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Bernard Hoekman, Francis Ng
and Marcelo Olarreaga

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Bernard Hoekman, World Bank and CEPR
Francis Ng, World Bank
Marcelo Olarreaga, World Bank and CEPR

ABSTRACT

Reducing Agriculture Tariffs Versus Domestic Support: What's More Important for Developing Countries?*

High levels of protection and domestic support for farmers in developed countries significantly affect many least developed countries (LDCs), both directly and through the price-depressing effect of agricultural support policies. High tariffs and domestic support may also lower the world price of agricultural products, benefiting net importers. This Paper assesses the impact of reducing these distortionary policies for a sample of 119 countries. We find significant differences in the impact of a 50% cut in tariffs and a 50% cut in domestic support for LDCs as compared to non-LDC developing countries. For both groups of countries, however, tariff reductions have a much greater positive effect on exports and welfare.

Bernard Hoekman
Development Research Group
The World Bank
1818 H Street
Washington DC 20433
USA
Tel: (1 202) 473 1185
Fax: (1 202) 522 1159
Email: bhoekman@worldbank.org

Francis Ng
Development Research Group
The World Bank
1818 H Street
Washington DC 20433
USA
Tel: (1 202) 473 8088
Fax: (1 202) 522 1159
Email: fng@worldbank.org

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Marcelo Olarreaga
Development Research Group
The World Bank
1818 H Street
Washington DC 20433
USA
Tel: (1 202) 458 8021
Fax: (1 202) 522 1159
Email: molarreaga@worldbank.org

1   Introduction

Developing country agricultural exports are limited by high tariffs in many countries. Domestic support for farmers in high-income economies also hurts developing country exporters to the extent that it boosts domestic production, depresses world prices, exacerbates the volatility of world prices and reduces the scope for import competition. High tariffs and domestic support policies may, however, benefit net importers of agriculture products in developing countries by providing access to the subsidized commodities at lower prices.[1] Thus, as is well known, national interests regarding reform of OECD agricultural trade and support policies will differ. However, most analyses conclude that the overall gain to developing countries from reforming agricultural policies greatly outweighs the potential costs to countries that are significant net importers of subsidized agricultural products.

Starting in 2000, negotiations were launched in the WTO to further reduce intervention in agricultural markets. These negotiations focus on both subsidy policies and border protection (tariffs and tariff rate quotas). An important policy question confronting developing countries is to determine which instruments of agricultural protection are most detrimental to their interests. In this paper we attempt to shed some light on this issue by assessing the relative impact of tariffs and domestic support policies on exports and welfare of developing countries. Specifically, we assess the impact of a 50 percent global reduction in agricultural tariffs and compare this to a 50 percent cut in domestic support.[2] Our objective is to assess where negotiating efforts in the context of the current WTO negotiations on agriculture might be best directed.

We find that in welfare terms, tariffs matter significantly more than subsidy policies— tariff reductions generate welfare gains that are substantially greater than reductions in support policies.[3] In large part this is because of high tariff peaks in OECD countries and because developing countries also use tariffs to protect domestic production. As is almost always the case, when it comes to trade policy reform, the principle 'what you do determines what you get' applies. This does not imply that negotiations should therefore emphasize tariffs over domestic

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[1] This potential national welfare benefit is offset by the higher price volatility created by support policies as country specific shocks may be transferred to world markets. In this paper we ignore the extent to which price volatility is transmitted to world markets.

[2] The policy simulation can be motivated by a conservative interpretation of the Doha declaration: "….we commit ourselves to comprehensive negotiations aimed at: substantial improvements in market access, reduction of, with a view to phasing out, all forms of export subsidies; and substantial reductions in trade-distorting domestic support" (WTO Doha Ministerial Declaration, para 13, November 2001).

support policies. A major political economy problem confronting WTO negotiators is to create incentives for countries to liberalize agricultural trade. Most developing countries oppose further agricultural trade liberalization in an environment that is characterized by continued large-scale support for OECD farmers. Past experience has demonstrated that the gains from own liberalization are attenuated because of the market segmenting effect of OECD subsidy policies. Indeed, own liberalization in some instances—e.g., India—has proven to be politically unsustainable as farmers are subjected to large world price swings and import surges of subsidized commodities (Gulati and Narayanan, 2002). Substantial reduction in OECD agricultural support policies is therefore not just important for developing countries in its own right—in that it generates direct benefits for the many economies that are (potential) net exporters—but is critical to create the conditions to allow developing country governments to pursue domestic reforms. That is, subsidy reforms in OECD countries are necessary, although not sufficient, for developing countries to reap significant gains from the current WTO negotiations on agriculture.

In contrast to most quantitative analyses of the effects of agricultural trade policies, we use a partial equilibrium framework to estimate the impact of policy changes for a sample of 119 countries on world prices of agricultural commodities that benefit from domestic support in at least one WTO member. We limit the analysis to products that benefit from domestic support in order not to bias our findings. Because most countries apply tariffs to all agricultural products, not just those that are subsidized, any comparison of the effect of reducing tariffs on all agricultural goods with a reduction in support policies would conclude that tariffs are more important for developing countries. The partial equilibrium approach allows us to assess the effects of policy changes on individual countries, including low income and least developed economies that are of particular concern to the development community. The majority of these countries are generally subsumed in regional aggregates in applied general equilibrium models. The partial equilibrium approach also allows us to use disaggregated trade and protection data— we work at the 6-digit level of the Harmonized System.

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[3] Note that export subsidies are left outside the analysis but these are relatively small as they represent only 8-10 percent of total domestic support.

2   Tariffs and domestic support in agriculture

Agricultural products are often subject to tariff peaks that are 100 percent or higher (Hoekman, Ng and Olarreaga, 2002). The average MFN tariff that is applied to agricultural products varies substantially across countries, but in the majority of OECD countries is more than double than the average that applies for manufactures. In addition to tariffs, many high-income countries subsidize domestic agriculture. WTO data indicate that there are 158 commodities at the 6-digit level of the Harmonized System (HS) that benefit from domestic support in at least one WTO member. Large scale domestic support is primarily used by OECD countries, especially the EU, Japan and the United States. Industrialized countries account for 88 percent of total domestic support payments; if South Korea and transition economies such as Poland are excluded, developing countries account for only 10 percent of total support reported to the WTO during 1995-6 (Table 1). Major subsidizers among developing countries include Brazil, Thailand and Venezuela. Not surprisingly, least developed countries (LDCs) report virtually no domestic support. Meat, dairy, cereals and sugar account for the lion's share of domestic support, representing almost 75 percent of all reported non-exempt domestic support (WTO categories DS4-9) (Table 2).

The average tariff on these subsidized products is around 18 percent, with peaks in the 100-200 percent range for many countries (Table 3). Average tariffs are relatively uniformly distributed across major product categories, with the highest applying in dairy and sugar (and alcoholic beverages—a special case given use of tariffs for excise purposes) (Table 4). These are also the sectors that have the highest levels of domestic support. A number of countries make intensive use of specific tariffs for agricultural imports. One consequence of this is that statutory average ad valorem MFN tariffs understate the level of tariff protection, especially for the EU and Japan.[4] In this paper we use estimates of ad valorem equivalents of specific tariffs for the 158 tariff lines on which the analysis focuses, drawing on data reported in Stawowy (2001) and OECD (2000). Given that estimates of ad valorem equivalents for Switzerland are incomplete and unreliable, we have excluded this country from the analysis (Switzerland relies almost completely on specific tariffs).

The global pattern of protection and support to agriculture will have differential impacts on countries depending on whether they are net producers or consumers of the commodities

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[4] Fontagné et al. (2002) report that the EU, Japan and the US have 1,059, 418 and 1,148 six-digit tariff lines that are subject to specific tariffs.

affected. A first cut at identifying the likely implications of protectionist policies for individual countries is to calculate the relative importance of exports and imports of the products that are subsidized by at least one WTO member. Such data reveal that LDCs are much more affected than other countries: 18 percent of their exports on average comprise goods that are subsidized in at least one WTO member, compared to 3-4 percent for other countries (Table 5). A similar observation holds for imports—nine percent of LDC imports involve products that are subsidized, compared to 3-4 percent for other countries. For many LDCs the potential incidence of subsidies is very high. Thus, for countries such as Benin, Burkina Faso, Burundi, Chad, Malawi, Mali, Rwanda, Sudan, Tanzania, Uganda and Zimbabwe, 60 to 80 percent of total exports comprise goods that are subsidized by one or more WTO members. Given that these are also countries that tend to have preferential—mostly duty-free—access to the European market (through the GSP and Everything But Arms initiative), this suggests subsidies are an important issue for WTO negotiations (as subsidies are not covered by preferential access agreements).[5] However, this ignores the depressing effects of tariffs by major WTO members on world prices, as well as the impact of own tariffs—issues that are explored empirically below.

Table 5 also identifies countries where the ratio of imports of subsidized goods to total imports is higher than the ratio of "affected" exports to total exports. In such cases it is possible that global liberalization may have short run negative effects on the terms of trade and/or welfare insofar as the prices of imports are lowered because of subsidies. Countries where the balance is tilted towards imports of subsidized commodities comprise countries at very different levels of per capita incomes. They include Bangladesh, Comoros, Egypt, Gambia, Guinea, Jordan, Korea, Maldives, Mauritania, Morocco, Nigeria, Oman, Saudi Arabia, Senegal, Taiwan, Tunisia and Venezuela.

The agricultural domestic support numbers reported to the WTO comprise a mix of instruments and measures. The major distinction that is made is between measures that are exempted from WTO reduction commitments under the Uruguay Round Agreement on Agriculture and those that are not. The former include so-called green box support, measures whose use is permitted for developing countries and payments under production limiting

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[5] It is difficult to assess to which extent EBA offers actual preferential access to LDCs as rules of origin and other non-tariff barriers may actually erode the preferential access granted on paper. In the case of the US initiative for Sub-Saharan Africa (AGOA), there is data made publicly available on the actual gains for African countries and these tend to be small (Mattoo, Roy and Subramanian, 2002). In the case of Europe, Brenton and Manchin (2002) show evidence that EU preferential access schemes have offered limited benefits due to restrictive rules of origin.

programs (including the blue box).[6] The latter include measures that are deemed to directly support production. As our interest in this paper is to compare the effect of border protection (tariffs) with domestic subsidy-type support on a product-by-product basis, we use the WTO Aggregate Measure of Support (AMS) data, as this does not include the effect of border barriers. We recognize that there are a number of limitations associated with the AMS data. One problem is that the time period for which data are available is short and reporting is incomplete, especially for more recent years. This is discussed further in the data annex. Another problem is that the economic relevance of the AMS time series is limited given the use of the fixed 1986-88 benchmark for purposes of calculating price support. However, assuming that changes in world prices over time have a proportional effect on the AMS figures of all WTO members, the double log specification used to estimate the import demand and export supply and the focus on percentage changes in variables should not result in a major bias in our results.

3   Analytical framework

To estimate the impact that a reduction in tariffs and/or domestic support may have on exports and welfare we use a simple partial equilibrium model. World markets are assumed to be perfectly competitive and integrated, in the sense that there is no further scope for arbitrage across countries. Products traded in world markets under the same 6-digit HS classification are considered to be perfectly homogenous.[7] Each 6-digit HS product category represents only a small share of the economy, so that the effect on other product markets of changes in a particular category is negligible.[8]

Import demand for each HS-6-digit product of country c is given by:

$$m_c = \frac{a_c}{\left[p_w(1+t_c)(1+\tau_c)\right]^{\varepsilon^d} s_c^{\lambda^d}} \tag{1}$$

---

[6] See Hoekman and Kostecki (2001) for a review of the WTO Agreement on Agriculture.

[7] In practice there may be heterogeneity even at the 6-digit level in that imports (or exports) may be of a higher quality than exports (imports). In some developing countries high quality imports may have only a limited degree of competition with low quality domestic production. If so, this will imply that traditional measures of protection such as the ratio of import to domestic price for the product will overstate the magnitude of protection. In this paper we use only tariffs, not the nominal rate of protection.

[8] The setup is very similar to the one in Zietz and Valdés (1986) and Hoekman, Ng and Olarreaga (2002). The latter discuss some of the caveats associated with the use of this type of model. Note that no account is taken of issues such as the potential impact of exchange rate overvaluation, indirect taxes and other factors that may result in an overall anti-agriculture bias and thus offset the effect of tariff protection and/or subsidy policies. Schiff and Valdes

where ε^d is the import demand elasticity (common to all countries), p_w is the price in the "world" market; t_c is the tariff in country c; τ_c is the average transport cost from country c to the "world" market;[9] s_c is the producer support in country c;[10] λ^d is the elasticity of import demand to the producer support through domestic supply (common to all countries); and a_c is a demand parameter in country c that captures size and all other factors influencing import demand.

Export supply for each HS-6-digit product of country c is given by:

$$x_c = b_c \left[\frac{p_w}{(1+\tau_c)} \right]^{\varepsilon^s} s_c^{\lambda^s} \tag{2}$$

where ε^s is the export supply elasticity (common to all countries), λ^s is the elasticity of export supply with respect to domestic support (common to all countries);[11] and b_c is a supply parameter that captures size and other determinants of export supply. The transport cost to world markets is also common among exporters and importers of the same product. The presence of tariffs and domestic support measures may lead to both imports and exports of a homogenous product for a country.

The equilibrium world price is obtained by solving for the world price in the world market clearing condition, i.e.,

$$p_w^e = \underset{p_w}{\mathrm{argsol}} \left[\sum_c m_c - \sum_c x_c = 0 \right] = \left[\frac{\displaystyle\sum_c \frac{a_c}{[(1+t_c)(1+\tau_c)]^{\varepsilon^d} s_c^{\lambda^d}}}{\displaystyle\sum_c \frac{b_c s_c^{\lambda^s}}{(1+\tau_c)^{\varepsilon^s}}} \right]^{1/(\varepsilon^s+\varepsilon^d)} \tag{3}$$

(1998) suggest that in many developing countries anti-agriculture bias due to such policies has declined, implying that direct instruments such as tariffs and subsidies are the major determinants of the magnitude of protection.
[9] This explains differences in import prices across different countries as observed in the data.
[10] We attribute to countries with no domestic support a \$1 value for the import demand function not to be undetermined.

The change in the world equilibrium price following a reduction in tariffs is obtained by taking the total differential of (3) with respect to τ_c. The percentage change in the world price with respect to a common percentage change in tariffs in all countries is then:

$$\hat{p}_w^e = -\frac{\varepsilon^d}{\varepsilon^d + \varepsilon^s}\hat{t}\left[\frac{\sum_c \frac{t_c}{(1+t_c)}\frac{a_c}{[(1+t_c)(1+\tau_c)]^{\varepsilon^d} s_c^{\lambda^d}}}{\sum_c \frac{a_c}{[(1+t_c)(1+\tau_c)]^{\varepsilon^d} s_c^{\lambda^d}}}\right] \tag{4}$$

where a "hat" (^) denotes the percentage change in the variable.

Similarly, the percentage change in world prices following a common percentage change in subsidies is:[12]

$$\hat{p}_w^e = -\frac{\hat{s}}{\varepsilon^d + \varepsilon^s}\left[\lambda^d \frac{\sum_c \frac{s_c-1}{s_c}\frac{a_c}{[(1+t_c)(1+\tau_c)]^{\varepsilon^d} s_c^{\lambda^d}}}{\sum_c \frac{a_c}{[(1+t_c)(1+\tau_c)]^{\varepsilon^d} s_c^{\lambda^d}}} + \lambda^s \frac{\sum_c \frac{s_c-1}{s_c}\frac{b_c s_c^{\lambda^s}}{(1+\tau_c)^{\varepsilon^s}}}{\sum_c \frac{b_c s_c^{\lambda^s}}{(1+\tau_c)^{\varepsilon^s}}}\right] \tag{5}$$

The change in export revenue and import revenue associated with a change in tariffs or domestic support is given by:

$$\hat{x}_c^r = (1+\varepsilon^s)\hat{p}_w + \lambda^s \hat{s}_c \frac{s_c-1}{s_c}$$

$$\hat{m}_c^r = -(\varepsilon^d-1)\hat{p}_w - \varepsilon^d \, \hat{t}\frac{t_c}{1+t_c} - \lambda^d \hat{s}_c \frac{s_c-1}{s_c} \tag{6}$$

where $\hat{x}_c^r$ is the percentage change in export revenue in country c, and $\hat{m}_c^r$ is the percentage change in import revenue in country c. Note that if there is no producer support or tariffs in

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[11] Again, we attribute to countries with no domestic support a $1 dollar value for the export supply function not to be undetermined.

[12] Here we do not change the $1 domestic support subsidy attributed to countries with no domestic support.

country c, then there will be no changes in export revenue or import revenue in this country, a part from those induced by the change in world price after other countries have reduced their tariffs or producer support.

Finally, one can measure the change in welfare in an importing and exporting country by taking the integral of the import demand and export supply functions with respect to world prices and tariffs (it is assumed that domestic support is just a transfer from government revenue to producers). The change in exporters and importers welfare relative to their initial export and import revenue is then given by:

$$\hat{w}_c^x = \frac{1}{1+\varepsilon^s}\left((1+\hat{p}_w)^{\varepsilon^s+1}-1\right)\left(1+\hat{s}\frac{s_c-1}{s_c}\right)^{\lambda^s}$$

$$\hat{w}_c^m = \frac{1}{(\varepsilon^d-1)}\left(\frac{1}{\left(\left(1+\hat{p}_w+\hat{t}\frac{t_c}{1+t_c}\right)^{\varepsilon^d-1}\right)}-1\right)\frac{1}{(1+t_c)^{\varepsilon^d}\left(1+\hat{s}\frac{s_c-1}{s_c}\right)^{\lambda^d}}+$$

$$t_c\hat{m}_c^r+\hat{t}\frac{t_c}{1+t_c} \qquad (7)$$

where $\hat{w}_c^x$ is the change in welfare in an exporting country relative to the initial export revenue;[13] $\hat{w}_c^m$ is the change in welfare in an importing country relative to the initial import revenue. The first term on the right-hand-side of $\hat{w}_c^m$ is the change in import consumer surplus and the second term is the change in tariff revenue. Note that changes in welfare in (7) take into account shifts of domestic import demand and export supply functions following changes in domestic tariffs and domestic support (when relevant). The overall change in welfare can be obtained by adding up the two expressions in (7) after normalizing the two terms to the same base (exports, imports, total trade, or in $ per capita terms).

4 Empirical methodology

The empirical methodology consists of three steps. First we estimate import demand and export supply elasticities with respect to prices and subsidies (i.e., ε^d, ε^s, λ^d and λ^s). We then

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[13] Note that is exactly equal to the percentage change in world prices if the elasticity of export supply is nil.

calibrate the demand and supply parameters (i.e., a_c and b_c) for each country and product (at the HS six-digit level). Finally, we use the elasticities and calibrated parameters to measure the changes in world prices, export revenue, import revenue and welfare following a 50 percent reduction in agriculture tariffs and domestic support in all countries.

To estimate the different elasticities, we could simply estimate the import demand and export supply functions (1) and (2). However, these are simultaneously determined in any country *c*. Moreover, we do not observe "world" prices, but only export and import unit prices in each country, which include transport costs. If traded quantities are measured with error (which is likely as customs generally are more concerned with value), unit prices will also be measured with error, which may bias our results. To avoid these problems we estimate the net import demand function as the log difference of import demand and export supply. Using the import demand and export supply functions in equations (1) and (2), this translates into estimating a stochastic version of:

$$
\begin{aligned}
\log(m^r) - \log(x^r) = \log(a_c) - \log(b_c) - \varepsilon^d \log(1+t_c) - \\
(\varepsilon^d - \varepsilon^s) \log(1+\tau_c) - (\lambda^d + \lambda^s) \log(s_c)
\end{aligned}
\tag{8}
$$

As controls for a_c and b_c we use GDP and population in each country. Product dummies at the HS six-digit level are also included.

In the second step, using the elasticities estimated using a stochastic version of (8), we calibrate a_c and b_c using (1) and (2). The estimation of changes in world prices, import revenue, export revenue and welfare is done using equations (4) to (7).

Data on import and export revenue as well as tariffs are available from the World Bank WITS database at the six digit of the harmonized system. The measure of domestic support that is used is the WTO Aggregate Measure of Support (AMS), obtained from the WTO, based on member notifications (WTO document G/AG/NG/S/1, April 13, 2000). The AMS data are based on an arbitrary product classification and were concorded to the HS classification (see the Data Annex).

Only 30 WTO members have made domestic support reduction commitments under the Agreement on Agriculture (AoA), but all members are required to notify domestic support. Compliance is weak—in 1995 only 75 percent of all WTO members that were required to notify, did so. In 1996 and 1997 the coverage drops to around 50 percent; for 1998 only 28 percent of

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WTO members had notified by March 2000. However, most countries that did not notify in 1997-8 had very little or no support in 1995-6, so the coverage of the data spans the major users. To address the incomplete reporting problem, we use the average AMS reported for whatever years are available. The empirical analysis therefore involves an unbalanced panel.

Domestic support notified to the WTO includes exempt and non-exempt measures. There are nine categories of support, designated DS1 through DS9. DS1 covers measures that WTO members have placed in the "green box", and are therefore exempt from reductions (the green box categories are defined in Annex 2 of the AoA). DS2 comprises measures that, for developing countries, are exempt from reduction commitments under Article 6.2 of the AoA relating to development programs. DS3 is used to signify direct payments under production-limiting programs under Article 6.5 of the AoA. Categories DS4 to DS9 comprise measures that are *not* necessarily exempt from reduction commitments. DS4 refers to non-exempt support that is below the de minimis level (as set out in Article 6.4 of the AoA). The remaining categories included in the total AMS of WTO members include market price support (DS5), non-exempt direct payments (DS6), other product-specific support (DS7), and any support measured via the Equivalent Measurement of Support methodology (DS8). Finally, where relevant, a total figure for non-product-specific support is also given (DS9).

Two problems with the estimation of equation (8) are (i) that transport costs are not directly observable and (ii) that we cannot retrieve the elasticity of import demand and export supply with respect to subsidies, but only its sum. Assuming that transport costs to the world market are equal for exporters and importers, these costs can be proxied by the ratio of export and import unit prices. As long as the measurement error in unit prices is identical for exports and imports the problems described above are addressed. As regards the second issue, we assume that elasticities of import demand and export supply with respect to subsidies are equal. A justification for this is that in both cases their effect occurs *only* through domestic supply.[14]

5 Results

We first focus on the estimation of the price and domestic support elasticity of export supply and import demand and then turn into the results of the simulation exercise.

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[14] Note that changes in world prices, tariffs and transport costs will affect both domestic demand and supply. In the simulations, we test the robustness of our results by letting the elasticities with respect to domestic support on the demand and supply side vary.

Estimating elasticities

Table 6 reports the results of the estimation of equation (8) using different measures of domestic support. In column 1 results are reported using notifications by WTO members of non-exempt support (this corresponds to categories DS4 to DS9 according to WTO notification procedures). These are (generally) product specific and include market price support (calculated according to the methodology in Annex 3 of the Uruguay Round Agreement on Agriculture) and non-exempt direct payments (denoted s_c^{DS4-9}). Column 2 reports results using notifications on exempt domestic support (this corresponds to categories DS1 to DS3 according to WTO notification procedures). These are non-product specific and include measures which WTO members have placed in the "green box", measures that are exempt in developing countries and direct payments under production-limiting programs (the 'blue box'). Such non-product specific support is allocated for purposes of estimation across products using the distribution of domestic support commitments by product (the idea being that exempt support is likely to be higher in sectors where non-exempt support is larger following a political-economy logic). This type of domestic support is denoted as s_c^{DS1-3}. Column 3 reports results of the estimation of (8) with the two types of domestic support entering separately. Finally, Column 4 reports results using the sum of both types of support.

Given the unbalanced nature of the data set, we work with a between estimator, using as observations the average across the four year period for which support data are available, rather than the annual data.[15] The elasticities are then identified using the cross-country variation for each product.[16] Results across the four specifications generally yield an elasticity of import demand around 1.36-1.45 and an elasticity of export supply around 0.19-0.28. The (sum) of the elasticities of domestic support varies from almost 0 (in the case of DS1-3 in column 3) to 0.10 in column 1 (DS4-9). The fact that DS1-3 is insignificant in column 3 may be due to collinearity problems given the methodology used to construct this variable (i.e., general domestic support is distributed across products using product specific support commitments). When both types of domestic support are added up in column 4, the (sum) of the elasticity of domestic support is statistically significant.

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[15] This is also due to the fact that ad-valorem equivalents of specific tariffs have only been estimated for 1999 in OECD (2000) and Stawowy (2001).
[16] Thus, the variation in import and export prices across countries, which is explained by transport cost to the "world" market, allows us to identify the different elasticities.

To determine whether we should work with the sum of the two types of domestic support, we run a non-linear specification of equation (8) to test whether the two types of domestic support can simply be added up. Results are reported below, with standard errors in parenthesis:[17]

$$
\begin{aligned}
\log(m^r) - \log(x^r) = \underset{(0.42)}{0.29} + \underset{(0.04)^{**}}{0.34} \log(gdp_c) - \underset{(0.04)^{**}}{0.45} \log(pop_c) - \underset{(0.05)^{**}}{0.34} \log(1+t_c) - \\
- \underset{(0.08)^{**}}{1.17} \log(1+\tau_c) - \underset{(0.02)^*}{0.04} \log\left(s_c^{DS4-9} + \underset{(0.00)}{0.00}\, s_c^{DS1-3} \right)
\end{aligned}
\tag{9}
$$

Equation (9) suggests that we should drop the general domestic support DS1-3 from the estimation, as the coefficient on s_c^{DS1-3} is not significantly different from zero. In the specification we employ in the simulations below we therefore only include non-exempt domestic support s_c^{DS4-9}, i.e., we use the results reported in column 1 of Table 6. Thus, the 50 percent reduction in domestic support used in the simulations pertains only to non-exempt domestic support (as exempt domestic support does not seem to affect trade flows and therefore should have no—or little—impact on world prices).[18]

The estimation in column 1 is done across the 158 HS 6 digit commodities. We therefore assume these elasticities to be common across these different products. This is not necessarily the case of course, as there may be heterogeneity across products. Table 7 reports results of the estimation in column 1 of Table 6 letting the elasticity vary across different groups of products (a seemingly unrelated regression technique was used to provide standard error estimates to control for a common explanatory variable that is omitted from the regression). The first five columns in Table 7 reports the results for animal products (HS 01 to 04), vegetables, fruits and nuts (HS 6 to 9), cereals and grains (HS 10 to HS 14), processed food products (HS 15 to HS 24), and cotton and other textile fibers (HS 50 to 53). While the variations in import demand and export supply elasticities are quite large, the elasticity with respect to domestic support is similar across sectors (it varies between -0.07 and -0.16). The product group-specific elasticities are used below as the

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[17] A "*" indicates statistical significance at the 5 percent level; "**" indicates significance at the 1 percent level.
[18] Note that exempt domestic support is generally de-linked from production and is more likely to affect the production decision rather than the level of production as measured when working with trade flows.

base estimates for the simulation exercises. The overall estimates in column 1 of Table 6 are used to test for the robustness of the results.[19]

Note that because we use the information on cross-country variation to estimate the different elasticities, it is assumed that these elasticities do not vary across countries. If we were to relax this constraint, the solution to the model in Section 3 would be non-linear. To determine the restrictiveness of this assumption we estimated the equation in column 1 of Table 6 for the three major users of domestic support separately: the EU, Japan and the United States. The results—not reported—suggest heterogeneity in the price elasticities across countries, but the imprecision in the parameter estimates did not allow the hypothesis to be rejected that they are equal across countries. Estimates of elasticities with respect to domestic support were relatively homogenous (-0.08 for the EU, -0.12 for Japan and –0.10 for the United States). Thus, the elasticity of net import demand with respect to domestic support seems to be relatively small (around 0.1) suggesting a reduction in domestic support across WTO members is likely to have a small impact on world prices.[20]

Simulation results

In our baseline simulations we use the estimated coefficients in Table 7 to calibrate import demand and export supply in each country. Then changes in export revenue, import revenue, and welfare following a 50 percent cut in tariffs and domestic support to farmers across all WTO members are calculated for each country using (6) and (7). We also calculate the change in terms of trade by weighting the changes in prices by export and import shares in each country. Recall that the simulations are done for the 158 tariff lines at the HS 6-digit level for which at least one country provides domestic support to its farmers. (The overall agriculture universe includes more than 900 tariff lines at the HS 6-digit level).

Table 8 reports results on the change in export revenue, the import bill, the terms-of-trade and welfare for the three broad country groups of a 50 percent tariff reduction or a 50 percent

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[19] Note that for Animal products, Cereals and other grains, and Silk, Cotton & other fibres, the coefficient capturing the import demand elasticity is insignificant whereas the difference between the import demand and export supply price elasticities is significant. In these three cases, we cannot reject the assumption that the export supply elasticity is zero. We therefore set the export supply elasticities to zero in the simulations for these products and calibrate the import demand elasticities accordingly.

[20] Note that the implicit assumption here is that domestic support only affects the variable cost of farmers receiving the subsidy, as we move along the export supply and import demand functions. If domestic support affects fixed costs (or the production decision), as is probably the case with subsidies that are decoupled from production, we would need to work along the domestic supply function. Data on production is not available for such a large number

domestic support reduction. Aggregate product specific and individual country results are reported in Appendix Tables 1 and 2. The increase in trade across all country groups is much larger for the 50 percent tariff cut than for the reduction in domestic support. Exports of developing countries (excluding LDCs) increase by $4.2 billion, or 6.7 percent of the initial export revenue for the 158 product categories (Table 8). LDC exports increase by $116 million (or 3.7 percent), while industrialized country exports increase by $3.3 billion dollars (4.7 percent). There is also an increase in the import bill following the 50 percent tariff reduction. In industrial countries the increase in imports is double the increase in exports (due both to an expansion in demand and higher world prices). The increase in imports in developing and least developed countries is roughly equal to the increase in exports.[21]

In relative terms many developing countries see a significant expansion in exports following a 50 percent cut in tariffs. Figure 1 plots the impact on exports of a 50 percent cut in tariffs (in the vertical axis) and domestic support (in the horizontal axis) trade for the 121 developing and least developed countries in the sample. The vertical and horizontal lines indicate a "zero" change in exports due to a cut in tariffs or domestic support, respectively. The highest percentage increases in exports are found in the Caribbean and Central American region reflecting the specialization of these countries in commodities such as edible fruits and vegetables, processed foods and sugar—the categories that see the largest expansion in demand in percentage terms (Appendix Table 1).[22] Mauritius, Philippines and Thailand—all developing countries that are producers of such commodities—also see increases in exports of over 10 percent. With a few exceptions such as Congo and Malawi, African countries tend to register only limited increases in exports.

The increase in exports following a 50 percent cut in domestic support is ten times lower than what is generated by cutting tariffs (Table 8). Developing country exports increase by $0.5 billion, or 0.8 percent of the 1995-1998 average level of exports. LDC exports rise by $64 million (2 percent), while industrial countries expand exports by $314 million (0.5 percent). More striking is the fact that the import bill decreases in developing and least developed

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of countries at the disaggregated level required. This also suggests that we should be working only with non-exempt subsidies (which are generally not decoupled from production).

[21] Note that the increase in exports is not necessarily equal to the increase in imports at the aggregate level for two reasons. First, increases in export and import revenue are measured at customs and therefore include transport cost. Second, we did not have data for all countries, so it is assumed that the rest-of-the world also adjusts to changes in world prices.

countries after a 50 percent cut in domestic support (Figure 2). The reason for this is that world prices increase after the cut—import demand functions being relatively elastic, the import bill necessarily decreases.

Welfare increases in all groups of countries after multilateral tariff reforms (Table 8). The increase in welfare for developing countries generated by the 50 percent tariff cut is due not only to increased exports, but to the liberalization that occurs in these countries (and the absence of domestic support). In contrast, developing countries as a group would see a small reduction in welfare following a cut in domestic support. The relatively high tariffs that prevail in many of these countries explain why the impact in welfare terms is so different. The potential negative implication of a cut in domestic support illustrates the importance of also cutting tariffs.

In the case of LDCs the ratio between gains is quite different. Instead of the ratio between export gains due to tariff vs. domestic support cuts being 10 to 1, it is only two to one. Moreover, the simulations suggest that these countries will obtain welfare gains from both types of reform. These differences between the two country groups reflects both the LDCs greater 'sensitivity' in relative terms to OECD support policies and the pattern of production and trade in the various products.

There is substantial heterogeneity across countries, reflecting differences in export and import bundles. Variations in the levels of tariffs and domestic support across different products in large trading partners also partly explain this heterogeneity. A cut of 50 percent in tariffs generates a relatively large increase in developing country exports of edible vegetables, fruits and nuts (HS07-08), sugar (HS17) preparations of vegetables and fruits (HS 20-21) and tobacco (HS24). In the case of LDCs, the largest increases occur in meat (HS02), sugar and miscellaneous edible preparations (HS21) (Appendix Table 1).[23]

A large number of countries in the sample see their terms-of-trade deteriorate after a 50 percent tariff cut (Appendix Table 2). This is also the case following a 50 percent cut in domestic support. Figure 3 plots the change in terms of trade following changes in tariffs and domestic support. As before, the vertical and horizontal lines indicate a "zero" change in the terms of trade. Changes in terms of trade seem to be positively correlated across the two types of cuts, i.e.,

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[22] To the extent that these countries enjoy tariff preferences in some products for these products, results may overstate their gains. But again, preferential access on paper does not necessarily mean actual preferences granted. Second, these are very small countries that only marginal affect the overall picture for developing countries.
[23] Note that here we abstract from sanitary or phyto-sanitary barriers, as well as other non-tariff barriers that may also be hindering trade.

countries that see their terms of trade increase after a tariff cut will also see their terms of trade improve after a domestic support cut.

The fact that the terms-of-trade deteriorates does not necessarily imply a reduction in welfare, given that countries own reforms will tend to increase welfare. Nonetheless in a number of instances welfare does decline. This is the case in particular for oil producers and large net importers such as Algeria, Bahrain, Brunei, Egypt, Gabon, Oman, Russia, Saudi Arabia, and Venezuela. Any welfare losses are generally much smaller if the experiment is a 50 percent cut in domestic support. Figure 4 plots the change in welfare per capita under the tariff cut against the change in welfare per capita under the domestic support cut for the countries in the sample, with the horizontal and vertical lines again indicating a "zero" change in welfare. Thus, countries in the North East quadrant of Figure 2 see their welfare increase under both types of reforms. This includes Mauritius, Fiji, Belize, Guyana, Costa Rica, Uruguay, etc. There are no countries in the South East quadrant, suggesting that there is no case where a country increases its welfare under the cut in domestic support but see its welfare reduced under the tariff cut. Losers under both types of reforms include the large net importers mentioned previously.

Sensitivity analysis

Given the various assumptions made with respect to elasticities, a number of sensitivity analyses were performed. We first re-estimated the figures in Table 8 using the elasticity estimates provided for the whole sample in the first column of Table 6 (instead of the elasticity estimates by product reported in Table 7). We also re-estimated the numbers of Table 8 using extreme values (i.e., instead of half the estimated coefficient in Table 8, we use either zero or the total value of the estimated coefficient) for the elasticities of domestic support on the import and export side. Finally, we compared results with the case where only OECD members reduce their tariffs and domestic support.

Using the elasticities estimated for the whole sample, the increase in exports after a 50 percent tariff cut is 25 percent lower for developing countries and 15 percent lower for LDCs. On the other hand, the increase in exports after a 50 percent cut in domestic support is 25 percent higher for developing countries, but 20 percent lower in the case of LDCs. Thus the imbalance in terms of gains is partly reversed. However, the qualitative results remain: the increase in exports by developing countries is 5 times larger under the 50 percent tariff cut than under the 50 percent domestic support cut. Similarly, for LDCs the increase in exports under the 50 percent tariff cut

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is 2 times larger than under the domestic support cut. The welfare gains for developing countries are positive in the case of tariffs, whereas they suffer welfare losses when domestic support is cut. For LDCs the welfare increase is 50 percent higher under the tariff cut.

As noted earlier, we cannot empirically identify the elasticity of domestic support on import demand and export supply separately, but only its sum. To test the sensitivity of our assumption that the two are equal, we assume that each in turn is zero and the coefficient identifies the other one. The estimated changes in export revenue, imports and welfare of a 50 percent tariff cut are not affected by these modifications (as import demand and export supply are re-calibrated accordingly). In the case of a 50 percent cut in domestic support, the increase in exports by developing countries is 30 percent higher when we assume that the domestic support elasticity of export supply is zero and 80 percent lower when we assume that the domestic support elasticity of import demand is zero. In terms of developing countries' welfare, the loss is 22 percent lower when the elasticity of export supply is zero and 25 percent higher when the elasticity of import demand is zero. In the case of LDCs, the estimated change in exports is marginally affected under both scenarios. For both groups of countries, however, the qualitative results remain the same.

Finally, we compared our results with a scenario where the 50 percent cut in tariffs and domestic support is undertaken only by OECD countries. In the case of domestic support, the increase in exports of developing countries is only 3 percent lower, which suggests that for non-LDC developing countries almost all the action from the reduction in domestic support comes from actions by the OECD. However, the increase in exports is 25 percent lower for LDCs. This suggests that domestic support in other developing countries affect LDC exports to a larger extent than other developing countries. This is also the case for tariff cuts. When OECD countries cut their tariffs by 50 percent, the increase in LDC exports is only 30 percent of the increase in exports when all WTO members reduce their tariffs by 50 percent. For other developing countries, the increase in exports under an OECD tariff cut is only half of the $4.2 billion generated if all WTO members reduce their tariffs by 50 percent. These results illustrate the importance of more general liberalization of trade in the commodities concerned.

6   Conclusions

As is the case for tariff peaks—see Hoekman, Ng and Olarreaga (2002)—we find that LDCs are disproportionately affected by agricultural support policies. Reducing such support is therefore

important. However, tariffs matter a lot more than subsidies in terms of their impact on world prices. The positive welfare effect of reducing tariffs on products that are also affected by agricultural support is a multiple of what can be achieved from an equivalent percentage cut in domestic support only—tariff reductions generate welfare gains that are a multiple of what can be obtained from reductions in support policies. This not only reflects the high tariff peaks in OECD countries, but the fact that developing countries use tariffs to protect domestic production. These countries generally have low levels of domestic support, reflecting both budget constraints and a more neutral policy stance in terms of supporting this sector of the economy.

Our analysis suggests the primary focus of attention should therefore be on reducing border protection in both OECD and developing countries. The negotiating challenge is how to achieve this. For developing countries tariffs are an important—indeed often the only—instrument of intervention that they have available to respond to the effects of OECD subsidy policies. An important dimension of agricultural support policies that has been ignored in this paper—the impact on price volatility—plays a major role here (Valdes and Foster, 2002). Tariff protection can shelter farmers from import surges in periods where world prices drop significantly. Whatever the source of the exogenous shock that drives prices down, much of the adjustment tends to fall disproportionately on residual (non-OECD) markets because support policies shelter OECD farmers from the shock. Unilateral liberalization of agricultural trade in countries such as India proved to be politically unsustainable as farmers were subjected to large world price swings and import surges of subsidized commodities (Gulati and Narayanan, 2002). Many developing countries therefore oppose further agricultural trade liberalization in an environment that is characterized by continued large-scale support for OECD farmers. Substantial reduction in OECD agricultural support policies is therefore important not only because it generates direct benefits for the many developing economies that are net exporters, it is critical to create the political support to induce (allow) developing country governments to continue to pursue welfare improving domestic agricultural trade policy reforms. Thus, reductions in production subsidies in OECD countries are necessary, although not sufficient, for developing countries to reap significant gains from the current WTO negotiations on agriculture.

The fact that our simulations suggest that a number of countries are predicted to lose from reforms suggests liberalization and removal of domestic support should be accompanied by compensation mechanisms, which could include additional 'aid for trade' (Hoekman, 2002). Of course, it is important to bear in mind that our analysis has been limited to only a few—the

subsidized—commodities. The Doha negotiations span all trade, including non-subsidized agricultural products and manufactures. The overall welfare numbers generated by our analysis are therefore not particularly relevant, except to indicate that the countries that lose from reforms that affect the subsidized sub-set of agricultural products will need to identify other areas in which they can generate offsetting gains. In principle this should be straightforward given the large negotiation set that was established in Doha.

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Table 1: Total Domestic Support Notifications to WTO by Income Country Group, 1995-98 ($ million)

Country/Group /c	Green box (exempt) /a				Domestic support /b				Total (DS1-DS9) /a/b			
	1995	1996	1997	1998	1995	1996	1997	1998	1995	1996	1997	1998
Industrial Countries (23)	145069	139650	77971	4730	119094	114118	37725	3980	264163	253767	115696	8711
of which:												
Canada	1529	1463			1482	5306			3011	6769		
European Union (15)	51833	55360			66743	65905			118577	121265		
Japan	33691	25905	21919		37686	30952	26544		71377	56858	48464	
Norway	1771	1762	1562	1560	1559	1645	1505	1459	3329	3407	3068	3019
Switzerland	2299	2404	2121	2191	3625	2964	2374	2257	5924	5368	4494	4448
United States	53071	51825	51249		7699	7074	7050	0	60770	58899	58299	
Developing Countries (81)	21484	18468	17439	7208	16418	7269	13279	10971	37902	25737	30718	18179
of which:												
Brazil	5241	2872	3739		295	363	307		5536	3235	4046	
Colombia	450	719	426		58	4	14		508	723	441	
Israel	292	414	338		533	559	554		825	973	892	
Korea	5200	6481	6133	3858	3057	2872	2711	1674	8257	9353	8844	5532
Poland	436	549	878	851	254	227	292	302	691	776	1170	1154
South Africa	763	525	544		617	654	542		1380	1179	1086	
Thailand	1568	2106	1738	1160	633	510	534	397	2202	2616	2272	1556
Venezuela	730	657	675		3064	794	1054		3793	1450	1730	
Least Developed Countries (30)	12	112	3	61	0	0	0	0	12	112	3	61
All countries	166565	158230	95413	11999	135512	121387	51004	14951	302077	279617	146417	26950
Memo: As % of total share												
Industrial Countries (23)	87.1	88.3	81.7	39.4	87.9	94.0	74.0	26.6	87.4	90.8	79.0	32.3
Developing Countries (81)	12.9	11.7	18.3	60.1	12.1	6.0	26.0	73.4	12.5	9.2	21.0	67.5
Least Developed Countries (30)	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2

Notes:
/a Green box, measures that are exempt for developing countries and policies covered by production-limiting programs (WTO categories DS1,DS2,DS3).
/b Comprises WTO categories DS4 to DS9—includes price support. See text for discussion and description.
/c Number of countries reported in the parentheses. A total of 120 countries notified to WTO during 1995-98
Source: Based on WTO document G/AG/NG/S/1.

Table 2: Commitments and Average Direct Domestic Support Levels, 1995-98

HS-2 Product	Direct Support ($ mil)		As % of Total (in %)	
	Commitment	1995-98	Commitment	1995-98
01 Live animals.	250	63	0.1	0.1
02 Meat and edible meat offal	60155	14907	22.3	18.5
04 Dairy prod; birds' eggs; honey	39372	11557	14.6	14.3
06 Live tree & other plant; bulb, cut flowers	0	14	0.0	0.0
07 Edible vegetables and roots & tubers	10326	3975	3.8	4.9
08 Edible fruit and nuts; melons	7879	3474	2.9	4.3
09 Coffee, tea, mat and spices	1272	50	0.5	0.1
10 Cereals.	104109	27953	38.5	34.6
11 Milled products; malt; starches	421	142	0.2	0.2
12 Oil seed, oleaginous fruits	8577	447	3.2	0.6
13 Lac; gums, resins & other vegetables	0	0	0.0	0.0
15 Animal/vegetable fats & oils & prod	1899	1050	0.7	1.3
17 Sugars and sugar confectionery	12370	5304	4.6	6.6
18 Cocoa and cocoa preparations	16	0	0.0	0.0
20 Prep of vegetable, fruit, nuts prod	892	529	0.3	0.7
21 Miscellaneous edible preparations	0	0	0.0	0.0
22 Beverages, spirits and vinegar	4306	1172	1.6	1.5
23 Residues & waste from food industry	382	192	0.1	0.2
24 Tobacco and manufactured	2662	735	1.0	0.9
50 Silk.	416	14	0.2	0.0
51 Wool, fine/coarse animal hair nest	124	17	0.0	0.0
52 Cotton.	3411	655	1.3	0.8
53 Other vegetable textile fibers & yarns	34	71	0.0	0.1
98 Non-product specific	11276	8392	4.2	10.4
Total Above Agricultural Products	270151	80714	100.0	100.0

Note: Direct domestic support is defined as the sum of WTO DS4-9 categories. See text.

Source: Based on WTO document G/AG/NG/S/1.

Table 3: Average MFN Tariff on Products Benefiting from Domestic Support
(including ad valorem equivalent of specific tariffs)

Countries	MFN Applied Tariff Average 1995-98 (%)	Maximum Rate Average 1995-98 (%)
Developed Countries		
Australia	1	7
Canada	30	1403
EEC15	22	219
Iceland	9	61
Japan	51	865
New Zealand	1	10
Norway	19	555
United States	14	121
Developing Countries		
Albania	14	30
Algeria	24	45
Antigua and Bar	27	40
Argentina	9	21
Bahrain	7	120
Barbados	22	40
Belize	24	40
Bolivia	10	10
Brazil	9	33
Cameroon	23	30
Chile	11	11
China	28	114
Colombia	14	20
Congo, Rep.	21	30
Costa Rica	13	103
Cote d'Ivoire	17	35
Cuba	9	30
Czech Republic	11	124
Dominica	22	40
Dominican Republic	17	35
Ecuador	13	20
Egypt, Arab Rep	31	1050
El Salvador	13	25
Gabon	23	30
Ghana	19	25
Grenada	20	40
Guatemala	12	20
Guyana	25	100
Honduras	14	30
Hungary	30	85
India	28	185
Indonesia	13	104
Iran, Islamic R	3	15
Israel	4	22
Jamaica	25	40
Jordan	23	180
Kenya	22	50
Korea, Rep.	46	284
Latvia	10	45
Lithuania	8	71
Malaysia	8	257
Malta	3	40
Mauritius	20	80
Mexico	15	171
Morocco	45	362
Nicaragua	8	38
Nigeria	27	75

Countries	MFN Applied Tariff Average 1995-98 (%)	Maximum Rate Average 1995-98 (%)
Oman	2	5
Pakistan	36	70
Panama	11	50
Papua New Guinea	38	85
Paraguay	9	25
Peru	16	25
Philippines	22	58
Poland	14	44
Romania	21	144
Russian Federation	9	25
Rwanda	25	100
Saudi Arabia	11	65
Slovenia	9	49
South Africa	7	55
Sri Lanka	33	60
St. Kitts and N	21	40
St. Lucia	22	40
Suriname	22	50
Taiwan, China	18	50
Thailand	41	65
Trinidad and Tobago	20	40
Tunisia	33	43
Turkey	28	145
Uruguay	10	24
Venezuela	13	20
Zimbabwe	26	68
Least Developed Countries		
Bangladesh	40	300
Burkina Faso	21	37
Central African	20	30
Chad	22	30
Madagascar	7.5	20
Malawi	18	45
Maldives	16	50
Mali	19	30
Mozambique	15	35
Solomon Islands	40	100
Sudan	8	30
Tanzania	29	40
Uganda	13	36
Zambia	17	25
Memo:		
All Above Countries	18	1403
Industrial Countries	19	1403
Developing Countries (non-LDC)	17	1050
Least Developed Countries	20	300

Note: Countries with zero tariffs not reported (Brunei, Estonia, Hong Kong, Kyrgyz, Rep. Singapore)
Source: UNCTAD TRAINS tariff data (through WITS), OECD (2000) and Stawowy (2001).

Table 4: Average MFN Tariff on Products with Domestic Support

HS-2 Product	Average 1995-98 (%)	Maximum 1995-98 (%)
01 Live animals.	11.6	555.0
02 Meat and edible meat offal	21.0	361.5
04 Dairy prod; birds' eggs; honey	29.4	349.5
06 Live tree & other plant; bulb, cut flowers	16.2	249.0
07 Edible vegetables and roots & tubers	24.0	865.4
08 Edible fruit and nuts; melons	20.0	238.9
09 Coffee, tea, mat and spices	16.7	559.3
10 Cereals.	21.8	719.1
11 Milled products; malt; starches	31.1	1402.8
12 Oil seed, oleaginous fruits	11.2	686.0
13 Lac; gums, resins & other vegetables	10.8	65.0
15 Animal/vegetable fats & oils & prod	15.3	188.0
17 Sugars and sugar confectionery	26.6	209.0
18 Cocoa and cocoa preparations	9.0	55.0
20 Prep of vegetable, fruit, nuts prod	23.0	162.8
21 Miscellaneous edible preparations	32.1	302.4
22 Beverages, spirits and vinegar	36.7	1050.0
23 Residues & waste from food industry	7.1	45.0
24 Tobacco and manufactured	20.1	257.3
50 Silk.	23.4	235.8
51 Wool, fine/coarse animal hair	6.3	54.9
52 Cotton.	5.2	35.3
53 Other vegetable textile fibres & yarns	5.9	52.5
Total (all items with positive domestic support)	18.4	1402
Memo:		
All Agricultural Products	19.8	1772

Source: UNCTAD TRAINS tariff data (through WITS), OECD (2000) and Swawoy (2001).

Table 5: Trade in Domestically Supported Agricultural Products by Country, 1995-98

Country (No. of countries)	Exports of goods supported by WTO members ($m) Ave 1995-98	Imports of goods supported in WTO members($m) Ave 1995-98	Exports of goods supported by WTO members as % of All Exports	Imports of goods supported in WTO members as % of All Imports
Albania	24	74	8.8	8.2
Algeria	5	1902	0.0	20.0
Angola	12	139	0.3	7.2
Antigua and Barbuda	3	9	6.0	2.8
Argentina	6251	603	25.6	2.3
Australia	9384	843	17.0	1.4
Bahrain	2	71	0.1	3.7
Bangladesh	90	805	2.2	12.7
Barbados	46	40	21.9	5.9
Belize	70	16	46.6	5.9
Benin	230	57	84.7	5.9
Bolivia	137	95	11.3	5.2
Brazil	6494	3968	13.1	6.7
Brunei	1	56	0.0	1.8
Bulgaria	333	276	6.9	5.4
Burkina Faso	130	35	75.5	7.9
Burundi	76	19	72.8	10.9
Cameroon	422	114	24.7	8.6
Canada	7023	3918	3.4	2.1
Central African Rep.	48	5	24.8	4.4
Chad	109	5	82.5	3.5
Chile	2225	542	14.2	3.2
China	3243	5471	1.9	4.0
Colombia	3460	1031	32.0	7.2
Comoros	0	13	0.1	24.3
Congo, Dem. Rep	147	76	10.6	8.6
Congo, Rep.	21	35	1.1	3.9
Costa Rica	1361	257	37.5	5.9
Cote d'Ivoire	1835	299	48.7	11.0
Croatia	101	411	2.2	5.0
Cuba	745	337	50.7	13.4
Cyprus	115	160	24.5	4.2
Czech Republic	443	1001	1.9	3.6
Djibouti	3	34	9.5	9.9
Dominica	21	7	57.7	7.1
Dominican Repub.	469	414	10.2	7.4
Ecuador	1457	258	31.2	5.7
EEC15	17375	38075	2.2	4.9
Egypt, Arab Rep	387	2319	11.0	17.1
El Salvador	485	236	42.0	8.3
Estonia	158	237	6.3	6.3
Fiji	222	46	37.9	6.5
Gabon	2	43	0.1	4.9
Gambia, The	2	41	11.0	17.5
Ghana	494	115	32.4	4.7
Grenada	4	12	14.5	7.2
Guatemala	1081	271	48.6	7.2
Guinea	38	99	7.8	19.1
Guinea-Bissau	31	4	39.8	4.2

Country (No. of countries)	Exports of goods supported by WTO members ($m) Ave 1995-98	Imports of goods supported in WTO members($m) Ave 1995-98	Exports of goods supported by WTO members as % of All Exports	Imports of goods supported in WTO members as % of All Imports
Guyana	182	27	33.1	6.7
Haiti	29	127	12.2	14.9
Honduras	385	194	43.9	9.0
Hong Kong, China	22	2964	0.1	1.5
Hungary	955	455	5.6	2.3
Iceland	148	54	7.9	2.6
India	2782	964	8.4	2.4
Indonesia	1394	3396	2.8	8.9
Iran, Islamic Rep.	163	1102	1.0	10.3
Israel	876	938	4.1	3.3
Jamaica	229	136	12.1	5.5
Japan	312	15850	0.1	4.9
Jordan	53	397	6.2	12.3
Kazakhstan	0	0	0.0	0.0
Kenya	790	210	48.7	8.4
Korea, Rep.	400	4727	0.3	3.6
Kuwait	4	277	0.0	4.0
Kyrgyz Republic	83	24	24.1	4.7
Latvia	32	143	2.0	5.7
Lithuania	227	244	6.7	5.0
Macao	6	51	0.3	2.5
Madagascar	77	45	26.6	7.8
Malawi	361	17	75.7	4.4
Malaysia	354	2457	0.5	3.4
Maldives	1	26	2.1	8.3
Mali	255	35	84.5	5.8
Malta	20	81	1.2	3.0
Mauritania	4	72	0.7	13.8
Mauritius	401	185	24.6	8.5
Mexico	3066	4317	3.0	4.3
Mongolia	48	10	12.0	2.2
Morocco	481	1204	9.0	13.8
Mozambique	0	0	0.0	0.0
Myanmar	284	27	23.6	1.0
New Zealand	3194	412	24.1	3.0
Nicaragua	239	110	40.0	8.7
Niger	34	48	17.2	12.9
Nigeria	277	431	1.8	7.5
Norway	116	980	0.3	2.8
Oman	45	281	0.7	5.8
Pakistan	536	543	7.0	6.7
Panama	244	121	38.8	4.1
Papua New Guinea	351	36	15.1	2.6
Paraguay	568	109	55.1	3.5
Peru	1144	778	19.3	9.6
Philippines	1468	1388	5.6	4.5
Poland	672	1917	2.7	4.9
Qatar	1	64	0.0	2.3
Romania	403	424	4.9	3.8
Russian Federation	931	3227	1.4	6.9
Rwanda	42	40	59.0	18.2

Country (No. of countries)	Exports of goods supported by WTO members ($m) Ave 1995-98	Imports of goods supported in WTO members($m) Ave 1995-98	Exports of goods supported by WTO members as % of All Exports	Imports of goods supported in WTO members as % of All Imports
Saudi Arabia	77	2045	0.1	6.3
Senegal	44	221	7.6	16.1
Sierra Leone	12	17	6.6	8.7
Singapore	677	1449	0.6	1.2
Slovak Republic	197	332	2.1	3.0
Slovenia	79	343	0.9	3.6
Solomon Islands	20	2	9.1	1.7
South Africa	1496	902	6.4	3.2
Sri Lanka	81	405	2.1	9.1
St. Kitts and Nevis	14	6	77.5	5.6
St. Lucia	45	17	63.8	5.3
St. Vincent and Grenadines	28	13	57.3	10.5
Sudan	290	127	60.1	8.6
Suriname	46	23	11.6	5.5
Switzerland	398	2496	0.5	3.2
Taiwan	247	3820	0.2	3.6
Tanzania	448	63	67.8	5.0
Thailand	3938	1715	7.0	2.8
Togo	103	40	42.5	6.3
Trinidad and Tobago	50	160	2.1	6.4
Tunisia	223	553	4.0	6.9
Turkey	2565	2147	10.5	5.0
Uganda	349	73	63.3	7.5
United Arab Emirates	225	782	1.0	3.1
United States	31450	15475	5.2	1.8
Uruguay	575	211	23.0	6.2
Venezuela	171	938	0.8	8.0
Zambia	76	30	8.1	4.0
Zimbabwe	1057	61	59.3	3.0
Memo:				
All above countries (143)	136483	151021	3.6	3.7
Industrial Countries (23)	69400	78103	3.1	3.3
Developing Countries (90)	63781	70616	4.2	4.2
Least Developed Countries (30)	3302	2302	17.8	8.9

Source: Based on UN COMTRADE Statistics.

Table 6: Estimates of price and domestic support elasticities [a]

	(1)	(2)	(3)	(4)
$\log(GDP)$	0.26 (0.03)**	0.24 (0.03)**	0.26 (0.03)**	0.24 (0.03)**
$\log(Pop)$	-0.35 (0.03)**	-0.33 (0.03)**	-0.35 (0.03)**	-0.33 (0.04)**
$\log(1+t)$ $-\left(\varepsilon^d\right)$	-1.36 (0.27)**	-1.46 (0.31)**	-1.37 (0.27)**	-1.42 (0.31)**
$\log(1+\tau)$ $-\left(\varepsilon^d - \varepsilon^s\right)$	-1.17 (0.08)**	-1.17 (0.08)**	-1.17 (0.08)**	-1.17 (0.08)**
$\log(s^{DS4-9})$ $-\left(\lambda^d + \lambda^s\right)$	-0.10 (0.02)**		-0.10 (0.03)**	
$\log(s^{DS1-3})$ $-\left(\lambda^d + \lambda^s\right)$		-0.05 (0.02)**	-0.00 (0.03)	
$\log(s^{DS1-3} + s^{DS4-9})$ $-\left(\lambda^d + \lambda^s\right)$				-0.06 (0.02)**
Product dummies	Yes	Yes	Yes	Yes
R^2_{adj}	0.136	0.135	0.136	0.135
# of observations	7610	7610	7610	7610
# HS 6-digit lines	158	158	158	158

[a] Estimation procedure is OLS. Standard errors in parenthesis are White Robust. "**" Significant at the 1 percent level. "*" significant at the 5 percent level.

Table 7: Estimates of price and domestic support elasticities by group of products[a]

	(1) HS 01 to 04 Animal products	(2) HS 06 to 09 Vegetables, fruits&nuts	(3) HS 10 to 14 Cereals& other grains	(4) HS 15 to 24 Food process. products	(5) HS 50 to 53 Silk, cotton &other fibres
$\log(GDP)$	-0.21 (0.08)**	0.51 (0.05)**	0.10 (0.06)	0.18 (0.06)**	0.56 (0.16)**
$\log(Pop)$	0.14 (0.09)	-0.67 (0.05)**	-0.18 (0.07)*	-0.20 (0.07)**	-0.19 (0.17)
$\log(1+t)$ $-\left(\varepsilon^d\right)$	-0.70 (0.51)	-2.16 (0.53)**	0.06 (0.62)	-2.35 (0.53)**	-0.44 (2.74)
$\log(1+\tau)$ $-\left(\varepsilon^d-\varepsilon^s\right)$	-0.86 (0.18)**	-1.12 (0.13)**	-1.25 (0.14)**	-1.44 (0.20)**	-0.98 (0.42)*
$\log(s^{DS4-9})$ $-\left(\lambda^d+\lambda^s\right)$	-0.07 (0.05)	-0.11 (0.04)*	-0.07 (0.04)	-0.16 (0.05)**	-0.11 (0.10)
Product dummies	Yes	Yes	Yes	Yes	Yes
R^2_{adj}	0.104	0.164	0.164	0.109	0.09
# of observations	1128	3028	1698	1448	308
# HS 6-dig lines	28	55	38	27	10

[a] Estimation using Seemingly Unrelated Regression procedure. Group specific elasticities estimated using the information in the whole sample, letting the elasticities vary by group of products. Standard errors in parenthesis are White Robust. "**" significant at the 1 percent level; "*" significant at the 5 percent level.

Table 8: Impact of a 50 percent cut in tariffs and domestic support (DS) (158 products)

Country group	Tariff cut		Cut in DS		Change in welfare	
	Change in exports	Change in imports	Change in exports	Change in imports	Tariff cut	DS cut
	($ mil)	($ mil)	($ mil)	($ mil)	($ mil)	($ mil)
Industrial Countries	3,262	7677	314	121	14,464	541
Developing Countries	4,146	4136	504	-92	2,293	-273
Least Developed Countries	116	118	64	-4	52	36
	(percent)	(percent)	(percent)	(percent)	($ per capita)	($per capita)
Industrial Countries	4.7	9.8	0.5	0.2	18.37	0.69
Developing Countries	6.7	6.0	0.8	-0.1	0.56	-0.07
Least Developed Countries	3.7	5.3	2.0	-0.2	0.12	0.08

Figure 1: Changes in Exports by Country
(50 % tariff cut vs. 50 % cut in domestic support)
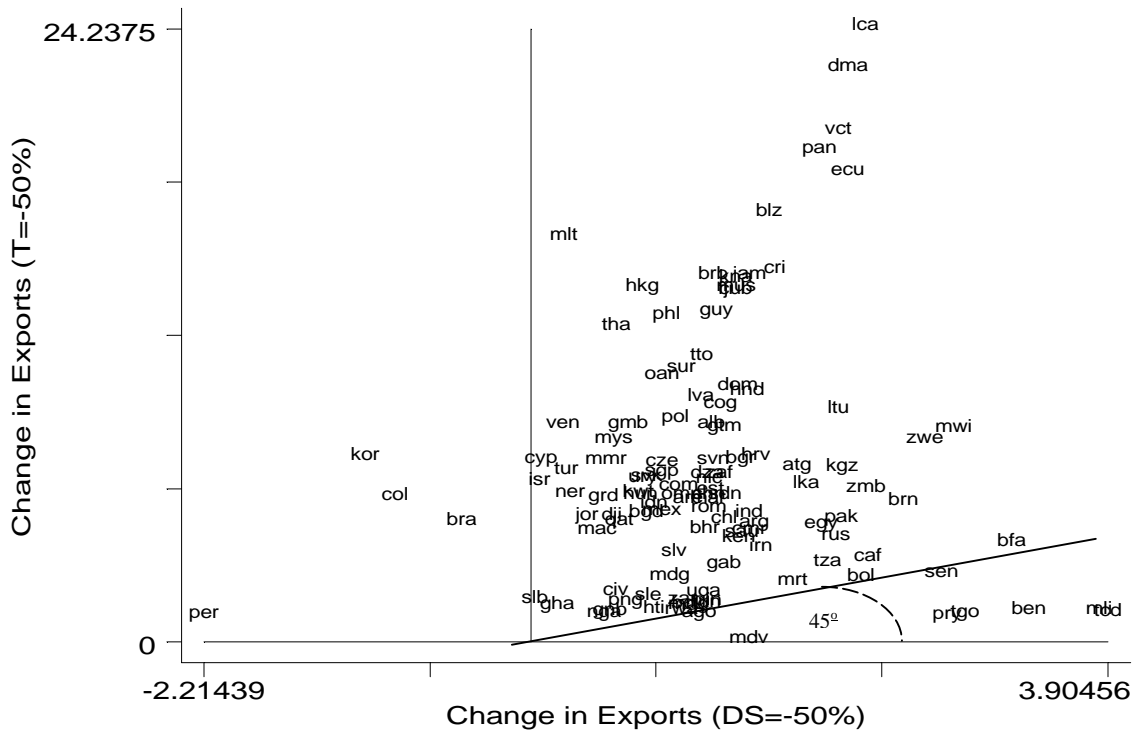
Figure 2: Changes in Imports by Country
(50 % tariff cut vs. 50 % cut in domestic support)
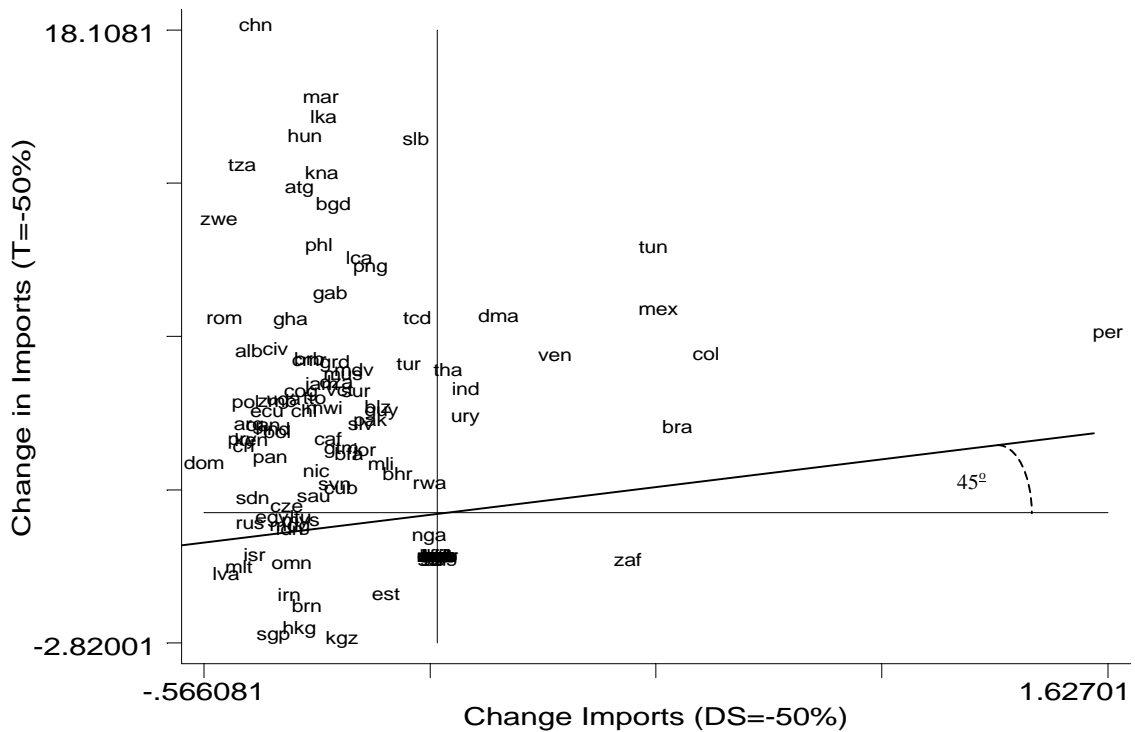
Figure 3: Changes in the Terms of Trade
(50% tariff cut vs. 50% cut in domestic support)
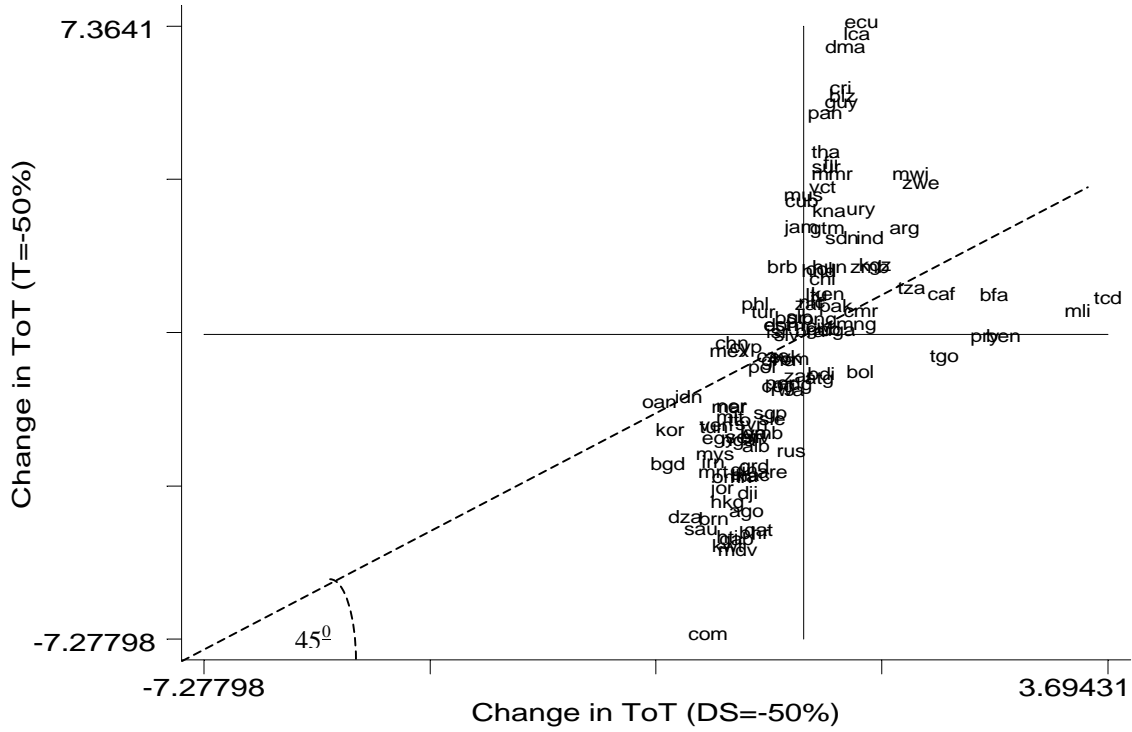
Figure 4: Changes in Welfare by Country ($ per capita)
(50% tariff cut vs. 50% cut in domestic support)
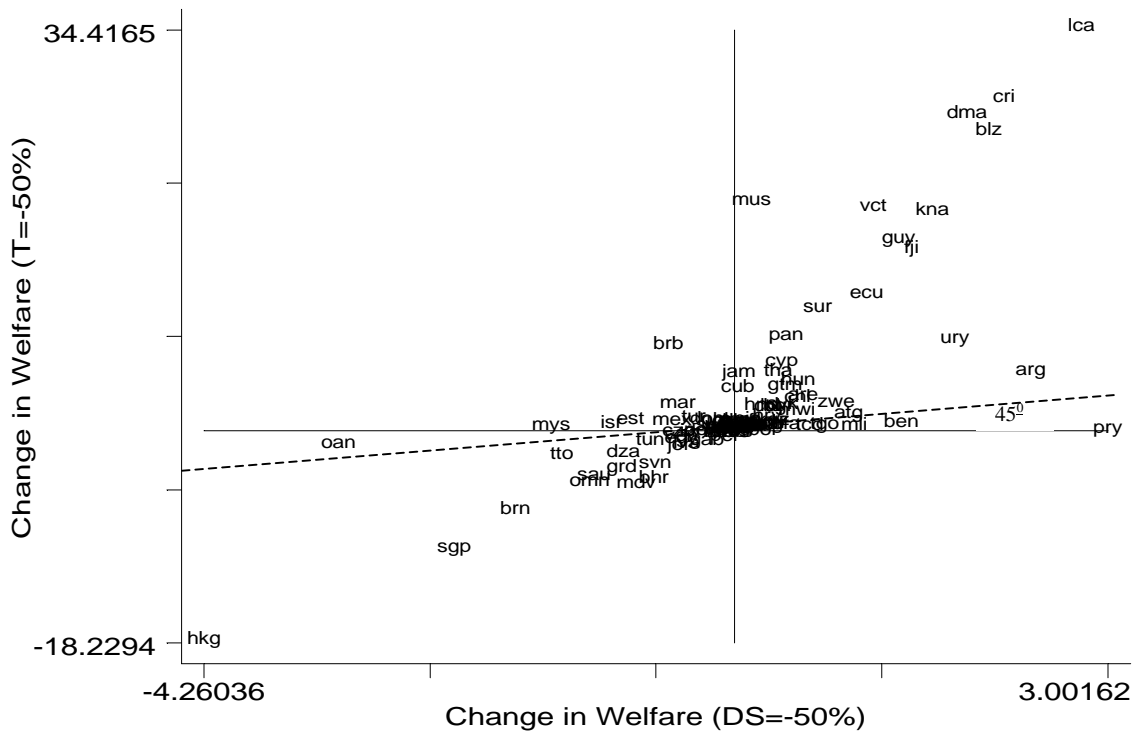
Annex: Data Sources

All trade data are from UN Comtrade Database (both value figures and unit prices). When countries did not report trade data to Comtrade we mirror their data using notifications by their trading partners. Tariffs are drawn from the UNCTAD and WTO as provided in UNCTAD/World Bank World Integrated Trade Solution (WITS) system. This database does not include the ad-valorem equivalent of specific tariffs. For ad-valorem equivalents of specific tariffs we rely on Stawowy (2001) for estimates for Canada, the European Union, Japan and the United States and OECD (2000) for other OECD countries. In cases where tariff quotas are used, tariff rates generally comprise the average of in and out of quota tariffs is generally taken, although in some cases only the out of quota tariff is available. The OECD ad-valorem equivalents of specific tariffs use exclusively out of quota tariffs. We do not have quota information, this may bias results some estimates as some import prices may be higher if exporters benefit from in-quota lower tariffs.

As mentioned in the text, the source of domestic support data is the WTO (document G/AG/NG/S/1). This data comes in national currency and was transformed into US dollars using the period average exchange rate reported in the IMF IFS. The product classification in each country notification is arbitrary and therefore we filter the product classification into the Harmonized System 6 digit classification. In most cases this can be done through a one-to-one mapping. In some cases, the domestic support reported covers several 6 digit tariff lines, in which case the subsidy was distributed across the relevant tariff lines using the share of the reporting country's exports as weights. The concordance file is available from the authors on request.

As exempt subsidies are not product specific, these were also mapped into a product specific subsidies using as weights the product-specific commitments that each country made in the Uruguay Round. Non-product specific support is divided evenly into all products exported by the country concerned. All products shown in notifications to the WTO are included, whether or not the support is below the de minimis level for the member concerned. Thus, total AMS may exceed total WTO commitments for a country. GDP (in US dollars) and population data are drawn from the World Bank's World Development Indicators database.

Appendix Table 1: Impact of tariff and domestic support cuts by group of products

HS 2 digit products	Change in exports with 50 percent tariff cut ($'000)	Change in imports with 50 percent tariff cut ($'000)	Change in exports with 50 percent cut in DS ($'000)	Change in imports with 50 percent cut in DS ($'000)	Change in exports with 50 percent tariff cut (percent)	Change in imports with 50 percent tariff cut (percent)	Change in exports with 50 percent cut in DS (percent)	Change in imports with 50 percent cut in DS (percent)
A. Impact on developing countries (non-LDCs):								
01 Live animals.	26116	21278	-916	1035	4.8	2.1	-0.2	0.1
02 Meat and edible meat offal	31104	40741	4569	2526	4.7	4.4	0.7	0.3
04 Dairy prod; birds' eggs; honey	157823	338591	25782	32685	8.5	5.7	1.4	0.5
06 Live tree & other plant; bulb	28293	26664	24664	-2178	2.1	7.3	1.8	-0.6
07 Edible vegetables and roots	442019	169647	22424	-3387	10.1	6.3	0.5	-0.1
08 Edible fruit and nuts; melons	1138841	234312	106692	-34114	12.3	4.9	1.2	-0.7
09 Coffee, tea, mat and spices	110458	116167	-32060	-6439	1.2	7.6	-0.3	-0.4
10 Cereals.	353031	1739555	126545	-40021	3.9	7.6	1.4	-0.2
11 Milled products; malt; starches	25671	57062	86	511	9.6	5.8	0.0	0.1
12 Oil seed, oleaginous fruits;	87943	501554	46149	3421	1.9	7.9	1.0	0.1
13 Lac; gums, resins & other veg	43	3176	0	1	3.3	4.0	0.0	0.0
15 Animal/veg fats & oils & prod	195152	122296	6290	-2105	7.3	6.2	0.2	-0.1
17 Sugars and sugar confectionery	693521	131776	9157	-18079	14.3	4.8	0.2	-0.7
18 Cocoa and cocoa preparations	15787	22191	93	57	0.6	3.8	0.0	0.0
20 Prep of vegetable, fruit, nuts	196982	72345	25567	-7897	13.8	9.4	1.8	-1.0
21 Miscellaneous edible prep.	246069	59568	-117	3008	18.7	2.3	0.0	0.1
22 Beverages, spirits and vinegar	32659	76229	13423	-5818	4.4	14.0	1.8	-1.1
23 Residues from food industry	2	61389	-7552	-15189	0.0	4.0	-0.5	-1.0
24 Tobacco and manufactured	329093	221150	53926	-30836	11.6	10.5	1.9	-1.5
50 Silk.	6574	503	975	116	23.7	5.3	3.5	1.2
51 Wool, fine/coarse animal hair	6425	30319	1954	69	1.6	2.7	0.5	0.0
52 Cotton.	21523	83998	76658	30440	1.1	1.2	3.8	0.4
53 Other vegetable textile fibres	409	5330	134	189	1.3	4.4	0.4	0.2
B. Impact on LDCs:								
01 Live animals.	3593	204	57	6	4.8	1.7	0.1	0.1
02 Meat and edible meat offal	3188	203	26	2	19.2	1.0	0.2	0.0
04 Dairy prod; birds' eggs; honey	252	11101	47	489	7.5	4.9	1.4	0.2
06 Live tree & other plant; bulb	432	68	616	-4	2.4	5.0	3.4	-0.3
07 Edible vegetables and roots	18426	17035	1035	-108	7.4	12.6	0.4	-0.1
08 Edible fruit and nuts; melons	1835	8184	417	-191	1.5	24.1	0.3	-0.6
09 Coffee, tea, mat and spices	7561	973	6809	-61	1.1	2.2	1.0	-0.1
10 Cereals.	3234	31639	1603	-2247	3.4	3.0	1.7	-0.2
11 Milled products; malt; starches	38	815	0	-1	9.0	1.9	0.1	0.0
12 Oil seed, oleaginous fruits;	13423	10066	274	-285	6.0	12.4	0.1	-0.4
13 Lac; gums, resins & other veg	10	30	0	0	3.3	0.9	0.0	0.0
15 Animal/veg fats & oils & prod	368	1490	8	-46	7.3	3.3	0.2	-0.1
17 Sugars and sugar confectionery	14042	17677	1373	-652	14.4	12.6	1.4	-0.5
18 Cocoa and cocoa preparations	278	0	3	0	0.6	0.0	0.0	0.0
20 Prep of vegetable, fruit, nuts	99	302	40	-25	7.1	2.4	2.8	-0.2
21 Miscellaneous edible prep.	379	1814	4	-28	18.7	3.7	0.2	-0.1
22 Beverages, spirits and vinegar	12	362	5	-18	4.4	3.0	1.8	-0.1
23 Residues from food industry	0	114	127	-20	0.0	4.8	1.5	-0.8
24 Tobacco and manufactured	33855	4485	11518	-559	8.9	8.4	3.0	-1.1
50 Silk.	2	1	0	0	23.7	0.5	3.5	0.1
51 Wool, fine/coarse animal hair	0	0	1	0	0.8	0.0	1.0	0.0
52 Cotton.	10712	11036	39801	135	1.1	5.2	3.9	0.1
53 Other vegetable textile fibres	4223	12	650	0	4.5	1.3	0.7	0.0

Appendix Table 2: Impact of a 50 percent cut in tariffs and domestic support (%)

| Country | 50% tariff cut | | 50% DS cut | | Change in terms of trade | | Change in welfare | |
	Change in export rev.	Change in import rev.	Change in export rev.	Change in import rev.	50% tariff cut	50 percent cut in DS	50% tariff cut ($ per capita)	50% cut in DS ($ per capita)
Albania	8.5	7.0	1.2	-0.5	-2.8	-0.6	-0.4	-0.1
Algeria	6.5	5.9	1.2	-0.2	-4.5	-1.4	-2.1	-0.9
Angola	1.0	0.0	1.1	0.0	-4.4	-0.7	0.0	0.0
Antigua and Barbuda	6.8	12.6	1.8	-0.3	-1.2	0.2	1.3	0.9
Argentina	4.6	4.5	1.5	-0.5	2.4	1.2	4.9	2.4
Australia	4.8	-3.5	1.0	-0.4	3.1	1.2	17.5	6.5
Bahrain	4.3	2.8	1.2	-0.1	-4.9	-0.6	-4.4	-0.6
Bangladesh	5.0	12.0	0.8	-0.3	-3.2	-1.7	0.0	-0.1
Barbados	14.4	6.7	1.2	-0.3	1.5	-0.3	7.1	-0.5
Belize	16.9	5.1	1.6	-0.1	5.6	0.5	25.5	2.0
Benin	1.2	0.0	3.4	0.0	-0.2	2.4	0.4	1.3
Bolivia	2.4	4.2	2.2	-0.4	-1.0	0.7	-0.2	0.2
Brazil	4.7	4.4	-0.5	0.6	0.0	0.1	0.1	0.1
Brunei	5.5	-1.7	2.5	-0.3	-4.5	-1.1	-7.0	-1.8
Bulgaria	7.1	0.0	1.4	0.0	0.3	-0.2	1.8	0.4
Burkina Faso	3.8	3.5	3.3	-0.2	0.8	2.3	0.3	0.4
Burundi	1.4	0.0	1.0	0.0	-1.1	0.2	0.1	0.1
Cameroon	4.3	6.7	1.5	-0.3	0.4	0.7	0.3	0.3
Canada	3.9	11.3	1.0	-0.5	0.8	0.8	26.9	2.9
Central African Rep.	3.3	4.0	2.3	-0.3	0.8	1.7	0.2	0.3
Chad	1.1	8.1	3.9	0.0	0.8	3.7	0.1	0.6
Chile	4.7	4.9	1.3	-0.3	1.2	0.2	2.6	0.5
China	5.7	18.1	1.2	-0.4	-0.3	-0.9	0.5	0.0
Colombia	5.7	6.9	-0.9	0.7	1.4	0.2	1.8	0.3
Comoros	6.1	0.0	1.0	0.0	-7.3	-1.2		
Congo, Dem. Rep	1.5	0.0	1.0	0.0	-1.1	-0.1	0.0	0.0
Congo, Rep.	9.3	5.6	1.3	-0.3	-1.3	-0.3	-0.1	0.0
Costa Rica	14.6	3.8	1.7	-0.5	5.8	0.5	28.4	2.2
Cote d'Ivoire	1.9	7.0	0.6	-0.4	0.1	0.2	0.5	0.3
Croatia	7.2	0.0	1.5	0.0	-2.6	-0.6	1.0	0.3
Cuba	13.8	2.3	1.4	-0.2	3.1	0.0	3.4	0.0
Cyprus	7.1	0.0	0.1	0.0	-0.4	-0.7	5.7	0.4
Czech Republic	7.0	1.7	0.9	-0.4	-0.6	-0.4	-0.3	-0.5
Djibouti	4.9	0.0	0.5	0.0	-3.9	-0.7	0.4	0.0
Dominica	22.6	8.2	2.1	0.1	6.8	0.5	26.9	1.9
Dominican Rep.	10.0	3.2	1.4	-0.6	0.1	-0.2	0.7	-0.2
EEC15	6.9	9.3	-0.3	0.7	-0.8	-0.4	13.9	-0.2
Ecuador	18.5	5.0	2.1	-0.4	7.4	0.7	11.5	1.1
Egypt, Arab Rep	4.6	1.3	2.0	-0.4	-2.6	-1.0	-0.9	-0.4
El Salvador	3.4	4.5	1.0	-0.2	-0.1	-0.2	0.1	-0.2
Estonia	5.9	-1.3	1.2	-0.1	0.1	-0.3	0.6	-0.8
Fiji	13.8	0.0	1.3	0.0	4.0	0.3	15.4	1.4
Gabon	3.0	9.0	1.3	-0.3	-5.0	-0.8	-1.2	-0.2
Gambia, The	8.5	0.0	0.7	0.0	-2.5	-0.5	0.1	0.0
Ghana	1.4	8.1	0.2	-0.4	-0.7	-0.3	-0.1	0.0
Grenada	5.6	6.6	0.5	-0.2	-3.2	-0.6	-3.4	-0.9
Guatemala	8.4	3.7	1.3	-0.2	2.4	0.3	3.6	0.4
Guinea	1.5	0.0	1.2	0.0	-3.4	-0.7	0.1	0.1
Guinea-Bissau	1.1	0.0	0.5	0.0	0.0	0.2	0.2	0.1
Guyana	13.0	5.0	1.3	-0.1	5.5	0.5	16.2	1.3
Haiti	1.2	0.0	0.8	0.0	-5.0	-0.9	0.0	0.0
Honduras	9.8	4.3	1.5	-0.4	1.4	0.2	1.9	0.2
Hungary	5.7	14.3	0.7	-0.3	1.5	0.3	4.0	0.5
Iceland	0.4	3.4	1.4	-0.6	-1.0	0.3	-4.5	2.3
India	5.0	5.7	1.5	0.1	2.2	0.8	0.1	0.0
Indonesia	5.3	0.9	0.8	-0.4	-1.6	-1.4	-0.3	-0.3
Iran, Islamic Rep.	3.6	-1.4	1.6	-0.4	-3.2	-1.1	-0.4	-0.2
Israel	6.3	0.0	0.1	-0.4	-0.1	-0.3	0.3	-1.0
Jamaica	14.4	5.9	1.5	-0.3	2.5	0.0	4.7	0.0
Japan	9.6	18.1	0.7	-0.1	-2.8	-1.4	64.8	-0.5
Jordan	4.9	3.6	0.4	-0.2	-3.8	-1.0	-1.6	-0.4

Kenya	4.0	3.9	1.4	-0.5	0.9	0.3	0.3	0.1
Korea, Rep.	7.2	18.1	-1.1	-0.1	-2.4	-1.6	18.0	-1.2
Kuwait	5.8	0.0	0.7	0.0	-5.2	-0.9	0.1	0.0
Kyrgyz Republic	6.8	-2.8	2.1	-0.2	1.5	0.9	0.6	0.3
Latvia	9.6	-0.6	1.2	-0.5	-2.5	-0.6	-1.3	-0.4
Lithuania	9.1	1.3	2.1	-0.3	0.8	0.2	1.8	0.3
Macao	4.3	0.0	0.4	0.0	-3.5	-0.6	0.6	0.1
Madagascar	2.5	1.0	0.9	-0.4	-1.3	-0.1	-0.1	0.0
Malawi	8.4	5.0	2.9	-0.3	3.7	1.3	1.5	0.5
Malaysia	7.9	1.2	0.6	-0.3	-3.0	-1.1	0.2	-1.5
Maldives	0.0	6.3	1.5	-0.2	-5.3	-0.8	-4.8	-0.8
Mali	1.2	3.1	3.8	-0.1	0.4	3.3	0.1	1.0
Malta	16.0	-0.4	0.2	-0.5	-2.1	-0.9		
Mauritania	2.3	0.0	1.8	0.0	-3.4	-1.1	0.0	0.0
Mauritius	13.9	6.2	1.4	-0.2	3.2	0.0	19.5	0.1
Mexico	5.1	8.4	0.9	0.5	-0.5	-0.9	0.6	-0.5
Mongolia	1.3	0.0	1.1	0.0	0.1	0.6	0.3	0.2
Morocco	5.5	15.7	1.2	-0.3	-1.8	-0.9	2.1	-0.5
Myanmar	7.1	0.0	0.5	0.0	3.7	0.3	0.3	0.0
New Zealand	6.3	-4.5	1.0	-0.7	4.4	0.7	42.7	6.5
Nicaragua	6.4	2.9	1.2	-0.3	0.7	0.1	0.7	0.1
Niger	5.8	0.0	0.3	0.0	-1.8	-0.9	0.1	0.0
Nigeria	1.0	0.7	0.5	0.0	-2.6	-0.8	0.0	0.0
Norway	5.0	3.0	1.0	-0.6	-2.5	-0.8	1.5	-1.6
Oman	5.7	-0.3	1.0	-0.4	-3.5	-0.9	-4.6	-1.2
Pakistan	4.8	4.6	2.1	-0.2	0.6	0.4	0.1	0.0
Panama	19.4	3.4	2.0	-0.4	5.2	0.3	7.9	0.4
Papua New Guinea	1.5	9.9	0.6	-0.2	0.3	0.2	0.5	0.2
Paraguay	0.9	4.0	2.8	-0.5	-0.2	2.2	-0.1	3.0
Peru	1.0	7.7	-2.2	1.6	-1.3	-0.3	-0.7	-0.1
Philippines	12.8	10.6	0.9	-0.3	0.6	-0.6	0.6	-0.2
Poland	8.7	5.3	1.0	-0.5	-0.9	-0.5	-0.3	-0.3
Qatar	4.6	0.0	0.6	0.0	-4.8	-0.5	0.1	0.0
Romania	5.2	8.1	1.2	-0.5	-0.7	-0.2	0.1	0.0
Russian Fed.	4.1	1.1	2.1	-0.5	-2.9	-0.1	-0.4	0.0
Rwanda	1.2	2.5	1.0	0.0	-1.4	-0.2	0.0	0.0
Saudi Arabia	4.2	2.0	1.4	-0.3	-4.8	-1.2	-4.1	-1.1
Senegal	2.6	0.0	2.8	0.0	-2.5	-0.7	0.1	0.1
Sierra Leone	1.7	0.0	0.8	0.0	-2.1	-0.4	0.0	0.0
Singapore	6.6	-2.7	0.9	-0.4	-2.0	-0.4	-10.3	-2.2
Slovak Republic	6.4	0.0	0.8	0.0	-0.6	-0.2	2.0	0.4
Slovenia	7.1	2.5	1.2	-0.2	-2.3	-0.6	-3.1	-0.6
Solomon Islands	1.6	14.2	0.0	-0.1	0.3	0.0	0.5	0.0
South Africa	6.5	-0.2	1.3	0.5	0.6	0.1	0.5	0.1
Sri Lanka	6.1	15.0	1.9	-0.3	-3.5	-0.7	-0.2	-0.1
St. Kitts and Nevis	14.3	13.1	1.4	-0.3	2.8	0.3	18.7	1.6
St. Lucia	24.2	10.2	2.3	-0.2	7.1	0.6	34.4	2.8
St. Vincent/Grenadines	20.1	5.7	2.1	-0.2	3.4	0.2	19.0	1.1
Sudan	5.7	2.0	1.3	-0.4	2.2	0.5	0.4	0.1
Suriname	10.7	5.6	1.0	-0.2	3.9	0.3	10.3	0.7
Taiwan	10.4	4.5	0.9	-0.4	-1.7	-1.8	-1.4	-3.2
Tanzania	3.0	13.3	2.0	-0.5	1.0	1.3	0.2	0.2
Thailand	12.4	6.4	0.6	0.0	4.2	0.3	4.8	0.3
Togo	1.0	0.0	2.9	0.0	-0.6	1.7	0.2	0.7
Trinidad and Tobago	11.2	5.4	1.2	-0.3	-2.1	-0.8	-2.3	-1.4
Tunisia	1.4	10.5	1.2	0.5	-2.3	-1.1	-1.1	-0.7
Turkey	6.7	6.5	0.2	-0.1	0.4	-0.5	0.8	-0.3
Uganda	1.9	5.3	1.2	-0.4	0.0	0.4	0.0	0.1
United Arab Emirates	5.6	0.0	1.1	0.0	-3.4	-0.4	2.8	0.6
United States	3.3	6.0	0.5	-0.5	0.3	1.0	1.7	1.7
Uruguay	6.4	4.8	0.8	0.1	2.9	0.7	7.6	1.8
Venezuela	8.5	6.8	0.2	0.3	-2.3	-1.1	-0.8	-0.4
Zambia	6.0	5.3	2.3	-0.4	1.5	0.8	0.2	0.1
Zimbabwe	7.9	11.5	2.7	-0.5	3.5	1.4	2.1	0.8