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# Technical Appendix

## Quantitative Estimates of the Economic Impacts of US Bilateral Free Trade Agreements

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To support the development of the papers for the Institute for International Economics conference on Free Trade Agreements and US Trade Policy and, more generally, to provide quantitative points of reference for discussions of the economic impacts of US bilateral free trade agreements (FTAs), the Institute commissioned two quantitative background studies by the authors. The first study, undertaken by John Gilbert, was tasked with providing estimates of the trade and economic welfare impacts of prospective US free trade agreements using a prominent computable general equilibrium model of the world economy, the GTAP (Global Trade Analysis Project) model (Gilbert 2003). The second study, undertaken by Dean DeRosa, was tasked with providing estimates of the trade impacts of prospective US free trade agreements using another prominent applied method for investigating the impacts of preferential trading arrangements, the so-called gravity model (DeRosa 2003).

This appendix provides an overview of the general economic framework and findings of the two studies, as set against both the increasing

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prominence of bilateral and regional trading arrangements in the global economy and the basic objectives of the Institute for International Economics conference. The latter include investigating the geopolitical and economic benefits of the prospective US FTAs from the viewpoint of both the United States and FTA partners and identifying likely sensitive trade, foreign investment, or other political or economic issues. Another important objective was to investigate the so-called competitive liberalization hypothesis—that is, whether the pursuit of discriminatory bilateral trading arrangements ultimately leads to multilateral trade liberalization on a nondiscriminatory basis.<sup>1</sup>

Before we turn to the results of the two studies, the next section briefly reviews what trade and other economic impacts are expected to follow from bilateral FTAs according to traditional and new economic theories of international trade and investment.

## **Traditional and New Theories of Preferential Trade Arrangements**

### **Viner-Meade Theory**

Traditional economic theory of preferential trade arrangements is associated principally with the seminal contributions to the “customs union issue” by Jacob Viner (1950) and subsequently James Meade (1955), followed by many others.<sup>2</sup> Traditional economic theory focuses largely, though not exclusively, on the concepts of trade creation and trade diversion under customs unions and other forms of preferential trade arrangements, as introduced by Viner. Essentially, trade creation refers to the possible expansion of a country’s total imports on entering into a bilateral or other preferential trade arrangement, leading to an improvement in economic welfare as high-cost domestic output is replaced by lower-cost output produced abroad. However, trade diversion may also occur if high-cost imports from one or more preferential trading partners supplant lower-cost imports from third countries not party to the arrangement, resulting in a diminution of economic welfare for the importing country. On balance, if trade creation effects outweigh trade diversion effects, then the preferential trade arrangement is said to be trade creating on a net basis and the arrangement is generally regarded as economically beneficial.

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1. See C. Fred Bergsten, “A Competitive Approach to Free Trade,” *Financial Times*, December 5, 2002, and Bergsten (2002). See also Baldwin (1995) and Andrianmananjara (2000).

2. See, among others, Lipsey (1970), Lloyd (1982), Robson (1987), and Pomfret (1988).

Viner considered mainly the case of “small” trading countries forming a customs union, whereas Meade’s analysis expanded Viner’s analysis to consider the more general case in which world relative prices might also be affected by the formation of a customs union—especially when one or more of the union members are “large” trading countries whose trade policies can have appreciable spillover effects on the economies of non-member countries through the diversion of trade flows and, more fundamentally, the impacts of the diversion of trade on world relative prices.

Spillover effects of preferential trade arrangements on third countries are particularly important today as bilateral and regional FTAs spread rapidly, with implications for the competitive liberalization hypothesis. Under the assumption made in many applied economic models that similar traded goods produced by different countries are imperfect substitutes for one another, spillover effects arising from the diversion of trade under preferential trade arrangements can be significant because imperfect substitution implies that all countries, large and small, can influence world prices in some degree—especially when a major hub country such as the European Union or the United States forges FTAs with a number of partners simultaneously. Under the competitive liberalization hypothesis, these spillover effects would be expected to provide an incentive for adversely affected nonmember countries to retaliate either by forging their own FTAs with countries from which their exports have been diverted or by more strongly supporting multilateral trade liberalization, to reduce if not entirely offset the margins of preference created by the trade-diverting free trade agreements. In the former case, if all adversely affected countries pursue FTAs (on substantially all traded goods) with the country whose imports were originally diverted, then at its limit the process should be expected to approach if not converge to unilateral free trade for the importing country. Moreover, if such bilateral trade liberalization spreads widely, then the process should also be expected to approach multilateral free trade. To be sure, this process involves considerable diversion of trade, but of the sort that may be offsetting in its retaliatory mode and even trade creating if the process leads to de facto unilateral trade liberalization for individual FTA partner countries.

The foregoing discussion, of course, is a simplification that does not take into account the full range of possible political-economy considerations that could hinder the process of competitive liberalization. In particular, the process could create vested interests in new FTAs (in hub countries or partner countries) that might significantly slow if not effectively halt progress toward either unilateral or multilateral trade liberalization. Such political-economy considerations are especially important areas for further analysis and research into bilateral FTAs and the dynamics of their adoption in individual countries.

## New Trade Theory and Deeper Integration

Coincident with the new wave of regionalism that emerged during the 1990s and continues today, many economists have sought to provide new understanding of the attractiveness of regional trade arrangements, including bilateral free trade agreements, in the belief that traditional trade theory does not adequately explain the appeal of regionalism today or even the potential benefits of nondiscriminatory trade liberalization itself. As a recent review points out (Burfisher, Robinson, and Thierfelder 2003; see also Panagariya 1999, 2000), the new literature on regional trade and economic integration arrangements forms an eclectic collection of theoretical and applied economic studies of both regional and general trade liberalization under conditions that might be considered extensions of those assumed in the traditional Viner-Meade theory.<sup>3</sup>

Under the rubric of the *new trade theory*, a number of economists have begun to explore the implications of imperfect competition in an increasingly integrated world economy (Helpman and Krugman 1985; Krugman 1995). When there is imperfect competition, natural, technological, or policy-based barriers to market entry by firms give rise to monopolistic profits, often in the presence of increasing returns to scale and production of differentiated goods by competing firms. Under such conditions, regional (and general) trade liberalization can result in procompetitive effects that are substantially larger than predicted by traditional trade theory, providing greater assurance that net trade creation and significant welfare benefits will occur. But also in the presence of imperfect competition, diversion of trade with nonmember countries may still occur under preferential trading arrangements, leaving the spillover effects of such arrangements on third countries no more certain than in traditional models.

Also in recent years, many economists have turned their attention to investigating the implications of so-called *deep integration*, which (following in the footsteps of the Europe 1992 Plan) is an essential feature of many new regional integration arrangements.<sup>4</sup> “Deep integration” refers to possibilities for harmonizing economic policies between countries seeking to forge closer economic relations: the objective is to eliminate administrative and regulatory “trade frictions” restricting expansion of international trade and foreign investment from within countries rather than at

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3. For further discussion of the issues raised in this section, see, e.g., Baldwin and Venables (1995), DeRosa (1998), and Schiff and Winters (2003).

4. The topic is strongly associated with its extensive description and discussion by Robert Lawrence (1996). Deep integration, however, has antecedents in early analyses of regional integration arrangements: see, e.g., Mikesell (1963).

their borders. These frictions take many forms, including customs clearance procedures, product standards and certification systems, labeling requirements, intellectual property rights enforcement, foreign direct investment (FDI) policies, and prudential supervision and professional licensing systems. In the context of regional integration arrangements among less-developed countries, inadequate or outmoded infrastructure—including networks of roads, railways, and telecommunication systems—might also be targeted for regional improvement or rationalization under deep integration provisions of modern customs unions and free trade area agreements.

Conceptually, eliminating administrative and regulatory frictions inhibiting international trade and foreign investment should be expected to reduce the costs of producing and distributing traded goods (and services) and, hence, to increase economic welfare in the countries seeking to forge these closer relations. However, some uncertainty surrounds the question of whether deep integration undertaken to harmonize national procedures and standards, and to improve regional social infrastructure and communication networks, will spur trade and investment between preferential trade agreement partners significantly more than it does trade and investment with third countries, leaving unclear the magnitude (and even the sign) of possible spillover effects on the world economy.

Although issues raised by the new trade theory and possibilities for deep integration are important and relevant to the new global economy, no applied economic model of the world economy is currently specified to investigate these issues across the wide spectrum of prospective partner countries with which the United States is currently considering bilateral FTAs. Indeed, previous quantitative studies of these issues have been of a one-off variety, using specially formulated, applied economic models calibrated to the circumstances of a comparatively small number of countries.

While we understand that more sophisticated economic models and modes of analysis might be called for in in-depth studies of prospective US bilateral FTAs, in the remainder of this appendix we present the quantitative results found from applying the current GTAP model—which incorporates differentiated traded goods but otherwise is founded principally on traditional, Viner-Meade customs union theory—to a large number of prospective US bilateral FTAs, individually and simultaneously. As mentioned at the outset, we also consider the quantitative results found from applying standard gravity model estimates to the question of the trade impacts of US bilateral FTAs with the same set of prospective partner countries.

## GTAP Model Results

This section presents estimates of trade and other economic impacts of US FTAs with a total of 14 prospective partner countries.<sup>5</sup> The estimates are derived from simulations of the standard GTAP model, using the GTAP5 database (Hertel 1997; Dimaranan and McDougall 2002).

### The GTAP Model

Computable general equilibrium (CGE) models are numerical models based on general equilibrium theory, built with the objective of turning the abstract models of economic theory into practical tools for policy analysis. A number of features distinguish CGE models from other widely used tools of trade policy analysis. CGE models are multisectoral, and in many cases they are multiregional. The behavior of economic agents is modeled explicitly through utility- and profit-maximizing assumptions. In addition, economywide resource and expenditure constraints are rigorously enforced; as a consequence, distortions in an economic system will often have repercussions beyond the sector in which they occur. Thus, simulations of CGE models are effective at capturing relevant direct and indirect effects of changes in trade policy.<sup>6</sup>

The GTAP model is a publicly available CGE model that is in widespread use and has a structure typical of many CGE models. Both multisectoral and multiregional, it assumes perfect competition and constant returns to scale in all markets and production of all goods. Bilateral trade is handled via the so-called Armington assumption, which treats similar goods produced in different countries as imperfect substitutes in consumption. Production is modeled using nested constant elasticity of substitution (CES) functions, with intermediate goods used in fixed proportions to output. Representative household demand is nonhomothetic; that is, it takes into account changes in commodity demand patterns as incomes rise.

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5. US bilateral FTAs with Australia, Botswana, Brazil, Chile, Indonesia, Malaysia, Morocco, New Zealand, Philippines, Singapore, Thailand, Taiwan, Korea, and the rest of the Southern African Customs Union (i.e., SACU besides Botswana) are considered, along with a scenario implementing all of the proposed agreements simultaneously. Other proposed FTA partners, such as Egypt, are not available in the GTAP5 database. The economies of the Central American Common Market countries (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua) are identified in GTAP in the aggregate, but because this group is based on a constructed input-output database and not on actual data from these countries, the group is not considered as a partner in the present analysis.

6. CGE simulation has become a widely employed tool of trade policy analysis; it is particularly well suited to examining proposed FTAs, where multisectoral reform is to be undertaken in at least two economies simultaneously. For recent surveys of the application of CGE models to regional trade negotiations, see Scollay and Gilbert (2000), Gilbert and Wahl (2002), and Robinson and Thierfelder (2002).

## FTA Scenarios

Although the GTAP5 database identifies some 66 regions and 57 sectors, the GTAP simulations presented here use an aggregation of 23 countries and 19 sectors, including 14 prospective partners in US FTAs that can be identified in the GTAP database. Other individual countries and regions included in the aggregation were selected on the basis of the extent of trading relations with the United States. The 19-sector aggregation in table A.1 was chosen on the basis of the prominence of the sectors in US total trade (exports plus imports). Values of the Armington substitution elasticities, also reported in table A.1, are those assumed uniformly for all countries in the standard GTAP database.

Each of the proposed US FTAs is initially simulated independently of the other proposed agreements, and thus the initial simulation results reflect the impacts of each prospective US FTA in isolation.<sup>7</sup> The exception is a second basic scenario in which all 14 proposed agreements are implemented simultaneously, in order to assess their impacts when the United States will have implemented FTAs with several trading partners under its new bilateral trade policy.

In all FTA scenarios, the US bilateral trade agreements are assumed to be implemented “clean,” meaning that all import tariffs are reduced to zero in the participating economies, on a preferential basis. All other tariffs (i.e., those applied to nonparticipating economies) are left in place. The tariffs used for the United States and its prospective FTA partners, reported in table A.2, are those in place in the base year 1997.<sup>8</sup> It should be noted that the GTAP database does not currently incorporate information about goods protection afforded by nontariff barriers. Nor does it incorporate information about service protection. Hence, the simulations

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7. Preexisting bilateral FTAs (mainly EU partnership agreements with such countries as Chile and Morocco) and preexisting regional trading arrangements such as AFTA (the ASEAN Free Trade Area), CER (Closer Economic Relations between Australia and New Zealand), and NAFTA (the North American Free Trade Agreement) are taken into account in the simulation results because the GTAP database incorporates the official tariff preferences of these preexisting trade agreements for their members.

8. GTAP protection data are derived from the Agricultural Market Access Database (AMAD, [www.amad.net](http://www.amad.net)) in the case of agriculture, and the UN Conference on Trade and Development (UNCTAD) TRAINS database ([www.unctad.org/trains](http://www.unctad.org/trains)) in the case of other merchandise trade. In the case of agriculture, applied rates are used where available, then MFN bound rates. US Department of Agriculture estimates are used in the case of rice to Japan, Korea, and the Philippines. In the case of other merchandise, the rates are generally MFN bound rates. Tariffs are specified on a bilateral basis, with the differences reflecting the differences in the composition of trade at the disaggregate level. Tariff preferences for NAFTA, EU-EFTA (European Free Trade Association), CER, and SACU are included in the database. Other preferences (such as the Generalized System of Preferences) are not. For full details, see Dimaranan and McDougall (2002).

Table A.1 Sectoral aggregation and central values of Armington elasticities

Sector	Items	Armington elasticities	
		Domestic-imported	Imported by source
Grains	Paddy rice, wheat, cereal grains NEC	2.20	4.40
Other crops	Vegetables and fruit, oilseeds, sugar cane/beet, plant-based fibers, crops NEC	2.20	4.40
Animal products	Cattle, animal products NEC, raw milk, wool	2.61	5.47
Forestry and fisheries	Forestry, fisheries	2.80	5.60
Processed food products	Meat products, vegetable oils, dairy products, processed rice, sugar, food products NEC, beverages, and tobacco	2.39	4.71
Lumber	Lumber	2.80	5.60
Pulp and paper products	Paper products, publishing	1.80	3.60
Textiles and apparel	Textiles, wearing apparel, leather products	3.32	6.78
Coal, oil, and gas	Coal, oil, gas, minerals NEC	2.80	5.60
Petroleum and coal products	Petroleum and coal products	1.90	3.80
Chemicals	Chemicals, rubber and plastics, mineral products NEC	2.10	4.07
Metals	Ferrous metals, metals NEC	2.80	5.60
Metal products	Metal products	2.80	5.60
Electronic equipment	Electronic equipment	2.80	5.60
Motor vehicles	Motor vehicles and parts	5.20	10.40
Other transportation equipment	Transportation equipment NEC	5.20	10.40
Machinery NEC	Machinery and equipment NEC	2.80	5.60
Manufactures NEC	Other manufactures NEC	2.80	5.60
Services	Electricity, gas, water, construction, trade and transportation, communication, financial services and insurance, recreation, public services, ownership of dwellings	1.94	3.85

NEC = not elsewhere classified

Source: Dimaranan and McDougall (2002).



**Table A.2 Tariffs applied by United States and prospective FTA partners by sector (percent)**

Sector	US tariffs on FTA partner imports											Rest of SACU		
	Australia	New Zealand	Korea	Taiwan	Indonesia	Malaysia	Philippines	Singapore	Thailand	Brazil	Chile		Morocco	Botswana
Grains	0.7	1.4	0.9	0.6	0.6	4.9	1.1	0.8	2.7	0.7	0.6	1.9	0.7	1.3
Other crops	9.5	7.6	10.5	16.9	21.1	20.2	7.1	21.0	19.2	18.6	6.3	13.9	8.1	10.0
Animal products	0.9	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.8	0.6	0.6	0.7
Forestry and fisheries	1.2	0.3	0.0	0.3	0.3	0.2	0.4	0.1	0.3	1.1	0.4	0.0	0.0	2.6
Processed food products	12.0	14.5	10.9	12.3	9.6	8.2	13.6	11.1	11.1	18.9	9.3	11.5	9.8	20.4
Lumber	1.6	0.2	1.7	2.0	4.0	2.3	2.3	1.6	2.7	2.1	1.1	2.6	0.0	2.1
Pulp and paper products	0.4	0.3	1.3	1.5	1.8	1.2	2.5	0.3	1.0	0.2	0.0	0.1	0.0	0.0
Textiles and apparel	9.0	4.2	14.0	13.9	14.9	14.7	14.2	15.0	14.2	8.5	12.4	11.8	0.0	11.6
Coal, oil, and gas	0.3	0.0	0.2	6.6	0.3	0.4	0.0	0.0	0.7	0.5	0.2	0.0	0.0	0.2
Petroleum and coal products	2.4	2.4	2.3	1.2	2.4	2.3	0.0	2.4	2.4	2.3	2.4	0.0	0.0	0.0
Chemicals	3.2	2.9	3.9	4.4	1.6	2.7	5.1	4.9	2.8	5.0	2.2	2.8	0.0	4.4
Metals	0.7	3.5	3.7	4.5	1.1	2.4	4.4	2.6	3.8	2.4	1.4	1.4	0.0	1.0
Metal products	3.2	2.4	3.7	4.4	3.6	2.3	3.6	3.5	3.4	3.5	1.9	3.0	0.0	3.3
Electronic equipment	2.3	1.2	0.6	1.1	2.2	1.0	0.6	0.6	1.4	2.7	1.2	0.1	0.0	2.3
Motor vehicles	2.2	1.3	2.4	2.1	1.6	1.5	1.5	1.4	1.5	1.7	1.4	1.3	0.0	1.7
Transportation equipment	0.6	1.3	0.4	5.6	1.4	3.3	2.8	0.9	2.2	1.9	1.3	0.0	0.0	2.2
Machinery NEC	2.6	2.1	2.6	3.1	3.4	2.4	3.5	3.0	3.3	2.2	1.7	3.3	0.0	2.4
Manufactures NEC	1.5	1.5	4.2	3.5	3.1	1.7	1.7	2.0	4.4	4.4	1.9	0.7	0.0	0.4

(table continues next page)

**Table A.2 Tariffs applied by US and prospective FTA partners by sector (percent) (continued)**

Sector	FTA partner tariffs on US imports												Rest of SACU	
	Australia	New Zealand	Korea	Taiwan	Indonesia	Malaysia	Philippines	Singapore	Thailand	Brazil	Chile	Morocco		Botswana
Grains	0.7	1.2	197.2	2.0	3.1	1.9	18.1	0.0	0.0	6.9	11.0	18.1	46.5	43.0
Other crops	2.1	2.6	98.3	9.1	7.0	45.0	12.2	7.6	33.0	7.0	11.0	24.1	21.2	19.5
Animal products	0.7	0.2	10.0	0.3	5.8	14.3	16.6	0.0	16.9	6.0	11.0	22.4	8.3	3.8
Forestry and fisheries	0.2	0.4	4.7	15.2	0.5	0.4	2.4	0.0	37.3	4.9	11.0	9.2	39.6	0.3
Processed food products	5.8	9.2	37.8	27.0	16.8	12.6	16.6	5.4	36.4	16.6	11.0	70.8	64.3	35.8
Lumber	4.6	7.5	5.7	1.2	9.2	11.6	14.1	0.0	11.0	17.3	11.0	28.8	27.9	2.8
Pulp and paper products	2.9	6.1	3.7	2.5	6.0	8.0	9.2	0.0	10.8	9.2	10.8	26.3	26.5	7.4
Textiles and apparel	14.4	8.2	7.1	5.2	10.4	14.6	13.7	0.0	23.1	16.3	11.0	22.6	22.3	21.6
Coal, oil, and gas	0.1	0.8	3.1	4.7	5.0	1.6	2.9	0.0	3.2	0.2	11.0	2.5	8.3	0.1
Petroleum and coal products	0.0	0.3	6.7	7.3	4.0	18.4	3.0	0.0	7.3	4.6	11.0	2.7	23.9	0.0
Chemicals	3.6	3.6	7.4	3.5	8.5	5.5	7.3	0.0	16.0	9.4	11.0	16.5	24.5	4.3
Metals	3.1	5.6	3.6	2.1	9.1	7.7	6.4	0.0	8.3	10.3	11.0	17.3	25.7	5.7
Metal products	6.4	6.8	6.2	8.2	12.6	10.7	8.8	0.0	22.6	16.2	11.0	24.1	81.8	5.7
Electronic equipment	0.9	2.2	8.0	2.7	10.0	0.4	3.1	0.0	3.9	13.7	11.0	8.0	20.5	1.6
Motor vehicles	8.5	9.7	8.4	28.9	21.1	28.2	22.4	0.0	35.7	37.0	11.0	15.4	22.3	18.9
Transportation equipment	0.4	0.7	0.7	1.0	0.2	0.1	3.7	0.0	1.7	1.3	7.5	6.3	22.3	0.4
Machinery NEC	3.9	4.8	7.6	4.3	4.6	4.3	5.3	0.0	11.5	14.6	11.0	12.7	21.9	5.6
Manufactures NEC	3.7	7.3	7.3	4.3	23.4	8.4	15.8	0.0	14.2	18.0	11.0	25.1	29.8	4.7

NEC = not elsewhere classified  
 SACU = Southern African Customs Union  
 Source: Dimaranan and McDougall (2002).

should be interpreted as representing the potential impacts of preferential tariff liberalization in merchandise goods only.

In order to provide a benchmark for the implications of the US bilateral FTAs, we consider simulated multilateral trade reform. Under this scenario, all economies in the model are assumed to eliminate all tariffs, on an MFN (most favored nation) basis.

In all of the simulations, factor market equilibrium conditions in the GTAP model allow full mobility of capital and labor (skilled and unskilled) across domestic activities, and hence the implicit time period in the comparative static exercises is the long run (10 to 12 years). Land is treated as imperfectly mobile across agricultural activities, while natural resources such as fisheries and mineral fuels are assumed to be sector-specific factors.

Finally, it should be noted that the competitive assumption of the standard GTAP model used here implies that all agents take prices as given and make zero economic profits in the long run. Alternative models that incorporate imperfect competition would predict larger net gains from trade liberalization as a consequence of economies of scale or pro-competitive effects of trade, as discussed in the previous section. Also, the static nature of the GTAP model implies a focus on efficiency effects for a given level of productive capacity. Dynamic CGE models would incorporate growth in productive capacity through capital accumulation as a consequence of trade liberalization or other economic policy reforms, and accordingly would also tend to predict larger net gains in economic welfare. For these well-known reasons, the results presented here should probably be regarded as lower-bound estimates of the trade and other economic impacts of prospective US FTAs on the United States and its FTA partners.

## Simulation Results

**FTAs Considered Independently.** The GTAP simulation results for the 14 US free trade agreements considered independently are presented in table A.3, for several key economywide variables. Export and import changes are given as percentages, evaluated at world prices. Impacts on tariff revenue and the change in economic welfare in equivalent variation (EV) form are presented in 1997 dollars. And finally, the change in economic welfare in equivalent variation form is also presented relative to GDP.

Tariff revenue changes are presented in terms both of the total revenue change and of the changes in revenue obtained from partner and nonpartner sources.<sup>9</sup> The loss in revenue from the partner country reflects the fall in the tariff rate applied to those goods being liberalized. The change in the

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9. The breakdown into two components extends the approach of Fukase and Martin (2001) for examining trade diversion consequences of preferential reform.

**Table A.3 Changes in economywide variables under proposed US FTAs considered individually**

Variable	Aus- tralia	New Zealand	Korea	Taiwan	Indo- nesia	Malay- sia	Philip- pines	Sing- apore	Thailand	Brazil	Chile	Morocco	Botswana	Rest of SACU
<b>Impacts on United States</b>														
Total imports														
(percent change)	0.1	0.0	0.7	0.5	0.2	0.2	0.2	0.1	0.4	0.7	0.1	0.0	0.0	0.1
From partner	13.9	33.6	23.4	19.9	48.8	10.8	27.7	6.2	32.2	37.4	18.1	18.2	0.5	18.3
From rest of the world	0.0	0.0	0.1	-0.2	-0.3	-0.1	-0.2	-0.1	-0.1	0.3	0.1	0.0	0.0	0.0
Total exports														
(percent change)	0.2	0.1	0.8	0.5	0.2	0.2	0.2	0.1	0.4	0.8	0.1	0.0	0.0	0.1
To partner	17.6	17.5	48.2	29.3	33.0	18.8	30.0	1.0	62.4	78.2	46.3	88.3	103.5	44.6
To rest of the world	-0.2	0.0	-1.0	-0.3	0.0	-0.1	-0.1	0.0	-0.3	-0.9	-0.1	-0.1	0.0	-0.1
Tariff revenue														
(millions of 1997 dollars)	-206.9	-180.4	-869.4	-1,442.1	-1,188.7	-400.1	-662.1	-306.2	-982.2	-617.9	-112.3	-10.9	0.9	-109.0
From partner	-182.6	-140.2	-746.8	-1,160.7	-820.0	-337.3	-470.3	-251.3	-744.0	-565.8	-105.1	-15.2	-0.1	-95.4
From rest of the world	-24.3	-40.2	-122.6	-281.4	-368.7	-62.8	-191.8	-54.9	-238.2	-52.1	-7.2	4.3	0.8	-13.6
Equivalent variation														
(millions of 1997 dollars)	467.8	18.6	2,694.1	760.2	-178.6	391.6	224.4	-81.0	823.8	2,779.9	414.8	178.2	16.8	339.1
Allocative efficiency	71.2	8.2	-165.3	107.6	-48.7	67.7	-42.3	-24.7	105.6	482.8	59.0	10.5	2.3	35.9
Terms of trade	396.6	10.4	2,859.4	652.5	-129.9	323.8	266.7	-56.2	718.2	2,297.1	355.7	167.8	14.5	303.2
Equivalent variation														
(percent GDP)	0.01	0.0	0.03	0.01	0.0	0.0	0.0	0.0	0.01	0.03	0.01	0.0	0.0	0.0

**Impacts on FTA partner countries**

<b>Total imports</b>														
(percent change)	1.6	2.1	5.8	3.7	5.0	1.9	5.8	0.5	4.7	9.0	2.8	3.8	0.7	2.7
From United States	17.7	17.7	49.6	29.3	33.6	19.5	30.9	1.0	63.7	78.2	46.5	92.8	107.3	45.1
From rest of the world	-2.7	-1.0	-5.1	-3.0	1.1	-1.1	0.3	0.4	-4.7	-11.6	-9.8	-5.1	-3.6	-3.4
<b>Total exports</b>														
(percent change)	1.1	1.4	3.6	2.9	4.3	1.4	5.1	0.5	3.5	7.8	2.2	4.2	0.3	1.8
To United States	13.2	32.5	22.9	19.6	48.9	10.6	27.1	6.2	31.8	37.4	17.6	18.0	0.5	18.0
To rest of the world	-0.5	-2.9	-0.4	-3.0	-6.0	-0.9	-3.9	-0.8	-3.9	1.4	-0.3	2.9	0.2	-0.1
<b>Tariff revenue</b>														
(millions of 1997 dollars)	-553.6	-88.6	-7,832.4	-1,462.6	-334.5	-657.7	-503.5	-28.8	-1,530.5	-3,745.4	-621.7	-292.3	-14.1	-439.6
From United States	-435.4	-76.5	-4,467.7	-965.0	-334.6	-402.8	-473.4	-25.3	-826.4	-1,940.1	-443.6	-115.3	-6.5	-232.2
From rest of the world	-118.3	-12.1	-3,364.7	-497.6	0.0	-255.0	-30.1	-3.5	-704.1	-1,805.3	-178.1	-177.0	-7.6	-207.4
<b>Equivalent variation</b>														
(millions of 1997 dollars)	83.0	161.5	1,637.8	1,042.8	1,313.2	248.3	907.1	342.6	779.7	31.8	-51.4	-92.6	4.6	-36.7
Allocative efficiency	-18.8	11.1	1,739.6	-22.9	308.0	18.8	404.2	41.8	19.0	218.6	-82.5	-24.7	4.7	-40.3
Terms of trade	101.8	150.3	-101.8	1,065.7	1,005.3	229.5	502.9	300.8	760.7	-186.8	31.1	-67.9	0.0	3.7
<b>Equivalent variation</b>														
(percent GDP)	0.02	0.25	0.37	0.35	0.63	0.23	1.16	0.43	0.49	0.00	-0.07	-0.26	0.10	-0.03

SACU = Southern African Customs Union

Source: GTAP simulation results.

nonpartner revenue reveals the implications of falls in the volume of trade flows not being liberalized, and is an indicator of trade diversion.<sup>10</sup>

The EV measure represents the change in income at constant prices that occurs as a result of the proposed change in trade policy. To give an indication of the significance of the dollar measure relative to total economic activity, the EV is also presented as a percentage of the base-year GDP. The dollar EV measure is further decomposed into allocative efficiency and terms-of-trade effects, following Arnold Harberger's fundamental equation of applied welfare economics (Harberger 1971). In essence, allocative efficiency effects measure the economic implications of reallocation of resources across activities (consumption, production, and trade). The greater the distortions in the economy, the greater the potential allocative efficiency effects of policy reform. Terms-of-trade effects, on the other hand, measure the implications of changes in the prices faced by the economy in international trade. The larger the economy, the greater are the expected terms-of-trade consequences of policy reform. Negative terms-of-trade consequences of an FTA for nonmember economies are another indicator of trade diversion, since the changes in trading prices reflect the reduction in imports by members from nonmember sources. Strong positive terms-of-trade effects for members can reflect both an improvement in economic welfare vis-à-vis nonmembers and the effects of improved access to partner markets (preferential access).

The simulation results in table A.3 for the individual US FTAs are wide-ranging, as one might expect, given the variety of prospective US partner countries and their economic circumstances. It is apparent that the potential trade and welfare impacts of the proposed FTAs for the United States are very small. Indeed, the improvement in US welfare is generally no more than 0.01 percent of GDP, except in the cases of a US-Brazil FTA or US-Korea FTA, for which the improvement in US welfare is 0.03 percent. In dollar terms, US free trade agreements with Brazil (\$2.8 billion), Korea (\$2.7 billion), Thailand and Taiwan (\$0.8 billion), Australia (\$0.5 billion), and Chile (\$0.4 billion) would contribute most to improving US welfare.

At the same time, the prospective US FTAs are substantially more beneficial to the US partner countries, when the gains in economic welfare are measured relative to GDP. In these terms, the Philippines benefits most (1.2 percent of GDP), followed by Indonesia (0.6 percent), Thailand (0.5 percent), and Korea, Singapore, and Taiwan (0.4 percent). Notably, according to the GTAP simulation results, economic welfare in Chile, Morocco, and SACU (the Southern African Customs Union, mainly South Africa) besides Botswana falls as a result of individual FTAs with the

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10. Fukase and Martin (2001) identify a third component, the increase in revenues associated with increased trade volumes of liberalized imports. This effect is not present in this study because of the assumption that liberalization is complete (i.e., the post-FTA preferential tariffs are zero).

United States: by 0.1 percent in Chile, 0.3 percent in Morocco, and less than 0.1 percent in the rest of SACU. These results follow from the dominance of trade diversion effects in the US FTAs with the three countries. However, the decline in economic welfare for the three countries should be considered in a somewhat broader context than the present GTAP results—namely, one that recognizes the preexistence of other preferential trading arrangements, such as European Union partnership agreements with Chile, Morocco, and South Africa. To the extent that increased US exports to these countries under US FTAs mainly reduces margins of preference enjoyed by countries under preexisting preferential agreements, the net trade diversion effects reflected in the present GTAP simulation results might be viewed in a more positive light. Conversely, to the extent that the increased US exports add to existing discrimination against third countries that are not party to preexisting preferential trading arrangements, the net trade diversion effects should be considered deleterious to these countries (Chile, Morocco, and the rest of SACU).

**FTAs Considered Simultaneously.** Table A.4 reveals the impacts of US bilateral FTAs when the agreements are implemented between the United States and a number of partner countries simultaneously. The initial economic gains for partner countries, as indicated in table A.3, are appreciably reduced by the inclusion of many countries as partners in US bilateral FTAs. For instance, the welfare gain of the Philippines is reduced by one-third, from 1.2 percent of GDP to 0.8 percent of GDP. Also, the total US economic gain from the bilateral FTAs rises to 0.1 percent of GDP. In effect, US pursuit of FTAs simultaneously with a wide number of partners reduces the margins of preference in the United States initially enjoyed by export producers in FTA partner countries (and hence reduces trade diversion), while it increases the magnitude of trade creation enjoyed by consumers in the United States.

Tables A.5 and A.6 indicate the corresponding changes in sectoral and regional patterns, respectively, of exports under the US bilateral FTAs. US exports to the world expand in a number of important categories, especially food grains (29 percent), motor vehicles (21 percent), other crops (12 percent), processed foods (11 percent), textiles and apparel (7 percent), and metal products (6 percent). Given the preferential nature of the agreements, US exports to the FTA partners increase by substantially larger margins in the same categories: for instance, by nearly 375 percent in motor vehicles and by more than 100 percent in food grains (165 percent), processed foods (126 percent), and textiles and apparel (109 percent).

Similarly, partner country exports to the United States also expand by very large proportions in some important categories, especially textiles and apparel (98 percent), nongrain crops (82 percent), and processed foods (66 percent). However, reflecting the partner countries' comparatively limited trade liberalization (i.e., only vis-à-vis imports from the

**Table A.4 Changes in economywide variables under proposed US FTAs considered simultaneously**

Variable	United States	Australia	New Zealand	Korea	Taiwan	Indonesia	Malaysia	Philippines	Singapore	Thailand	Brazil	Chile	Morocco	Botswana	Rest of SACU
Total imports (percent change)	3.2	0.8	1.2	5.3	3.1	3.9	1.3	4.6	-0.2	3.9	7.9	2.2	3.2	-0.6	2.0
From partner	19.9	14.1	13.1	46.8	25.6	28.1	15.8	26.2	-2.3	58.4	74.0	42.1	86.2	99.3	39.5
From rest of the world	-0.2	-2.7	-1.2	-5.0	-2.7	0.7	-1.2	-0.2	0.2	-4.7	-11.7	-9.3	-5.1	-4.6	-3.5
Total exports (percent change)	3.4	0.6	0.8	3.1	2.4	3.5	0.8	4.1	-0.2	2.8	7.4	1.7	3.7	-0.8	1.4
To partner	32.4	13.5	31.1	20.6	18.2	42.9	9.6	23.0	5.7	27.9	35.4	16.6	15.7	0.7	16.7
To rest of the world	-3.0	-1.0	-3.4	-0.5	-3.1	-5.6	-1.4	-3.6	-1.5	-3.7	1.3	-0.8	2.6	-0.9	-0.4
Tariff revenue (millions of 1997 dollars)	-6,607.3	-551.8	-89.2	-7,816.5	-1,439.1	-368.2	-664.4	-521.3	-28.0	-1,533.5	-3,736.3	-612.1	-291.6	-16.9	-439.1
From partner	-5,634.9	-435.4	-76.5	-4,467.7	-965.0	-334.6	-402.8	-473.4	-25.3	-826.4	-1,940.1	-443.6	-115.3	-6.5	-232.2
From rest of the world	-972.4	-116.4	-12.8	-3,348.8	-474.1	-33.6	-261.7	-47.9	-2.7	-707.2	-1,796.2	-168.5	-176.3	-10.4	-206.9
Equivalent variation (millions of 1997 dollars)	9,113.6	-235.4	69.9	1,069.2	634.2	963.9	-11.8	610.2	72.3	414.2	-475.5	-114.2	-110.5	0.2	-126.3
Allocative efficiency	8,215.9	-186.1	67.1	-548.5	658.8	739.1	12.9	307.5	64.5	471.3	-451.2	-28.2	-82.9	-2.9	-71.7
Terms of trade	897.7	-49.3	2.8	1,617.6	-24.7	224.7	-24.7	302.7	7.7	-57.0	-24.2	-86.0	-27.7	3.1	-54.6
Equivalent variation (percent GDP)	0.11	-0.06	0.11	0.24	0.21	0.46	-0.01	0.78	0.09	0.26	-0.06	-0.15	-0.32	0.00	-0.09

SACU = Southern African Customs Union

Source: GTAP simulation results.



**Table A.5 Changes in the sectoral pattern of exports under proposed US FTAs considered simultaneously**  
(percent change; exports in millions of 1997 dollars)

Sector	United States				FTA partners			
	Initial exports		Free trade agreement		Initial exports		Free trade agreement	
	Total	To FTA partners	Total	To FTA partners	Total	To United States	Total	To United States
Grains	10,924.9	2,266.0	29.2	164.6	2,984.1	45.0	-1.9	10.5
Other crops	18,663.8	3,672.7	12.2	91.0	15,882.7	2,167.2	8.9	81.5
Animal products	2,939.6	983.6	2.3	21.9	4,811.8	281.6	0.1	8.8
Forestry and fisheries	2,648.2	257.9	2.4	44.1	4,274.2	276.3	-2.2	0.9
Processed food products	30,540.7	3,633.1	10.6	125.5	49,677.9	6,249.9	8.5	65.6
Lumber	9,473.4	812.9	1.4	40.6	19,754.3	3,998.4	-0.2	11.2
Pulp and paper products	19,912.9	3,343.2	1.2	15.6	12,010.7	994.7	-1.3	3.0
Textiles and apparel	20,611.1	1,942.4	7.3	109.1	72,097.7	16,458.4	21.2	98.2
Coal, oil, and gas	6,402.9	1,322.0	1.8	15.1	42,381.0	1,463.8	-0.5	2.2
Petroleum and coal products	6,382.0	1,420.4	2.0	12.6	16,086.2	281.8	-0.3	9.3
Chemicals	96,106.9	19,657.2	2.8	21.5	73,038.8	8,569.1	0.5	14.9
Metals	20,523.8	2,977.2	1.1	23.5	55,182.3	5,932.9	-0.1	12.6
Metal products	13,714.1	2,070.1	6.4	56.7	14,222.3	3,531.5	1.9	20.3
Electronic equipment	109,331.5	33,273.7	3.0	15.7	226,040.0	67,783.3	0.0	3.8
Motor vehicles	56,832.4	3,593.7	20.5	374.3	22,254.1	4,069.0	2.7	31.3
Transportation equipment	45,807.6	12,122.0	-2.9	2.7	14,338.0	1,519.7	1.1	36.9
Machinery NEC	160,560.8	31,786.3	3.7	30.1	83,679.3	14,690.7	0.3	15.5
Manufactures NEC	11,322.0	1,570.6	3.0	43.5	16,044.4	4,294.7	1.7	15.6
Services	210,108.8	28,740.9	-2.5	-1.2	140,788.3	23,551.4	-1.6	-0.5

NEC = not elsewhere classified

Source: GTAP simulation results.

**Table A.6 Changes in the regional pattern of exports under US FTAs considered simultaneously** (percent change; exports in millions of 1997 dollars)

Region/ country	Initial exports			Free trade agreement		
	Total	To United States	To FTA partners	Total	To United States	To FTA partners
USA	852,718.7	—	1,008,342.0	3.4	—	32.4
Canada*	230,948.0	167,579.9	411,535.2	-0.3	-0.1	-3.5
Mexico*	115,223.2	86,241.1	206,690.4	-0.2	-0.1	-6.2
<b>Total NAFTA</b>	<b>1,198,889.9</b>	<b>253,820.9</b>	<b>1,626,568.0</b>	<b>2.4</b>	<b>-0.1</b>	<b>28.5</b>
European Union	2,360,107.4	221,573.8	2,771,685.0	-0.3	0.4	-3.4
Australia*	70,568.7	7,820.7	99,348.7	0.6	13.5	-3.1
New Zealand*	17,027.1	2,068.1	24,584.0	0.8	31.1	-5.6
Japan	490,448.8	127,311.1	763,190.7	-0.1	1.8	-3.2
China	292,748.8	75,785.4	416,218.6	-0.8	-3.1	-2.5
Korea*	149,293.4	25,360.9	203,748.2	3.1	20.6	-2.9
Taiwan*	136,412.6	35,282.1	194,249.3	2.4	18.2	-4.5
Indonesia*	56,894.5	10,613.4	79,828.1	3.5	42.9	-5.8
Malaysia*	95,093.7	18,826.4	146,908.4	0.8	9.6	-2.0
Philippines*	40,994.6	11,848.4	60,261.8	4.1	23.0	-3.5
Singapore*	125,698.3	22,396.0	186,264.7	-0.2	5.7	-2.5
Thailand*	70,707.9	14,558.2	101,636.8	2.8	27.9	-4.6
<b>Total ASEAN</b>	<b>389,389.0</b>	<b>78,242.3</b>	<b>574,899.8</b>	<b>1.6</b>	<b>18.4</b>	<b>-3.1</b>
Brazil*	57,880.7	10,321.5	74,335.5	7.4	35.4	-4.2
Chile*	18,801.1	2,627.2	25,348.1	1.7	16.6	-2.9
Central America	39,265.1	16,104.7	57,783.4	-0.7	-4.6	0.5
Rest of South America	90,590.8	25,061.3	134,632.7	-1.3	0.4	-9.9
Morocco*	8,789.0	764.0	9,933.7	3.7	15.7	0.9
Botswana*	2,912.2	90.7	3,423.6	-0.8	0.7	-6.8
Rest of SACU*	34,388.4	3,582.3	45,318.1	1.4	16.7	-2.3
Rest of world	840,206.9	103,320.5	1,036,218.0	-0.3	-1.0	-1.4
<b>Total world</b>	<b>6,197,719.8</b>	<b>989,137.3</b>	<b>8,061,485.0</b>	<b>0.6</b>	<b>3.2</b>	<b>3.1</b>

\* = FTA partners; ASEAN = Association of Southeast Asian Nations; SACU = Southern African Customs Union

Source: GTAP simulation results.

United States), partner exports to the world do not expand appreciably except in the aforementioned categories.

With respect to the changes in the regional pattern of exports (table A.6), total exports of the United States and most FTA partners expand by 2 to 4 percent. The United States expands its total exports to FTA partners by 32 percent, and the FTA partners generally expand their total exports to the United States by similar and in some cases greater proportions (e.g.,

Indonesia's 43 percent). The exports to the world of third countries generally decline by only about 1 percent (China and rest of South America) or less. However, appreciable trade diversion is apparent in the results for exports to the FTA partner countries. Except for exports of the United States, exports of most countries to FTA partner countries, including bilateral exports of FTA partner countries themselves, decline by 2 to 6 percent. This last result again illustrates the degree to which the current US strategy to pursue bilateral FTAs with a wide number of partner countries tends to limit trade diversion in the United States but not trade diversion in the partner countries, so long as the partner countries themselves do not likewise pursue unilateral trade liberalization or a wide number of bilateral FTAs.

The spillover effects of the simultaneous US bilateral FTAs on economic welfare in selected third countries, including China, the European Union, Japan, and Mexico, are presented in table A.7. Also presented in the table are benchmark GTAP results for multilateral free trade undertaken simultaneously by the United States, its 14 FTA partners, and the third countries included in the table.

The spillover effects on economic welfare of the US bilateral FTAs are modest relative to GDP for major countries such as Japan (-0.1 percent) and the European Union (-0.0 percent), but arguably less so for NAFTA partners Canada and Mexico (both -0.2 percent). Spillover effects are also of appreciable magnitude relative to GDP for the Central American countries (-0.7 percent) and China (-0.2 percent). Of course, these results mask possibly sizable impacts on the economic welfare of different groups of consumers and producers within third countries, including large third countries such as EU members and Japan. In these countries, export producers that suffer especially adverse affects might be sufficiently influential politically to unleash competitive liberalization forces within their country that would push more effectively for multilateral trade liberalization on a nondiscriminatory basis. However, the present GTAP results suggest that competitive liberalization forces are likely to be strongest in China and other developing countries excluded from the prospective US free trade agreements—that is, in the countries that are least likely to be effective in promoting multilateral trade liberalization.

Finally, the benchmark welfare effects for multilateral trade liberalization indicate how dramatically better off the world economy would be under multilateral trade liberalization than under widespread US bilateral free trade agreements. The GTAP results indicate that whereas the world economy would lose by \$0.4 billion under the US FTAs, it would gain by more than \$84 billion under multilateral trade liberalization. This would seemingly provide the latent forces of competitive liberalization worldwide considerable grist for finally winning support for multilateral trade liberalization, whether in a successful outcome to the Doha Round or some other form (including possibly coalescence of FTAs worldwide).

**Table A.7 Changes in economic welfare by region under US FTAs and multilateral free trade (millions of 1997 dollars)**

Region/ country	Initial GDP	Free trade agreements considered simultaneously		Multilateral free trade	
		Equivalent variation	Equivalent variation (percent GDP)	Equivalent variation	Equivalent variation (percent GDP)
USA	7,945,196.5	9,113.6	0.11	-254.0	0.00
Canada*	631,127.2	-1,021.0	-0.16	1,732.2	0.27
Mexico*	388,824.4	-776.3	-0.20	-514.4	-0.13
<b>Total NAFTA</b>	8,965,148.1	7,316.3	0.08	963.9	0.01
European Union	7,957,957.5	-3,499.6	-0.04	-3,574.7	-0.04
Australia*	392,841.3	-235.4	-0.06	2,803.1	0.71
New Zealand*	65,079.0	69.9	0.11	3,350.8	5.15
Japan	4,255,524.0	-2,041.7	-0.05	15,749.1	0.37
China	994,687.2	-1,926.0	-0.19	5,536.5	0.56
Korea*	445,502.9	1,069.2	0.24	9,638.6	2.16
Taiwan*	299,681.0	634.2	0.21	3,769.4	1.26
Indonesia*	208,833.9	963.9	0.46	2,642.1	1.27
Malaysia*	106,090.4	-11.8	-0.01	1,263.5	1.19
Philippines*	78,356.1	610.2	0.78	-57.3	-0.07
Singapore*	79,822.1	72.3	0.09	2,157.8	2.70
Thailand*	157,779.8	414.2	0.26	2,745.7	1.74
<b>Total ASEAN</b>	630,882.3	2,048.8	0.32	8,751.9	1.39
Brazil*	789,679.9	-475.5	-0.06	5,996.1	0.76
Chile*	76,147.5	-114.2	-0.15	551.4	0.72
Central America Rest of South America	94,053.6	-615.4	-0.65	1,735.2	1.84
	626,100.0	-750.8	-0.12	4,855.1	0.78
Morocco*	34,946.7	-110.5	-0.32	990.0	2.83
Botswana*	4,777.3	0.2	0.00	172.6	3.61
Rest of SACU*	139,050.5	-126.3	-0.09	1,458.4	1.05
Rest of world	3,209,725.0	-1,688.2	-0.05	21,602.5	0.67
<b>Total world</b>	28,981,783.7	-445.1	0.00	84,349.8	0.29

\* = FTA partners; ASEAN = Association of Southeast Asian Nations; SACU = Southern African Customs Union

Source: GTAP simulation results.

However, the GTAP results also reveal a possible dark outcome for the world economy, one in which economic interests in the European Union and the United States effectively block competitive liberalization forces. The GTAP results make it clear that both the European Union and the United States are worse off under multilateral free trade than under the US bilateral FTAs, the European Union by only about \$0.1 billion but the United States by more than \$9.0 billion.

## Gravity Model Results

Among the most robust empirical approaches to forecasting bilateral trade flows is the so-called gravity model approach.<sup>11</sup> The basic gravity model consists of the results of ordinary least squares regression pitting bilateral trade flows in a common currency (adjusted for inflation) against the gravitational “mass” of explanatory variables describing the bilateral trading partners, including especially their proximity, combined population, and combined GDP. Most gravity models find that trade between two countries is significantly greater, the greater their combined population and GDP and the shorter the distance between them. Additional explanatory variables also are frequently important. For instance, trading partners that share a common border or a common language are often found to enjoy significantly greater mutual trade.

In recent years, gravity models have been applied widely to assess whether, and to what extent, regional and other forms of preferential trading arrangements result in expanded bilateral trade among member countries. This is typically accomplished by including a dichotomous (0, 1) explanatory variable in the regression equation for each preferential arrangement among two or more trading partners. The econometric results have been impressive, widely supporting the hypothesis that preferential trading arrangements lead to significant expansion of trade between member countries (see, e.g., Frankel 1997).<sup>12</sup>

Gravity model results for preferential trading arrangement variables do not usually differentiate between the effects of trade creation and trade diversion. That is, while they indicate the expected magnitude of expansion in bilateral trade, they typically do not indicate whether the main cause of an increase in mutual trade is trade with internationally competitive producers (trade creation), or trade with noncompetitive producers attributable to margins of preference (trade diversion). Trade creation adds to the economic welfare of the importing country (and the world at large), while trade diversion generally increases only the economic welfare of inefficient exporters (and their home country).

Nonetheless, gravity model estimates of the responsiveness of bilateral trade flows to regional and other preferential trading arrangements might be applied to consider the *gross* trade impacts of proposed US FTAs with partner countries. Specifically, they are interpreted here as an upper bound on the potential magnitude of trade creation.

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11. The theoretical basis of the gravity model has not been fully appreciated until relatively recently; see, e.g., Anderson (1979), Bergstrand (1985, 1989), and Deardorff (1998).

12. See also Greenaway and Milner (2002) for an extensive discussion of methodological and modeling issues surrounding the econometric results for FTAs using the gravity model.

## Methodology and FTA Scenarios

The quantitative analysis here is based on recent gravity model estimates found by Andrew Rose (2003) for bilateral merchandise trade between 178 trading countries during the period 1948–1999.<sup>13</sup> His gravity model regressions find that regional free trade areas tend to add 0.78 to bilateral real trade (measured in log terms) between member countries. In the analysis here, this econometric estimate is applied in combination with IMF *Direction of Trade* data for 2000 for the United States and more than 20 prospective partner countries in diverse regions of the world,<sup>14</sup> to calculate the trade impacts of forming US bilateral free trade agreements.

Three FTA scenarios are considered:

1. US FTAs are established bilaterally with the selected prospective partner countries.
2. US FTAs lead to regional free trade areas among prospective partner countries in the same region and the United States.
3. US FTAs lead to a “multilateral” free trade area among the prospective partner countries worldwide and the United States.

The first scenario corresponds to the simple case of bilateral FTAs struck by the United States with each of the prospective partner countries. The second scenario adds the possibility that prospective FTA partners in the same region will be stimulated by the US free trade agreements in the first scenario to forge bilateral FTAs among themselves, in effect forming regional free trade areas that include the United States as an extraregional member. Finally, the third scenario considers the impacts of forging bilateral FTAs among all prospective FTA partners, in effect forming a multilateral free trade area among the prospective FTA partners and the United States.

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13. Rose’s regression data for annual bilateral trade flows (in US dollars, deflated by the US consumer price index for urban consumers) are drawn from the IMF *Direction of Trade* database, which excludes Taiwan and some centrally planned economies. His regression estimates include year-specific “fixed” effects to account for such factors as the value of the dollar, the global business cycle, the extent of globalization, oil shocks, and so forth.

14. Actual and prospective partner countries in US free trade agreements are Canada and Mexico (NAFTA); Australia and New Zealand (CER, or Closer Economic Relations, countries); Korea, Indonesia, Malaysia, Philippines, Singapore, Taiwan, and Thailand (ASEAN, or Association of Southeast Asian Nations, countries plus Korea and Taiwan); Brazil, Chile, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua (CACM, or Central American Common Market, countries plus Brazil and Chile); Egypt, Israel, Jordan, Morocco (MENA, or Middle East and North Africa, countries); and Botswana, Lesotho, Namibia, South Africa, and Swaziland (Southern African Customs Union, or SACU, countries). Of these countries, Canada, Israel, and Mexico enjoyed FTAs with the United States that were substantially in force during 2000.

The three FTA scenarios are grounded partly in fact. For instance, the second scenario may well describe the outcome of proposed US FTAs with the ASEAN (Association of Southeast Asian Nations) countries, CACM (Central American Common Market) countries, and SACU countries, in which members of these existing regional trading arrangements are stimulated, if not compelled, to incorporate their bilateral trade reforms with the United States with one another. However, the possibility that the US FTAs might lead to a multilateral free trade area among the prospective partner countries worldwide and the United States—for instance, as an alternative to an unsuccessful Doha Round—seems more remote, though widespread adoption of FTAs might well lead to some coalescence of them in the long run should the Doha Round fail.

Finally, it should be borne in mind that the single gravity model estimate underlying the quantitative analysis here might not be appropriate to each of the three scenarios. Indeed, while Rose’s econometric estimate of the average trade impact of regional trade arrangements worldwide might be appropriate to the second scenario, it might overestimate and underestimate, respectively, the trade impacts of US bilateral FTAs in the first scenario and the multilateral free trade area in the third scenario.

## Quantitative Results

The computed trade impacts of the three FTA scenarios are presented in table A.8. The results are derived by applying Rose’s estimate of the (proportional) impact of regional free trade areas on bilateral trade to “base” 2000 trade flows among the United States and the prospective partner countries, grouped by regional blocs in the first panel of table A.8. Rose’s regression coefficient estimate of 0.78 for the bilateral trade impact of regional free trade areas implies that countries entering into a bilateral free trade agreement can expect their mutual trade to expand by 118 percent in real terms.<sup>15</sup>

The base trade flows in table A.8 account for between about 50 percent (imports) and about 60 percent (exports) of the total international trade of the United States and its prospective FTA partners in 2000. As might be expected, the United States and its prospective FTA partners account for substantially smaller proportions of the total international trade of the MENA (Middle East and North Africa) and SACU countries, whose

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15. Given the particular log-specification of the regression equation underlying Rose’s gravity model, the proportional impact of a free trade agreement on bilateral trade is computed as  $[\text{EXP}(0.78) - 1] = 1.18$ , where EXP is the natural exponential function operator. Rose’s gravity model is not explicitly dynamic, so, given that annual data are used to estimate the parameters of his model, the trade impacts presented in table A.8 might be expected to occur over a medium-term period of one to five years.

**Table A.8a Gravity model estimates of US FTA-led expansion of bilateral, regional, and “multilateral” trade: Base “multilateral” trade, 2000 (millions of dollars)**

Export/import country	United States	NAFTA	CER	ASEAN+	CACM+	MENA	SACU	Base	World	Base/world (percent)
<b>NAFTA</b>	364,271.0	686,572.1	19,115.5	111,423.4	31,778.9	12,098.9	3,978.0	864,966.7	1,296,825.0	66.7
United States	—	309,356.0	17,322.6	104,358.8	26,933.2	11,411.1	3,612.4	472,994.1	851,306.0	55.6
Canada*	229,191.0	233,609.2	1,430.7	5,424.7	1,913.5	657.8	293.4	243,329.4	282,037.0	86.3
Mexico*	135,080.0	143,606.9	362.2	1,639.9	2,932.1	30.0	72.2	148,643.3	163,482.0	90.9
<b>CER</b>	8,878.2	10,924.9	5,944.4	19,190.9	547.5	668.2	802.9	39,078.8	83,410.6	45.7
Australia	6,692.7	8,173.1	3,086.0	17,020.2	452.1	570.5	743.8	30,045.6	68,469.6	43.9
New Zealand	2,185.5	2,751.8	2,858.4	2,170.6	95.5	97.6	59.2	8,033.2	14,941.0	53.8
<b>ASEAN + KO + TA</b>	163,820.9	184,671.9	15,167.8	159,290.3	6,496.8	3,594.3	2,367.6	371,588.7	744,922.8	49.9
Korea (KO)	40,911.0	48,976.0	3,137.9	24,071.5	3,018.2	1,480.4	588.9	81,273.0	178,119.0	45.6
Indonesia	11,097.4	12,276.7	1,956.0	19,125.1	385.4	330.8	225.5	34,299.6	66,692.2	51.4
Malaysia	25,990.0	29,318.4	3,056.4	38,667.5	744.1	345.3	337.2	72,468.9	121,308.0	59.7
Philippines	14,216.4	15,901.5	371.8	11,970.2	193.4	62.7	53.3	28,553.1	48,358.5	59.0
Singapore	19,630.4	21,331.0	2,598.2	29,819.3	361.8	453.9	231.5	54,795.7	106,234.0	51.6
Thailand	17,161.4	18,955.6	1,991.1	15,330.6	380.6	199.1	299.3	37,156.2	75,894.8	49.0
Taiwan (TA)	34,814.3	37,912.7	1,827.9	1,733.6	94.2	39.3	0.8	63,042.2	148,316.3	42.5
<b>CACM + BR + CH</b>	30,179.2	35,479.4	543.5	4,808.9	5,778.6	559.6	366.2	47,536.3	102,879.6	46.2
Brazil (BR)	14,393.1	17,481.7	457.5	2,498.1	1,635.2	511.3	321.3	22,905.1	61,199.2	37.4
Chile (CH)	3,601.8	4,996.6	66.6	1,983.2	1,195.4	30.8	39.2	8,311.8	20,206.7	41.1
Costa Rica	3,717.0	4,050.7	13.7	232.2	628.0	2.3	3.3	4,930.3	8,139.9	60.6
El Salvador	1,952.5	2,086.9	0.7	15.3	813.3	9.5	0.1	2,925.8	3,254.9	89.9
Guatemala	2,743.8	2,956.3	2.8	49.4	819.0	4.9	2.0	3,834.5	4,685.8	81.8
Honduras	3,173.7	3,236.7	1.4	24.6	321.9	0.7	0.0	3,585.3	4,158.9	86.2
Nicaragua	597.3	670.5	0.8	6.1	365.6	0.1	0.3	1,043.4	1,234.3	84.5



<b>MENA</b>	14,334.2	15,293.3	415.8	2,590.3	625.9	304.6	237.2	19,467.1	47,461.9	41.0
Egypt	894.7	926.0	12.3	336.5	40.7	81.1	8.3	1,404.9	6,239.7	22.5
Israel*	12,899.8	13,667.3	291.5	1,885.8	487.3	144.4	222.5	16,698.8	30,860.0	54.1
Jordan	74.5	76.5	4.0	77.5	5.2	65.4	3.6	232.2	1,785.9	13.0
Morocco	465.2	623.5	108.0	290.5	92.7	13.7	2.7	1,131.1	8,576.3	13.2
<b>SACU</b>	4,603.3	5,029.2	585.4	2,748.5	312.3	371.3	0.0	9,046.7	33,729.5	26.8
Botswana	42.0	42.2	0.0	6.5	0.2	1.4	0.0	50.4	778.2	6.5
Lesotho	143.9	148.7	0.0	0.5	0.0	0.0	0.0	149.2	172.4	86.5
Namibia	44.5	87.7	5.7	5.4	0.0	0.5	0.0	99.2	606.3	16.4
South Africa	4,316.8	4,693.1	578.3	2,458.3	311.4	369.5	0.0	8,410.6	31,843.5	26.4
Swaziland	56.1	57.5	1.4	277.8	0.7	0.0	0.0	337.3	329.1	102.5
<b>Base</b>	586,086.8	937,970.9	41,772.4	300,052.3	45,540.0	17,596.9	7,751.8	1,350,684.4	2,309,229.4	58.5
<b>World</b>	1,238,200.0	1,692,825.0	88,216.0	644,126.9	103,628.5	75,632.0	28,567.0	2,632,995.4	—	—
<b>Percent</b>										
(Base/world)	47.3	55.4	47.4	46.6	43.9	23.3	27.1	51.3	—	—

\* = Countries with existing FTA with the United States.  
 ASEAN = Association of South East Asian Nations  
 CACM = Central American Common Market  
 CER = Closer Economic Relations (Australia–New Zealand)  
 MENA = Middle East and North Africa  
 NAFTA = North American Free Trade Agreement  
 SACU = Southern African Customs Union

Table A.8b Scenario 1: US FTA expansion of bilateral trade (millions of dollars)

Export/import country	United States	NAFTA	CER	ASEAN+	CACM+	MENA	SACU	Total	Change	Change/base (percent)	Change/world (percent)
<b>NAFTA</b>	<b>364,271.0</b>	<b>686,572.1</b>	<b>39,581.7</b>	<b>234,720.5</b>	<b>63,599.7</b>	<b>17,729.3</b>	<b>8,245.9</b>	<b>1,050,449.1</b>	<b>185,482.4</b>	<b>21.4</b>	<b>14.3</b>
United States	—	<b>309,356.0</b>	<b>37,788.8</b>	<b>227,655.8</b>	<b>58,754.1</b>	<b>17,041.5</b>	<b>7,880.3</b>	<b>658,476.5</b>	<b>185,482.4</b>	<b>39.2</b>	<b>21.8</b>
Canada*	<b>229,191.0</b>	<b>233,609.2</b>	<b>1,430.7</b>	<b>5,424.7</b>	<b>1,913.5</b>	<b>657.8</b>	<b>293.4</b>	<b>243,329.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Mexico*	<b>135,080.0</b>	<b>143,606.9</b>	<b>362.2</b>	<b>1,639.9</b>	<b>2,932.1</b>	<b>30.0</b>	<b>72.2</b>	<b>148,643.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>CER</b>	<b>19,367.5</b>	<b>21,414.3</b>	<b>5,944.4</b>	<b>19,190.9</b>	<b>547.5</b>	<b>668.2</b>	<b>802.9</b>	<b>48,568.2</b>	<b>10,489.3</b>	<b>27.5</b>	<b>12.6</b>
Australia	<b>14,599.9</b>	<b>16,080.3</b>	<b>3,086.0</b>	<b>17,020.2</b>	<b>452.1</b>	<b>570.5</b>	<b>743.8</b>	<b>37,952.9</b>	<b>7,907.2</b>	<b>26.3</b>	<b>11.5</b>
New Zealand	<b>4,767.6</b>	<b>5,333.9</b>	<b>2,858.4</b>	<b>2,170.6</b>	<b>95.5</b>	<b>97.6</b>	<b>59.2</b>	<b>10,615.3</b>	<b>2,582.1</b>	<b>32.1</b>	<b>17.3</b>
<b>ASEAN + KO + TA</b>	<b>357,370.7</b>	<b>378,221.8</b>	<b>15,167.8</b>	<b>159,290.3</b>	<b>6,496.8</b>	<b>3,594.3</b>	<b>2,367.6</b>	<b>565,138.6</b>	<b>193,549.8</b>	<b>52.1</b>	<b>26.0</b>
Korea (KO)	<b>89,246.2</b>	<b>97,311.2</b>	<b>3,137.9</b>	<b>24,071.5</b>	<b>3,018.2</b>	<b>1,480.4</b>	<b>588.9</b>	<b>129,608.2</b>	<b>48,335.2</b>	<b>59.5</b>	<b>27.1</b>
Indonesia	<b>24,208.7</b>	<b>25,388.0</b>	<b>1,956.0</b>	<b>19,125.1</b>	<b>385.4</b>	<b>330.8</b>	<b>225.5</b>	<b>47,410.8</b>	<b>13,111.3</b>	<b>38.2</b>	<b>19.7</b>
Malaysia	<b>56,696.5</b>	<b>60,024.9</b>	<b>3,056.4</b>	<b>38,667.5</b>	<b>744.1</b>	<b>345.3</b>	<b>337.2</b>	<b>103,175.3</b>	<b>30,706.5</b>	<b>42.4</b>	<b>25.3</b>
Philippines	<b>31,012.7</b>	<b>32,697.8</b>	<b>371.8</b>	<b>11,970.2</b>	<b>193.4</b>	<b>62.7</b>	<b>53.3</b>	<b>45,349.4</b>	<b>16,796.3</b>	<b>58.8</b>	<b>34.7</b>
Singapore	<b>42,823.2</b>	<b>44,523.8</b>	<b>2,598.2</b>	<b>29,819.3</b>	<b>361.8</b>	<b>453.9</b>	<b>231.5</b>	<b>77,988.5</b>	<b>23,192.8</b>	<b>42.3</b>	<b>21.8</b>
Thailand	<b>37,437.1</b>	<b>39,231.3</b>	<b>1,991.1</b>	<b>15,330.6</b>	<b>380.6</b>	<b>199.1</b>	<b>299.3</b>	<b>57,432.0</b>	<b>20,275.7</b>	<b>54.6</b>	<b>26.7</b>
Taiwan (TA)	<b>75,946.4</b>	<b>79,044.8</b>	<b>2,056.4</b>	<b>20,306.1</b>	<b>1,413.1</b>	<b>722.0</b>	<b>631.8</b>	<b>104,174.4</b>	<b>41,132.1</b>	<b>65.2</b>	<b>27.7</b>
<b>CACM + BR + CH</b>	<b>65,835.1</b>	<b>71,135.3</b>	<b>543.5</b>	<b>4,808.9</b>	<b>5,778.6</b>	<b>559.6</b>	<b>366.2</b>	<b>83,192.2</b>	<b>35,655.9</b>	<b>75.0</b>	<b>34.7</b>
Brazil (BR)	<b>31,398.1</b>	<b>34,486.8</b>	<b>457.5</b>	<b>2,498.1</b>	<b>1,635.2</b>	<b>511.3</b>	<b>321.3</b>	<b>39,910.1</b>	<b>17,005.0</b>	<b>74.2</b>	<b>27.8</b>
Chile (CH)	<b>7,857.2</b>	<b>9,252.1</b>	<b>66.6</b>	<b>1,983.2</b>	<b>1,195.4</b>	<b>30.8</b>	<b>39.2</b>	<b>12,567.2</b>	<b>4,255.4</b>	<b>51.2</b>	<b>21.1</b>
Costa Rica	<b>8,108.5</b>	<b>8,442.2</b>	<b>13.7</b>	<b>232.2</b>	<b>628.0</b>	<b>2.3</b>	<b>3.3</b>	<b>4,321.9</b>	<b>4,391.5</b>	<b>89.1</b>	<b>54.0</b>
El Salvador	<b>4,259.3</b>	<b>4,393.7</b>	<b>0.7</b>	<b>15.3</b>	<b>813.3</b>	<b>9.5</b>	<b>0.1</b>	<b>5,232.6</b>	<b>2,306.8</b>	<b>78.8</b>	<b>70.9</b>
Guatemala	<b>5,985.5</b>	<b>6,198.1</b>	<b>2.8</b>	<b>49.4</b>	<b>819.0</b>	<b>4.9</b>	<b>2.0</b>	<b>7,076.2</b>	<b>3,241.7</b>	<b>84.5</b>	<b>69.2</b>
Honduras	<b>6,923.3</b>	<b>6,986.3</b>	<b>1.4</b>	<b>24.6</b>	<b>321.9</b>	<b>0.7</b>	<b>0.0</b>	<b>7,335.0</b>	<b>3,749.6</b>	<b>104.6</b>	<b>90.2</b>
Nicaragua	<b>1,303.0</b>	<b>1,376.2</b>	<b>0.8</b>	<b>6.1</b>	<b>365.6</b>	<b>0.1</b>	<b>0.3</b>	<b>1,749.1</b>	<b>705.7</b>	<b>67.6</b>	<b>57.2</b>

<b>MENA</b>	<b>16,028.9</b>	16,988.0	415.8	2,590.3	625.9	304.6	237.2	21,161.8	1,694.7	8.7	3.6
Egypt	1,951.8	1,983.1	12.3	336.5	40.7	81.1	8.3	2,462.0	1,057.1	75.2	16.9
Israel*	<b>12,899.8</b>	13,667.3	291.5	1,885.8	487.3	144.4	222.5	16,698.8	0.0	0.0	0.0
Jordan	<b>162.5</b>	164.5	4.0	77.5	5.2	65.4	3.6	320.2	88.0	37.9	4.9
Morocco	<b>1,014.8</b>	1,173.1	108.0	290.5	92.7	13.7	2.7	1,680.8	549.6	48.6	6.4
<b>SACU</b>	<b>10,042.0</b>	10,467.9	585.4	2,748.5	312.3	371.3	0.0	14,485.4	5,438.7	60.1	16.1
Botswana	<b>91.6</b>	91.8	0.0	6.5	0.2	1.4	0.0	100.0	49.6	98.5	6.4
Lesotho	<b>313.9</b>	318.7	0.0	0.5	0.0	0.0	0.0	319.2	170.0	114.0	98.6
Namibia	<b>97.1</b>	140.3	5.7	5.4	0.0	0.5	0.0	151.8	52.6	53.0	8.7
South Africa	<b>9,417.0</b>	9,793.3	578.3	2,458.3	311.4	369.5	0.0	13,510.8	5,100.2	60.6	16.0
Swaziland	<b>122.4</b>	123.8	1.4	277.8	0.7	0.0	0.0	403.6	66.3	19.6	20.1
<b>Total</b>	<b>832,915.3</b>	1,184,799.4	62,238.6	423,349.3	77,360.9	23,227.3	12,019.8	1,782,995.2	432,310.9	32.0	18.7
<b>Change</b>	<b>246,828.5</b>	246,828.5	20,466.2	123,297.0	31,820.9	5,630.4	4,267.9	432,310.9	—	—	—
<b>Change/base</b>	<b>(percent)</b>	42.1	26.3	49.0	41.1	32.0	55.1	32.0	—	—	—
<b>Change/world</b>	<b>(percent)</b>	19.9	14.6	23.2	19.1	7.4	14.9	16.4	—	—	—

\* = Countries with existing FTA with the United States.  
 ASEAN = Association of South East Asian Nations  
 CACM = Central American Common Market  
 CER = Closer Economic Relations (Australia–New Zealand)  
 MENA = Middle East and North Africa  
 NAFTA = North American Free Trade Agreement  
 SACU = Southern African Customs Union

Note: Numbers in bold indicate base trade plus bilateral FTA effects.

**Table A.8c Scenario 2: US FTA-led expansion of regional trade (millions of dollars)**

Export/import country	United States	NAFTA	CER	ASEAN+	CACM+	MENA	SACU	Total exports	Change	Change/base (percent)	Change/world (percent)
<b>NAFTA</b>	<b>364,271.0</b>	<b>686,572.1</b>	<b>39,581.7</b>	<b>234,720.5</b>	<b>63,599.7</b>	<b>17,729.3</b>	<b>8,245.9</b>	<b>1,050,449.1</b>	<b>185,482.4</b>	<b>21.4</b>	<b>14.3</b>
United States	—	<b>309,356.0</b>	<b>37,788.8</b>	<b>227,655.8</b>	<b>58,754.1</b>	<b>17,041.5</b>	<b>7,880.3</b>	<b>658,476.5</b>	<b>185,482.4</b>	<b>39.2</b>	<b>21.8</b>
Canada*	<b>229,191.0</b>	<b>233,609.2</b>	<b>1,430.7</b>	<b>5,424.7</b>	<b>1,913.5</b>	<b>657.8</b>	<b>293.4</b>	<b>243,329.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Mexico*	<b>135,080.0</b>	<b>143,606.9</b>	<b>362.2</b>	<b>1,639.9</b>	<b>2,932.1</b>	<b>30.0</b>	<b>72.2</b>	<b>148,643.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>CER</b>	<b>19,367.5</b>	<b>21,414.3</b>	<b>12,967.5</b>	<b>27,311.1</b>	<b>547.5</b>	<b>668.2</b>	<b>802.9</b>	<b>63,711.5</b>	<b>25,632.7</b>	<b>67.3</b>	<b>30.7</b>
Australia	<b>14,599.9</b>	<b>16,080.3</b>	<b>6,731.9</b>	<b>22,506.7</b>	<b>452.1</b>	<b>570.5</b>	<b>743.8</b>	<b>47,085.4</b>	<b>17,039.7</b>	<b>56.7</b>	<b>24.9</b>
New Zealand	<b>4,767.6</b>	<b>5,333.9</b>	<b>6,235.6</b>	<b>4,804.3</b>	<b>95.5</b>	<b>97.6</b>	<b>59.2</b>	<b>16,626.1</b>	<b>8,592.9</b>	<b>107.0</b>	<b>57.5</b>
<b>ASEAN + KO + TA</b>	<b>357,370.7</b>	<b>378,221.8</b>	<b>15,167.8</b>	<b>304,970.1</b>	<b>6,496.8</b>	<b>3,594.3</b>	<b>2,367.6</b>	<b>710,818.4</b>	<b>339,229.7</b>	<b>91.3</b>	<b>45.5</b>
Korea (KO)	<b>89,246.2</b>	<b>97,311.2</b>	<b>3,137.9</b>	<b>43,841.5</b>	<b>3,018.2</b>	<b>1,480.4</b>	<b>588.9</b>	<b>149,378.2</b>	<b>68,105.2</b>	<b>83.8</b>	<b>38.2</b>
Indonesia	<b>24,208.7</b>	<b>25,388.0</b>	<b>1,956.0</b>	<b>41,181.7</b>	<b>385.4</b>	<b>330.8</b>	<b>225.5</b>	<b>69,467.5</b>	<b>35,167.9</b>	<b>102.5</b>	<b>52.7</b>
Malaysia	<b>56,696.5</b>	<b>60,024.9</b>	<b>3,056.4</b>	<b>73,208.9</b>	<b>744.1</b>	<b>345.3</b>	<b>337.2</b>	<b>137,716.8</b>	<b>65,247.9</b>	<b>90.0</b>	<b>53.8</b>
Philippines	<b>31,012.7</b>	<b>32,697.8</b>	<b>371.8</b>	<b>19,480.0</b>	<b>193.4</b>	<b>62.7</b>	<b>53.3</b>	<b>52,859.1</b>	<b>24,306.0</b>	<b>85.1</b>	<b>50.3</b>
Singapore	<b>42,823.2</b>	<b>44,523.8</b>	<b>2,598.2</b>	<b>55,507.2</b>	<b>361.8</b>	<b>453.9</b>	<b>231.5</b>	<b>103,676.4</b>	<b>48,880.7</b>	<b>89.2</b>	<b>46.0</b>
Thailand	<b>37,437.1</b>	<b>39,231.3</b>	<b>1,991.1</b>	<b>27,453.5</b>	<b>380.6</b>	<b>199.1</b>	<b>299.3</b>	<b>69,554.9</b>	<b>32,398.7</b>	<b>87.2</b>	<b>42.7</b>
Taiwan (TA)	<b>75,946.4</b>	<b>79,044.8</b>	<b>2,056.4</b>	<b>44,297.2</b>	<b>1,413.1</b>	<b>722.0</b>	<b>631.8</b>	<b>128,165.4</b>	<b>65,123.2</b>	<b>103.3</b>	<b>43.9</b>
<b>CACM + BR + CH</b>	<b>65,835.1</b>	<b>71,135.3</b>	<b>543.5</b>	<b>4,096.4</b>	<b>12,605.8</b>	<b>559.6</b>	<b>366.2</b>	<b>89,306.9</b>	<b>41,770.6</b>	<b>87.9</b>	<b>40.6</b>
Brazil (BR)	<b>31,398.1</b>	<b>34,486.8</b>	<b>457.5</b>	<b>1,964.4</b>	<b>3,567.2</b>	<b>511.3</b>	<b>321.3</b>	<b>41,308.4</b>	<b>18,403.3</b>	<b>80.3</b>	<b>30.1</b>
Chile (CH)	<b>7,857.2</b>	<b>9,252.1</b>	<b>66.6</b>	<b>1,363.5</b>	<b>2,607.8</b>	<b>30.8</b>	<b>39.2</b>	<b>13,359.9</b>	<b>5,048.1</b>	<b>60.7</b>	<b>25.0</b>
Costa Rica	<b>8,108.5</b>	<b>8,442.2</b>	<b>13.7</b>	<b>641.9</b>	<b>1,370.0</b>	<b>2.3</b>	<b>3.3</b>	<b>10,473.5</b>	<b>5,543.1</b>	<b>112.3</b>	<b>68.1</b>
El Salvador	<b>4,259.3</b>	<b>4,393.7</b>	<b>0.7</b>	<b>33.1</b>	<b>1,774.2</b>	<b>9.5</b>	<b>0.1</b>	<b>3,285.5</b>	<b>3,285.5</b>	<b>121.3</b>	<b>100.9</b>
Guatemala	<b>5,985.5</b>	<b>6,198.1</b>	<b>2.8</b>	<b>65.4</b>	<b>1,786.7</b>	<b>4.9</b>	<b>2.0</b>	<b>8,059.9</b>	<b>4,225.4</b>	<b>110.2</b>	<b>90.2</b>
Honduras	<b>6,923.3</b>	<b>6,986.3</b>	<b>1.4</b>	<b>23.0</b>	<b>702.2</b>	<b>0.7</b>	<b>0.0</b>	<b>7,713.8</b>	<b>4,128.4</b>	<b>115.1</b>	<b>99.3</b>
Nicaragua	<b>1,303.0</b>	<b>1,376.2</b>	<b>0.8</b>	<b>5.1</b>	<b>797.7</b>	<b>0.1</b>	<b>0.3</b>	<b>2,180.1</b>	<b>1,136.7</b>	<b>108.9</b>	<b>92.1</b>

<b>MENA</b>	<b>16,028.9</b>	16,988.0	415.8	2,572.6	625.9	<b>664.5</b>	237.2	21,504.0	2,036.9	10.5	4.3
Egypt	1,951.8	1,983.1	12.3	318.9	40.7	<b>176.9</b>	8.3	2,540.1	1,135.2	80.8	18.2
Israel*	<b>12,899.8</b>	13,667.3	291.5	1,885.8	487.3	<b>314.9</b>	222.5	16,869.4	170.6	1.0	0.6
Jordan	<b>162.5</b>	164.5	4.0	77.5	5.2	<b>142.7</b>	3.6	397.5	165.3	71.2	9.3
Morocco	<b>1,014.8</b>	1,173.1	108.0	290.5	92.7	<b>30.0</b>	2.7	1,697.0	565.8	50.0	6.6
<b>SACU</b>	<b>10,042.0</b>	10,467.9	585.4	2,748.5	312.3	371.3	<b>0.0</b>	14,485.4	5,438.7	60.1	16.1
Botswana	<b>91.6</b>	91.8	0.0	6.5	0.2	1.4	<b>0.0</b>	100.0	49.6	98.5	6.4
Lesotho	<b>313.9</b>	318.7	0.0	0.5	0.0	0.0	<b>0.0</b>	319.2	170.0	114.0	98.6
Namibia	<b>97.1</b>	140.3	5.7	5.4	0.0	0.5	<b>0.0</b>	151.8	52.6	53.0	8.7
South Africa	<b>9,417.0</b>	9,793.3	578.3	2,458.3	311.4	369.5	<b>0.0</b>	13,510.8	5,100.2	60.6	16.0
Swaziland	<b>122.4</b>	123.8	1.4	277.8	0.7	0.0	<b>0.0</b>	403.6	66.3	19.6	20.1
<b>Total imports</b>	832,915.3	1,184,799.4	69,261.7	576,419.1	84,188.1	23,587.2	12,019.8	1,950,275.3	599,590.9	44.4	26.0
<b>Change</b>	246,828.5	246,828.5	27,489.3	276,366.8	38,648.1	5,990.3	4,267.9	599,590.9	—	—	—
<b>Change/base</b>											
(percent)	42.1	26.3	65.8	92.1	84.9	34.0	55.1	44.4	—	—	—
<b>Change/world</b>											
(percent)	19.9	14.6	31.2	42.9	37.3	7.9	14.9	22.8	—	—	—

\* = Countries with existing FTA with the United States.  
 ASEAN = Association of South East Asian Nations  
 CACM = Central American Common Market  
 CER = Closer Economic Relations (Australia–New Zealand)  
 MENA = Middle East and North Africa  
 NAFTA = North American Free Trade Agreement  
 SACU = Southern African Customs Union

Note: Numbers in bold indicate base trade plus regional FTA effects.

**Table A.8d Scenario 3: US FTA-led expansion of “multilateral” trade (millions of dollars)**

Export/import country	United States	NAFTA	CER	ASEAN+	CACM+	MENA	SACU	Total exports	Change	Change/base (percent)	Change/world (percent)
<b>NAFTA</b>	364,271.0	686,572.1	41,700.0	243,067.1	69,324.7	18,541.9	8,677.8	1,067,883.6	202,916.8	23.5	15.6
United States	—	309,356.0	37,788.8	227,655.8	58,754.1	17,041.5	7,880.3	658,476.5	185,482.4	39.2	21.8
Canada*	229,191.0	233,609.2	3,121.0	11,833.8	4,174.3	1,435.0	640.0	254,813.4	11,484.1	4.7	4.1
Mexico*	135,080.0	143,606.9	790.1	3,577.4	6,396.3	65.3	157.5	154,593.7	5,950.4	4.0	3.6
<b>CER</b>	19,367.5	23,832.4	12,967.5	41,864.3	1,194.5	1,457.6	1,751.6	83,067.9	44,989.1	118.1	53.9
Australia	14,599.9	17,829.4	6,731.9	37,129.1	986.2	1,244.6	1,622.5	65,543.7	35,498.1	118.1	51.8
New Zealand	4,767.6	6,003.0	6,235.6	4,735.2	208.3	213.0	129.1	17,524.1	9,491.0	118.1	63.5
<b>ASEAN + KO + TA</b>	357,370.7	402,856.7	33,088.2	347,487.3	14,172.6	7,840.8	5,164.8	810,610.4	439,021.7	118.1	58.9
Korea (KO)	89,246.2	106,839.8	6,845.1	52,511.4	6,584.2	3,229.5	1,284.7	177,294.8	96,021.8	118.1	53.9
Indonesia	24,208.7	26,781.2	4,267.0	41,720.9	840.8	721.7	491.9	74,823.5	40,524.0	118.1	60.8
Malaysia	56,696.5	63,957.3	6,667.3	84,352.1	1,623.3	753.2	735.6	158,088.8	85,620.0	118.1	70.6
Philippines	31,012.7	34,688.7	811.1	26,112.8	422.0	136.9	116.3	62,287.8	33,734.7	118.1	69.8
Singapore	42,823.2	46,532.9	5,667.9	65,049.9	789.3	990.1	505.1	119,535.3	64,739.6	118.1	60.9
Thailand	37,437.1	41,351.1	4,343.6	33,443.2	830.3	434.3	652.9	81,055.3	43,899.1	118.1	57.8
Taiwan (TA)	75,946.4	82,705.5	4,486.0	44,297.2	3,082.7	1,575.1	1,378.3	137,524.9	74,482.6	118.1	50.2
<b>CACM + BR + CH</b>	65,835.1	77,397.4	1,185.7	10,490.6	12,605.8	1,220.8	798.8	103,699.1	56,162.8	118.1	54.6
Brazil (BR)	31,398.1	38,135.9	998.0	5,449.5	3,567.2	1,115.3	700.9	49,966.7	27,061.7	118.1	44.2
Chile (CH)	7,857.2	10,900.0	145.3	4,326.3	2,607.8	67.1	85.5	18,132.0	9,820.2	118.1	48.6
Costa Rica	8,108.5	8,836.4	30.0	506.6	1,370.0	5.1	7.2	10,755.4	5,825.1	118.1	71.6
El Salvador	4,259.3	4,552.4	1.5	33.5	1,774.2	20.8	0.1	6,382.6	3,456.8	118.1	106.2
Guatemala	5,985.5	6,449.2	6.1	107.7	1,786.7	10.7	4.3	8,364.9	4,530.4	118.1	96.7
Honduras	6,923.3	7,060.8	3.0	53.6	702.2	1.6	0.1	7,821.3	4,236.0	118.1	101.9
Nicaragua	1,303.0	1,462.6	1.8	13.4	797.7	0.2	0.7	2,276.2	1,232.8	118.1	99.9

<b>MENA</b>	<b>16,028.9</b>	<b>17,214.3</b>	<b>562.6</b>	<b>3,422.7</b>	<b>789.6</b>	<b>494.0</b>	<b>254.5</b>	<b>22,737.7</b>	<b>3,270.6</b>	<b>16.8</b>	<b>6.9</b>
Egypt	1,951.8	2,020.0	26.8	734.2	88.8	176.9	18.1	3,064.8	1,659.9	118.1	26.6
Israel*	12,899.8	13,667.3	291.5	1,885.8	487.3	144.4	222.5	16,698.8	0.0	0.0	0.0
Jordan	162.5	166.9	8.7	169.0	11.4	142.7	7.9	506.6	274.4	118.1	15.4
Morocco	1,014.8	1,360.1	235.6	633.8	202.2	30.0	5.9	2,467.6	1,336.4	118.1	15.6
<b>SACU</b>	<b>10,042.0</b>	<b>10,971.1</b>	<b>1,277.1</b>	<b>5,995.8</b>	<b>681.2</b>	<b>810.1</b>	<b>0.0</b>	<b>19,735.2</b>	<b>10,688.5</b>	<b>118.1</b>	<b>31.7</b>
Botswana	91.6	92.1	0.1	14.2	0.5	3.1	0.0	109.9	59.5	118.1	7.6
Lesotho	313.9	324.4	0.0	1.0	0.0	0.0	0.0	325.4	176.3	118.1	102.2
Namibia	97.1	191.3	12.4	11.8	0.0	1.0	0.0	216.5	117.3	118.1	19.3
South Africa	9,417.0	10,237.8	1,261.6	5,362.8	679.3	806.0	0.0	18,347.5	9,936.9	118.1	31.2
Swaziland	122.4	125.5	3.0	605.9	1.4	0.0	0.0	735.9	398.5	118.1	121.1
<b>Total imports</b>	<b>832,915.3</b>	<b>1,218,844.0</b>	<b>90,781.0</b>	<b>652,327.8</b>	<b>98,768.5</b>	<b>30,365.1</b>	<b>16,647.5</b>	<b>2,107,733.9</b>	<b>757,049.5</b>	<b>56.0</b>	<b>32.8</b>
<b>Change</b>	<b>246,828.5</b>	<b>280,873.1</b>	<b>49,008.6</b>	<b>352,275.5</b>	<b>53,228.5</b>	<b>12,768.2</b>	<b>8,895.6</b>	<b>757,049.5</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Change/base</b>											
(percent)	42.1	29.9	117.3	117.4	116.9	72.6	114.8	56.0	—	—	—
<b>Change/world</b>											
(percent)	19.9	16.6	55.6	54.7	51.4	16.9	31.1	28.8	—	—	—

\* = Countries with existing FTA with the United States.

ASEAN = Association of South East Asian Nations

CACM = Central American Common Market

CER = Closer Economic Relations (Australia–New Zealand)

MENA = Middle East and North Africa

NAFTA = North American Free Trade Agreement

SACU = Southern African Customs Union

Note: Numbers in bold indicate base trade plus "multilateral" FTA effects.

exports and especially imports are predominantly oriented to markets in the European Union.<sup>16</sup>

**Scenario 1: FTA-Led Expansion of Bilateral Trade.** US FTAs with the large number of prospective partner countries in table A.8b (excluding Canada, Mexico, and Israel) result in the expansion of US imports by \$247 billion and US exports by \$185 billion. Relative to US trade with the world in 2000, the US FTAs result in the expansion of both US imports and exports by about 20 percent.<sup>17</sup>

With respect to the FTA partner countries, imports of the CACM countries plus Brazil and Chile and of the CER (Australia–New Zealand Closer Economic Relations) countries expand the most in proportional terms, 31 percent and 23 percent respectively, because the imports of these countries are sourced mainly from the United States. Similarly, exports expand most in proportional terms for those partner countries whose exports are mainly destined for the United States: the CACM countries (between 50 percent and 90 percent) and the Philippines (35 percent).

**Scenario 2: FTA-Led Expansion of Regional Trade.** If the US FTAs lead FTA partner countries in the same region to adopt bilateral free trade agreements among themselves, in effect forming a series of regional free trade areas that include the United States as an extraregional member, then trade impacts substantially larger than in scenario 1 result. With respect to imports, the ASEAN countries plus Korea and Taiwan expand their imports by 43 percent, followed by the CACM countries plus Brazil and Chile (37 percent) and the CER countries (31 percent). On a combined basis, the United States and its FTA partners increase their total imports by 23 percent, compared to 16 percent in the first scenario.

With respect to exports, the ASEAN countries plus Korea and Taiwan expand their exports by 46 percent, followed by the CACM countries plus Brazil and Chile at 41 percent. Combined, the United States and its FTA partners increase their total exports by 26 percent, compared to 19 percent in the first scenario.

**Scenario 3: FTA-Led Expansion of “Multilateral” Trade.** If US FTAs lead the United States and the FTA partner countries worldwide to adopt a

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16. The base trade data in table A.8 are incomplete for the SACU countries, except South Africa. Also notably, the analysis here assumes that the base trade data already reflect the impact of preexisting US FTAs with Canada and Mexico and with Israel, under NAFTA and the US-Israel FTA respectively.

17. The description of the quantitative results here emphasizes proportional rather than absolute changes in trade. Also, the discussion focuses mainly on changes in trade vis-à-vis the world rather than individual partner countries. Thus, while FTAs everywhere result in the expansion of bilateral trade between FTA partners by 118 percent, the calculated changes in their trade vis-à-vis the world are typically substantially less than this figure.



multilateral free trade area among themselves, then the calculated expansion of trade climbs to especially high levels, except for the NAFTA countries (Canada and Mexico are already the beneficiaries of an FTA with the United States) and the MENA countries (among which Israel is already the beneficiary of an FTA with the United States). With respect to imports, the CER countries expand their imports by 56 percent, followed by the ASEAN countries plus Korea and Taiwan (55 percent) and the CACM countries plus Brazil and Chile (51 percent). On a combined basis, the United States and the prospective FTA partner countries increase their total imports by 29 percent, compared to 16 percent in the first scenario and 23 percent in the second scenario.

With respect to exports, the ASEAN countries plus Korea and Taiwan expand their exports by 59 percent, followed by the CACM countries plus Brazil and Chile, and the CER countries, both at about 54 percent. Combined, the United States and the prospective FTA partner countries increase their total exports by 33 percent, compared to 19 percent in the first scenario and 26 percent in the second scenario.

## Conclusion

Although the economic basis of the gravity model is less transparent than that of CGE models such as the GTAP model, gravity model estimates of the trade impacts of US free trade agreements appear to be substantially greater than those produced by the GTAP model. In addition, they give little indication that eventual multilateral trade liberalization brought about by the forces of competitive liberalization might be less attractive to the United States, its prospective FTA partners, or third countries than the currently emerging world of preferential trade arrangements.<sup>18</sup>

Nonetheless, the gravity model results presented here are no less subject to important caveats than the GTAP model results (see, e.g., Anderson and van Wincoop 2003). Among these, in the context of the present study, is the uncertain appropriateness of applying a single gravity model estimate of the mean sensitivity of bilateral trade flows to regional trade arrangements to prospective US FTAs established bilaterally, regionally, and even multilaterally. Moreover, the present gravity model-based results provide no assurance that the expansion of bilateral trade resulting from the prospective US FTAs is predominantly trade creating and hence mainly welfare enhancing for the individual countries considered. Indeed, while the quantitative results presented here may be broadly indicative of the range of impacts that prospective US FTAs might have on

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18. Gravity model estimates of the trade impacts of FTAs might be still greater, according to recent empirical studies in which the possible endogeneity of tariffs and other protection measures is recognized. See Baier and Bergstrand (2002).

trade and other economic variables, there is considerable need for more in-depth economic research into free trade agreements entered into by the United States and others, including careful political economy analysis of how, and even whether, the forces of competitive liberalization lead to welfare-enhancing outcomes for both the United States and the world as a whole.

## References

- Anderson, James E. 1979. A Theoretical Foundation for the Gravity Equation. *American Economic Review* 69, no. 1: 106–16.
- Anderson, James E., and Eric van Wincoop. 2003. Gravity with Gravitas: A Solution to the Border Problem. *American Economic Review* 93, no. 1: 170–92.
- Andrianmananjara, Soamiely. 2000. Regionalism and Incentives for Multilateralism. *Journal of Economic Integration* 15, no. 1: 1–18.
- Baier, Scott L., and Jeffrey H. Bergstrand. 2002. On the Endogeneity of International Trade Flows and Free Trade Agreements. Department of Economics, Clemson University, South Carolina, and University of Notre Dame, Indiana.
- Baldwin, Richard. 1995. A Domino Theory of Regionalism. *NBER Working Paper* 4364. Cambridge, MA: National Bureau of Economic Research.
- Baldwin, Richard E., and A. J. Venables. 1995. Regional Economic Integration. In vol. 3 of *Handbook of International Economics*, ed. Gene Grossman and Kenneth Rogoff. Amsterdam: Elsevier.
- Bergsten, C. F. 2002. A Renaissance for US Trade Policy? *Foreign Affairs* 81, no. 6: 86–98.
- Bergstrand, Jeffrey H. 1985. The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence. *Review of Economics and Statistics* 67, no. 3 (August): 474–81.
- Bergstrand, Jeffrey H. 1989. The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade. *Review of Economics and Statistics* 71, no. 1 (February): 143–53.
- Burfisher, Mary E., Sherman Robinson, and Karen Thierfelder. 2003. Regionalism: Old and New, Theory and Practice. Paper presented at the conference Agricultural Policy Reform and the WTO: Where Are We Heading? sponsored by the International Agricultural Trade Research Consortium (IATRC), Capri, Italy (June 23–26).
- Deardorff, Alan V. 1998. Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World? In *The Regionalization of the World Economy*, ed. Jeffrey A. Frankel. Chicago: University of Chicago Press.
- DeRosa, Dean A. 1998. Regional Integration Arrangements: Static Economic Theory, Quantitative Findings, and Policy Guidelines. *Policy Research Working Paper* 2007. Washington: World Bank. Available at [www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2007/wps2007.pdf](http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2007/wps2007.pdf) (August).
- DeRosa, Dean A. 2003. Gravity Model Calculations of the Trade Impacts of US Free Trade Agreements. Background paper prepared for the conference Free Trade Agreements and US Trade Policy, sponsored by the Institute for International Economics, Washington (May 7–8).
- Dimaranan, B., and R.A. McDougall. 2002. Global Trade, Assistance, and Protection: The GTAP5 Database. Center for Global Trade Analysis, Purdue University, West Lafayette, IN.
- Frankel, Jeffrey A. 1997. *Regional Trading Blocs in the World Economic System*. Washington: Institute for International Economics.
- Fukase, Emiko, and Will Martin. 2001. A Quantitative Evaluation of Vietnam’s Accession to the ASEAN Free Trade Area. *Journal of Economic Integration* 16, no. 4: 545–67.

- Gilbert, John. 2003. CGE Simulations of US Bilateral Free Trade Agreements. Background paper prepared for the conference Free Trade Agreements and US Trade Policy, sponsored by the Institute for International Economics, Washington (May 7–8).
- Gilbert, John, and T. Wahl. 2002. Applied General Equilibrium Assessments of Trade Liberalization in China. *World Economy* 25, no. 5: 697–731.
- Greenaway, David, and Chris Milner. 2002. Regionalism and Gravity. *Scottish Journal of Political Economy* 49, no. 5: 574–85.
- Harberger, Arnold C. 1971. Three Basic Postulates for Applied Welfare Economics. *Journal of Economic Literature* 9, no. 3: 785–97.
- Helpman, Elhanan, and Paul R. Krugman. 1985. *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy*. Cambridge, MA: MIT Press.
- Hertel, Thomas W., ed. 1997. *Global Trade Analysis: Modeling and Applications*. Cambridge: Cambridge University Press.
- Krugman, Paul R. 1995. Increasing Returns, Imperfect Competition, and the Positive Theory of International Trade. In *Handbook of International Economics* (vol. 3), ed. Gene Grossman and Kenneth Rogoff. Amsterdam: Elsevier.
- Lawrence, Robert Z. 1996. *Regionalism, Multilateralism, and Deeper Integration*. Washington: Brookings Institution.
- Lipsey, Richard G. 1970. *The Theory of Customs Unions: A General Equilibrium Analysis*. London: Weidenfeld and Nicolson.
- Lloyd, P. J. 1982. 3x3 Theory of Customs Unions. *Journal of International Economics* 12: 41–63.
- Meade, James E. 1955. *The Theory of Customs Unions*. Amsterdam: North-Holland Publishing.
- Mikesell, Raymond F. 1963. The Theory of Common Markets as Applied to Regional Arrangements among Developing Countries. In *International Trade in a Developing World: Proceedings of a Conference Held by the International Economic Association*, ed., R. Harrod and D. Hague. New York: St. Martin's Press.
- Panagariya, Arvind. 1999. The Regionalism Debate: An Overview. *World Economy* 22, no. 4: 477–511.
- Panagariya, Arvind. 2000. Preferential Trade Liberalization: The Traditional Theory and New Developments. *Journal of Economic Literature* 38, no. 2: 287–331.
- Pomfret, Richard. 1988. *Unequal Trade: The Economics of Discriminatory International Trade Policies*. Oxford: Basil Blackwell.
- Robinson, Sherman, and Karen Thierfelder. 2002. Trade Liberalization and Regional Integration: The Search for Large Numbers. *Australian Journal of Agricultural and Resource Economics* 46, no. 4: 585–604.
- Robson, Peter. 1987. *The Economics of International Integration*. London: Unwin Hyman.
- Rose, Andrew K. 2003. Which International Institutions Promote International Trade? Haas School of Business, University of California, Berkeley. Photocopy.
- Schiff, Maurice, and L. Alan Winters. 2003. *Regional Integration and Development*. Washington: World Bank.
- Scollay, Robert, and John Gilbert. 2000. Measuring the Gains for APEC Trade Liberalization: An Overview of CGE Assessments. *World Economy* 23, no. 2: 175–93.
- Viner, Jacob. 1950. *The Customs Union Issue*. New York: Carnegie Endowment for International Peace.

