OECD DomesticSupport and the Developing Countries

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Abstract

This paper aims to shed light on the potential interests of developing countries in reforms to domestic support for agriculture in the OECD economies. In order to accomplish this goal, we begin by reviewing the literature on the impacts of domestic support on key variables, including farm income, in the OECD economies themselves. We then proceed to revise the standard GTAP model of global trade, based on recent work at the OECD, in order to better capture these impacts. This work at OECD and analytical results derived by Hertel (1989) suggest the possibility of policy re-instrumentation, whereby farm income is stabilized in the face of cuts to overall support levels by shifting the mix of subsidies away from the more trade-distorting instruments which also tend to be ineffective tools for boosting farm incomes.

We conclude that developing countries will be well advised to focus their efforts on improved market access to the OECD economies, while permitting these wealthy economies to continue – indeed even increase – direct support payments. Provided these increased payments are not linked to output or variable inputs, the trade-distorting effects are likely to be small, and they can be a rather effective way of offsetting the potential losses that would otherwise be sustained by OECD farmers. This type of policy re-instrumentation will increase the probability that such reforms will be deemed politically acceptable in the OECD member economies, while simultaneously increasing the likelihood that such reforms will also be beneficial to the developing economies.

Keywords: agricultural trade, developing countries, domestic support, OECD, WTO

1. Introduction

In the late 1980's, market price support accounted for about 75 percent of total producer support in agriculture in the member countries of the Organization for Economic Cooperation and Development (OECD) (OECD, 2002). Prior to the Uruguay Round Agreement on Agriculture (URAA), this was also the only area of agricultural protection under negotiation in the international arena. An important innovation in the URAA was to put domestic subsidies on the negotiating table. As a result of the URAA, the share of producer support provided by market interventions has gradually fallen, so that it now accounts for only two-thirds of total support among OECD members (OECD, 2002). Much of the discussion around a new WTO agreement on agriculture is focused on continuing this move towards support that is less coupled to production decisions.

The goal of this paper is to assess the likely impact of this decoupling trend on developing country welfare. In the process of making this assessment special attention is paid to the impact of reforms on real farm income in the reforming OECD countries, as the farm lobby is a powerful political force and operates as an important constraint on reform efforts. These dual objectives require two rather distinct paths in the analysis. First, we must assess direct impact of domestic support in the OECD countries on OECD agriculture – specifically farm incomes, production and subsequently trade. Then we must assess the impact of these changes on the developing countries.

2. Background on Domestic Support and Developing Country Trade

The OECD uses the concept of Producer Support Estimates (PSE) as the principal indicator in monitoring and evaluating agricultural policy developments. The PSE is "an indicator of the monetary value of gross transfers from consumers and taxpayers to

agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their natures, objectives or impacts on farm production or income." The total PSE is comprised of a variety of instruments of support that vary in their effects on farm income in the OECD countries and trade and by extension impact the welfare of developing countries. OECD (2002c) reports the changes by country and support type for the PSE over the period from 1986 to 2001. Notable for the OECD regions is the shift in composition of support, especially in the EU and the U.S., as land based and historical payments have tended to replace more distorting support instruments for many crops. This trend is of potential importance to developing country welfare, especially in light of the current round of WTO negotiations on agriculture which is expected to drive the composition of OECD domestic support further in this direction.

Developing countries are an enormously diverse group. Some are net exporters, and some are net importers of the temperate products that OECD countries tend to protect. Some are closely tied into the OECD markets – by virtue of geography or perhaps historical trade preferences. Others are more reliant on other developing countries for their food supplies and export markets. The strength of the trade links of a developing country with the OECD countries plays an important role in the impact of OECD domestic support reform on the developing country.

Based on specialization indexes of trade between regions, calculated as (X-M)/(X+M), where X is aggregate exports and M is aggregate imports, for the past thirty years, some generalizations can be made about the trade patterns of OECD members and developing countries to help guide the analysis to follow[1]. For the temperate products

[1] More detailed information on the trade specialization calculations is available in a longer version of this paper available at www.gtap.org.

(crops and livestock) that receive support in OECD regions, the tendency is for this index to move in the net export direction (toward +1), while that of the developing countries moves in the opposite direction. Alternatively, tropical products in general will show the net positions of the two types of countries to be reversed. There is a rough division between temperate products, where OECD domestic support plays an important role and where developing countries are largely net importers, and tropical products for which developing countries are largely net exporters. The role of domestic support is a major contributor to these trends in the net relative positions in trade, especially when one recognizes the growing share in developing country imports of temperate products from the OECD over this same thirty year time frame.

3. Literature Review

Hertel (1989) develops a series of propositions relating to the impacts of a wider range of support measures on production, net exports, employment, land rents and farm income. He places these on both an equal cost and equal PSE basis for a single product, agricultural sector in the absence of pre-existing support. A few key points emerge from this paper. First of all, subsidies on variable inputs that substitute for fixed factors (e.g., land) in agriculture have a greater impact on output, and hence trade, than do equal cost output subsidies. Such variable input subsidies also moderate the share of producer support that accrues to land and other fixed factors. On the other hand, subsidies to land, such as the per hectare payments currently made in the EU, have a more modest effect on output, while leading to higher land rents than under an equal cost output subsidy. Finally, when compared to an output subsidy of equal cost, export subsidies have a larger

impact on exports, agricultural production, employment, and land rents, provided the elasticity of export demand exceeds the domestic demand elasticity.

Subsequent work in this area has been largely computational in nature (see e.g. Abler and Shortle, 1992; Gunter *et al.*, 1996). Of special interest for the present paper is the OECD's (2001) *Market Effects of Crop Support Measures*. In this report, the impacts of a wide range of producer support across OECD countries are compared. The authors find that the movement from market price support and output subsidies to land-based payments is a "win-win" scenario in most countries – with farm income rising and diminished world price impacts.[2] This suggests an interesting possibility for re-instrumentation of producer support for agriculture in OECD countries that maintain OECD farm incomes, while contributing to enhanced welfare on the part of developing country exporters, a hypothesis explored in greater detail below.

A separate study, also undertaken at the OECD (OECD, 2002b) analyzed the impact of further agricultural trade reforms on developing countries using two modeling frameworks (OECD's AgLink and the GTAP model). They look at relatively broad groups of developing countries, and do not consider more elaborate reforms in which the mix of measures is changed in an attempt to maintain farm incomes.

In contrast, Frandsen, Gersfelt and Jensen (2002) use a modified version of the GTAP model to examine the impact of further decoupling of domestic support in the EU emphasizing the budgetary and macro-economic effects of these policy reforms among OECD countries. They argue that further decoupling of EU agricultural policies would reduce budgetary exposure in the EU as well as bringing it into compliance with

[2] One cautionary note, as anticipated in the results of Hertel (1989), is that a shift towards variable input subsidies could have the opposite effect with larger world price impacts and smaller farm-income benefits.

potentially stricter WTO disciplines on domestic support. They also find rather substantial changes in world prices – particularly for meat products, although they do not examine the issue of overall developing country welfare explicitly, and they restrict themselves to EU reforms.

The goal of this paper is to assess the impact of changes in both the mix and the level of domestic support in OECD countries on the welfare of farm households in the OECD and on the national welfare of developing countries. Therefore, it is not enough to say that world prices will rise or they will fall. The welfare impacts on developing countries will depend on whether they are net exporters or net importers of protected products. It will also depend on the bilateral trade patterns observed. This points to analysis employing a global trade model with bilateral trade flows explicitly treated. One such framework is offered by the Global Trade Analysis Project (GTAP) data base and associated models, used by a number of the preceding studies.

Since the early 1990's, there has been a large number of global, general equilibrium, analyses of trade liberalization – some of which include domestic support (these include Francois, *et al.*, 1996; Hertel *et al.*, 1996; Harrison, *et al.*, 1996; Anderson, Erwidodo and Ingco, 1999; Elbehri, *et al.*, 1999; Hertel and Martin, 1999; Anderson, *et al.*, 2001; Rae and Strutt, 2002). Most of these studies are based on the GTAP data base and modeling framework. Version 5 of the GTAP database introduced a first-cut disaggregation of support across inputs (Dimaranan, 2002), but it still suffers from some important limitations (Gehlhar and Nelson, 2001; Frandsen, Jensen and Yu, 2001). Furthermore, the standard GTAP model is not well-suited to analysis of domestic support

issues, due to its relatively simplistic treatment of factor markets. One contribution of the present paper is to address these limitations.

4. Methodology

A special purpose version of the GTAP global model of trade is constructed adopting as a starting point, the general framework proposed in OECD (2001) in which factor demand and supply relations play a central role. An important contribution of the report resides in the annexes, where extensive literature reviews are available for the EU and for North America, providing central parameter values for the key elasticities of substitution, as well as for factor supply elasticities (see tables A1.3 and A1.4 of OECD, 2001).

We begin by segmenting the factor markets for labor and capital between agriculture and non-agriculture. A key parameter in the OECD analysis is the elasticity of factor supply for farm-owned inputs. The values of these parameters, as well as the ranges, proposed by the OECD are reported in Table 2. Note that these values are less than one, which is a sharp contrast to the usual assumption of perfect factor mobility used in most CGE analyses. This means that commodity supply is also less responsive, and more of the benefits of farm subsidies (or losses from their elimination) will accrue to farm households.

On the factor demand side, we employ a nested-CES production function which can be calibrated to the three key elasticities of substitution available from the OECD report (Table 2). Specifically, we postulate that output is a CES composite of two input aggregates. The first of these is a purchased input aggregate, while the second is a value-added aggregate. The individual inputs in each of these groups are assumed to be

separable from one another – with a common elasticity of substitution. The purchased input and value-added aggregates are themselves each a CES function of individual farm inputs. This gives us a total of three CES substitution parameters. They are calibrated to the OECD central values for the Allen partial elasticities of substitution between: (i) land and other farm-owned inputs, (ii) land and purchased inputs, and (iii) among purchased inputs. These values are reported in table 2 for the OECD countries covered in the report.

Given our interest in tracking real farm income and the overall measure of support for OECD agriculture, we also add some additional equations to the model to determine these variables. Real farm income is based on payments to endowments in the farm sector, adjusted for depreciation and the farm sector's share of national net taxes. To obtain real farm income, we deflate this by the regional household's price index which is computed in the standard GTAP model.

The computation of PSEs in the GTAP model is complicated by the fact that traded commodities are differentiated by origin. So the model tracks bilateral trade and there is no unique world price. Therefore, the domestic-world price gap is measured as a trade-weighted combination of bilateral import and export prices. In the case of market price support, this price gap is applied to output in order to compute the change in PSE associated with a given policy change.

Finally, given the importance of the trade elasticities to our analysis, we have incorporated recent estimates, implemented at the disaggregated GTAP level, based on the methodology outlined in Hummels (1999). He uses detailed trade, tariff and transport cost data for a variety of importing countries in North and South America to estimate a differentiated products model of import demand. The variation in bilateral transport costs

permits him to get quite precise estimates of these parameters – in sharp contrast to much of the earlier work in this area.

The remainder of the model follows the standard GTAP framework[3], with sectors producing output under perfect competition and constant returns to scale. Consumer demands are modeled using the non-homothetic, CDE functional form, calibrated to estimates of price and income elasticities of demand. Bilateral trade flows are modeled using the common, Armington approach under which products are differentiated by origin. Bilateral transport costs between countries are explicitly modeled, and a global "bank" serves to close the model with respect to global savings and investment.

The study uses an aggregation of a revised version of the GTAP 5 database (Dimaranan and McDougall, 2002). In the GTAP 5 database, all the different components of OECD PSE data except for market price support are distributed into four classifications of domestic support namely: output subsidies intermediate input subsidies, land-based payments and capital based payments (Jensen, 2002). In contrast to GTAP 5, the land-based payments were revised to separately handle payments on historical entitlements. The region and sector aggregation of the GTAP data base used in the study is laid out in Table 1.

Two comprehensive reform scenarios are considered for simulation analysis. In the first, direct support (non-market price support) for all OECD countries is reduced by fifty percent. This is followed by a reform scenario in which only the border measures are reduced by fifty percent and an equal farm income condition is imposed, by which area payments are allowed to compensate OECD farmers for any income lost from the reform.

[3] For complete exposition of the standard GTAP modeling framework, please see Hertel (1997), and the technical documentation at www.gtap.org.

5. Results and Discussion

A first step in employing the model as formulated is to validate the model's consistency with the analytical results shown by Hertel (1989) and the computational analyses that have followed. A series of experiments involving stylized shocks to evaluate relative impacts of the different types of subsidies on farm income, world prices, and land rents were performed[4]. The direction of these impacts conform to those derived in Hertel (1989) and the impact ratios computed relative to changes in market price support are quite similar to those in Dewbre, Anton, and Thompson (2001).

Having validated the model, we undertake the analysis of the two OECD reform scenarios considered for impacts on developing country welfare and OECD farm income. The first column of Table 3 reports the average world price impacts of cutting direct support for all agricultural commodities in the OECD by 50 percent. It is immediately clear that these support policies have the strongest impact on program crops and ruminant livestock (primarily beef). These are the commodities where the world price increases are greatest. Sugar and dairy, where the bulk of protection remains at the border, actually shows small price declines, as land and labor shifts out of protected crops into other activities. This causes other crop prices to fall as well.

The remaining columns of Table 3 decompose the total world price effect by type of instrument, including output subsidies, intermediate input subsidies, land-based payments and capital subsidies (including livestock-based payments). Despite the importance of land-based payments for program crops in the EU and USA, it is the intermediate input subsidies that contribute most to the world price effects for these crops

[4] For a detailed exposition of these stylized experiments focusing on a single instrument, region, or commodity please see the longer version of this same paper at www.gtap.org.

stemming from domestic support policies in the OECD. For example, 1.7% of the 4.9% increase in the world price of wheat following this cut in domestic support is attributed to the cut in intermediate input subsidies. This is due to the fact that they are both important in the overall mix of support as well as highly distorting of world trade. In the case of the strong increase in the price of ruminant meat, this is largely due to the subsidies on animal numbers (capital subsidy).[5]

The impact of this domestic support reduction scenario on developing country welfare is reported in the first column of Table 4[6]. As can be seen from this table, developing countries as a group lose from this cut in OECD direct support. The notable exceptions are Argentina, Brazil and India. The next two columns of this table decompose these welfare effects into their allocative efficiency and terms of trade components. The bulk of the developing country losses are due to the deterioration of their terms of trade. The only case where the allocative efficiency effect dominates is for China, driven by the interaction between reduced oilseed imports from the USA, interacting with a very high pre-WTO accession tariff on these imports. That tariff has since been dramatically reduced as part of China's WTO accession process (Ianchovichina and Martin, 2002) so this effect is no longer empirically relevant.

We can decompose the terms of trade effect into its component parts to obtain some further insight into the source of the developing country losses[7]. This is done in the subsequent three columns of Table 4. Note that the world price effects are dominant, and negative, followed in magnitude by the export price effects which are positive for

[5] These results can be compared roughly to those of Rae and Strutt (2002) by noting that they omit the land and capital-based payments from their domestic support scenario, arguing that these are largely "blue box payments" and therefore exempt from cuts under the Uruguay Round agreement.
[6] For details on welfare decomposition please see Huff and Hertel (1996).
[7] For details on terms of trade decomposition please see McDougall (1993).

developing countries as a group. The import price effects are negative, and considerably smaller in absolute value.

Table 5 breaks out the world price effects by commodity and region. The world price effect is positive when the price rises and the country is a net exporter and negative when it is a net importer. For a world price decline, it is precisely the opposite. From Table 3, recall that the world price rises were most dramatic for the program crops and for ruminant meats, while the biggest price decline is for other crops. Furthermore, developing countries tend to be net importers of supported crops and livestock products, and net exporters of other crops. Therefore, it is not surprising that the largest losses are for wheat, coarse grains, ruminant products (net importers with a world price rise) and for other crops (net exporters with a declining world price). From the point of view of an individual region/country, MENA and Rest of Latin America are among the hardest hit by these effects.

Recall, however, that our analytical framework takes into account the differentiation of products by country of origin. So the export price effect can potentially offset or reinforce the world price effect, depending on whether developing country export prices rise or fall, relative to the world average. The last set of columns in Table 5 report the export, import and total TOT price effects, by commodity for developing countries as a group. Here, it can be seen that the product differentiation aspect of the analysis further reinforces the adverse impacts on developing countries for wheat, coarse grains, oilseeds, and ruminant products. However, in the case of other crops, which are quite highly differentiated, the rise in developing country export prices, relative to the

world average, generates an overall gain. Developing countries also benefit overall from developments in the global markets for manufactures and services.

In addition to the losses incurred by developing countries from the cuts to direct support in the OECD countries, there are substantial declines in OECD farm incomes. The largest decline is in the EU-15 (-16%), followed by EFTA (-13%), then USA (-5%) and Canada (-3.5%). The losses in most other OECD countries are under one percent, due to relatively more reliance on border measures (e.g Japan and Korea) or lower levels of support (e.g. Australia and Canada). From a political economy point of view, this kind of reform looks like a difficult one to sell. Therefore we turn to an alternative type of comprehensive reform builing on the idea of re-instrumentation.

The next scenario we consider is an alternative comprehensive OECD reform focusing on reductions in market price support. Specifically, tariffs and export subsidy rates in the OECD countries are cut by 50%. Direct support is actually permitted to increase in order to compensate producers for the resulting loss in income. We use the land-based payments to compensate producers, since they are the most efficient and least trade-distorting of the instruments currently in use.

Table 6 reports the world price effects of the re-instrumentation experiment. The first column reports the total effect, while the subsequent columns break this total into the parts attributable to tariffs in the major OECD markets, as well as export subsidies (EU and other OECD). The first thing to note is that the world price effects on program crops and ruminant products are far more modest than those following the domestic support experiment. In general, the average world price of crops rises, while the average world price of livestock products falls. The largest contributor to the higher rice prices is the

Japanese tariff cut. In the case of wheat prices, EU export subsidies, followed by Japanese tariffs, are the largest contributions to the increase. The situation is similar for coarse grains, where the majority of the world price impact is traced back to the elimination of EU export subsidies. The average world farm gate price of sugar rises due to cuts in the EU and US import tariffs. Meat and dairy prices world-wide are heavily influenced by the EU tariff cuts. With a large share of the world's output in the EU, lower prices in that market contribute to a decline in the world average price. Finally, in the case of other food products, the "other" OECD countries tariffs appear to play the largest role.

Table 7 reports the welfare impacts of the re-instrumentation experiment. In sharp contrast to the domestic support experiment, most developing countries gain from the liberalization. Only China, ASEAN-4 and Rest of South Asia decline, and these losses are relatively small. As before the overall effects, as well as most of the individual country effects, are dominated by the terms of trade changes. Two notable exceptions are China and MENA where the allocative efficiency effect dominates the terms of trade effect and changes the regional welfare outcome. In the case of China, this is due to a reduction in other processed food output, which shows a much higher rate of taxation than other sectors in this aggregation of the version 5 GTAP data base. This gives rise to an efficiency loss. For MENA, the source of the large efficiency gain is due to the increase in imports. MENA's imports of everything excepting supported crops tend to increase only modestly. However, this region has very high rates of protection on many of these products imported from the EU and EFTA – indeed much higher than for most other products. Other processed food products is a case in point, with an average bilateral

tariff of 165% on imports from the EFTA region. Thus when other processed food products from EFTA increase, as a result of trade liberalization in that region, there is a substantial efficiency gain for the MENA region. However, in the aggregate, these efficiency gains are only a small portion of the total developing country gains from the re-instrumentation experiment.

The breakout of the total regional terms of trade effects into their component parts in the remaining columns of Table 7 reveals that, unlike the previously considered scenario, the across-the-board cut to market price support is most strongly influenced by the export price effect. With all OECD countries increasing their imports, and hence their exports, the average price of OECD exports falls for most products. This depresses the world average price of most products, leaving the developing countries with a favorable position for their export prices, relative to the world average. Both the world price effect and the import price effect are still negative, but these are dominated by the strong positive change in developing country export prices.

In order to explore the export price effect in greater detail, Table 8 presents this component of each country's terms of trade at the individual commodity level. Apart from the program commodities, almost all the export price effects are positive, reflecting the general tendency of OECD export prices to fall, relative to those of the developing countries. The total export price effect by commodity, summed over all the developing countries, shows the largest positive effects for other crops and other processed food products. Table 8 also reports the total world and import price effects, by commodity, for the developing countries, as well as the total TOT effect (sum of world, export and import effects). On a commodity basis, the only negative entries in this final column

pertain to wheat and coarse grains. All other commodities show a total TOT effect that is positive for the developing countries.

6. Summary and Conclusions

Long term support for agricultural program commodities in OECD countries, coupled with dis-protection in many developing countries, has left many of the latter increasingly dependent on imports. With few exceptions, developing countries show substantial move towards the net importer status over the past thirty years for temperate products. For example, in terms of trade specialization, Indonesia falls from -0.57 to -0.88 and ASEAN-4 falls from +0.58 to +0.20. Several regions show shifts from net exporter to net importer status. Sub-Saharan Africa's index falls from +0.39 in the 1965-75 period to -0.17 in the 1986-98 period, while the trade specialization index for Latin America outside of Brazil, Argentina and Mexico falls from 0.36 to -0.08. As these developing countries have come to rely on imports of grains and oilseeds from the subsidized OECD economies, they have become much more exposed to agricultural reforms that raise the prices of these specific products. As a result, we find that an across-the-board, 50% cut in all direct support for OECD agriculture leads to welfare losses for most of the developing regions, as well as for the combined total group of developing countries. The 50% cut in direct support also results in large declines in farm incomes in Europe, and, to a lesser degree, North America. This makes such a reform package an unlikely political event.

An alternative approach to reforming agricultural policies in the OECD would be to focus on broad-based reductions in market price support. This has been occurring in a number of OECD countries, most notably the EU where direct payments have

increasingly replaced border measures. As demonstrated in this paper, the basic economic principles of agricultural support policies suggest that a shift from market price support to land-based payments can generate outcomes whereby farm incomes are maintained and world price distortions are reduced. This is the direction charted by the OECD in its recent "Positive Reform Agenda" for agriculture (OECD, 2002a). We formally examine such an agricultural reform scenario, implementing a 50% cut in market price support for OECD agriculture, with a compensating set of land payments designed to maintain farm income in each of the member economies. This comprehensive reform scenario results in increased welfare for most developing countries, with gains on other commodities offsetting the terms of trade losses from higher program crop prices.

The preference for a continued focus on cuts in market price support, instead of shifting the emphasis to domestic support cuts is also reflected in two recent papers by other authors on this same general topic. Rae and Strutt (2002) conclude from their GTAP-based comparison between border measures and domestic support that improved market access generates far greater trade and welfare gains than domestic support cuts. This leads them to propose that trade negotiators' attention be focused squarely cuts to border measures before turning any attention to domestic support.[8] Hoekman, Ng and Olarreaga (2002) focus on developing country impacts of OECD agricultural policies using very different approach, but they reach the same conclusion as this paper.[9] They find that cuts to tariffs will generate much larger global welfare gains and positive gains

[8] Unlike this study, Rae and Strutt focus solely on cuts in domestic support provided through output and variable input subsidies (their proxy for "amber box" measures).
[9] Their analysis is based on a highly disaggregate, econometric model that assumes products are perfect substitutes.

to developing countries, whereas cuts to domestic support lead to smaller global welfare gains and losses for developing countries.

In summary, we conclude that developing countries will be well advised to focus their efforts on improved market access to the OECD economies, while permitting these wealthy economies to continue – indeed even increase – direct support levels in the form or area payments. When these increased payments are not linked to output or variable inputs, the trade-distorting effects are likely to be small, and they can be a rather effective way of offsetting the potential losses that would otherwise be sustained by OECD farmers. This type of policy re-instrumentation will increase the probability that such reforms will be deemed politically acceptable in the OECD member economies, while simultaneously increasing the likelihood that such reforms will also be beneficial to the developing economies.

Table 1. Regional and Sectoral Aggregation

OECD Countries	
ANZ	Australia and New Zealand
Japan	Japan
Korea	South Korea
USA	United States
Canada	Canada
Mexico	Mexico
EU15	European Union
EFTA	European Free Trade Area
CEU	Hungary and Poland
Turkey	Turkey
Developing Countries	
China	China
Indonesia	Indonesia
Vietnam	Vietnam
ASEAN4	Malaysia, Philippines, Singapore, Thailand
India	India
RSoAsia	Rest of South Asia
Argentina	Argentina
Brazil	Brazil
RLatAm	Rest of Latin America
FSU	Former Soviet Union
MENA	Middle East and North Africa
Tanzania	Tanzania
Zambia	Zambia
R_SSA	Rest of Sub-Saharan Africa
ROW	Rest of World
Program Commodities	
pdrice	paddy rice
wheat	wheat
crsgrns	cereal grains nec
oilsds	oilseeds
rawsgr	sugar cane, sugar beet
pcrice	processed rice
refsgr	sugar
Livestock and Meat Products	
ruminants	cattle/sheep, wool
nonrumnts	animal products nec
rawmilk	raw milk
rummeat	meat: cattle/sheep
nrummeat	meat products nec
dairy	dairy products
Other Agriculture and Food	
othcrops	vegetables and fruits, plant-based fibers, other crops
vegoilfat	vegetable oils and fats
othprfood	other processed food
mnfc	manufactures
srvc	services

Table 2. Factor Supply and Substitution Elasticities adapted from OECD (2001)

Regions*	Factor Supply Elasticity	Elasticity of Substitution among:		
	Farm-owned Factors	Purchased and Farm Owned	Land and Farm Owned	Purchased Factors (Inputs)
Aus/NZ	0.40	0.90	0.10	0.10
Japan	0.50	0.40	0.30	0.30
	(0.10 - 0.90)	*(0 - 0.80)*	*(0 - 0.60)*	*(0 - 0.60)*
Korea	0.50	0.40	0.30	0.30
USA	0.40	0.80	0.30	0.15
	(0.10 - 0.70)	*(0 - 1.60)*	*(0 - 0.60)*	*(0 - 0.30)*
Canada	0.40	0.90	0.10	0.10
	(0.10 - 0.70)	*(0 - 1.80)*	*(0 - 0.20)*	*(0 - 0.20)*
Mexico	0.50	0.50	0.50	0.15
	(0.30 - 0.70)	*(0 - 1.00)*	*(0 - 1.00)*	*(0 - 0.30)*
EU15	0.50	0.90	0.40	0.50
	(0.10 - 0.90)	*(0.30 - 1.50)*	*(0 - 0.80)*	*(0 - 1.00)*
EFTA	0.50	0.90	0.40	0.50
	(0.10 - 0.90)	*(0.30 - 1.50)*	*(0 - 0.80)*	*(0 - 1.00)*
CEU	0.50	0.90	0.40	0.50
Turkey	0.50	0.50	0.50	0.15
China	0.50	0.50	0.50	0.15
Indonesia	0.50	0.50	0.50	0.15
Vietnam	0.50	0.50	0.50	0.15
ASEAN4	0.50	0.50	0.50	0.15
India	0.50	0.50	0.50	0.15
RSoAsia	0.50	0.50	0.50	0.15
Argentina	0.50	0.50	0.50	0.15
Brazil	0.50	0.50	0.50	0.15
RLatAm	0.50	0.50	0.50	0.15
FSU	0.50	0.50	0.50	0.15
MENA	0.50	0.50	0.50	0.15
Tanzania	0.50	0.50	0.50	0.15
Zambia	0.50	0.50	0.50	0.15
R_SSA	0.50	0.50	0.50	0.15
ROW	0.50	0.50	0.50	0.15

Source: OECD (2001).

* Data ranges in parentheses.

** The data provided in OECD (2001) cover only Japan, USA, Canada, Mexico, EU, and Switzerland. We adapted data Canada's data for Australia/New Zealand, Japan's data for Korea, and Switzerland's data for EFTA. Data for Mexico was assigned to the CEU (Hungary and Poland), Turkey and all the developing countries.

Table 3. Change in Average World Prices due to Comprehensive OECD Domestic Support Reform (50% reduction)

Commodity	World Price Change	Contribution by Tax/Subsidy to World Price Change			
		Output	Int. Input	Land	Capital
pdrice	0.26	0.12	0.34	0.05	-0.23
wheat	4.91	1.03	1.68	1.11	1.09
crsgrns	5.5	1.42	1.79	1.02	1.27
oilsds	3.53	0.92	1.21	0.79	0.6
rawsgr	-0.58	0.09	0.14	-0.33	-0.48
othcrops	-1.5	-0.01	-0.03	-0.69	-0.77
ruminants	4.3	0.48	0.95	-0.38	3.25
nonrumnts	0.54	0.26	0.45	-0.14	-0.02
rawmilk	0.21	0.14	0.81	-0.33	-0.4
pcrice	0.27	0.13	0.12	0.06	-0.03
vegoilfat	0.97	0.2	0.34	0.24	0.2
refsgr	-0.06	0.05	0.06	-0.03	-0.15
rummeat	2.21	0.31	0.56	-0.11	1.44
nrummeat	0.43	0.17	0.28	-0.06	0.04
dairy	-0.19	0.14	0.36	-0.27	-0.43
othprfood	0.22	0.06	0.11	0.07	-0.03
mnfc	0.12	0.01	0	0.1	0.01
srvc	0.11	0.01	0	0.1	-0.01

Source: Authors' Simulation

Table 4. Developing Region Welfare Changes: Domestic Support Reform in $ millions (percentage in parentheses)

Region	Equivalent Variation				Terms of Trade Components		
	Total	Alloc. Efficiency	IS Effect	T.O.T.	World Price	Export Price	Import Price
China	-69.1 (-0.009)	-69.6	-18.0	18.5 (0.005)	-51.8 (-0.015)	137.1 (0.039)	-66.8 (0.019)
Indonesia	-13.6 (-0.007)	0.8	-1.9	-12.4 (-0.021)	-54.5 (-0.095)	35.5 (0.062)	6.6 (-0.012)
Vietnam	-8.2 (-0.042)	-1.9	0.3	-6.6 (-0.071)	-10.0 (-0.107)	5.8 (0.062)	-2.4 (0.026)
ASEAN4	-15.2 (-0.004)	4.9	-4.3	-15.9 (-0.004)	-47.4 (-0.013)	113.4 (0.031)	-81.9 (0.022)
India	35.9 (0.010)	15.2	-2.1	22.8 (0.049)	-22.9 (-0.049)	38.6 (0.083)	7.1 (-0.015)
RsoAsia	-44.2 (-0.037)	-3.3	-1.2	-39.7 (-0.149)	-57.2 (-0.214)	17.2 (0.064)	0.3 (-0.001)
Argentina	157.3 (0.053)	26.2	10.6	120.5 (0.428)	183.1 (0.653)	-53.1 (-0.189)	-9.5 (0.034)
Brazil	200.2 (0.029)	73.3	31.9	94.9 (0.173)	1.1 (0.002)	88.5 (0.161)	5.3 (-0.010)
RlatAmer	-214.3 (-0.050)	-29.9	-1.0	-183.4 (-0.135)	-244.7 (-0.180)	101.8 (0.075)	-40.5 (0.030)
MENA	-270.1 (-0.045)	-50.6	-1.8	-217.7 (-0.091)	-315.9 (-0.132)	83.1 (0.035)	15.1 (-0.006)
Tanzania	-7.0 (-0.111)	-1.2	-1.0	-4.9 (-0.420)	-7.1 (-0.608)	1.8 (0.154)	0.4 (-0.035)
Zambia	0.0 (0.000)	0.2	0.0	-0.3 (-0.017)	-1.4 (-0.103)	0.4 (0.031)	0.7 (-0.055)
R_SSA	-126.1 (-0.424)	-16.0	-2.1	-108.0 (-0.120)	-149.7 (-0.166)	31.1 (0.034)	10.6 (-0.012)
ROW	17.1 (0.002)	27.7	-1.1	-9.4 (-0.001)	-221.4 (-0.029)	285.9 (0.037)	-73.9 (0.010)
LDC Total	-357.3	-24.2	8.4	-341.6	-999.7	887.0	-228.9

Source: Authors' Simulations

Table 5. Terms of Trade Welfare Contribution Decomposed by Region and Commodity: Comprehensive 50% Reduction in OECD Domestic Support in $ millions

	World Price Effects by Region																
Com.	China	Indon.	Vnam	ASEAN	Ind.	RSoA	Arg.	Braz	RLat Amer	MENA	Tanz.	Zamb.	R_SSA	ROW	Total World Price Effect	Export Price Effect	Import Price Effect
Pdrice	0.2	-0.1	0.0	0.1	0.2	0.0	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.4	-0.9	-1.3
Wheat	-25.6	-33.9	-0.2	-38.8	-10.4	-47.0	69.2	-27.9	-42.3	-145.9	-0.3	0.0	-28.6	-44.5	-376.2	-82.3	68.8
Crsgrns	47.5	-8.0	0.2	-21.2	0.6	-0.5	71.7	-1.8	-42.5	-103.7	0.2	-0.5	0.5	-113.4	-171.0	-176.6	77.8
Oilsds	-28.7	-10.5	0.9	-17.7	9.0	-2.0	5.1	56.1	17.6	-10.7	0.4	0.1	7.0	-47.7	-21.0	-135.3	14.6
Rawsgr	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	-0.2
Othcrop	-2.1	-7.5	-11.8	10.1	-26.3	0.7	-18.6	-49.9	-186.4	-5.6	-7.5	-0.9	-131.1	92.0	-344.8	606.7	-123.8
Rumin	-20.0	-6.8	-0.1	-8.0	-6.1	-0.1	3.4	-1.6	3.7	-14.7	0.0	0.0	2.4	-19.6	-67.6	-48.7	30.7
Nrumin	3.8	0.5	0.2	-0.5	0.2	0.0	0.5	0.4	0.4	0.6	0.1	0.0	0.7	-8.5	-1.8	-14.4	1.8
Rawmlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Pcrice	0.3	0.0	0.3	0.7	1.1	0.4	0.2	-0.2	0.1	-1.1	0.0	0.0	-0.4	-0.8	0.5	-3.4	-1.7
Vegoil	-29.7	9.2	-0.5	32.9	3.2	-8.9	32.6	18.9	-7.0	-21.7	-0.3	0.0	-3.9	-20.1	4.8	-87.8	14.2
Refsgr	0.4	0.8	0.0	-1.8	-0.3	0.5	-0.1	-3.3	-3.9	4.0	0.0	-0.1	-0.6	0.7	-3.9	16.1	-0.8
Rummt	-6.7	-1.2	0.0	-6.9	3.8	-0.8	15.3	1.9	6.3	-15.8	0.0	0.0	-0.4	-33.5	-37.9	-49.3	22.3
Nrummt	1.6	-0.2	0.1	0.9	0.0	0.0	0.5	3.8	-0.2	-2.3	0.0	0.0	-0.6	-3.8	-0.3	-8.4	-3.5
Dairy	1.0	0.7	0.1	4.3	0.0	0.5	-0.7	1.0	2.3	6.6	0.0	0.0	1.6	5.8	23.1	8.6	-26.6
Othprocfd	2.2	1.1	0.4	1.8	1.3	0.5	1.0	0.6	4.2	-2.2	0.1	0.0	0.5	-7.2	4.3	19.2	-13.1
Mnfc	-9.1	-1.8	0.4	2.9	0.9	-0.2	2.3	0.7	4.7	-11.0	0.1	0.0	-1.7	3.5	-8.2	610.5	-190.3
Srvc	13.1	3.2	0.0	-6.1	0.1	-0.4	0.8	2.4	-1.7	7.8	0.0	0.0	5.1	-24.4	-0.2	232.9	-31.0

Source: Authors' simulation results.

Table 6. World Price Effects of Comprehensive 50% Market Price Support Reductions for OECD Agriculture, coupled with Re-instrumentation

Commodity	World Price Change	Contribution of Import Tariffs				Contribution of Export Subsidies	
		EU	USA	Japan	Other OECD	EU	Other OECD
pdrice	0.711	0.145	-0.004	0.44	0.088	0.039	0.003
wheat	0.794	0.072	-0.028	0.28	0.106	0.344	0.02
crsgrns	0.954	0.005	-0.074	0.122	0.145	0.744	0.012
oilsds	0.408	0.077	-0.068	0.26	0.127	0.008	0.004
rawsgr	0.205	0.14	0.063	0.036	-0.047	-0.007	0.02
othcrops	0.171	-0.008	0.049	0.092	0.022	-0.002	0.018
ruminants	0.031	-0.102	0.015	0.079	-0.016	-0.014	0.069
nonrumnts	-0.119	-0.088	0	0.045	-0.065	-0.016	0.005
Rawmilk	0.182	0.08	0.048	0.031	-0.074	-0.004	0.101
pcrice	-0.209	-0.306	0.019	0.071	0.001	0.004	0.002
vegoilfat	-0.095	0.018	-0.022	-0.008	-0.089	0.005	0.001
refsgr	0.071	0.005	0.044	0.023	0	-0.002	0.001
rummeat	-0.068	-0.103	-0.011	0.039	0.006	-0.004	0.005
nrummeat	-0.184	-0.125	-0.001	0.021	-0.065	-0.014	0
dairy	-0.167	-0.14	0.004	0.012	-0.023	-0.021	0.001
othprfood	-0.347	-0.099	-0.005	-0.016	-0.231	0.003	0.001
mnfc	-0.025	-0.01	-0.002	-0.009	-0.003	-0.001	0
srvc	-0.024	-0.008	-0.002	-0.008	-0.005	-0.001	0

Source: Authors' Simulations

Table 7. Developing Region Welfare Changes: OECD Re-instrumentation of Ag. Support in $ millions (percentage change in parentheses)

Region	Equivalent Variation			Terms of Trade Components			
	Total	Alloc. Efficien.	IS Effect	T.O.T	World Price	Export Price	Import Price
China	-59.8	-78.3	-6.2	24.8	-4.1	57.6	-28.8
	(-0.008)			(0.009)	(-0.001)	(0.021)	(0.011)
Indonesia	-6.3	-4.2	-0.6	-1.5	-14.2	18.3	-5.6
	(-0.003)			(-0.003)	(-0.024)	(0.032)	(0.001)
Vietnam	4.4	-1.5	-0.9	6.8	-0.4	8.3	-1.1
	(0.023)			(0.077)	(-0.005)	(0.094)	(0.012)
ASEAN4	-34.3	-16.8	-1.3	-16.2	-21.5	32.6	-27.3
	(-0.009)			(-0.004)	(-0.006)	(0.009)	(0.008)
India	0.6	-17.9	-0.5	19.0	-2.8	26.0	-4.2
	(0.001)			(0.043)	(-0.006)	(0.059)	(0.010)
RsoAsia	-17.7	-5.4	-0.1	-12.3	-11.3	6.8	-7.9
	(-0.015)			(-0.042)	(-0.039)	(0.024)	(0.027)
Argentina	71.2	6.2	3.2	61.8	20.1	49.4	-7.7
	(0.024)			(0.221)	(0.072)	(0.177)	(0.027)
Brazil	102.2	47.8	13.8	40.6	2.7	47.2	-9.4
	(0.015)			(0.082)	(0.005)	(0.096)	(0.019)
RlatAmer	238.6	26.3	13.4	199.0	-3.8	243.1	-40.4
	(0.056)			(0.174)	(-0.003)	(0.213)	(0.035)
MENA	15.6	56.6	-0.3	-40.7	-31.4	61.2	-70.6
	(0.003)			(-0.016)	(-0.013)	(0.024)	(0.028)
Tanzania	3.3	0.6	0.6	2.1	0.7	1.6	-0.2
	(0.052)			(0.209)	(0.066)	(0.163)	(0.019)
Zambia	0.2	-0.1	0.0	0.3	0.1	0.4	-0.1
	(0.004)			(0.029)	(0.006)	(0.032)	(0.008)
R_SSA	90.5	17.2	0.7	72.7	11.8	76.2	-15.3
	(0.030)			(0.082)	0.013)	(0.086)	(0.017)
ROW	28.9	25.6	-1.2	4.5	-0.4	15.7	-10.8
	(0.004)			(0.002)	(-0.000)	(0.007)	(0.005)
LDC Total	437.3	56.0	20.6	360.8	-54.5	644.4	-229.4

Source: Authors' Simulations

Table 8. Terms of Trade Welfare Contribution Decomposed by Region and Commodity: Comprehensive 50% Reduction in OECD Market Price Support, with Re-Instrumentation in $ millions

	Export Price Effects by Country																
Com.	China	Indon.	Vnam	ASEAN	Ind.	RSoA	Arg.	Braz	RLat Amer	MENA	Tanz.	Zamb.	R_SSA	ROW	Total Export Price Effect	World Price Effect	Import Price Effect
Pdrice	-0.6	0.0	-0.2	-0.5	-1.0	-0.3	-0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-2.3	3.6	-0.6
Wheat	-0.1	0.0	0.0	-0.1	-0.2	0.0	-3.0	-0.1	0.1	-0.9	0.0	0.0	-0.1	-0.3	-4.7	-59.8	-38.7
Crsgrns	-5.7	-0.1	0.0	-0.2	-0.1	0.0	3.1	-0.3	-0.1	-0.2	-0.1	0.0	-1.3	-0.6	-5.6	-18.6	-53.7
Oilsds	-0.4	0.0	0.0	-0.1	-0.5	-0.1	0.0	-1.9	3.9	0.0	0.0	0.0	0.4	-0.3	1.1	0.5	-0.7
Rawsgr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Othcrop	2.3	10.0	5.8	11.6	2.2	-0.1	6.8	3.4	122.9	9.3	0.6	0.1	34.4	1.7	210.8	47.8	-23.0
Rumin	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.2	0.7	0.0	0.0	0.4	0.4	3.5	-0.7	-0.8
Nrumin	6.1	0.6	0.3	1.4	0.3	0.2	0.9	0.5	2.0	2.2	0.1	0.0	1.3	1.2	16.9	-0.8	-2.3
Rawmlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Pcrice	1.1	0.3	1.2	5.6	4.2	1.4	0.6	0.0	1.8	0.3	0.0	0.0	0.1	0.1	16.8	-1.3	-10.6
Vegoil	1.4	1.8	0.0	7.1	2.2	0.0	13.5	6.3	2.2	1.0	0.0	0.0	0.8	1.1	37.4	-1.7	-5.0
Refsgr	0.1	0.0	0.0	1.6	0.1	0.0	0.0	0.9	6.1	0.2	0.0	0.0	1.2	0.0	10.2	1.5	0.5
Rummt	0.1	0.0	0.0	0.1	0.4	0.0	3.1	0.5	3.1	0.1	0.0	0.0	0.6	0.2	8.2	0.4	-2.8
Nrummt	5.1	0.0	0.1	1.8	0.0	0.0	1.7	4.0	1.7	0.4	0.0	0.0	0.3	1.5	16.7	-0.6	-7.0
Dairy	0.1	0.0	0.0	0.4	0.0	0.0	1.0	0.0	1.2	0.5	0.0	0.0	0.2	0.7	4.1	7.7	-6.6
Othprocfd	28.0	8.7	2.8	37.8	8.6	5.4	9.9	8.2	50.1	12.9	0.5	0.0	14.6	16.0	203.5	-32.6	-9.4
Mnfc	19.8	-2.4	-1.3	-18.7	8.0	1.0	9.0	20.7	32.9	27.4	0.2	0.2	18.6	-2.8	112.4	0.7	-65.4
Srvc	-0.1	-0.7	-0.5	-15.2	1.9	-0.5	2.5	4.9	13.7	7.5	0.4	0.1	4.7	-3.0	15.5	-0.9	-3.4

Source: Authors' simulation results.

7. References

Abler, David G. and James S. Shortle. 1992. "Environmental and Farm Commodity Policy Linkages in the US and the EC," *European Review of Agricultural Economics*, 19:197-217.

Anderson, Kym, Betina Dimaranan, Joseph Francois, Thomas Hertel, Bernard Hoekman and Will Martin. 2001. "The Cost of Rich (and Poor) Country Protection to Developing Countries," *Journal of African Economies.* 10(3): 227-257

Anderson, Kym, Erwidodo and Merlinda D. Ingco. 1999 "Integrating Agriculture into the WTO: The Next Phase," Paper prepared for the World Bank's Conference on Developing Countries and the Millennium Round, Council Room, WTO Secretariat, Centre William Rappard, Geneva, 19-20 September.

Dewbre, Joe, Jesus Anton, and Wyatt Thompson. 2001. "The Transfer Efficiency and Trade Effects of Direct Payments," *American Journal of Agricultural Economics*, 83(5):1204-1214.

Dimaranan, Betina V. "Construction of the Protection Data Base," Chapter 16.A in Dimaranan and McDougall (2002), *Global Trade, Assistance, and Production: The GTAP 5 Data Base*. Center for Global Trade Analysis, Purdue University, West Lafayette, Indiana, USA.

Dimaranan, Betina V. and Robert McDougall, Editors. 2002. *Global Trade, Assistance, and Production: The GTAP 5 Data Base*. Center for Global Trade Analysis, Purdue University, West Lafayette, Indiana, USA.

Elbehri, Aziz, Merlinda D. Ingco, Thomas Hertel and Ken Pearson. 1999. "Agriculture and WTO 2000: Quantitative Assessment of Multilateral Liberalization of Agricultural Policies," Paper presented at the Conference on Agriculture and the New Trade Agenda in the WTO 2000 Negotiations, October 1-2, Geneva, Switzerland.

Francois, Joseph, Bradley McDonald and H. Nordstrom. 1996. "The Uruguay Round: A Numerically-based Qualitative Assessment," Chapter 9 in *The Uruguay Round and the Developing Countries,*Will Martin and L.A. Winters (Eds.) Cambridge University Press, New York.

Frandsen, Soren, Birgitte Gersfelt, and Hans Grinsted Jensen. 2002. "Decoupling Support in Agriculture: Impacts of Redesigning European Agricultural Support," Paper presented at the Fifth Annual Conference on Global Economic Analysis held in Taipei, Taiwan, 5-7 June.

Frandsen, Soren, Hans Grinsted Jensen, and Wusheng Yu. 2001. "Domestic Support in Agriculture Version 5 of the GTAP Database: The Case of the European Union," Paper presented at the Fourth Conference on Global Economic Analysis held at Purdue University, Indiana, USA, June.

Gehlhar, Mark J. and Frederick J. Nelson. 2001. "Treatment of Domestic Agricultural Support and Implications for Reductions: The Case for the United States," Paper presented at the Fourth Conference on Global Economic Analysis held at Purdue University, Indiana, USA, June.

Gunter, Lewell F., Ki Hong Jeong, and Fred C. White. 1996. "Multiple Policy Goals in a Trade Model with Explicit Factor Markets," *American Journal of Agricultural Economics*, May 1996, pp. 313-330.

Harrison, G.W., Rutherford, T.F. and Tarr, D.G. 1996."Quantifying the Uruguay Round," Chapter 8 in *The Uruguay Round and the Developing Countries,*Will Martin and L.A. Winters (Eds.) Cambridge University Press, New York.

Hertel, Thomas W. 1989. "Negotiating Reductions in Agricultural Support: Implications of Technology and Factor Mobility," *American Journal of Agricultural Economics*, August 1989, pp. 559-573.

Hertel, Thomas and Will Martin. 1999. "Would Developing Countries Gain from Inclusion of Manufactures in the WTO Negotiations?" Paper prepared for the World Bank's Conference on Developing Countries and the Millennium Round, Council Room, WTO Secretariat, Centre William Rappard, Geneva, 19-20 September.

Hertel, Thomas, Will Martin and Betina Dimaranan and Koji Yanagishima. 1996. "Manufactures Trade in a Changing World Economy," Chapter 7 in *The Uruguay Round and the Developing Countries,* Will Martin and L.A. Winters (Eds.). Cambridge University Press, New York.

Hoekman, B., F. Ng and Marcelo Olarreaga. 2002. "Reducing Agricultural Tariffs versus Domestic Support: What's More Important for Developing Countries?" paper presented at the International Agricultural Trade Research Consortium Conference on "The Developing Countries, Agricultural Trade and the WTO," Whistler June 16-17, 2002.

Huff, Karen M. and Thomas W. Hertel. 1996. “Decomposition of Welfare Effects in the GTAP Model,” GTAP technical Paper No.5, Center for Global Trade Analysis, Purdue University, Indiana, USA.

Hummels, David. 1999. “Toward a Geography of Trade Costs,” mimeo, University of Chicago, Illinois, USA.

Ianchovichina, E. and W. Martin. 2002. “Economic Impacts of China’s Accession to the WTO,” mimeo, International Trade Department, World Bank.

Jensen, Hans Grinsted. 2002. “Agricultural Domestic Support,” Chapter 16.E in Dimaranan and McDougall (2002), *Global Trade, Assistance, and Production: The GTAP 5 Data Base*. Center for Global Trade Analysis, Purdue University, West Lafayette, Indiana, USA.

Martin, Will and L. Alan Winters. Editors. 1986. *The Uruguay Round and the Developing Economies.* Cambridge University Press, New York.

McDougall, Robert A. 1993. “Two Small Extensions to SALTER,” SALTER Working Paper No.12, Industry Commission, Canberra, Australia.

Rae, Allan N. and Anna Strutt. 2002. “The Current Round of Agricultural Trade Negotiations: Why Bother about Domestic Support?” Paper presented at the Fifth Annual Conference on Global Economic Analysis held in Taipei, Taiwan, 5-7 June.

Organization of Economic Cooperation and Development. 2001. *Market Effects of Crop Support Measures*. OECD, Paris, France.

Organization of Economic Cooperation and Development. 2002a. *Agricultural Policies in OECD Countries: A Positive Agenda for Reform*. OECD, Paris, France.

Organization of Economic Cooperation and Development. 2002b. *The Medium-Term Impacts of Trade Liberalisation in OECD Countries on the Food Security of Non-Member Economies*. OECD, Paris, France.

Organization of Economic Cooperation and Development. 2002c. *Monitoring and Evaluation of Agricultural Policies in OECD Countries*. OECD, Paris, France.