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Estimates from Gravity and Computable General Equilibrium Models

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Quantitative assessments of the trade expansion and income gains fostered by a US-Indonesia FTA require detailed consideration of the economic structure and multilateral trade patterns of both countries. We use both gravity and computable general equilibrium (CGE) models. Our gravity model is an augmented version of Andrew Rose's (2004) framework, but whereas Rose analyzed total merchandise trade between multiple partner countries, we examine disaggregated merchandise trade. We also incorporate more extensive information about regional trade agreements (RTAs) than Rose originally considered. Our CGE model uses the comparative static framework of world trade and economic activity designed by the Global Trade Analysis Project (GTAP), which disaggregates world merchandise trade by sectors and also—unlike the gravity model—covers world trade in services.

We use two models to estimate the effects of a US-Indonesia FTA to improve our confidence in the general tenor of the results. The gravity model is grounded in the empirical tradition of trade analysis, and the CGE model rests foremost on theoretical foundations. Hence, each model is a check on the other. The basic features and results of our gravity and CGE models are described in the sections that follow. Appendix A provides further technical details.

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Gravity Model: Construction and Results

With the proliferation of preferential trading arrangements during the last decade, the gravity model has become a widely utilized tool for analyzing the consequences of bilateral agreements and RTAs.[1] The basic gravity model evaluates thousands of two-way bilateral trade flows, measured in a common currency and adjusted for inflation, against the gravitational mass of explanatory variables describing the characteristics of bilateral trading partners. The core variables are distance and joint real GDP.[2] Nearly all gravity models find that two-way trade between countries is significantly greater the larger the countries' combined GDP, and the shorter the distance between them. Of greater interest are the additional variables showing how much two-way trade expands or contracts from the quantity predicted by the basic core variables on account of the partners' institutional or policy features. Trading partners that share a common border, a common language, or a common currency are typically found to enjoy significantly greater mutual trade.

To analyze RTAs, we introduce a dichotomous (0, 1) explanatory variable called a dummy variable to represent preferential arrangements, individually or combined. If the coefficient on the dummy variable is positive and significant, then the regional trading arrangement is judged to expand mutual two-way trade between the arrangement members. The extent of trade expansion is usually measured in percentage terms. The percentage trade expansion can be derived from the estimated coefficient on the dummy variable. Given the log-linear specification of the gravity model regression equation,[3] the impact of an FTA on bilateral trade can be computed in percentage terms as $100*[exp(b_{rta}) - 1.00]$. In our expression, b_{rta} is the estimated coefficient for the dummy variable representing the presence of an RTA, and $exp(b_{rta})$ is the value of the natural number **e** raised to the exponent b_{rta}, so that if the coefficient b_{rta} is 0.33, then the value of $exp(b_{rta})$ is

1. David Greenaway and Christopher Milner (2002) provide an excellent introduction to and review of the recent literature on the gravity model and its econometric applications for assessing the trade and other consequences of preferential trading arrangements among regional trading partners.

2. A third core variable is joint GDP per capita. A higher joint GDP per capita figure implies a smaller joint population figure for a given joint GDP level. A smaller combined population tends to depress the bilateral level of trade; hence the coefficient on joint GDP per capita is frequently negative. However, some gravity model investigators consider joint GDP per capita to be a proxy for accumulated physical and human capital, expecting that the coefficient on this variable in the regression equation would be positive.

3. In a log-linear regression equation, the dependent variable—here, two-way bilateral trade—is expressed in logarithmic terms. Some independent variables, such as the discrete dummy variables, are expressed simply as linear numbers (e.g., 0 or 1). Others, such as the continuous variables for distance or joint GDP, are expressed in logarithmic terms.

1.39 and the percentage expansion in trade is estimated as 100*[1.39 – 1.00], or 39 percent.

US-Indonesia FTA Analytical Framework

We investigate the potential for expansion of US-Indonesia trade under a FTA following the approach of Jeffrey Frankel (1997) and Inbom Choi and Jeffrey Schott (2001), among others, using the general framework of the abovementioned Rose (2004) gravity model. Our approach represents the existing RTAs on a combined basis, circa 2000, as reported to the World Trade Organization (WTO). It also tries to account for the possibility that the existing level of US-Indonesia trade is significantly higher or lower than the level that the basic explanatory variables of the gravity model predict in the absence of a FTA.

Our econometric results are based on bilateral trade flows worldwide from 1962 to 1999, compiled by Feenstra et al. (2005) and originally disaggregated according to the four-digit Standard International Trade Classification (SITC). For the present analysis, the Feenstra et al. trade data were aggregated to the one-digit SITC level and deflated by the US consumer price index. They were then concorded, by year and country pair, to the extensive set of explanatory variables compiled for the Rose (2004) gravity model.[4] The core explanatory variables in the Rose dataset include distance between trading partners, joint real GDP, and joint real GDP per capita. The Rose dataset also includes a number of country-specific variables, such as landlocked or island status, languages spoken, dates of independence, and variables indicating past colonial relations.[5] Using the augmented Rose gravity model, the dataset constructed for the present analysis entails nearly 940,000 observations, covering bilateral trade for about 61,000 combinations of commodities and pairs of trading countries.[6]

To the core explanatory variables are added dummy variables representing bilateral, regional, and other preferential trading arrangements. These include an explanatory variable representing the generalized system of preferences (GSP).[7] Whereas Rose (2004) treated RTAs on a combined basis, cov-

4. The regression variables constructed from the Feenstra-Lipsey and Rose datasets are described in appendix table A.1.

5. See table A.1 in appendix A for a description of the regression variables.

6. Notwithstanding its large size, the combined Feenstra-Lipsey and Rose dataset has some gaps and excludes Taiwan and some centrally planned economies because of holes in the two datasets individually.

7. Under the GSP system, a number of advanced countries extend preferences to less developed countries on a nonreciprocal basis. The GSP programs of major industrial and other countries are monitored by the UN Conference on Trade and Development (UNCTAD), including through a series of manuals describing the individual programs. See UNCTAD (2004).

ering just 10 RTAs around the world,[8] we utilize official information about trade agreements notified to the WTO (Crawford and Fiorentino 2005) to represent 60 bilateral agreements and RTAs spanning the gravity model estimation period from 1962 to 1999.[9] The RTAs are represented by three independent RTA variables covering: the European Union itself and 8 RTAs to which the European Union is a party, plus 2 RTAs to which the United States is a party (the US-Israel FTA and NAFTA); 10 RTAs organized by other high-income countries; and 39 RTAs organized solely among middle-income countries and low-income countries.[10] This treatment of recent bilateral agreements and RTAs enables us to estimate different gravity model coefficients for their impact on bilateral trade, according to whether the European Union or the United States is a party, the pact includes other (smaller) high-income countries, or the pact is solely among middle-income or low-income countries. The reasons for these distinctions are twofold. First, a group that includes either of the two giant economies—the European Union or the United States—could plausibly inspire a larger percentage change in trade than a grouping that includes a smaller high-income economy, such as Australia or Sweden. Second, a group that includes only middle-income or low-income countries might emphasize diplomatic accommodation over economic liberalization and thus exert a smaller percentage impact on trade.

In addition to Rose's set of explanatory variables, our calculations specify two US-Indonesia trade integration and openness variables. Actual trade integration between Indonesia and the United States is captured by a dummy variable for trade between the two countries, as if an FTA were already in place. Indonesia and US openness are measured by separate dummy variables, one for each country. The dummy variable takes the value of one each time Indonesia or the United States is a trading partner with any other country in the world, so the estimated coefficients for these openness variables suggest the degree to which Indonesian or US trade with the world is greater or less than the norm established by the core gravity-model variables and other variables included on the right-hand side of the gravity equation.

Finally, due to concerns about the adverse impact of corruption on commercial ties, we include an explanatory variable representing the sentiments

8. The Rose dataset includes dummy variables with a value of one for 10 prominent RTAs: the Association of Southeast Asian Nations (ASEAN), European Union, US-Israel FTA, North America Free Trade Agreement (NAFTA), Caribbean Community (Caricom), Agreement on Trade and Commercial Relations between the Government of Australia and the Government of Papua New Guinea (Patcra), Australia-New Zealand Closer Economic Relations Trade Agreement (Anzcerta), Central American Common Market (CACM), South Pacific Regional Trade and Economic Cooperation Agreement (Sparteca), and the Southern Cone Common Market (Mercosur).

9. According to Jeffrey Schott (2004), by May 2003 some 155 bilateral agreements and RTAs had been notified to the WTO under Article 24 of the General Agreement on Tariffs and Trade (GATT).

10. The majority of the agreements included in the third RTA variable are bilateral agreements and RTAs among small developing countries and among the newly independent states of Eastern Europe. See Crawford and Fiorentino (2005) and appendix A.

of foreign firms toward doing business, not only in Indonesia, but also in up to 50 other countries worldwide, as measured by the Corruption Perceptions Index, published since 1995 by Transparency International (TI).[11] The explanatory variable appears as a joint corruption perceptions variable in the Rose gravity model dataset. It is formed by the product of logarithmic TI scores for business integrity in each country covered by the TI published data from 1995 to 1999. In this version of the model, the greater is the perceived integrity of business transactions in the two trading countries, as measured by a higher joint TI index of integrity rankings, the greater is the expected level of their mutual trade.[12]

Results from the Gravity Model

Tables 8A.1 and 8A.2 present the regression results for overall trade (SITC 0 through 9) and for trade by major commodity categories: food, beverages, and tobacco (SITC 0 and 1), raw materials (SITC 2 and 4), mineral fuels and lubricants (SITC 3), and manufactures (SITC 5 through 8). Regression coefficients are presented for the overall period from 1962 to 1999 and for two subperiods, 1990 to 1999 and 1995 to 1999. The two subperiods correspond to the decade of the 1990s and the post–Uruguay Round period, respectively.

Three sets of gravity model estimates appear in tables 8A.1 and 8A.2. Following Rose (2004), we base our discussion principally on the estimates obtained by the so-called robust standard errors (RSE) approach, which uses the familiar method of ordinary least squares (OLS) but computes standard errors of the regression estimates that account for possible heteroskedasticity (i.e., nonuniformity) of the regression error terms—thereby accounting in a rudimentary way for the possible influence of unobserved variables.

A common problem in estimating gravity models is the possible presence of unobserved explanatory variables. Failure to account for these missing variables can lead to unreliable parameter estimates (see Hsiao 2003). The RSE approach is one way to deal with unobserved variables; another and better-known procedure is the random effects (RE) method, reported in our second set of coefficient estimates. However, the conditions for successfully applying the RE method are not always satisfied, leading to biased estimates for the regression coefficients when one or more observed explanatory variables are correlated with the RE variable.

11. For more information on the index, see Transparency International's Web site, www.transparency.org.

12. Given the limited number of countries covered by the TI rankings, bringing the joint TI index as an explanatory variable into the Rose gravity model cuts in half the number of observations available for estimating the model's parameters for the subperiod 1995–99. As seen in tables 8A.1 and 8A.2, adding the joint TI index also requires dropping two explanatory variables—common country and currency union—from the estimating equation for 1995–99 because the two dropped variables are collinear in the reduced sample, creating econometric problems.

A recent estimation procedure developed by Thomas Plumper and Vera E. Troeger (2004) provides the basis for our third set of gravity model estimates. The Plumper and Troeger procedure attempts to overcome the shortcomings of the RE estimation, and other procedures as well, by minimizing the covariance of observed explanatory variables with the RE variable.

The discussion here focuses mainly on the RSE estimates, but it should be noted that the coefficient estimates for important explanatory variables vary sharply among the three sets of parallel econometric results in tables 8A.1 and 8A.2. In each case, we include among the summary regression statistics the results of applying the so-called Hausman (1978) specification test. The Hausman test assesses the difference between coefficient estimates for the time-variant explanatory variables in the gravity model—mainly, joint real GDP, joint real GDP per capita, the three RTA variables, and the joint TI index—and unbiased coefficient estimates for the same variables found using a straightforward OLS procedure.[13] If the Hausman test statistic is significant when the estimates for the time-variant variables differ sharply from the unbiased OLS estimates, then the estimates for both the time-variant variables and the time-invariant variables must be considered biased and possibly unreliable. Tables 8A.1 and 8A.2 show that both the RSE and RE regressions everywhere fail the Hausman test, while the Plumper and Troeger regression coefficients are inherently designed to pass the same statistical test. Estimation bias may thus go some way toward explaining the wide differences in coefficient estimates observed in the tables for such key explanatory variables as joint GDP, the RTA and openness indicator variables, and the joint TI index.

Nevertheless, we base our discussion here principally on the RSE estimates because they figure prominently in the gravity model literature (Rose 2004) and avoid some of the extreme and implausible findings of the Plumper and Troeger estimates. To cite two examples, the Plumper and Troeger coefficients suggest that US and EU RTAs exercised no influence on bilateral trade flows during the subperiod from 1990 to 1999, but that US openness during the post–Uruguay Round period enhanced US trade by a factor of 25.

By contrast, our RSE coefficient estimates for both total and disaggregated trade accord with widely reported gravity model coefficients. The core explanatory variables, led by distance, joint real GDP, and joint real GDP per capita, bear the anticipated signs and are generally significant at high levels. Bilateral trade is positively related to the joint GDP of the partner countries and negatively related to the distance between them. Similarly, countries sharing a common border tend to trade significantly more with one another, and landlocked countries tend to trade significantly less than do countries that are not landlocked. The influence on bilateral trade of a higher

13. This approach is known as the least squares dummy variable (LSDV) method. It involves finding the first difference of the time series regression equation (resulting in the elimination of time-invariant explanatory variables) and then applying the familiar method of OLS estimation. See Hsiao (2003).

joint TI index, reflecting greater joint integrity in business dealings, is widely positive and significant. Mineral fuels are an exception, reflecting the strong cross-country correlation between oil, wealth, and corruption.

The overall explanatory power of our gravity model, using disaggregated bilateral trade data from the Feenstra et al. dataset (R-squared generally about 0.30–0.40), is appreciably lower than found by Rose (2004) using aggregate bilateral trade data (R-squared 0.50–0.60). An exception, however, is the impressive explanatory power of the regression results in table 8A.2 for manufactures (R-squared 0.60 and higher).

Gravity model studies by Rose (2004) and other previous investigators, using aggregate bilateral trade, frequently report estimated coefficients near unity for an RTA variable that represents about 10 strong RTAs combined. By contrast, in our analysis, the estimated coefficients for our three RTA variables, distinguished by the character of partner countries, are usually less than 0.50, and there appears to be a general decline in the coefficients during the 1990s, according to the RSE estimates. For the EU and US RTAs in the late 1990s, the estimated RTA coefficients decline to about 0.10 for total trade and trade in raw materials and manufactures; the estimated coefficient for trade in agriculture remains above 0.50. The coefficient estimates for the middle income– and low income–country RTA variables are often negative and significant for 1990 to 1999, especially for manufactures, suggesting that the agreements were not economically robust during much of the 1990s.

The coefficient of the openness variable for Indonesia in the gravity model reports the extent to which Indonesia's actual trade deviates from the levels predicted by the standard variables in the gravity model for an imaginary country with almost identical conditions as Indonesia—that is, the same GDP, distance from markets, and common among other variables. The only difference is that the imaginary Indonesia trades with its partners to the average extent predicted by all of the right-hand side variables in the gravity equation except the openness term.

Indonesia's openness term indicates that the country's actual trade falls mainly within the bounds of the average benchmark that the model establishes for total trade during from 1962 to 1999 but significantly above the average during the 1990s (0.32) and the post Uruguay Round period (0.59). Similar patterns appear for Indonesia's trade in raw materials, manufactures, and especially mineral fuels, a prime component of the country's exports. In agriculture, however, the estimates for Indonesia's open term do not indicate that Indonesia's trade is significantly different from the benchmark for any period considered in the analysis.

Estimated coefficients for the US-Indonesia trade integration variable on a sector-by-sector basis (table 8A.2) are significant mainly for mineral fuels and manufactured products, indicating that bilateral trade may already exceed the international norm for these two important trade categories. However, the estimation suggests that US-Indonesia trade integration deteriorated during the post–Uruguay Round period, for both

trade in individual sectors and overall trade. This weakening of trade integration between the two countries contrasts with the general openness to trade found by the gravity model for both countries and might indicate a basis for expanding trade under an US-Indonesia FTA, not only in manufactures but also raw materials and possibly agricultural products.

The implications of the positive and significant estimates for the joint TI index deserve additional consideration. The mean value of this explanatory variable is substantially lower for bilateral trade involving Indonesia (2.32) than for trade involving other country pairs (3.21). This implies that poor business practices in Indonesia significantly reduce Indonesia's trade with the United States and other countries. Based on the joint TI index coefficient estimate of 0.61 for overall trade from 1995 to 1999 (table 8A.1), the so-called integrity burden on Indonesia's trade, compared with the world norm, can be calculated at 100*(0.61)*(3.21 – 2.32), or around 54 percent. In other words, Indonesia's business practices might result in 54 percent lower trade for the country than would otherwise be the case. If the US-Indonesia FTA contributes to better business practices in Indonesia, ultimately raising them to the global norm, then Indonesia might enjoy an integrity dividend of 54 percent in its trade, with other trading partners as well as the United States.

Table 8A.3 reports the bilateral trade expansion effects implied by the positive and significant coefficient estimates for the EU and US RTAs variable in tables 8A.1 and 8A.2.[14] The simple average column weighs equally the coefficients estimated for each of the overlapping periods. Based on the simple average percentage expansion for total trade, it appears that overall US-Indonesia merchandise trade might expand under an FTA by a central estimate of about 42 percent, holding all other factors constant. Analogously, it appears that agriculture and manufactures two-way trade might expand by substantially more than 100 percent and somewhat more than 40 percent, respectively.[15]

However, taking guidance solely from the post–Uruguay Round period (1995–99), an FTA with the United States or the European Union as a partner might be significantly less expansionary: a 14 percent increase for total trade, a 68 percent gain for agricultural trade, and a boost of only 9 percent for manufactures trade.

An overall expansion of bilateral trade between Indonesia and the United States on the order of just 14 percent might be deemed disappoint-

14. The figures in the tabulation are based on regressions that include the dummy variables for US-Indonesia trade integration and openness. However, as mentioned, the dummy variables make very little difference to the RTA coefficients. In this table, the implausible negative estimated values for the coefficients of the EU and US RTAs variable for trade in fuels are treated as zero.

15. The trade expansion estimates for agriculture have not been adjusted to exclude US-Indonesia trade in either rice or sugar, which are highly protected and politically sensitive in both countries and are not expected to be covered in the proposed FTA. These two foodstuffs presently account for little more than one percent of agricultural trade between the two countries.

ing. However, this projection does not include the expansion of bilateral trade that improving business practices in Indonesia could induce. Additionally, it does not account for the influence of possible expansion of bilateral investment flows under the proposed US-Indonesia FTA and the further inducement to bilateral trade such expanded investment flows could motivate. A great deal of bilateral trade expansion could be induced by a leap in bilateral foreign direct investment (FDI), as chapter 7 suggests.

CGE Model: Construction and Results

CGE models are numerical models based on general equilibrium theory, built to turn the abstract models of the theory into a practical tool for policy analysis. A number of features distinguish CGE models from other widely used tools of trade policy analysis, such as partial equilibrium and gravity models. They are multisectoral, in many cases multiregional, and the behavior of economic agents is modeled explicitly through utility and profit maximizing assumptions. Economy-wide resource and expenditure constraints are rigorously enforced. Distortions in an economic system will often have repercussions beyond the sector in which they occur. By linking markets into a single system, CGE techniques effectively capture relevant feedback and flow-through effects associated with changes in trade policy. CGE simulation has become a widely accepted tool of trade policy analysis and is particularly well suited to examining proposed free trade arrangements in which multisectoral reform is to be undertaken in at least two economies simultaneously and the potential second-best consequences of the discriminatory aspect of the trade reform are well known (see Panagariya 2000).

Against these significant advantages, CGE models are also highly data intensive and subject to uncertainties of specification, experimental design, and parameterization. Hence, it is important to evaluate CGE simulation results carefully and undertake sensitivity analysis. For recent surveys on applying CGE models to regional trade negotiations, see Scollay and Gilbert (2000), Scollay and Gilbert (2001), Gilbert and Wahl (2002), Robinson and Thierfelder (2002), and Lloyd and MacLaren (2004).[16]

The present CGE model was simulated using the abovementioned GTAP model, which is publicly available, in widespread use, and has a structure typical of many CGE models. The GTAP model is a multiregion, multisector model that assumes perfect competition and constant returns to scale.

16. Vanzetti, McGuire, and Prabowo (2005) use a general equilibrium model to assess trade and welfare implications of a series of scenarios concerning trade policy options available to Indonesia (standstill, unilateral trade liberalization, bilateral FTA with the United States, deepening of ASEAN plus 3, and multilateralism). Their results are in line with the ones presented in this study, except that they anticipate a net negative welfare effect while our results predict a net positive welfare effect.

Aspects of the GTAP model are fully documented in Hertel (1997) and the GTAP Web site (www.gtap.org).

Experimental Design

The basic simulation design mirrors that used in DeRosa and Gilbert (2004). The proposed US-Indonesia FTA is first simulated independently of the existence of other potential agreements, and the results thus reflect the estimated effect of the proposal in isolation. In all cases, the arrangements are assumed to be implemented clean, meaning that the participating economies reduce all import tariffs to zero on a preferential basis. All other tariffs, such as those applied to nonparticipating economies, are left in place. The tariffs used are those in place in 2001, the base year for this analysis. Services protection, implemented in the base data as described above, is also assumed to be removed.

Because of the potential sensitivity of the rice and sugar sectors in a US-Indonesia FTA, we also run the analysis with these two sectors excluded from the agreement. Under this scenario, the tariff levels on those products in the base year are assumed to remain in place.

To provide a benchmark for the implications of bilateral free trade areas, as opposed to other forms of liberalization, we also consider unilateral trade reform scenarios in Indonesia and the United States. In these scenarios, each economy is assumed to unilaterally remove all tariffs on a nondiscriminatory basis. As above, the tariffs are at 2001 rates, and the unilateral reform is considered in each economy independently—that is, other countries do not respond to the reform. These results are presented alongside the free trade area estimates.

Finally, we consider an all-partners experiment in which the proposed US-Indonesia agreement is implemented simultaneously with other current and prospective US FTAs expected to be in force by 2005, with the United States as the FTA hub.[17] In the experiment with all free trade areas, it is assumed that the agreements are implemented simultaneously with the United States only. That is, we do not consider preferential liberalization among the proposed partner regions or recent or potential Indonesian FTAs

17. Based on the current list of US Trade Representative notifications to Congress and the availability of data in GTAP6, the list of agreements in the all partners scenario is US-Singapore, US-Australia, US-Morocco, US–Southern African Customs Union, Central American Free Trade Agreement–Dominican Republic (CAFTA-DR), US-Thailand, US-Pakistan, US-Chile, US-Malaysia, and US-Korea. Because the CAFTA-DR dataset in the GTAP is based largely on externally constructed aggregate data, the results for this region should be interpreted cautiously. Similarly, Pakistan is not identified directly in the database, but instead is grouped in the "rest of South Asia" category, composed of Pakistan, Maldives, and Bhutan. Pakistan is by far the dominant member of the category, with roughly 85 percent of the region's GDP, so we have treated the results for this region as approximating the effects for Pakistan.

with third partners. We also consider excluding the two sensitive sectors from the US-Indonesia agreement under this scenario.

All of the simulations are run as comparative statics. The factor market closure allows full mobility of capital and labor, both skilled and unskilled, across domestic activities; hence, the implicit time period is the long-run (typically this closure is regarded as corresponding to a 10–12 year adjustment period). However, the adjustment path is not directly modeled. Land is treated as imperfectly mobile across agricultural activities, and natural resources are assumed to be specific factors.

Results of the CGE Model

The first set of tables (8A.4 through 8A.8) describe the estimated effect of a US-Indonesia FTA in isolation, simulated from the original database as detailed in the section above. Table 8A.4 summarizes the data for several key economywide variables. Some of the data are replicated and expanded in subsequent tables. The first four columns present results for the United States; the next four give results for Indonesia. The first of the three columns allocated to each economy presents the initial values in millions of US dollars at 2001 prices for the relevant economic variable, as contained in the GTAP6 database. Subsequent columns present the estimated change in the same variable under the free trade area, free trade area with sugar and rice excluded, and unilateral reform scenarios, respectively. Export and import changes are given as percentages, evaluated at world prices. Tariff revenue and equivalent variation (EV) estimates are presented as changes in millions of 2001 US dollars.

We first consider the standard scenario of eliminating all tariff barriers on a bilateral basis. In this scenario, the proposed FTA is expected to significantly increase total trade between Indonesia and the United States. The total value of bilateral exports from Indonesia to the United States increases by an estimated 45 percent, while the value of bilateral exports from the United States to Indonesia increases by an estimated 25 percent. For the United States, the increase in Indonesian imports does not come at the expense of a significant drop in nonpartner trade, which is not surprising given the relatively small trade flows from the US perspective. For Indonesia, there is a stronger shift in exports toward the United States and away from other countries—approximately a 5 percent decrease in non-US exports. However, we estimate a small increase in Indonesian imports from other countries of around 3 percent.

Tariff revenue changes are presented both in terms of total revenue change and the changes in revenue obtained from partner and nonpartner sources. These figures directly indicate the revenue consequences of the proposed FTA. The breakdown into two components extends the approach of Emiko Fukase and Will Martin (2001) for examining the trade diversion

consequences of preferential reform. The loss in revenue from the trading partner reflects the fall in the tariff rate applied to the goods being liberalized under the FTA. The change in the nonpartner revenue indicates falls in the volume of trade flows not being liberalized, suggesting trade diversion. For the US-Indonesia FTA, the change in nonpartner revenue is negative for the United States but positive for Indonesia, likely reflecting the increase in national income that an FTA implies for Indonesia; some of that income is spent on imports from nonpartner sources.

The EV measure indicates changes in economic welfare associated with the new trade policy, representing the change in income at constant prices that is equivalent to the proposed policy change. To indicate 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 measure is further decomposed into allocative efficiency and terms-of-trade effects. Allocative efficiency effects measure the economic implications of reallocating resources across activities of consumption, production, and trade. The greater the distortions in the economy, the greater the potential allocative efficiency effects of policy reform, both direct and indirect. Terms-of-trade effects measure the implications of changes in the prices that the economy faces 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 also indicate trade diversion, as the changes in trading prices reflect reduced imports by members from nonmember sources. Strong positive terms-of-trade effects within members can reflect both improvement vis-à-vis nonmembers and the effects of improved access to partner markets through preferential access.

The estimates suggest that the proposed free trade area would result in a small welfare loss for the United States, negligible to its GDP. Indonesia, however, stands to gain notably in both absolute and relative terms ($909 million, or roughly 0.6 percent of GDP, a typical effect for this class of model). In the unilateral reform scenario, the United States suffers a small welfare loss of 0.1 percent of GDP and Indonesia gains $231 million, or 0.2 percent of GDP. Both cases reflect the effects of deterioration in the terms of trade.[18] In other words, if terms-of-trade effects are as important as the CGE framework implies, then the bilateral FTA delivers a better economic outcome for both partners than does unilateral liberalization.[19]

The welfare implications of excluding sensitive items from an FTA are theoretically unclear. Robert Scollay and John Gilbert (2001) argue that

18. The assumed values of the Armington elasticities are important here. In general, higher Armington elasticities lead to greater effects on allocative efficiency and smaller effects on terms of trade for a given increment in the volume of trade.

19. The CGE framework does not envisage economies of scale, imperfect competition, or the possibility that a country might diversify its export menu as it increases the volume of exports. All of these factors would diminish the extent of terms-of-trade loses.

excluding agriculture from a proposed Japan-Korea FTA would actually improve welfare more than including the sector would. The reasoning is that sensitive sectors are often highly protected because they are inefficient, and though high protection is often interpreted as large but unrealized potential trade creation, inefficiency among potential members could lead to trade diversion instead. For the US-Indonesia FTA, excluding the sugar and rice sectors may not have a strong impact: Excluding them reduces the predicted volume of overall trade expansion and the overall welfare gains, but according to the GTAP model, the reductions are negligible.[20]

Table 8A.5 presents the welfare (EV) predictions of the simulations for all of the identified regions in the model. This allows us to see which other economies are likely to be hurt by a US-Indonesia FTA. While the proposed agreement improves net welfare at the world level, it would negatively affect economies that are close competitors with Indonesia, in particular China and several of Indonesia's ASEAN partners—the Philippines, Thailand, and Vietnam—though by small amounts relative to GDP.

Table 8A.6 shows the regional aspect of changes in the pattern of exports. The variables considered are the percentage change in the value of total exports to all countries and the percentage change in the value of exports to Indonesia and the United States, evaluated at world prices. The table assesses the potential trade diversion effects of preferential trade reform by directly observing changes in the regional trade pattern. For the United States, the partner economies that suffer trade diversion are mainly in Asia and South Asia—particularly China, Bangladesh, Sri Lanka, and Vietnam—though the effects are relatively small. For Indonesia, imports from nonmember economies actually increase across the board, though by much smaller margins than US-Indonesian trade. The figures at the regional level do not change significantly when sensitive items are excluded.

Trade reform will typically have differential impacts by sector, a key to understanding the potential domestic political-economy implications of the reform. Table 8A.7 presents the estimated sectoral effects of the proposed US-Indonesia FTA, expressed as the percentage change in the value of exports, evaluated at world prices relative to the baseline. The percentage change in both total export value and the value of exports to the FTA partner are presented in the FTA scenarios. The table suggests the industries that are likely to gain or lose from preferential export access. While US exports are not much affected by the proposed FTA, in percentage terms,

20. Throughout this chapter "sugar" refers mostly to raw and refined sugars and other sugars contained in HS chapter 17. By contrast, so-called "sugar" tariff rate quotas in previous FTAs (e.g., CAFTA-DR) were larger in scope and also affected sugar-based products such as chocolates (HS 1806), infant formula (HS 1901), preparations based on coffee (HS 2101), and "other food preparations" (HS 2106). Indonesia could eventually develop exports in some of these items. The impact of excluding rice could also be underestimated. The estimate is based on a tariff of 430 rupiah per kilogram in the GTAP model, whereas the current tariff is 700 rupiah per kilogram. However, US rice is not a competitive source for Indonesian imports.

significant bilateral expansion occurs in US exports of food products, textiles, wearing apparel, motor vehicles, and other manufactures. However, chemicals and machinery and equipment show the largest dollar increase in projected US export gains.[21] For Indonesia, the largest export increases are in textiles, wearing apparel, and leather- and rubber-based products. Exports of electronic equipment and other manufactures decline. Exports of services expand strongly from the United States to Indonesia by approximately 22 percent, but bilateral services exports from Indonesia to the United States decline by 4 percent.

When sensitive items are excluded from an FTA, we would generally expect smaller impacts on the excluded sectors because they do not face a direct price shock from liberalization. However, excluded sectors can experience indirect changes through changes in other prices in a general equilibrium system. Excluding sugar and rice from the proposed FTA sharply curtails US market penetration in those products, and vice versa. However, the exclusion does not have a substantial effect at the macroeconomic level.

Table 8A.8 presents sectoral changes, expressed as percentage changes in output volume relative to the initial value of output for each sector. For the United States, the proposed agreement would have only a minor effect on the production structure of the economy, with leather- and rubber-based products being the only sector in which the change exceeds 0.5 percent. As the much smaller partner, Indonesia faces much larger structural adjustments. The calculations suggest that the output of most manufacturing sectors would see small declines, with electronic equipment hit hardest (9 percent). Sharp increases in output of light manufactures—textiles, apparel, and leather- and rubber-based products—would absorb jobs lost in other sectors. This outcome is typical for developing economies, as they generally specialize in a narrow range of goods.

Evaluation of the All Partners Scenarios

As noted above, because the United States has recently negotiated several FTAs and is in the process of negotiating several more, it is important to consider how the proposed US-Indonesia FTA might interact with the other agreements. As in DeRosa and Gilbert (2004), we deal with this possibility by considering an "all partners" scenario, in which other recently approved US FTAs and the proposed US-Indonesia FTA are simulated together. Tables 8A.9 through 8A.13 present the results, which correspond to tables 8A.4 to 8A.8 considered above. Because we consider cases in which rice and sugar are excluded and not excluded, we present tables 8A.9 and 8A.13 in two parts.

When we account for the entire set of likely partners, the estimated benefits to the United States of pursuing the FTA agenda become significantly

21. Despite a lower calculated percentage increase, chemicals and machinery and equipment make up more than 55 percent of US manufactured exports to Indonesia.

larger at around $3.2 billion annually. For potential partners, however, the benefits of preferential access to the US market erode as more economies forge agreements with the United States. Hence, the estimated annual benefits to Indonesia fall from approximately $909 million to $776 million, or 0.55 percent of GDP. As above, excluding rice and sugar does not substantially change the results.

Summing Up

The calculations from the gravity and CGE models offer two useful views of the economic prospects of an US-Indonesia FTA that coincide in some respects. The two models concur in suggesting that the FTA would significantly expand bilateral two-way trade. The gravity model estimates the overall gain in mutual trade at about 42 percent; the GTAP model estimates gains at between 25 percent (US exports to Indonesia) and 45 percent (Indonesian exports to the United States), with an average increase of about 35 percent in bilateral two-way trade. Improved business practices in Indonesia, in concert with the proposed US-Indonesia FTA, might additionally expand Indonesia's overall trade by as much as 54 percent, with not only the United States but also other major trading partners. However, the models disagree regarding the sectors that stand to benefit from the FTA. The gravity model stresses gains in agriculture and raw materials, but the CGE indicates greater gains in manufactures and services and little trade stimulation in agriculture.

The general equilibrium estimates of the GTAP model provide additional insights. The CGE model finds only a negligible loss in economic welfare for the large US economy, but appreciable improvement for Indonesia, estimated at 0.6 percent of yearly GDP. It also points to particular sectors that would benefit from expanding bilateral exports. These include food products, textiles, and motor vehicles in the United States and apparel and leather products—balanced against declines in electronic equipment and other manufactures—in Indonesia.

Adverse spillover effects arising from trade diversion are small, as effects of appreciable magnitude are confined mainly to Indonesia's closest international competitors: China, Philippines, Thailand, and Vietnam. However, the adverse impacts are minor, generally less than 0.1 percent of the respective countries' GDPs.

Finally, the GTAP model results suggest that liberalizing services trade between Indonesia and the United States would lead to substantial expansion of US services exports to Indonesia, but a small decline in flows of services from Indonesia to the United States. Because the framework for the domestic and international service economy in the GTAP is still elementary, these results should be interpreted cautiously. A model with more sophisticated dynamic linkages between FDI and international trade in both goods and services might produce different results.

Appendix 8A

Table 8A.1 Robust standard errors (RSE), random effects (RE), and Plumper-Troeger (PT) estimates for total trade in the Rose gravity model, with US-Indonesia trade integration and openness variables, 1962–99

	1962–99			1990–99			1995–99		
	RSE	RE	PT	RSE	RE	PT	RSE	RE	PT
Constant	–23.00***	–17.88***	–21.54***	–19.25***	–5.96***	10.04***	–20.63***	–9.78***	26.21***
Distance	–0.76***	–0.81***	–0.84***	–0.68***	–0.79***	–0.79***	–0.73***	–0.79***	–0.85***
Joint GDP	0.69***	0.72***	0.99***	0.61***	0.52***	0.02***	0.72***	0.61***	–0.55***
Joint GDP per capita	0.23***	–0.07***	–0.42***	0.19***	–0.26***	0.01***	–0.13***	–0.39***	0.53***
Common language	0.23***	0.10***	0.30***	0.25***	0.12***	–0.11***	0.29***	0.14***	–0.24***
Common border	0.43***	0.51***	0.19***	0.74***	1.04***	0.87***	0.83***	1.12***	1.03***
Landlocked	–0.12***	–0.19***	–0.17***	–0.20***	–0.52***	–0.82***	–0.32***	–0.42***	–1.32***
Island	0.11***	0.09***	0.31***	0.16***	0.34***	0.38***	0.14***	0.44***	0.68***
Land area	–0.08***	–0.13***	–0.26***	–0.04***	–0.08***	0.13***	–0.06***	–0.06***	0.35***
Common colonizer	0.31***	–0.06**	–0.38***	0.24***	–0.11***	–0.25***	0.38***	0.02	–0.07***
Colony	1.17***	0.73***	0.68***	0.96	0.30*	0.08	0.83	0.18	0.06
Ever a colony	1.24***	1.78***	1.25***	0.79***	1.07***	1.16***	0.50***	0.85***	1.64***
Common country	–0.49	0.21	–0.09	–1.62**	–0.77	–0.39***	(dropped)	(dropped)	(dropped)
Currency union	0.97***	0.80***	0.81***	0.54**	0.67***	–0.47***	(dropped)	(dropped)	(dropped)
GSP	0.17***	–0.11***	–0.13***	–0.12***	0.27***	0.28***	–0.11***	0.05*	–0.11***

EU and US RTAs (11)	0.48***	0.12***	0.20***	0.40***	0.20***	0.00	0.13**	0.67***	0.16***
Other HIC RTAs (10)	1.09***	0.24***	0.16***	0.88***	0.34***	0.13***	0.11	0.37***	0.16***
MIC and LIC RTAs (39)	0.15***	0.55***	0.53***	–0.07**	–0.14***	0.14***	0.15***	–0.21***	0.23***
US-Indonesia trade	1.25**	1.58***	1.46***	1.20**	1.82***	2.05***	0.61	1.07*	1.02***
US openness	0.79***	1.50***	1.10***	0.58***	1.48***	1.96***	0.71***	1.44***	3.36***
Indonesia openness	0.07	–0.13**	–0.79***	0.32***	0.01	0.35***	0.59***	0.27***	1.08***
Joint TI index							0.61***	0.43***	–0.07***
R-squared	0.43	0.41	0.82	0.43	0.35	0.92	0.46	0.41	0.97
Hausman chi-squared	–2,717#	–29,040#		–16,927#	11,836***		4,462***	5,095***	
Observations (thousands)	940	940	940	263	263	263	64	64	64
Groups (thousands)	61	61	61	44	44	44	22	22	22

***, **, * indicate that the coefficient estimate is statistically significant at the 99, 95, and 90 levels, respectively.

# indicates model fails to meet asymptotic assumption of the Hausman test.

GSP = generalized system of preferences

HIC, MIC, LIC = high-, middle-, low-income countries, respectively

RTA = regional trade agreement

TI index = Transparency International's corruption index

Notes: Table shows estimates for total trade in all commodities and manufactures (SITC 0 through 9). Regressand is log real trade. Distance, joint GDP, joint GDP per capita, land area, and joint TI index are measured in log terms. Estimated year effects are not reported. Numbers in parentheses indicate how many RTAs are covered by the separate RTA variables. The Hausman chi-squared statistic provides tests whether the explanatory variables are correlated with unobservable random effects. Groups are numbers of country-pair-commodity combinations for which trade exists in the data sample.

Sources: Authors' calculations based on ordinary least squares and generalized least squares estimation of the Rose (2004) gravity model without random effects (RSE) and with random effects (RE, PT), using a combined version of the Rose (2004) and the Feenstra et al. (2005) datasets. RSE estimates follow Rose (2004). PT estimates are based on a multi-step estimation routine developed by Plumper and Troeger (2004).

Table 8A.2 Robust standard errors (RSE), random effects (RE), and Plumper-Troeger (PT) estimates for major commodity categories in the Rose gravity model, with US-Indonesia trade integration and openness variables, 1962–99

	1962–99			1990–99			1995–99		
Category	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**
Food, beverages, and tobacco (SITC 0 and 1)									
Constant	−16.13***	−12.52***	−16.45***	−13.09***	−2.67***	6.04***	−14.01***	−5.42***	21.98***
Distance	−0.59***	−0.67***	−0.66***	−0.45***	−0.64***	−0.63***	−0.55***	−0.62***	−0.80***
Joint GDP	0.52***	0.57***	0.83***	0.45***	0.40***	0.18***	0.53***	0.43***	−0.39***
Joint GDP per capita	0.15***	−0.11***	−0.43***	0.11***	−0.23***	−0.19***	−0.10***	−0.29***	0.36***
Common language	0.26***	0.14***	0.35***	0.27***	0.13**	0.00	0.32***	0.18**	−0.15***
Common border	0.55***	0.60***	0.37***	0.88***	1.07***	0.88***	0.95***	1.15***	0.97***
Landlocked	−0.26***	−0.24***	−0.30***	−0.26***	−0.49***	−0.72***	−0.38***	−0.46***	−1.23***
Island	0.16***	0.07*	0.34***	0.15***	0.30***	0.36***	0.13	0.37***	0.55***
Land area	−0.01	−0.07***	−0.19***	−0.01	−0.05***	0.05***	0.00	0.00	0.28***
Common colonizer	0.16*	−0.13**	−0.46***	0.17*	−0.17*	−0.41***	0.30	0.05	−0.22***
Colony	1.38***	0.50***	0.43***	1.55***	0.55	0.36*	1.40***	0.44	0.35
Ever a colony	1.48***	2.16***	1.46***	0.99***	1.37***	1.28***	0.81***	1.12***	1.77***
Common country	−0.32	0.95	0.47***	−2.21***	−0.81	−0.81***	(dropped)	(dropped)	(dropped)
Currency union	0.97***	0.80***	0.83***	1.00**	1.07**	0.43***	(dropped)	(dropped)	(dropped)
Generalized system of preferences	0.30***	−0.04***	−0.06***	0.08*	0.36***	0.20***	0.02	0.21***	−0.04***
EU and US RTAs (11)	1.06***	0.15***	0.21***	0.97***	0.12***	−0.10***	0.52***	0.61***	−0.09***
Other HIC RTAs (10)	1.00***	0.33***	0.25***	0.54*	0.37***	0.21***	−0.13	0.42**	0.18***
MIC and LIC RTAs (39)	0.05	0.32***	0.28***	−0.10	−0.19***	−0.02	−0.02	−0.27***	0.12***
US-Indonesia trade	0.79	1.30	0.99***	1.13	1.68	1.60***	0.52	0.93	0.73***
US openness	1.12***	1.77***	1.28***	0.74***	1.50***	1.77***	0.92***	1.48***	3.02***
Indonesia openness	−0.05	−0.33***	−0.87***	−0.15	−0.36***	−0.19***	0.29	0.00	0.72***
Joint TI index							0.54***	0.38***	−0.02

R-squared	0.36	0.33	0.82	0.36	0.28	0.91	0.40	0.37	0.97
Hausman chi-squared	–545#	678***		–3,019#	1,795***		307***	684***	
Observations (thousands)	194	194	194	53	53	53	13	13	13
Groups (thousands)	12	12	12	9	9	9	4	4	4
Raw materials (SITC 2 and 4)									
Constant	–17.98***	–15.84***	–27.58***	–13.67***	–5.26***	10.69***	–15.62***	–8.15***	37.11***
Distance	–0.55***	–0.59***	–0.67***	–0.41***	–0.50***	–0.48***	–0.53***	–0.56***	–0.55***
Joint GDP	0.58***	0.66***	1.25***	0.44***	0.39***	–0.15***	0.53***	0.45***	–1.24***
Joint GDP per capita	0.04*	–0.22***	–0.84***	0.10***	–0.20***	0.15***	–0.12***	–0.29***	1.23***
Common language	0.02	–0.09*	0.26***	0.06	–0.01	–0.22***	0.09	–0.02	–0.34***
Common border	0.30**	0.33***	0.12***	0.78***	1.00***	0.88***	0.86***	1.08***	1.20***
Landlocked	–0.19***	–0.18***	–0.08***	–0.27***	–0.44***	–0.82***	–0.48***	–0.45***	–1.67***
Island	0.14**	0.08*	0.37***	0.08	0.21***	0.21***	0.09	0.32***	0.32***
Land area	0.00	–0.08***	–0.33***	0.04***	0.00	0.24***	0.05***	0.04**	0.72***
Common colonizer	0.31***	–0.14**	–0.17***	0.53***	0.17*	0.06***	0.79***	0.37**	1.39***
Colony	0.52	0.42***	0.35***	0.06	0.09	–0.05	–0.07	0.16	0.08
Ever a colony	0.89***	1.24***	0.58***	0.43***	0.56***	0.72***	0.37*	0.61***	1.36***
Common country	–0.22	–0.21	–0.35**	–2.19	–1.70	–2.12***	(dropped)	(dropped)	(dropped)
Currency union	0.41**	0.76***	0.82***	–0.22	0.02	–1.18***	(dropped)	(dropped)	(dropped)
GSP	–0.02	–0.18***	–0.17***	–0.14***	0.04	–0.10***	–0.11	–0.02	0.04***
EU and US RTAs (11)	0.48***	0.05*	0.23***	0.40***	0.21***	0.03	0.10	0.46***	0.06***
Other HIC RTAs (10)	1.04***	0.21***	0.10**	0.65**	0.21**	0.00	–0.52	0.17	0.19**
MIC and LIC RTAs (39)	0.20***	0.53***	0.46***	0.12*	–0.01	0.10***	0.30***	–0.03	–0.07***
US-Indonesia trade	1.48	1.79	1.48***	1.64	2.21*	2.37***	0.90	1.27	1.04***
US openness	0.45***	0.96***	0.28***	0.24**	0.87***	1.32***	0.27	0.74***	2.64***
Indonesia openness	0.11	–0.02	–1.08***	0.44***	0.24**	0.69***	1.03***	0.84***	2.53***
Joint TI index							0.54***	0.39***	0.03**

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Table 8A.2 Robust standard errors (RSE), random effects (RE), and Plumper-Troeger (PT) estimates for major commodity categories in the Rose gravity model, with US-Indonesia trade integration and openness variables, 1962–99 *(continued)*

	1962–99			1990–99			1995–99		
Category	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**
R-squared	0.33	0.31	0.78	0.31	0.27	0.90	0.36	0.33	0.96
Hausman chi-squared	609***	–2,931#		–1,434#	1,035***		74***	458***	
Observations (thousands)	162	162	162	43	43	43	11	11	11
Groups (thousands)	11	11	11	7	7	7	4	4	4
Mineral fuels and lubricants (SITC 3)									
Constant	–13.93***	–10.03***	–4.96***	–8.73***	–1.93**	7.51***	–8.39***	–4.30***	20.98***
Distance	–1.23***	–1.05***	–1.21***	–0.98***	–0.88***	–1.02***	–1.33***	–1.10***	–1.20***
Joint GDP	0.37***	0.28***	0.14***	0.31***	0.25***	0.08***	0.46***	0.40***	–0.38***
Joint GDP per capita	0.54***	0.45***	0.56***	0.28***	0.05	0.00	0.07	–0.20***	0.40***
Common language	–0.12	–0.33***	–0.30***	–0.01	–0.08	–0.16***	0.28*	0.23	–0.04
Common border	0.05	0.49***	0.00	0.64***	1.10***	0.61***	1.11***	1.43***	1.38***
Landlocked	–1.59***	–1.33***	–1.75***	–1.40***	–1.30***	–1.62***	–1.52***	–1.14***	–1.97***
Island	0.51***	0.47***	0.49***	0.53***	0.58***	0.66***	0.86***	0.92***	1.14***
Land area	0.17***	0.19***	0.25***	0.18***	0.15***	0.21***	0.14***	0.14***	0.41***
Common colonizer	1.01***	0.75***	0.63***	1.40***	0.77***	0.92***	0.95*	0.67**	0.86***
Colony	0.38	0.73***	0.75***	0.22	–0.07	–0.24	0.70**	0.27	0.18
Ever a colony	0.94***	1.06***	1.00***	0.22	0.30	0.15***	0.44	0.46	0.94***
Common country	–0.68	–0.82	–1.23***	–1.91***	–1.24	–1.02	(dropped)	(dropped)	(dropped)
Currency union	0.08	0.70***	0.87***	–0.41	0.01	–0.71***	(dropped)	(dropped)	(dropped)
GSP	–0.56***	–0.35***	–0.23***	–0.44***	–0.29***	0.15***	–0.30**	–0.39***	0.15***
EU and US RTAs (11)	–0.37*	–0.39***	–0.42***	–0.14	–0.14*	–0.29***	–0.34*	0.16	0.00
Other HIC RTAs (10)	–0.73**	0.30**	0.34***	–0.11	–0.11	–0.28***	1.16**	0.54	0.03
MIC and LIC RTAs (39)	0.14	0.35***	0.38***	0.24	0.21*	0.50***	0.29	0.12	0.21***

US-Indonesia trade	3.16***	3.57*	3.27***	1.75***	2.30	1.93***	1.22***	1.67	1.11***
US openness	0.73***	0.97***	1.09***	0.75***	1.12***	1.46***	1.34***	1.42***	2.62***
Indonesia openness	0.87***	0.80***	0.98***	0.74***	0.58**	0.66***	0.75**	0.67**	1.36***
Joint TI index							–0.21*	0.10	–0.14***
R-squared	0.35	0.34	0.76	0.29	0.27	0.88	0.41	0.39	0.94
Hausman chi-squared	–45#	285***		–705#	85***		645***	91***	
Observations (thousands)	61	61	61	17	17	17	5	5	5
Groups (thousands)	5	5	5	3	3	3	2	2	2
Manufactures (SITC 5 through 8)									
Constant	–32.18***	–23.69***	–24.63***	–28.07***	–10.16***	13.29***	–30.84***	–15.82***	24.98***
Distance	–0.93***	–0.99***	–1.01***	–0.91***	–1.03***	–0.98***	–0.96***	–1.04***	–1.12***
Joint GDP	0.95***	0.94***	1.15***	0.85***	0.72***	–0.06***	1.02***	0.87***	–0.35***
Joint GDP per capita	0.30***	–0.10***	–0.46***	0.24***	–0.34***	0.11***	–0.19***	–0.54***	0.32***
Common language	0.35***	0.26***	0.33***	0.35***	0.19***	–0.18***	0.36***	0.17***	–0.29***
Common border	0.53***	0.61***	0.19***	0.76***	1.19***	1.06***	0.65***	1.14***	1.05***
Landlocked	0.09***	–0.06***	–0.03***	–0.08***	–0.52***	–0.88***	–0.17***	–0.37***	–1.29***
Island	0.00	–0.01	0.27***	0.12***	0.36***	0.37***	0.03	0.45***	0.83***
Land area	–0.18***	–0.24***	–0.35***	–0.12***	–0.16***	0.16***	–0.14***	–0.15***	0.24***
Common colonizer	0.38***	–0.13***	–0.57***	0.14**	–0.27***	–0.36***	0.30***	–0.14	–0.70***
Colony	1.36***	0.80***	0.75***	1.13**	0.38	0.06	0.87*	0.17	0.00
Ever a colony	1.54***	2.17***	1.75***	1.18***	1.53***	1.76***	0.63***	1.10***	2.09***
Common country	–0.52	0.47	0.11	–2.33***	–0.90	–0.75***	(dropped)	(dropped)	(dropped)
Currency union	1.28***	0.66***	0.62***	0.67**	0.77**	–0.84***	(dropped)	(dropped)	(dropped)
GSP	0.33***	–0.08***	–0.16***	–0.14***	0.47***	0.41***	–0.14***	0.16***	–0.11***
EU and US RTAs (11)	0.52***	0.22***	0.28***	0.42***	0.34***	0.06***	0.09*	0.94***	0.29***
Other HIC RTAs (10)	1.75***	0.35***	0.23***	1.28***	0.47***	0.18***	0.21	0.41***	0.12***

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Table 8A.2 Robust standard errors (RSE), random effects (RE), and Plumper-Troeger (PT) estimates for major commodity categories in the Rose gravity model, with US-Indonesia trade integration and openness variables, 1962–99 *(continued)*

	1962–99			1990–99			1995–99		
Category	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**	**RSE**	**RE**	**PT**
MIC and LIC RTAs (39)	0.15***	0.71***	0.71***	–0.22***	–0.24***	0.19***	0.13***	–0.29***	0.12***
US-Indonesia trade	1.12***	1.45**	1.50***	1.30***	1.99***	2.67***	0.70**	1.13	1.31***
US openness	0.63***	1.54***	1.35***	0.48***	1.61***	2.47***	0.39***	1.45***	3.91***
Indonesia openness	–0.01	–0.30***	–0.97***	0.43***	–0.01	0.47***	0.61***	0.22**	0.75***
Joint TI index							0.87***	0.62***	–0.07***
R-squared	0.62	0.57	0.85	0.63	0.51	0.94	0.74	0.66	0.98
Hausman chi-squared	–11,646#	5,085***		–38,660#	15,711***		–102,000#	8,713***	
Observations (thousands)	461	461	461	133	133	133	31	31	31
Groups (thousands)	28	28	28	21	21	21	11	11	11

***, **, * indicate that the coefficient estimate is statistically significant at the 99, 95, and 90 percent levels, respectively.
# indicates model fails to meet asymptotic assumption of the Hausman test.
GSP = generalized system of preferences
HIC, MIC, LIC = high-, middle-, low-income countries, respectively
RTA = regional trade agreement
TI index = Transparency International's corruption index

Notes: Regressand is log real trade. Distance, joint GDP, joint GDP per capita, land area, and joint TI index are measured in log terms. Estimated year effects are not reported. Numbers in parentheses indicate how many RTAs are covered by the separate RTA variables. The Hausman chi-squared statistic provides tests whether the explanatory variables are correlated with unobservable random effects. Groups are numbers of country-pair-commodity combinations for which trade exists in the data sample.

Sources: Authors' calculations based on ordinary least squares and generalized least squares estimation of the Rose (2004) gravity model without random effects (RSE) and with random effects (RE, PT), using a combined version of the Rose (2004) and the Feenstra et al. (2005) datasets. RSE estimates follow Rose (2004). PT estimates are based on a multi-step estimation routine developed by Plumper and Troeger (2004).

Table 8A.3 Predicted bilateral trade expansion under a US-Indonesia FTA (percent)

Category	1962–99	1990–99	1995–99	Simple average
Total trade (SITC 0 through 9)	62	49	14	42
Disaggregated trade				
Agriculture (SITC 0 and 1)	189	164	68	140
Raw material (SITC 2 and 4)	62	49	11	40
Fuels (SITC 3)	0	0	0	0
Manufactured goods (SITC 5 through 8)	68	52	9	43

Note: Based on estimation results presented in tables 8A.1 and 8A.2.

Table 8A.4 Estimated changes in key economywide variables for the United States and Indonesia

	United States				Indonesia			
Variable	Initial value (millions of US dollars)	Free trade area	Excluding sensitive items	Unilateral benchmark	Initial value (millions of US dollars)	Free trade area	Excluding sensitive items	Unilateral benchmark
		(change in percent, millions of US dollars)				(change in percent, millions of US dollars)		
Total import value	1,289,389	0.1	0.1	2.8	45,663	5.0	5.0	8.3
From partner	12,057	45.2	45.1	10.5	4,663	25.1	24.9	5.7
From rest of world	1,277,332	–0.4	–0.4	2.7	40,999	2.7	2.7	8.6
Total export value	881,425	0.6	0.6	4.3	68,019	3.8	3.8	4.6
To partner	4,506	25.0	24.8	7.6	11,372	45.3	45.2	6.2
To rest of world	876,919	0.4	0.4	4.2	56,648	–4.6	–4.6	4.3
Tariff revenue	19,939	–1,039	–1,037	–19,939	1,623	–65	–63	–1,623
From partner	589	–589	–588	–589	93	–93	–92	–93
From rest of world	19,350	–450	–449	–19,350	1,530	28	29	–1,530
Welfare as percent of GDP		0.0	0.0	–0.1		0.6	0.6	0.2
Total equivalent variation		–955	–955	–11,176		909	907	231
Allocative efficiency		–338	–339	1,729		97	97	757
Terms of trade		–617	–617	–12,905		812	810	–526

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.5 Estimated changes in net welfare by region (millions of dollars)

Country/ region	Initial GDP (billions of US dollars)	US-Indonesia free trade area			Excluding sensitive items			Unilateral benchmark					
								United States			Indonesia		
		Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade
Australia	350.1	22	12	10	22	12	10	198	6	192	13	1	12
New Zealand	49.8	3	2	1	3	2	1	77	0	77	1	–1	2
China	1,060.4	–258	–17	–241	–258	–17	–241	2,306	306	2,000	35	–56	92
Hong Kong	165.3	28	11	16	27	11	16	53	–70	124	13	1	12
Japan	4,017.7	145	91	54	145	91	54	1,862	299	1,563	23	–48	71
South Korea	408.4	7	20	–13	7	20	–13	892	87	805	81	–1	82
Bangladesh	45.5	–21	–10	–11	–21	–10	–11	201	97	104	–1	–1	–1
India	458.4	–21	–5	–16	–21	–5	–16	235	84	151	10	3	6
Sri Lanka	15.6	–16	–1	–15	–16	–1	–15	158	19	138	1	1	0
Pakistan	81.6	–11	0	–11	–11	0	–11	184	30	154	–2	0	–2
Chile	65.0	5	3	2	5	3	2	52	0	52	–1	–1	0
Rest of South America	1,176.4	20	20	0	20	20	0	865	193	672	–21	–10	–11
CAFTA	102.3	–51	–25	–26	–50	–25	–26	827	343	484	–11	–5	–6
Western Europe	7,978.2	314	273	40	313	273	40	5,094	350	4,744	103	–24	126
Switzerland	239.2	7	9	–2	7	9	–2	209	0	209	3	–2	5
Eastern Europe	817.3	41	34	7	41	34	7	469	18	451	–21	–10	–10
Morocco	32.9	1	1	0	1	1	0	22	7	15	–3	–1	–1

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Table 8A.5 Estimated changes in net welfare by region (millions of dollars) *(continued)*

Country/ region	Initial GDP (billions of US dollars)	US-Indonesia free trade area			Excluding sensitive items			Unilateral benchmark					
								United States			Indonesia		
		Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade
SACU	10.0	–1	0	–1	–1	0	–1	32	3	29	0	0	0
Rest of world	1,623.0	21	26	–5	21	26	–5	1,715	51	1,664	50	17	33
Indonesia	140.6	909	97	812	907	97	810	296	–67	362	231	757	–526
Malaysia	86.9	1	8	–7	1	8	–7	165	–47	212	20	0	21
Philippines	67.3	–28	–9	–19	–28	–9	–19	225	43	182	–2	–3	1
Singapore	84.9	1	5	–3	1	5	–3	17	–23	40	33	–1	34
Thailand	111.6	–30	4	–34	–30	4	–33	287	–42	329	26	–3	29
Vietnam	31.1	–12	–5	–6	–11	–5	–6	155	74	82	2	0	2
All ASEAN	522.5	842			841			1,144			310		
Canada	704.1	110	31	79	110	31	79	–852	42	–893	–7	–8	1
United States	9,993.1	–955	–338	–617	–955	–339	–617	–11,176	1,729	–12,905	24	–10	34
Mexico	599.4	–28	–23	–6	–28	–23	–6	–1,205	–123	–1,082	–9	–3	–6
All NAFTA	11,296.6	–873			–874			–13,233			8		
All world	30,516.1	204			203			3,363			591		

ASEAN = Association of Southeast Asian Nations
CAFTA = Central American Free Trade Agreement
NAFTA = North American Free Trade Agreement
SACU = Southern African Customs Union

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.6 Estimated changes in the regional pattern of exports

Country/region	Initial value (billions of US dollars)			US-Indonesia free trade area (percent change)			Excluding sensitive items (percent change)			Unilateral benchmark (percent change)			
										United States		Indonesia	
	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia	Total	To the United States	Total	To Indonesia
Australia	72.3	8.6	1.6	0.0	−0.2	0.5	0.0	−0.2	0.5	0.3	3.9	0.1	4.2
New Zealand	18.1	2.8	0.3	0.0	−0.2	1.2	0.0	−0.2	1.2	0.4	6.4	0.0	3.9
China	379.4	108.4	2.8	−0.1	−1.2	3.1	−0.1	−1.2	3.1	1.0	8.2	0.1	33.8
Hong Kong	98.1	20.4	0.7	0.0	−0.5	7.7	0.0	−0.5	7.7	0.6	8.2	0.0	9.5
Japan	448.0	123.8	6.6	−0.1	−0.3	0.0	−0.1	−0.3	0.0	0.4	4.0	0.1	7.1
South Korea	175.4	37.2	3.3	0.0	−0.4	4.4	0.0	−0.4	4.4	0.6	6.4	0.1	16.5
Bangladesh	7.8	2.9	0.0	−0.3	−2.1	6.3	−0.3	−2.1	6.3	2.8	19.3	0.0	3.6
India	60.3	12.2	0.8	0.0	−0.9	4.3	0.0	−0.9	4.3	0.4	2.3	0.0	9.9
Sri Lanka	6.4	2.4	0.0	−0.1	−2.0	7.7	−0.1	−2.0	7.7	2.0	20.4	0.0	8.1
Pakistan	14.2	3.6	0.2	−0.1	−1.4	3.8	−0.1	−1.4	3.8	1.5	16.1	0.0	1.7
Chile	21.7	4.0	0.1	0.0	−0.2	2.0	0.0	−0.2	2.0	0.2	1.7	0.0	−1.2
Rest of South America	187.6	49.5	0.6	−0.1	−0.5	3.9	−0.1	−0.5	3.9	0.4	3.0	0.0	0.9
CAFTA	34.2	13.4	0.1	−0.1	−0.9	4.5	−0.1	−0.9	4.5	1.9	13.2	0.0	−9.5
Western Europe	2,546.0	294.8	9.2	0.0	−0.3	4.5	0.0	−0.3	4.5	0.3	3.2	0.0	9.4
Switzerland	107.1	14.7	0.3	0.0	−0.1	3.1	0.0	−0.1	3.1	0.3	2.3	0.0	13.8
Eastern Europe	341.1	24.3	0.7	0.0	−0.2	3.5	0.0	−0.2	3.5	0.2	0.8	0.0	−1.7

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Table 8A.6 Estimated changes in the regional pattern of exports *(continued)*

Country/ region	Initial value (billions of US dollars)			US-Indonesia free trade area (percent change)			Excluding sensitive items (percent change)			Unilateral benchmark (percent change)			
										United States		Indonesia	
	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia	Total	To the United States	Total	To Indonesia
Morocco	11.2	1.1	0.0	0.0	–0.3	6.3	0.0	–0.3	6.3	0.3	1.8	0.0	2.3
SACU	6.2	0.5	0.0	0.0	–1.5	4.4	0.0	–1.5	4.4	1.0	27.9	0.0	43.3
Rest of world	555.3	114.8	4.8	0.0	–0.3	3.0	0.0	–0.3	3.0	0.5	2.8	0.0	3.7
Indonesia	68.0	11.4		3.8	45.3		3.8	45.2		0.8	10.5	4.6	
Malaysia	124.4	24.0	1.6	0.1	–0.3	2.1	0.1	–0.3	2.1	0.3	3.0	0.0	1.5
Philippines	37.8	11.5	0.2	0.1	–0.8	2.2	0.1	–0.8	2.2	0.1	5.5	0.0	–1.8
Singapore	110.4	17.8	3.2	0.0	–0.3	1.4	0.0	–0.3	1.4	0.2	1.1	0.0	–1.9
Thailand	79.4	17.2	1.2	0.0	–0.8	2.0	0.0	–0.8	2.2	0.3	6.0	0.0	8.5
Vietnam	15.3	1.4	0.1	0.0	–1.1	2.1	0.0	–1.1	2.3	0.2	5.5	0.0	7.5
All ASEAN	435.2	83.3	6.3	0.6	5.8	1.7	0.6	5.7	1.7	0.3	4.6	0.7	1.2
Canada	265.3	198.2	0.6	0.0	–0.1	2.5	0.0	–0.1	2.5	–0.9	–2.2	0.0	0.6
United States	881.4		4.5	0.6		25.0	0.6		24.8	4.3		0.0	5.7
Mexico	164.3	129.5	0.1	0.0	–0.1	7.1	0.0	–0.1	7.1	–0.5	–1.8	0.0	12.2
All NAFTA	1,311.0	327.6	5.2	0.4	–0.1	21.9	0.4	–0.1	21.8	2.6	–2.0	0.0	5.2
All world	6,836.5	1,250.4	43.8	0.1	0.1	5.1	0.1	0.1	5.1	0.8	2.7	0.1	8.3

ASEAN = Association of Southeast Asian Nations
CAFTA = Central American Free Trade Agreement
NAFTA = North American Free Trade Agreement
SACU = Southern African Customs Union

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.7 Estimated changes in the sectoral pattern of exports

	United States							Indonesia						
	Initial value (millions of US dollars)		**US-Indonesia free trade area** (percent change)		**Excluding sensitive items** (percent change)		**Unilateral benchmark** (percent change)	**Initial value** (millions of US dollars)		**US-Indonesia free trade area** (percent change)		**Excluding sensitive items** (percent change)		**Unilateral benchmark** (percent change)
Sector	**Total**	**To Indonesia**	**Total**	**To Indonesia**	**Total**	**To Indonesia**		**Total**	**To the United States**	**Total**	**To the United States**	**Total**	**To the United States**	
Grains	9,630	125	0.2	2.8	0.2	2.9	1.5	17	0	5.2	5.5	5.1	5.4	19.5
Other crops	15,955	481	0.3	7.5	0.3	7.5	2.3	2,236	534	3.0	6.2	3.0	6.2	6.8
Other agriculture	3,755	14	0.0	12.8	0.0	12.8	1.8	101	9	2.1	2.1	2.1	2.1	7.4
Forestry and fisheries	1,498	19	0.2	−2.5	0.2	−2.5	0.9	540	23	−1.1	−1.0	−1.1	−1.0	0.1
Coal, oil, and gas	4,251	4	0.2	70.6	0.2	70.6	2.7	10,958	312	−0.8	−0.7	−0.8	−0.7	0.0
Processed rice	463	5	1.0	85.5	0.0	−1.3	2.6	24	4	6.6	23.4	2.8	2.7	14.7
Sugar	346	6	0.9	41.3	0.3	2.0	4.3	17	1	68.4	984.1	−2.1	−2.5	4.0
Other food products	27,857	266	0.7	30.9	0.7	30.9	1.5	4,318	478	−2.4	5.6	−2.4	5.6	2.3
Textiles	12,454	23	0.5	78.1	0.5	78.1	5.4	4,360	388	4.9	110.9	4.9	111.0	12.0
Wearing apparel	4,996	7	1.1	209.1	1.1	209.1	9.4	4,591	2,083	52.8	121.7	52.8	121.7	11.0
Leather and rubber products	1,893	19	3.0	85.1	3.0	85.1	18.8	2,912	1,436	78.6	163.0	78.6	163.0	8.6
Wood products	8,208	32	0.9	14.6	0.9	14.6	1.5	5,929	1,042	−6.0	−1.9	−6.0	−1.9	−0.9

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Table 8A.7 Estimated changes in the sectoral pattern of exports *(continued)*

	United States							Indonesia						
	Initial value (millions of US dollars)		**US-Indonesia free trade area** (percent change)		**Excluding sensitive items** (percent change)		**Unilateral benchmark** (percent change)	**Initial value** (millions of US dollars)		**US-Indonesia free trade area** (percent change)		**Excluding sensitive items** (percent change)		**Unilateral benchmark** (percent change)
Sector	**Total**	**To Indonesia**	**Total**	**To Indonesia**	**Total**	**To Indonesia**		**Total**	**To the United States**	**Total**	**To the United States**	**Total**	**To the United States**	
Paper products	20,028	124	0.7	25.6	0.7	25.6	0.7	3,376	238	−5.2	−5.6	−5.2	−5.6	1.5
Chemicals	104,307	440	0.6	41.1	0.6	41.1	1.3	5,958	776	−1.8	0.4	−1.8	0.4	4.6
Minerals and metals	32,031	94	0.7	42.2	0.7	42.2	1.6	3,838	240	−3.0	15.5	−3.0	15.6	3.4
Fabricated metal products	14,850	18	0.7	83.3	0.7	83.3	1.2	614	137	−3.6	−2.0	−3.6	−2.0	11.5
Motor vehicles	56,744	44	0.3	89.7	0.3	89.7	−0.1	413	68	−1.5	−1.6	−1.5	−1.6	19.3
Other transportation equipment	51,766	122	0.8	3.7	0.8	3.7	2.5	283	7	−1.2	2.7	−1.1	2.7	21.9
Electronic equipment	110,394	179	0.9	18.2	0.9	18.2	2.6	8,416	1,950	−8.7	−8.0	−8.7	−7.9	4.9
Machinery and equipment	164,825	479	0.9	30.7	0.9	30.7	2.3	3,721	577	−0.9	−0.8	−0.9	−0.8	14.4
Other manufactures	15,581	19	0.8	99.8	0.8	99.8	3.4	1,245	462	−7.8	−7.8	−7.7	−7.8	3.3
Nontraded services	4,080	4	0.7	3.4	0.7	3.4	1.6	178	3	−3.7	−4.1	−3.7	−4.1	2.2
Traded services	215,512	1,981	0.1	21.6	0.1	21.6	11.1	3,974	603	−14.8	−4.6	−14.8	−4.6	−0.5

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.8 Estimated changes in the sectoral pattern of production (percent change)

Sector	United States				Indonesia			
	Initial value (millions of US dollars)	Free trade area	Excluding sensitive items	Unilateral benchmark	Initial value (millions of US dollars)	Free trade area	Excluding sensitive items	Unilateral benchmark
Grains	27,801.0	0.1	0.1	0.5	5,887.2	0.3	0.3	−0.8
Other crops	78,066.2	0.1	0.1	−0.2	11,983.0	1.0	1.0	1.6
Other agriculture	91,908.3	0.1	0.1	−0.1	3,750.7	0.1	0.1	0.3
Forestry and fisheries	21,533.1	0.1	0.1	−0.1	6,547.3	−2.4	−2.4	−0.4
Coal, oil, and gas	112,694.8	0.1	0.1	0.1	22,338.3	−0.6	−0.6	0.1
Processed rice	2,139.3	0.2	0.0	−0.5	6,169.7	0.1	0.2	−1.6
Sugar	29,813.3	0.0	0.1	−3.5	2,132.2	0.2	−0.3	−4.1
Other food products	705,772.7	0.1	0.1	−0.2	25,158.6	−0.4	−0.4	−0.2
Textiles	143,342.4	−0.1	−0.1	−6.9	12,028.3	15.4	15.4	5.7
Wearing apparel	108,992.9	−0.5	−0.5	−8.2	5,647.9	42.2	42.2	9.7
Leather and rubber products	15,729.4	−1.8	−1.8	−14.7	3,463.7	70.6	70.6	9.0
Wood products	225,190.2	0.1	0.1	0.0	8,430.9	−5.9	−5.9	−1.0
Paper products	388,626.5	0.1	0.1	0.0	7,387.4	−4.9	−4.9	−0.3
Chemicals	855,295.9	0.2	0.2	−0.6	24,865.2	0.1	0.1	−0.1
Minerals and metals	376,787.9	0.2	0.2	−0.7	7,490.5	−2.9	−2.9	0.2
Fabricated metal products	286,955.4	0.2	0.2	−0.5	1,968.3	−1.6	−1.6	−0.2
Motor vehicles	462,527.4	0.0	0.0	−0.6	6,351.8	−0.5	−0.5	−4.6
Other transportation equipment	192,079.4	0.4	0.4	0.9	826.3	−0.9	−0.9	5.6
Electronic equipment	347,530.9	0.5	0.5	1.2	11,855.5	−9.1	−9.1	3.9
Machinery and equipment	779,369.4	0.3	0.3	0.0	6,294.9	−1.1	−1.1	10.0
Other manufactures	64,930.5	0.4	0.4	0.2	2,190.4	−5.1	−5.1	−1.7
Nontraded services	2,477,931.5	0.0	0.0	0.0	34,778.7	1.2	1.2	1.8
Traded services	9,987,796.0	−0.1	−0.1	0.2	71,813.6	−3.3	−3.3	−1.9

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.9a Estimated changes in key economywide variables for the United States and Indonesia (all US FTAs included)

Variable	United States	Indonesia	Malaysia	Thailand	Singapore	Korea	CAFTA	Australia	Chile	Pakistan	SACU	Morocco
Total import value (percent change)	1.5	6.9	14.4	2.8	10.0	9.2	7.1	4.3	3.7	1.4	3.0	1.7
From partner/s	17.3	46.8	82.4	36.4	48.2	143.0	45.4	20.8	31.4	0.8	56.3	21.6
From rest of world	–2.2	–2.3	8.1	–4.6	–2.0	–0.1	3.8	2.5	–0.3	1.5	–3.1	–0.8
Total export value (percent change)	0.6	10.6	–7.5	1.4	6.5	–4.1	–2.1	3.2	2.2	2.1	0.9	2.6
To partner/s	14.9	26.0	25.2	9.9	36.3	10.4	56.7	39.7	10.9	8.4	20.0	32.0
To rest of world	–1.3	6.5	–18.6	–0.6	–12.7	–5.7	–7.7	–4.1	0.1	0.9	–4.4	–1.2
Tariff revenue (millions of US dollars)	–431.4	–8,190.1	133.5	–239.7	–920.5	–156.5	–18.5	–66.0	–611.1	–0.3	–735.5	–4,964.1
From partner/s	–332.4	–3,814.9	–84.0	–189.1	–844.7	–85.4	–25.3	–93.3	–378.0	–0.4	–444.2	–3,842.6
From rest of world	–99.0	–4,375.2	217.4	–50.6	–75.8	–71.1	6.9	27.3	–233.2	0.1	–291.4	–1,121.5
Welfare (percent of GDP)	0.0	0.6	0.6	0.4	–0.1	0.4	1.5	0.0	0.2	1.4	1.5	0.8
Total equivalent variation (millions of US dollars)	3,150.4	776.4	524.5	462.6	–117.5	1,536.2	1,542.1	53.6	139.0	1,102.7	149.3	248.6
Allocative efficiency	–76.5	142.0	90.6	–140.4	–181.1	2,724.2	688.8	–3.6	38.1	594.4	67.9	128.5
Terms of trade	3,226.9	634.4	433.9	603.0	63.6	–1,188.0	853.3	57.3	100.9	508.3	81.4	120.1

CAFTA = Central American Free Trade Agreement
SACU = Southern African Customs Union

Source: Simulation results.

Table 8A.9b Estimated changes in key economywide variables for the United States and Indonesia, excluding sensitive items (all US FTAs included)

Variable	United States	Indonesia	Malaysia	Thailand	Singapore	Korea	CAFTA	Australia	Chile	Pakistan	SACU	Morocco
Total import value (percent change)	1.5	6.9	14.4	2.8	10.0	9.2	7.1	4.3	3.7	1.4	3.0	1.7
From partner/s	17.3	46.8	82.4	36.4	48.2	143.0	45.4	20.7	31.4	0.8	56.3	21.6
From rest of world	–2.2	–2.3	8.1	–4.6	–2.0	–0.1	3.8	2.5	–0.3	1.5	–3.1	–0.8
Total export value (percent change)	0.6	10.6	–7.5	1.4	6.5	–4.1	–2.1	3.2	2.2	2.1	0.9	2.6
To partner/s	14.9	26.0	25.2	9.9	36.3	10.4	56.7	39.6	10.9	8.4	20.0	32.0
To rest of world	–1.3	6.5	–18.6	–0.6	–12.7	–5.7	–7.7	–4.1	0.1	0.9	–4.4	–1.2
Tariff revenue (millions of US dollars)	–431.4	–8,190.2	133.5	–239.7	–920.5	–156.5	–18.5	–64.1	–611.2	–0.3	–735.5	–4,963.0
From partner/s	–332.4	–3,814.9	–84.0	–189.1	–844.8	–85.4	–25.3	–92.1	–378.0	–0.4	–444.2	–3,842.1
From rest of world	–99.0	–4,375.2	217.5	–50.6	–75.7	–71.1	6.8	28.0	–233.2	0.1	–291.4	–1,120.9
Welfare (percent of GDP)	0.0	0.6	0.6	0.4	–0.1	0.4	1.5	0.0	0.2	1.4	1.5	0.8
Total equivalent variation (millions of US dollars)	3,148.7	775.4	524.5	463.0	–117.4	1,536.2	1,542.7	53.8	139.0	1,102.7	149.3	248.6
Allocative efficiency	–77.8	142.1	90.6	–140.5	–181.1	2,724.2	689.1	–3.6	38.1	594.4	67.9	128.5
Terms of trade	3,226.5	633.3	433.9	603.5	63.7	–1,188.0	853.6	57.5	100.9	508.3	81.4	120.1

CAFTA = Central American Free Trade Agreement
SACU = Southern African Customs Union

Source: Simulation results.

Table 8A.10 Estimated changes in net welfare by region (all US FTAs included)

Country/region	Initial GDP (billions of US dollars)	Free trade area (millions of US dollars)			Excluding sensitive items (millions of US dollars)		
		Total	Allocative efficiency	Terms of trade	Total	Allocative efficiency	Terms of trade
Australia	350.1	54	–4	57	54	–4	57
New Zealand	49.8	–43	9	–52	–43	9	–52
China	1,060.4	–1,248	–484	–764	–1,248	–484	–764
Hong Kong	165.3	149	29	120	149	29	120
Japan	4,017.7	–896	–389	–507	–896	–389	–507
South Korea	408.4	1,536	2,724	–1,188	1,536	2,724	–1,188
Bangladesh	45.5	–92	–41	–50	–92	–41	–50
India	458.4	–285	–91	–193	–285	–91	–193
Sri Lanka	15.6	–62	–6	–56	–62	–6	–56
Pakistan	81.6	1,103	594	508	1,103	594	508
Chile	65.0	139	38	101	139	38	101
Rest of South America	1,176.4	–530	–161	–369	–530	–161	–369
CAFTA	102.3	1,542	689	853	1,543	689	854
Western Europe	7,978.2	–2,146	–182	–1,964	–2,146	–182	–1,964
Switzerland	239.2	–101	–9	–91	–101	–9	–91
Eastern Europe	817.3	–228	–11	–217	–228	–11	–217
Morocco	32.9	249	128	120	249	128	120
SACU	10.0	149	68	81	149	68	81
Rest of world	1,623.0	–311	–36	–275	–311	–36	–275
Indonesia	140.6	776	142	634	775	142	633
Malaysia	86.9	525	91	434	525	91	434
Philippines	67.3	–142	–30	–112	–142	–30	–112
Singapore	84.9	–118	–181	64	–117	–181	64
Thailand	111.6	463	–140	603	463	–140	603
Vietnam	31.1	–21	–7	–14	–21	–7	–14
All ASEAN	522.5	1,483			1,483		
Canada	704.1	–457	–60	–397	–456	–60	–397
United States	9,993.1	3,150	–77	3,227	3,149	–78	3,226
Mexico	599.4	–637	–53	–584	–637	–54	–584
All NAFTA	11,296.6	2,057			2,055		
All world	30,516.1	2,519			2,517		

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.11 Estimated changes in the regional pattern of exports (all US FTAs included)

	Initial value (billions of US dollars)			Free trade area (percent change)			Excluding sensitive items (percent change)		
	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia	Total	To the United States	To Indonesia
Australia	72.3	8.6	1.6	0.6	14.9	–0.2	0.6	14.9	–0.2
New Zealand	18.1	2.8	0.3	–0.3	0.5	0.3	–0.3	0.5	0.3
China	379.4	108.4	2.8	–0.4	–2.0	2.2	–0.4	–2.0	2.2
Hong Kong	98.1	20.4	0.7	–0.3	–3.3	7.4	–0.3	–3.3	7.4
Japan	448.0	123.8	6.6	–0.2	0.1	–0.6	–0.2	0.1	–0.6
South Korea	175.4	37.2	3.3	10.6	26.0	10.6	10.6	26.0	10.6
Bangladesh	7.8	2.9	0.0	–1.3	–9.8	7.4	–1.3	–9.8	7.4
India	60.3	12.2	0.8	–0.4	–3.5	3.3	–0.4	–3.5	3.4
Sri Lanka	6.4	2.4	0.0	–0.8	–8.9	9.1	–0.8	–8.9	9.1
Pakistan	14.2	3.6	0.2	–7.5	25.2	–21.4	–7.5	25.2	–21.4
Chile	21.7	4.0	0.1	1.4	9.9	–0.2	1.4	9.9	–0.2
Rest of South America	187.6	49.5	0.6	–0.3	–1.2	3.6	–0.3	–1.2	3.6
CAFTA	34.2	13.4	0.1	6.5	36.3	–8.6	6.5	36.3	–8.6
Western Europe	2,546.0	294.8	9.2	–0.2	–0.6	3.7	–0.2	–0.6	3.7
Switzerland	107.1	14.7	0.3	–0.1	–0.2	2.5	–0.1	–0.2	2.5
Eastern Europe	341.1	24.3	0.7	–0.1	–0.8	3.0	–0.1	–0.8	3.0
Morocco	11.2	1.1	0.0	–4.1	10.4	–1.5	–4.1	10.4	–1.5
SACU	6.2	0.5	0.0	–2.1	56.7	0.7	–2.1	56.7	0.7
Rest of world	555.3	114.8	4.8	–0.2	–1.4	1.8	–0.2	–1.4	1.8
Indonesia	68.0	11.4		3.2	39.7		3.2	39.6	
Malaysia	124.4	24.0	1.6	2.2	10.9	1.0	2.2	10.9	1.0
Philippines	37.8	11.5	0.2	–0.2	–2.4	1.8	–0.2	–2.4	1.8
Singapore	110.4	17.8	3.2	2.1	8.4	2.3	2.1	8.4	2.3
Thailand	79.4	17.2	1.2	0.9	20.0	–2.3	0.9	20.0	–2.2
Vietnam	15.3	1.4	0.1	–0.1	–0.8	2.7	–0.1	–0.8	2.9
All ASEAN	435.2	83.3	6.3	1.8	14.1	1.1	1.8	14.1	1.1
Canada	265.3	198.2	0.6	–0.2	–0.3	2.2	–0.2	–0.3	2.2
United States	881.4		4.5	2.6		20.8	2.6		20.6
Mexico	164.3	129.5	0.1	–0.1	–0.4	7.1	–0.1	–0.4	7.1
All NAFTA	1,311.0	327.6	5.2	1.7	–0.3	18.3	1.7	–0.3	18.1
All world	6,836.5	1,250.4	43.8	0.6	1.6	4.4	0.6	1.6	4.4

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.12 Estimated changes in the sectoral pattern of exports (all US FTAs included)

	United States						Indonesia					
	Initial value (millions of US dollars)		US-Indonesia free trade area (percent change)		Excluding sensitive items (percent change)		Initial value (millions of US dollars)		US-Indonesia free trade area (percent change)		Excluding sensitive items (percent change)	
Sector	Total	To Indonesia	Total	To Indonesia	Total	To Indonesia	Total	To the United States	Total	To the United States	Total	To the United States
Grains	9,630	125	27.5	–14.9	27.5	–14.9	17	0	12.0	25.5	11.9	25.4
Other crops	15,955	481	15.9	–5.0	15.9	–5.0	2,236	534	1.0	14.3	1.0	14.3
Other agriculture	3,755	14	–1.6	1.7	–1.6	1.7	101	9	2.6	7.2	2.6	7.2
Forestry and fisheries	1,498	19	0.8	–2.9	0.8	–2.9	540	23	–0.8	–0.9	–0.8	–0.9
Coal, oil, and gas	4,251	4	1.9	70.5	1.9	70.5	10,958	312	–0.1	–0.4	–0.1	–0.4
Processed rice	463	5	39.4	75.6	38.4	–6.6	24	4	1.5	11.5	–1.9	–7.2
Sugar	346	6	24.1	38.0	23.5	–0.4	17	1	49.6	699.1	–2.4	–28.3
Other food products	27,857	266	6.7	24.6	6.7	24.6	4,318	478	–4.3	6.6	–4.2	6.6
Textiles	12,454	23	17.3	63.8	17.3	63.8	4,360	388	4.3	86.2	4.3	86.2
Wearing apparel	4,996	7	27.2	191.7	27.2	191.8	4,591	2,083	41.0	94.8	41.0	94.8
Leather and rubber products	1,893	19	10.3	64.9	10.3	64.9	2,912	1,436	75.7	155.1	75.7	155.2

Wood products	8,208	32	2.5	12.5	2.5	12.5	5,929	1,042	−5.1	−0.3	−5.1	−0.2
Paper products	20,028	124	1.6	23.4	1.6	23.4	3,376	238	−4.6	−3.9	−4.6	−3.9
Chemicals	104,307	440	2.5	36.8	2.5	36.8	5,958	776	−1.9	0.9	−1.9	0.9
Minerals and metals	32,031	94	3.7	39.1	3.7	39.1	3,838	240	−2.8	16.7	−2.8	16.7
Fabricated metal products	14,850	18	2.3	77.2	2.3	77.2	614	137	−3.3	−0.7	−3.3	−0.7
Motor vehicles	56,744	44	2.4	85.1	2.4	85.1	413	68	−2.1	−0.5	−2.1	−0.5
Other transportation equipment	51,766	122	−0.8	−1.4	−0.8	−1.4	283	7	0.2	5.8	0.2	5.8
Electronic equipment	110,394	179	−0.5	14.7	−0.5	14.7	8,416	1,950	−6.9	−6.6	−6.8	−6.6
Machinery and equipment	164,825	479	2.2	26.8	2.2	26.8	3,721	577	−0.1	0.8	−0.1	0.8
Other manufactures	15,581	19	4.2	91.1	4.2	91.1	1,245	462	−6.7	−6.6	−6.7	−6.5
Nontraded services	4,080	4	−0.4	1.5	−0.4	1.5	178	3	−2.4	−2.1	−2.4	−2.1
Traded services	215,512	1,981	1.1	20.7	1.1	20.7	3,974	603	−13.3	−3.3	−13.3	−3.3

Source: Initial data from the GTAP6 database (Dimaranan and McDougall 2005). Estimates from simulation results.

Table 8A.13a Estimated changes in the sectoral pattern of production (all US FTAs included) (percent change in volume)

Sector	United States	Indonesia	Malaysia	Thailand	Singapore	Korea	CAFTA	Australia	Chile	Pakistan	SACU	Morocco
Grains	7.2	0.5	3.3	0.1	1.8	−22.6	−5.1	−1.2	1.5	−1.1	−7.9	−3.6
Other crops	1.2	0.9	−1.1	−0.2	−0.3	−12.1	−2.1	−1.6	1.7	−1.5	−1.6	−1.4
Other agriculture	−0.3	−0.1	2.2	−1.0	1.3	24.3	−1.6	0.1	0.4	0.7	−4.9	0.1
Forestry and fisheries	0.0	−2.0	3.7	−1.2	−0.6	5.7	−1.1	0.2	0.3	1.1	−2.3	6.9
Coal, oil, and gas	0.1	−0.2	−0.6	−0.4	6.2	−0.4	−8.1	−0.1	0.6	−9.4	−7.0	−15.1
Processed rice	6.6	0.1	10.3	0.7	0.3	3.5	−5.5	−0.1	0.0	−1.5	−6.0	−0.5
Sugar	−1.3	0.1	10.5	0.3	1.3	9.5	6.4	7.8	0.3	−3.1	8.3	0.4
Other food products	0.1	−0.7	2.9	−1.9	0.2	24.5	−3.7	0.0	0.3	−5.2	−6.2	−1.7
Textiles	−1.4	12.1	31.6	13.3	21.5	30.6	39.0	0.4	1.1	−5.9	32.2	−4.6
Wearing apparel	−2.3	33.1	74.9	20.0	40.4	37.7	33.4	0.5	1.3	2.7	49.4	−1.2
Leather and rubber products	−2.8	68.5	10.6	20.7	7.5	22.9	−10.7	−0.4	1.3	−26.2	−8.3	−0.3
Wood products	0.0	−4.9	5.0	−6.7	3.9	2.0	−11.5	−0.5	1.5	−0.3	−4.6	−0.9
Paper products	0.1	−4.2	0.1	−2.5	2.6	2.4	−6.8	−0.3	−0.5	−3.6	−6.4	−4.6
Chemicals	0.2	0.0	2.3	−2.1	3.8	5.1	−6.0	−0.6	0.9	−6.8	−4.8	−4.1
Minerals and metals	0.3	−2.5	3.2	−3.5	2.5	4.8	−12.2	−1.1	1.4	−3.7	−0.5	−0.3
Fabricated metal products	0.0	−1.3	3.1	−4.6	2.3	6.4	−10.6	−0.5	0.8	1.3	0.9	−0.4
Motor vehicles	0.1	−0.4	2.7	−0.5	1.5	5.2	−3.1	−0.7	0.4	6.2	−1.8	2.7
Other transportation equipment	−0.4	−0.2	6.8	2.3	5.1	9.2	−10.4	−0.1	1.6	−3.1	−2.1	−4.1
Electronic equipment	−0.7	−7.3	3.3	−4.3	2.0	3.6	−21.5	−0.5	−4.6	−2.6	1.0	−5.4
Machinery and equipment	0.2	−0.3	4.7	−2.8	4.1	4.9	−19.0	−1.0	0.4	−3.1	2.6	−1.1
Other manufactures	0.5	−4.4	3.9	−3.7	4.5	10.7	−10.9	−0.4	0.7	−9.4	−10.5	−2.7
Nontraded services	0.1	1.1	−0.2	2.3	−0.4	−1.0	4.0	0.3	1.5	8.8	13.3	10.8
Traded services	0.0	−3.0	−6.4	−1.4	−1.5	−3.2	−1.1	0.1	−1.2	1.2	1.5	−0.4

CAFTA = Central American Free Trade Agreement
SACU = Southern African Customs Union

Source: Simulation results.

Table 8A.13b Estimated changes in the sectoral pattern of production, excluding sensitive items (all US FTAs included)
(percent change in volume)

Sector	United States	Indonesia	Malaysia	Thailand	Singapore	Korea	CAFTA	Australia	Chile	Pakistan	SACU	Morocco
Grains	7.2	0.5	3.3	0.1	1.8	–22.6	–5.1	–1.2	1.5	–1.1	–7.9	–3.6
Other crops	1.2	0.9	–1.1	–0.2	–0.3	–12.1	–2.1	–1.6	1.7	–1.5	–1.6	–1.4
Other agriculture	–0.3	–0.1	2.2	–1.0	1.3	24.3	–1.6	0.1	0.4	0.7	–4.9	0.1
Forestry and fisheries	0.0	–2.0	3.7	–1.2	–0.6	5.7	–1.1	0.2	0.3	1.1	–2.3	6.9
Coal, oil, and gas	0.1	–0.2	–0.6	–0.4	6.2	–0.4	–8.1	–0.1	0.6	–9.4	–7.0	–15.1
Processed rice	6.5	0.2	10.4	0.7	0.3	3.5	–5.5	–0.1	0.0	–1.5	–6.0	–0.5
Sugar	–1.3	–0.2	10.5	0.3	1.3	9.5	6.5	7.9	0.3	–3.1	8.4	0.4
Other food products	0.1	–0.7	2.9	–1.9	0.2	24.5	–3.7	0.0	0.3	–5.2	–6.2	–1.7
Textiles	–1.4	12.1	31.6	13.3	21.5	30.6	38.9	0.4	1.1	–5.9	32.2	–4.6
Wearing apparel	–2.3	33.1	74.9	20.0	40.4	37.7	33.4	0.5	1.3	2.7	49.4	–1.2
Leather products	–2.8	68.5	10.6	20.7	7.5	22.9	–10.7	–0.4	1.3	–26.2	–8.3	–0.3
Wood products	0.0	–4.9	5.0	–6.7	3.9	2.0	–11.5	–0.5	1.5	–0.3	–4.6	–0.9
Paper products	0.1	–4.2	0.1	–2.5	2.6	2.4	–6.8	–0.3	–0.5	–3.6	–6.4	–4.6
Chemicals	0.2	0.0	2.3	–2.1	3.8	5.1	–6.0	–0.6	0.9	–6.8	–4.8	–4.1
Minerals and metals	0.3	–2.5	3.2	–3.5	2.5	4.8	–12.2	–1.1	1.4	–3.7	–0.5	–0.3
Fabricated metal products	0.0	–1.3	3.1	–4.6	2.3	6.4	–10.6	–0.5	0.8	1.3	0.9	–0.4
Motor vehicles	0.1	–0.4	2.7	–0.5	1.5	5.2	–3.1	–0.7	0.4	6.2	–1.8	2.7
Other transportation equipment	–0.4	–0.2	6.8	2.3	5.1	9.2	–10.4	–0.1	1.6	–3.1	–2.1	–4.1
Electronic equipment	–0.7	–7.2	3.3	–4.3	2.0	3.6	–21.5	–0.6	–4.6	–2.6	1.0	–5.4
Machinery and equipment	0.2	–0.3	4.7	–2.8	4.1	4.9	–19.0	–1.0	0.4	–3.1	2.6	–1.1
Other manufactures	0.5	–4.4	3.9	–3.7	4.5	10.7	–10.9	–0.4	0.7	–9.4	–10.5	–2.7
Nontraded services	0.1	1.1	–0.2	2.3	–0.4	–1.0	4.0	0.3	1.5	8.8	13.3	10.8
Traded services	0.0	–3.0	–6.4	–1.4	–1.5	–3.2	–1.1	0.1	–1.2	1.2	1.5	–0.4

CAFTA = Central American Free Trade Agreement
SACU = Southern African Customs Union

Source: Simulation results.