | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

## Table 7
## Global Welfare Effects of Bilateral Negotiating Options for Japan and the United States
## (Percent GNP and Millions of Dollars)

| | Japan-Singapore FTA (1) | | U.S.-Singapore FTA (2) | | Japan-Korea FTA (3) | | U.S.-Korea FTA (4) | | Japan-Chile FTA (5) | | U.S.-Chile FTA (6) | | Japan-Mexico FTA (7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | Mil. | % | Mil. | % | Mil. | % | Mil. | % | Mil. | % | Mil. | % | Mil. |
| **Industrialized Countries** | | | | | | | | | | | | | | |
| **Japan** | 0.19 | 12,028.52 | 0.03 | 2,186.08 | 0.45 | 29,502.55 | 0.01 | 357.22 | 0.07 | 4,439.96 | 0.00 | 142.87 | 0.10 | 6,640.48 |
| **United States** | 0.03 | 2,355.51 | 0.19 | 17,508.46 | 0.00 | -292.21 | 0.33 | 30,121.00 | 0.00 | -47.91 | 0.05 | 4,435.03 | -0.01 | -832.39 |
| **Canada** | 0.02 | 162.52 | -0.01 | -47.59 | 0.01 | 46.34 | 0.04 | 282.11 | 0.00 | -4.26 | 0.01 | 37.52 | 0.00 | -35.90 |
| **Australia** | 0.05 | 215.91 | 0.05 | 236.63 | 0.02 | 82.63 | 0.02 | 86.46 | 0.00 | 2.70 | 0.00 | -11.48 | 0.00 | 9.61 |
| **New Zealand** | 0.05 | 34.59 | 0.05 | 35.79 | 0.02 | 11.97 | 0.01 | 8.40 | 0.00 | -0.08 | 0.00 | -1.52 | 0.00 | 3.14 |
| **EU and EFTA** | 0.02 | 2,343.21 | 0.02 | 1,988.36 | 0.00 | -264.00 | 0.00 | 392.54 | 0.00 | -105.89 | 0.00 | -14.78 | 0.00 | -148.11 |
| **Developing Countries** | | | | | | | | | | | | | | |
| **Asia** | | | | | | | | | | | | | | |
| **Hong Kong** | 0.02 | 30.59 | -0.01 | -11.77 | 0.01 | 8.70 | 0.13 | 162.62 | 0.00 | -0.68 | 0.00 | 4.83 | -0.01 | -6.78 |
| **China** | 0.00 | -4.82 | 0.00 | -0.14 | 0.00 | -2.20 | 0.02 | 217.88 | 0.00 | -3.40 | 0.00 | -20.77 | 0.00 | -0.63 |
| **Korea** | 0.04 | 216.35 | 0.05 | 264.90 | 0.94 | 5,341.66 | 2.11 | 12,018.37 | 0.00 | -26.11 | 0.00 | -19.61 | 0.00 | -17.19 |
| **Singapore** | 3.17 | 2,360.29 | 3.37 | 2,507.79 | -0.02 | -18.51 | 0.08 | 60.53 | 0.00 | -0.80 | 0.00 | 3.58 | 0.00 | -3.24 |
| **Taiwan** | 0.06 | 201.52 | 0.03 | 114.68 | -0.04 | -156.86 | 0.00 | -5.12 | 0.00 | -10.04 | 0.00 | 12.06 | -0.01 | -32.46 |
| **Indonesia** | 0.01 | 12.77 | 0.03 | 81.20 | 0.03 | 65.30 | 0.04 | 93.71 | 0.00 | -0.58 | 0.00 | -2.76 | 0.00 | 5.69 |
| **Malaysia** | -0.30 | -362.64 | -0.12 | -144.22 | -0.03 | -32.16 | 0.05 | 54.74 | 0.00 | -1.84 | 0.01 | 6.19 | -0.01 | -11.75 |
| **Philippines** | 0.00 | 3.68 | -0.01 | -6.39 | 0.00 | 3.91 | 0.05 | 42.62 | 0.00 | -0.87 | 0.01 | 5.34 | 0.00 | -1.61 |
| **Thailand** | 0.02 | 49.87 | 0.04 | 78.86 | 0.00 | 1.27 | 0.02 | 47.66 | 0.00 | -3.45 | 0.00 | 5.11 | 0.00 | -0.03 |
| **Rest of Asia** | 0.01 | 66.09 | 0.00 | 7.89 | 0.00 | 15.73 | 0.02 | 110.58 | 0.00 | -1.92 | 0.00 | 4.52 | 0.00 | -4.30 |
| **Other** | | | | | | | | | | | | | | |
| **Chile** | 0.00 | 3.54 | 0.02 | 18.33 | 0.02 | 18.40 | 0.02 | 12.98 | 0.93 | 748.70 | 0.69 | 556.21 | 0.00 | -0.55 |
| **Mexico** | 0.02 | 57.79 | -0.01 | -46.45 | 0.01 | 23.25 | 0.02 | 53.61 | 0.00 | -8.00 | 0.00 | -6.05 | 0.58 | 2,035.30 |
| **Cent., Carib., S. America** | 0.01 | 130.13 | 0.00 | 19.95 | 0.00 | 42.43 | 0.02 | 254.51 | 0.00 | 23.90 | -0.01 | -151.17 | 0.00 | -28.54 |
| **Middle East and N. Africa** | 0.03 | 237.91 | 0.03 | 269.35 | 0.03 | 229.12 | 0.05 | 465.30 | 0.00 | 6.35 | 0.00 | -17.70 | 0.00 | 16.87 |
| **Total** | | 20,143.33 | | 25,061.73 | | 34,627.33 | | 44,837.73 | | 5,005.79 | | 4,967.40 | | 7,587.59 |

**Table 8**
**Sectoral Employment Effects for Japan and for the United States of Bilateral Negotiating Options**
**(Percent of Employment and Number of Workers**

| | Sectoral Employment Effects for Japan | | | | | | | | Sectoral Employment Effects for the United States | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Japan-Singapore FTA (1) | | Japan-Korea FTA (2) | | Japan-Chile FTA (3) | | Japan-Mexico FTA (4) | | U.S.-Chile FTA (5) | | U.S.-Singapore FTA (6) | | U.S.-Korea FTA (7) | |
| **Sector** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** |
| **Agriculture** | 0.04 | 1,515 | -0.02 | -1,016 | 0.00 | -165 | -0.02 | -662 | -0.02 | -698 | 0.10 | 4,216 | 1.44 | 59,104 |
| **Mining** | 0.37 | 251 | -0.15 | -99 | 0.08 | 52 | -0.11 | -77 | 0.00 | 1 | 0.09 | 616 | -0.11 | -764 |
| **Food Beverages & Tobacco** | 0.00 | 44 | -0.08 | -2,567 | -0.01 | -457 | -0.02 | -510 | -0.01 | -203 | 0.04 | 1,146 | 0.13 | 4,093 |
| **Textiles** | 0.08 | 599 | -0.07 | -490 | 0.01 | 51 | -0.01 | -58 | 0.01 | 173 | 0.05 | 581 | -0.49 | -5,926 |
| **Wearing Apparel** | 0.04 | 619 | -0.27 | -3,708 | 0.00 | 35 | -0.01 | -139 | -0.02 | -170 | -0.03 | -300 | -0.72 | -7,903 |
| **Leather Products & Footwear** | 0.08 | 83 | -0.75 | -820 | 0.01 | 6 | -0.02 | -19 | -0.03 | -37 | 0.19 | 275 | -0.85 | -1,233 |
| **Wood & Wood Products** | 0.03 | 526 | 0.00 | -23 | 0.00 | 69 | 0.00 | -13 | 0.00 | 91 | 0.03 | 1,231 | -0.03 | -1,475 |
| **Chemicals** | 0.09 | 1,339 | 0.14 | 2,160 | 0.01 | 171 | 0.01 | 115 | 0.02 | 518 | 0.06 | 1,769 | 0.00 | 46 |
| **Non-metallic Min. Products** | 0.05 | 631 | 0.08 | 1,050 | 0.01 | 70 | 0.01 | 73 | 0.01 | 40 | 0.04 | 338 | -0.02 | -171 |
| **Metal Products** | 0.11 | 2,648 | 0.17 | 4,130 | 0.02 | 435 | 0.02 | 592 | 0.00 | -73 | 0.07 | 2,045 | -0.07 | -2,034 |
| **Transportation Equipment** | 0.29 | 1,714 | -0.07 | -408 | 0.08 | 448 | 0.05 | 290 | 0.02 | 378 | 0.06 | 1,231 | -0.09 | -1,804 |
| **Machinery & Equipment** | 0.17 | 3,946 | 0.28 | 6,650 | 0.02 | 438 | 0.06 | 1,401 | 0.02 | 518 | 0.15 | 4,222 | -0.04 | -1,090 |
| **Other Manufactures** | 0.19 | 966 | -0.01 | -71 | 0.02 | 78 | 0.05 | 280 | 0.00 | 91 | 0.19 | 3,511 | -0.39 | -7,023 |
| **Elec., Gas & Water** | 0.03 | 979 | 0.05 | 1,920 | 0.00 | 160 | 0.01 | 303 | 0.00 | 78 | 0.01 | 409 | -0.01 | -277 |
| **Construction** | 0.00 | 200 | 0.02 | 1,402 | 0.00 | 37 | 0.00 | 244 | 0.00 | 125 | 0.00 | 38 | -0.01 | -1,692 |
| **Trade & Transport** | -0.10 | -16,336 | -0.08 | -13,056 | 0.00 | -518 | -0.02 | -2,561 | 0.00 | 500 | -0.07 | -22,013 | -0.06 | -17,836 |
| **Other Private Services** | 0.00 | 470 | 0.03 | 4,894 | 0.00 | -911 | 0.00 | 652 | 0.00 | -1,422 | 0.00 | -569 | 0.00 | -698 |
| **Government Services** | 0.00 | -195 | 0.00 | 50 | 0.00 | 2 | 0.00 | 91 | 0.00 | 90 | 0.00 | 1,254 | -0.05 | -13,315 |
| **Total** | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

**Table 9**
**Sectoral Employment Effects for Japan and for the U.S. FTA Partner Countries**
**(Percent of Employment and Number of Workers**

| | Singapore | | | | Korea | | | | Chile | | | | Mexico | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Japan FTA (1) | | U.S. FTA (2) | | Japan FTA (3) | | U.S. FTA (4) | | Japan FTA (5) | | U.S. FTA (6) | | Japan FTA (7) | |
| **Sector** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** | **%** | **Workers** |
| **Agriculture** | -1.25 | -59 | -2.41 | -114 | 0.25 | 7,056 | -4.02 | -114,460 | 0.08 | 880 | 0.38 | 4,122 | -0.05 | -4,680 |
| **Mining** | -5.16 | -31 | -4.70 | -28 | -1.10 | -339 | 1.13 | 348 | -2.19 | -2,105 | 1.15 | 1,104 | -0.12 | -201 |
| **Food Beverages & Tobacco** | -0.43 | -230 | -5.66 | -3,028 | -0.01 | -75 | -1.58 | -8,315 | 0.21 | 476 | -0.29 | -656 | -0.09 | -447 |
| **Textiles** | -5.53 | -251 | -4.75 | -215 | 0.45 | 2,908 | 4.52 | 29,419 | -0.79 | -287 | -0.70 | -253 | -0.43 | -1,162 |
| **Wearing Apparel** | -5.76 | -3,173 | 14.26 | 7,853 | 3.19 | 18,712 | 8.13 | 47,642 | -0.46 | -274 | 0.02 | 10 | -0.43 | -824 |
| **Leather Products & Footwear** | -4.25 | -109 | -5.51 | -142 | 4.47 | 4,702 | 6.68 | 7,028 | -0.94 | -41 | 0.32 | 14 | -0.22 | -286 |
| **Wood & Wood Products** | -3.75 | -1,576 | -3.95 | -1,659 | -0.38 | -1,470 | -0.15 | -586 | -1.09 | -460 | 0.03 | 14 | -0.28 | -1,228 |
| **Chemicals** | -6.08 | -8,788 | -5.84 | -8,440 | -1.37 | -8,701 | 0.02 | 110 | -1.27 | -1,015 | -1.92 | -1,535 | -0.40 | -1,009 |
| **Non-metallic Min. Products** | -4.58 | -749 | -4.42 | -724 | -1.20 | -4,948 | -0.40 | -1,664 | -0.69 | -63 | -0.36 | -33 | -0.23 | -7,617 |
| **Metal Products** | -8.52 | -3,573 | -7.68 | -3,221 | -1.61 | -15,549 | 0.88 | 8,510 | -2.63 | -2,912 | 1.39 | 1,537 | -0.35 | -1,014 |
| **Transportation Equipment** | -5.67 | -210 | -6.02 | -223 | -0.57 | -903 | -0.14 | -229 | -4.02 | -412 | -1.84 | -189 | -0.58 | -752 |
| **Machinery & Equipment** | -8.11 | -5,630 | -5.65 | -3,924 | -2.16 | -10,607 | 1.55 | 7,608 | -3.51 | -506 | -5.04 | -726 | -0.12 | -243 |
| **Other Manufacturers** | -7.80 | -2,250 | -6.17 | -1,780 | -0.53 | -2,612 | 4.55 | 22,656 | -2.18 | -23 | -1.86 | -20 | -1.27 | -318 |
| **Elec., Gas & Water** | -1.15 | -433 | -1.19 | -449 | -0.03 | -286 | 0.64 | 6,101 | -0.35 | -963 | 0.05 | 141 | -0.05 | -383 |
| **Construction** | -0.74 | -1,469 | -0.75 | -1,490 | -0.27 | -8,915 | -0.22 | -7,318 | -0.27 | -1,547 | -0.18 | -1,063 | -0.07 | -1,286 |
| **Trade & Transport** | 2.94 | 22,098 | 2.10 | 15,808 | 1.16 | 42,137 | 0.77 | 28,208 | -0.01 | -207 | -0.40 | -5,777 | 0.20 | 23,779 |
| **Other Private Services** | 2.65 | 8,492 | 1.51 | 4,834 | -0.34 | -12,384 | -0.80 | -29,219 | 1.17 | 10,866 | 0.56 | 5,214 | 0.03 | 1,600 |
| **Government Services** | -1.46 | -2,059 | -2.16 | -3,058 | -0.28 | -8,724 | 0.14 | 4,159 | -0.23 | -1,406 | -0.31 | -1,905 | -0.13 | -3,931 |
| **Total** | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |