Dispelling Some Misconceptions about Agricultural Trade Liberalization

Stephen Tokarick

To say that markets for agricultural commodities are highly distorted would be an understatement. High-income countries employ a dizzying array of policies to support farm income, such as import tariffs; tariff-rate quotas (in which imports up to a certain level are subject to a given tariff rate and imports above the quota limit are subject to a different, usually higher, tariff rate); subsidies on inputs, outputs, and exports; and direct payments to farmers. Nicholas Stern (2002), past chief economist of the World Bank, has argued that "OECD subsidies exceeding US$300 billion a year are not only very costly to OECD taxpayers, but more importantly, impose a high burden on farmers and rural households in developing countries." Stiglitz and Charleton (2005, p. 120, note 11; see also p. 50) state: "Total OECD spending on agricultural subsidies is more than US$300 billion per year." Many others have echoed this number (for other examples, see Goldin and Reinert, 2006; Stuart and Fanjul, 2005), or its implication that agricultural subsidies from high-income countries amount to about $1 billion per day. One U.K. economist put this estimate in vivid perspective: "[Y]ou could fly all the cows in France around the world, business class, for the same cost of the European Union's agricultural subsidies" (Harcourt, 2004).

Agricultural trade policies in rich countries are certainly costly and inefficient, but many of the common claims about the magnitudes of the support and the economic effects of these policies are not grounded in solid fact or sound economics. This paper begins with a look at the data on patterns of agricultural support across countries. Agricultural subsidies have received nearly all of the public attention, perhaps because it is embarrassing to reveal how much money OECD

■ *Stephen Tokarick a Senior Economist, Research Department, International Monetary Fund, Washington, D.C. His e-mail address is ⟨stokarick@imf.org⟩.*

countries spend to support such a small sector of their economies. While agricultural subsidies are inefficient, their magnitude has often been exaggerated in the public discussion. While the aggregate value of all farm producer support approaches $300 billion, "subsidies" and "spending" directly linked to prices and output are actually less than half that total, while other forms of support, such as import tariffs and "decoupled" assistance that is not linked to levels of farm production are actually more important.

An opening discussion of the mechanics of agricultural support will set the stage for the next part of the paper, which discusses the economic effects of agricultural trade liberalization, defined to be the removal of all forms of agricultural support. The implicit or explicit argument that often follows hard upon the heels of the inflated estimates of the size of high-income country farm "subsidies" is that the support to farmers in high-income countries is extremely damaging to poor, developing countries—even more damaging than tariffs levied against developing-country exports. However, the effects of liberalizing trade in agricultural products is likely to be both smaller and more heterogeneous than such statements suggest. Some low-income countries are net exporters of agricultural products; others are net importers. The degree of substitutability between foreign and domestic agricultural products also varies substantially.

Those who oppose agricultural trade liberalization have their own favorite misstatements. One common claim often made by European trade negotiators is that if high-income countries cut agricultural tariffs worldwide, this step would erode the special treatment—often called "trade preferences"—that high-income countries currently make available to many of the lowest-income countries. As a result, they argue that the lowest-income countries could end up worse off as a result of agricultural trade liberalization. However, analysis shows that the magnitude of this effect, if it exists at all, is likely to be very small, and not nearly enough to counterbalance the more positive benefits of agricultural trade liberalization.

This paper will discuss the economics of agricultural trade liberalization, and in doing so, it will attempt to dispel some of the misconceptions that have become part of the discussion on how to reform agricultural trade policies. The discussion of the economic effects of different types of agricultural support raises a number of policy questions: Who gains and loses from liberalization? What is the best way to reform agricultural support? What are the effects of agricultural trade liberalization on the poorest economies? This paper provides answers to these questions.

What Forms of Agricultural Support Do Countries Use?

Each year, the Organization for Economic Cooperation and Development (OECD) publishes "producer support estimates" that capture all transfers from consumers and taxpayers that support agricultural producers, both in OECD countries and in a number of non-OECD countries. Support to producers is

Table 1

Support to Agricultural Producers, 2005

(in billions of U.S. dollars)

	All OECD countries	United States	European Union	Japan	Korea	All other OECD
Market price support[a]	149.9	8.7	55.5	40.2	21.8	23.6
Producer support payments	129.9	34.0	71.5	4.0	1.8	18.6
Based on output	14.9	6.2	5.6	1.1	0.0	1.9
Based on area planted	38.3	8.6	26.4	0.1	0.0	3.2
Based on historical entitlements	31.9	5.2	20.1	0.2	0.6	5.8
Based on input usage	27.1	8.5	12.1	1.5	0.5	4.5
Based on input constraints	13.1	3.4	7.8	1.2	0.1	0.7
Based on overall farm income	5.1	2.1	0.0	0.0	0.5	2.4
Miscellaneous	−0.4	0.0	−0.5	0.0	0.0	0.1
Coupled payments[b]	41.6	14.7	17.2	2.6	0.5	6.5
Decoupled payments[c]	88.4	19.3	54.3	1.4	1.3	12.1
Total producer support	**279.8**	**42.7**	**127.0**	**44.3**	**23.6**	**42.2**

Source: Database of Consumer and Producer Support Estimates, OECD, 2006.

[a] Comprised of border protection policies, such as import tariffs and export subsidies.

[b] Coupled payments are those that are directly related to production levels, and in the OECD classification, include payments based on output or input usage.

[c] Decoupled payments include those based on historical entitlements, input constraints, and overall farm income.

classified into eight categories. The first category is "market price support," which measures support that arises by altering the prices received by producers and paid by consumers. Essentially, market price support comprises any policy that creates a "wedge" between the domestic and international price of a product, such as an import tariff or an export subsidy. The other seven categories include payments to agricultural producers that are based on output levels, as well as payments not directly tied to production, such as direct transfer payments. Table 1 provides a breakdown of agricultural support provided to farmers in selected OECD countries that had relatively large levels of support in 2005.

The data in Table 1 readily dispel some misconceptions about the importance of various types of agricultural support to producers in OECD countries. While aggregate producer support was close to $300 billion in 2005, "subsidies," or "producer support payments," only comprised about 46 percent of total producer support. The other 54 percent of support to agricultural producers comes in the form of market price support, which is a consequence of "border policies"—policies that cause the domestic price of a product to diverge from the international price. The border policies usually take two forms—import tariffs or export subsidies—and it turns out that market price support consists almost completely of import tariffs, since few countries use export subsidies. It is not possible to decompose market price support into import tariffs and export subsidies for 2005, due to

lack of data. However, in 2002, the latest year for which data are available, expenditure on export subsidies totaled around $3.5 billion, with the European Union accounting for about $3.3 billion of this amount. Export subsidies are probably the least important type of support provided to agricultural producers, given that the dollar value is so small and practically all of the export subsidies are used by one region, the European Union. With this fact in mind, the agreement among members of the World Trade Organization in the ongoing Doha talks to eliminate export subsidies by 2013 seems rather unambitious.

Table 1 also shows wide differences in the *types* of subsidies provided to agricultural producers, which has implications for the economic impact of removing these subsidies. Within the category of "producer support payments," some types of subsidies called "coupled payments" affect farm output directly, such as payments based on output and input usage, while other types of subsidies called "decoupled payments" are not linked to current production levels, such as payments based on historical entitlements and the size of acreage planted in past years. Not all subsidies are alike, and the economic impact of altering them will differ.

As Table 1 shows, three countries and one region—the United States, the European Union, Japan, and Korea—accounted for about 85 percent of total support to agricultural producers in all OECD countries in 2005. Support levels differ markedly across countries however. The OECD calculates a "producer support estimate" (PSE), which captures total support to agricultural producers as a percent of the value of agricultural production. Using this metric, the countries with the highest producer support estimates in 2005 were Switzerland and Iceland (67 percent each), Norway (66 percent), Korea (63 percent), and Japan (55 percent). The average producer support estimate for all OECD countries was 29 percent in 2005. The producer support estimate for the European Union exceeded this level (33 percent), while the producer support estimate for the United States was 16 percent.

On a commodity basis, support in 2005 was highest on 1) rice, 2) sugar, 3) grains, 4) sheepmeat, 5) milk and dairy products, and 6) beef and veal. In most high-income countries, support to agricultural producers is provided in the form of import tariffs, however, the United States provides the majority of its support through payments to producers. Most low-income countries do not have the budgetary resources to provide support to agricultural producers in the form of subsidies. However, China provided $36.2 billion in total producer support in 2005, most of it, like the United States, through payments to producers. India also provides significant subsidies to agricultural producers. Other countries with significant support included Russia ($6.8 billion), Romania ($5 billion), and Brazil ($4.5 billion).

Table 2 provides an overview of tariff rates in World Trade Organization member countries for agricultural and food products and all products.[1] As shown,

[1] The tariff rates reported for developed countries take into account tariff preferences, like the European Union's "Everything but Arms" initiative and the U.S. Generalized System of Preferences. These schemes allow eligible exporters—those that are beneficiaries of the preference schemes—to ship

Table 2
Profile of Agricultural Tariff Rates

	Agriculture and food	All goods		Agriculture and food	All goods
	Import-weighted ad-valorem tariff rates for 2001				
High-income countries	16.0	2.9	**Developing countries**	17.7	9.9
Australia, Canada, and New Zealand	7.4	2.3	East Asia and Pacific	26.3	10.5
			China	37.6	13.6
United States	2.4	1.8	South Asia	33.9	23.5
European Union	13.9	3.2	India	50.3	28.1
Japan	29.4	5.2	Europe and central Asia	14.8	6.0
Korea and Taiwan	55.0	7.6	Middle East and North Africa	14.1	9.8
			Sub-Saharan Africa	18.2	12.6
			Latin America and the Caribbean	10.3	7.7

Source: Van der Mensbrugghe (2006, p. 73).

ad-valorem tariff rates on agricultural and food products in developing countries are higher than those applied by developed countries. This does *not* necessarily mean that tariffs in developing countries are more costly for these countries in terms of reducing efficiency, as the costs depend on how changes in tariffs affect the quantities of traded goods. Note that tariff rates on agricultural goods exceed tariff rates applied to all other goods in both developed and developing countries.

While nearly all countries apply tariffs against agricultural imports, not all countries employ subsidies that directly affect the quantity of agricultural production. By a large margin, developed countries—mainly industrial countries—are the principal users of subsidies. For example, over the period between 1995 and 1998, the last year for which data are available on all countries, the "quad countries"—the United States, Canada, the European Union, and Japan—accounted for 84 percent of total agricultural subsidies, while developing countries accounted for only about 12 percent, but within the group of developing countries, these subsidies were provided mainly by those in the middle- and upper-income portions of this group (Hoekman, Ng, and Olarreaga, 2006). Under the Agreement on Agriculture reached as part of the Uruguay Round, countries are subject to limits on certain types of subsidies—those deemed to be the most distortionary. These subsidies are referred to as the "aggregate measure of support." In 1999, the total amount of these subsidies reported to the World Trade Organization was $80.8 billion, of

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goods to the European Union and the United States at tariff rates that are below the rates charged to other exporters.

which $77 billion was accounted for by five countries: the European Union ($49.9 billion), the United States ($16.9 billion), Japan ($6.7 billion), Switzerland ($2.1 billion), and Norway ($1.4 billion). All other countries accounted for the remaining $3.8 billion.

One notable trend in recent years is that upper-income farmers have been receiving larger portions of agricultural subsidies in both the European Union and the United States. Tables 3 and 4 present a profile of the recipients of agricultural subsidies in these regions. There has been a clear trend toward larger and wealthier farms receiving a disproportionate share of agricultural subsidies. For example, in the United States in 2004, farms that accounted for more than $250,000 in sales, which represented only about 9 percent of all farms, received 58 percent of total government payments. In the European Union in 2003, farms that accounted for over 100,000 euros in sales, which represented only 0.3 percent of all farms, received about 12 percent of government payments.

The Economic Impact of Agricultural Support

Theoretical Framework

The impact of agricultural trade liberalization on a particular country depends on the magnitude of two effects: terms-of-trade effects and efficiency effects.

The terms-of-trade effect arises because a reduction in agricultural support will result in an increase in the world prices of the products subject to tariffs or subsidies, while domestic prices fall. Tariffs reduce the demand for the protected products on world markets, so removing them will increase demand and world prices. Subsidies tend to increase production and exports of the subsidized products, so removing them will push up world prices. The increase in world prices will affect a country's real income differently depending on whether it is a net exporter or a net importer of the good whose world price has risen. For net exporters of a certain product, this price increase makes them better off; conversely, net importers of a product would be harmed. Another key factor determining how world prices change in response to changes in agricultural support is the degree of substitutability between foreign and domestic products. This issue will be discussed in greater detail below.

The second effect is that a reduction in support for agricultural producers will improve economic efficiency, because the support caused more resources to be used in agricultural production than would otherwise be the case. Therefore, a reallocation of resources from the agricultural sector to other sectors of the economy would tend to improve real income, although it is theoretically possible that this reallocation could be harmful, depending on whether pre-existing distortions in other sectors discouraged or promoted production of those goods. If the resources released from agricultural sectors move into sectors that have distortions

Table 3

United States: Distribution of Government Payments to Farmers

	2000	*2001*	*2002*	*2003*	*2004*
Value of production of farms:					
<50,000 U.S. dollars					
Share of all farms (in percent)	73.0	73.6	73.6	74.8	73.1
Share of all payments (in percent)	12.8	16.9	18.5	17.2	15.7
>50,000, but <99,999 U.S. dollars					
Share of all farms (in percent)	9.7	8.8	8.8	8.6	8.9
Share of all payments (in percent)	12.0	10.7	11.2	10.3	7.6
>100,000, but <249,999 U.S. dollars					
Share of all farms (in percent)	10.1	9.6	9.6	8.6	8.8
Share of all payments (in percent)	29.0	25.2	24.9	23.5	19.1
>250,000 U.S. dollars					
Share of all farms (in percent)	7.3	8.1	8.1	8.1	9.3
Share of all payments (in percent)	46.2	47.2	45.3	49.1	57.6

Source: Economic Research Service (various years).

Table 4

European Union: Distribution of Government Payments to Farmers

	2000	*2001*	*2002*	*2003*
Sales of farms:				
<10,000 EUR				
Share of all farms (in percent)	87.8	86.6	87.8	86.8
Share of all payments (in percent)	30.8	28.9	28.2	27.6
>10,000, but <100,000 EUR				
Share of all farms (in percent)	11.9	13.1	11.8	12.9
Share of all payments (in percent)	56.3	57.8	57.1	60.2
>100,000, but <500,000 EUR				
Share of all farms (in percent)	0.3	0.4	0.3	0.3
Share of all payments (in percent)	10.8	11.0	10.8	10.4
>500,000 EUR				
Share of all farms (in percent)	0.01	0.02	0.02	0.01
Share of all payments (in percent)	2.10	2.40	3.90	1.80

Source: European Commission (various years).

in place that encourage production, this would likely be harmful because the inflow of resources would exacerbate the effects of the existing distortions in those sectors. Conversely, if the resources released by the agricultural sectors are reemployed in sectors that have distortions that "tax" or hinder production in those sectors, then the inflow of resources will be beneficial to the extent that they offset the harmful effects of the existing distortions. However, absent these "second-best effects," real income would rise as a result of the removal of a distortion.

One additional efficiency issue to consider is how the removal of agricultural

support affects the government's budget. Complete elimination of import tariffs will reduce tariff revenue. However, a partial reduction of tariffs could cause government revenue to rise or fall, depending on the responsiveness of imports to price changes. If removing support policies causes government revenue to decline, the government would have to replace the lost revenue with some other type of tax if it wanted to maintain the same level of spending, and this alternative tax will have a welfare cost associated with it that should be counted against the efficiency gains from reducing the agricultural support. Conversely, elimination of subsidies would reduce government spending, which would permit a reduction in other tax rates, and this would raise real income in addition to the efficiency gains from subsidy elimination itself.

The terms-of-trade effect and the efficiency effect can either reinforce each other or work in opposite directions: for example, a country could be worse off as a result of widespread agricultural liberalization if its terms of trade deteriorate and the magnitude of this effect exceeds any improvement in efficiency.

The economic effects of removing import tariffs are quite distinct from those of removing production subsidies. In general, an import tariff of a given percentage will inflict a larger efficiency loss on the economy, compared to a production subsidy of the same percentage. The reason is that a *tariff* is a tax on imports, which is the difference between domestic production and consumption and is therefore equivalent to a tax on consumption *plus* a subsidy to production, while a *production subsidy* is, by definition, only a subsidy to production. The greater efficiency loss of tariffs should inform any discussion of the impact of agricultural policy reform.

The Impact of Agricultural Liberalization on High-Income Countries

While there is general agreement that reform or elimination of trade barriers in agriculture would be beneficial, some related questions have no clear-cut answers. For example, would *every* country benefit from the elimination of agricultural tariffs and subsidies? If not, which countries might be harmed and what might be the magnitude of any losses? These policy questions can be answered by studies that use economic models to assess the impact of agricultural trade liberalization. This section focuses on only three such studies, each of which uses an economic model of the world economy that captures both the terms-of-trade effects across countries and the efficiency effects within countries described above. The results from these models are not directly comparable for various reasons discussed below, however, they do raise some key issues that are important for understanding the economic effects of agricultural trade liberalization.

All three studies are helpful in answering the question of who gains and loses from agricultural trade liberalization and the magnitude of these effects. Anderson, Martin, and van der Mensbrugghe (2005) used a dynamic model of the world economy classified into 27 regions and 25 sectors (13 of which are agricultural sectors) to calculate the impact of agricultural trade liberalization on trade flows, prices, and real income across countries. The model takes as its starting point the

Table 5

Summary of the Welfare Effects of Agricultural Trade Liberalization

(change in real income, in billions of U.S. dollars)

	Benefiting region		
Liberalizing region:	High-income countries	Developing countries	World
High-income countries:			
Anderson et al.[a]	109.0	26.0	135.0
Hertel and Keeney[b]	36.9	10.8	47.7
Tokarick[c]	91.7	8.0	99.7
Developing countries			
Anderson et al.[a]	19.0	28.0	47.0
Hertel and Keeney[b]	4.8	3.3	8.1
Tokarick[c]	2.8	21.4	24.2
Total			
Anderson et al.[a]	128.0	54.0	182.0
Hertel and Keeney[b]	41.6	14.1	55.7
Tokarick[c]	97.8	30.4	128.2

Sources: Anderson, Martin, and van Mensbrugghe (2005), Hertel and Kenney (2006), and Tokarick (2005).

[a] Relative to base year of 2015.
[b] Relative to base year of 2001.
[c] Relative to base year of 1997.

structure of production and trade in 2001 and then projects what the economy would look like in the year 2015. Then, using 2015 as a base, the authors report the economic impact of eliminating all agricultural trade barriers. The second study is by Hertel and Keeney (2006), who use a general equilibrium model of the world economy that has been designed for policy analysis—the GTAP model—to calculate the impact of agricultural trade liberalization. This model uses the year 2001 as the base year and models 29 regions of the world economy. The authors estimate the impact of trade reform relative to the structure of the world economy as it was in 2001, rather than the hypothetical year of 2015. Also, unlike the first model of Anderson, Martin, and van der Mensbrugghe (2005), this second model is static, not dynamic. The third model, which I used in Tokarick (2005), is an earlier version of the GTAP model of 19 regions, uses 1997 as the base year, and adopts much larger trade elasticities than Hertel and Keeney (2006). This choice will have important implications for the results discussed below.

Table 5 presents a summary from each of the three models of the estimated impact of removing all forms of agricultural trade barriers on real income. The aggregate results are shown for two broad groupings of countries: 1) high-income countries and 2) developing countries, which include both middle- and low-income countries. As shown in Table 5 under the column labelled "World," the removal of agricultural trade barriers (both tariffs and subsidies) by both developed and developing countries would yield a gain in real income for the world of $182 billion

according to Anderson, Martin, and van der Mensbrugghe (2005), $56 billion according to Hertel and Kenney (2006), and $128 billion according to my analysis (Tokarick, 2005). This type of liberalization, in which all countries remove their agricultural trade barriers completely, results in a welfare gain for all country groupings. However, within groups, individual countries might lose. For example, in the simulations of Anderson et al. (2005), complete liberalization by all countries would result in welfare losses for Bangladesh and India, as a consequence of a deterioration in their terms of trade. In general, countries that have low trade barriers and are net-importers of agricultural products that were subject to distortions, such as Singapore, could lose from global agricultural trade liberalization.

The elimination of agricultural trade barriers causes output of agricultural goods to decline in the highly distorted economies (like the European Union) as resources are allocated to more productive uses. The welfare gains for agricultural exporters that have no or small amounts of protection—such as Australia and New Zealand—result mainly from an improvement in their terms of trade. Despite the differences across models in terms of data used and benchmark years, all studies seem to agree that the largest beneficiaries from agricultural trade liberalization are the high-income countries, not developing countries. These studies find that the largest beneficiaries tend to be the most distorted economies mentioned earlier, such as the European Union, Japan, Korea, and the United States.

Effects of Agricultural Liberalization on Developing Countries

A great deal of the discussion over the impact of agricultural trade liberalization has centered on low-income or developing countries. What should the role of developing countries be in reforming agricultural trade policies? Should developing countries implement reforms on their own or should they wait for developed countries to reform their policies first? In previous rounds of trade liberalization under the General Agreement of Tariffs and Trade (the GATT) and the World Trade Organization, some developing countries were exempt from liberalization or permitted to phase in reforms over a very long time period. What would be the effect on developing countries from reforming their own agricultural trade policies, relative to the effects that would arise if developed countries eliminated their agricultural trade barriers while barriers in developing countries remained unchanged? Do developing countries have a great deal to gain from the liberalization of agricultural trade? These issues are quite complex, but the results from empirical modeling exercises can help shed some light on these questions.

The effects of agricultural trade liberalization on developing countries depends crucially on the extent to which developing countries liberalize their own agricultural trade policies. If most or all of the agricultural trade liberalization is implemented by high-income countries, some developing countries would actually be harmed. The reason is that tariff and subsidy removal by high-income countries will tend to raise the world prices of products previously subject to these tariffs and subsidies. Therefore, absent any liberalization of their own, the net impact on the

Table 6

Importance of Tariff and Subsidy Removal
for Developing Countries

(change in real income, in billions of U.S. dollars)

Liberalization by high-income countries:	*Impact on real income of developing countries*
Tariff removal	
Hertel and Keeney[a]	11.9
Tokarick[b]	12.5
Removal of all subsidies	
Hertel and Keeney[a]	−1.2
Tokarick[b]	−4.5
Removal of export subsidies only	
Hertel and Keeney[a]	−1.5

Sources: Hertel and Kenney (2006), and Tokarick (2005).
[a] Relative to base year of 2001.
[b] Relative to base year of 1997.

real income of developing countries will depend on whether they are net-importers or exporters of the previously protected products: the net-exporting countries will benefit, since their terms of trade improve, while the net-importers will lose since their terms of trade deteriorate. In my simulations in Tokarick (2005), for example, a grouping of countries in the Middle East and North Africa—Morocco and Tunisia, in particular—would probably be hurt by liberalization by high-income countries alone because they are significant net importers of products subsidized by rich countries, such as wheat, meat, and dairy products.

Studies show that some liberalization by high-income countries, without any liberalization by developing countries, could harm developing countries. In Table 5, Hertel and Keeney estimate that liberalization by high-income countries, without any reform by developing countries, would raise real income for developing countries by $10.8 billion. Table 6 shows the components of this amount: tariff elimination by high-income countries alone would raise real income in developing countries by $11.9 billion, but removal of all subsidies would *reduce* the real income of developing countries by $1.2 billion, resulting in a net gain for developing countries of $10.8 billion. Developing countries would benefit from tariff reductions in rich countries as a result of improved market access, but would be harmed by subsidy removal because they are net-importers of products subsidized in rich countries. Similarly, in Tokarick (2005), I estimate that liberalization by high-income countries alone would increase real income in developing countries by $8 billion (Table 5), and this comes about from a gain of $12.5 billion from tariff elimination and a loss of $4.5 from subsidy elimination (Table 6). Cernat, Laird, and Turrini (2003) and Diao, Somwaru, and Roe (2001) reach similar conclusions. Thus, it would be incorrect to assert that agricultural trade liberalization benefits *all*

developing countries. The impact of liberalization is positive for developing countries in the *aggregate*, as shown in Table 5, but individual countries could be harmed, depending on the extent to which they reduce their own barriers to trade and whether they are a net-importer or -exporter of agricultural goods. Whether developing countries would gain or lose also depends importantly on the type of any liberalization. Tariff elimination alone by high-income countries would likely benefit developing countries as a group, while if only subsidies are removed, developing countries would be harmed in the aggregate as a consequence of a deterioration in their terms of trade.

One result that is consistent across all modeling studies is that the elimination of tariffs on agricultural products would have a much larger quantitative effect on the real income of developing countries than the elimination of all subsidies (whether export or production subsidies). A number of commentators and non-government organizations have emphasized the negative impacts that high-income country subsidies have on developing countries. For example, Oxfam has produced a number of papers that excoriate rich countries for agricultural "dumping," which they describe as rich countries selling subsidized products on world markets (for example, Stuart and Fanjul, 2005). However, empirical studies shown in Table 6 confirm that the removal of tariff barriers in high- and low-income countries would have a much larger impact on real income than removal of either production or export subsidies. Although not reported in Table 6, Anderson, Martin, and Valenzuela (2006) estimate that if all countries (high-income and developing countries) were to remove their agricultural support policies, then about 93 percent of the gains in real income for the world would be due to tariff elimination, 5 percent due to elimination of production subsidies, and 2 percent attributable to export subsidies.

Setting aside the differences across models that arise because of a different choice of base year, the results reported in Table 5 also reveal that the modeling exercises differ significantly with respect to the extent to which developing countries benefit from the elimination of their own agricultural trade barriers, relative to the elimination of agricultural tariffs and subsidies in the high-income countries. At one end of the spectrum, the study by Hertel and Keeney (2006) estimates that developing countries would gain more from the removal of agricultural trade barriers in high-income countries ($10.8 billion) compared to the gains they would experience as a result of their own liberalization ($3.3 billion). Anderson, Martin, and van der Mensbrugghe (2005) present a different picture: developing countries would get about half their gains from their own liberalization and half from liberalization by high-income countries. My study (Tokarick, 2005) presents a dramatically different picture: about 70 percent of the gains to developing countries resulting from an agricultural trade liberalization would result from their own liberalization and only 30 percent from liberalization by rich countries.

Dramatic differences in the results across models stem largely from how the terms of trade of developing countries are affected by agricultural trade liberaliza-

tion in each model. A key determinant of how liberalization of agriculture affects the terms of trade in numerical general equilibrium models is the degree of substitutability between imported and domestic goods. As a general rule, if the degree of substitutability is high, the impact of liberalization on the terms of trade will be small and vice versa. The models in Table 5 adopt very different assumptions regarding the degree of substitutability between imports and domestic goods. For example, Hertel and Keeney (2006) assume a much lower degree of substitutability between imports and domestic goods than I do in Tokarick (2005). As a consequence, Hertel and Keeney calculate that the terms of trade for developing countries would deteriorate by a much larger magnitude than in my model, which reduces the magnitude of the gains that arise from liberalization. On the other hand, I assume that developing countries possess very little ability to affect their terms of trade. Thus, my results show a much larger welfare gain for developing countries from their own reforms because the terms of trade do not deteriorate nearly as much as in the model by Hertel and Keeney. Although the welfare effects of reform depend crucially on the degree of substitution between imported and domestic goods, there is no consensus on the crucial elasticity values from the econometric literature.

The choice of elasticity values depends on more than just econometric estimates. It turns out that the lower the values for the elasticity of substitution between imports and domestic goods, the greater the likelihood that a country could make itself *better* off as a consequence of restricting trade. The reason is that the smaller the elasticity between imports and domestic goods, the more market power a country has because, in a sense, a low substitution elasticity suggests that the good produced by one country is "different" than goods produced and traded by other countries. In such a case, a country has an incentive to act like a monopolist and restrict the amount of the good that it trades. In contrast, a high elasticity of substitution means that a country has little or no ability to turn the terms of trade in its favor by restricting trade. Thus, the choice of elasticity values depends on whether a modeler wants to accept the econometric estimates for the elasticity of substitution and the implications this has for a country's ability to affect its terms of trade, or to adopt elasticity values that generate terms of trade effects that a modeler considers reasonable. Some modelers argue that agricultural commodities are highly homogeneous, which would imply high values for the elasticity of substitution and result in a country having little scope for influencing its terms of trade. This judgment turns out to have significant consequences for model results.

The Case of Cotton

Liberalization of trade in cotton has become an important policy issue because cotton is subsidized in a few high-income countries, such as the United States, and is of export interest to a number of low-income countries. Over the period between 2000 and 2002, the United States accounted for about 32 percent of total world exports of cotton, followed by Australia (14 percent), Uzbekistan (11 percent),

Greece (4 percent), and Syria (3 percent)—so together, these five countries accounted for about two-thirds of world exports. Over this same period, the United States spent about $3 billion subsidizing the production of cotton and the European Union spent about $0.5 billion, mainly for producers in Greece and Spain. Other countries such as Turkey, although not a significant exporter, subsidized cotton production to a small degree. There is disagreement over the extent to which China subsidized cotton production. According to Baffes (2006), China spent about $1.5 billion in production subsidies per year between 2000 and 2002, but Anderson and Valenzuela (2006) did not include any subsidies for China in their model.

Given that the United States accounts for such a large share of world exports of cotton, production subsidies in the United States depress the world price, and therefore reduce the export earnings of other exporters. A number of studies have estimated the impact of removing cotton subsidies in the United States on the world price, but they have generated a wide range of results—anywhere from a 3 to a 30 percent increase (FAO, 2004, offers a review of the studies). Some of the countries that are heavily dependent on cotton exports are also very poor countries, such as Benin, Burkina Faso, Chad, Mali, and Togo, which have per-capita incomes below $400 per year. Cotton exports for these countries account for anywhere between 20 and 50 percent of their total export earnings, so cotton subsidies in the United States have significant impacts on them. In an unprecedented move, the "cotton four" countries—Benin, Burkina Faso, Chad, and Mali—approached the World Trade Organization and sought the removal of cotton subsidies in the United States and elsewhere. They also went so far as to demand the payment of "damages" of approximately $250 million that they claimed they suffered in terms of foregone export earnings as a result of the rich-country subsidies.

Using a general equilibrium model of the world economy, Anderson and Valenzuela (2006) find that the removal of all cotton subsidies (and tariffs) would boost world welfare by about $283 million and about half of this gain would accrue to countries in sub-Saharan Africa. Furthermore, the removal of all support applied to cotton would raise exports of sub-Saharan African countries by about 55 percent. Although the removal of all cotton support would raise real income for the world, and countries in sub-Saharan Africa in particular, net-importing countries that use imported cotton in textiles, such as Bangladesh, India, and countries in Latin America, would be worse off as a result of an increase in the world price of cotton. The example of cotton highlights the sometimes significant distributional effects that changes in trade policy can have.

Dealing With the Erosion of Trade Preferences

One factor that complicates any analysis of the effects of agricultural trade liberalization on developing countries is the existence of trade preferences. Many rich

countries have in place a number of programs that allow exports of certain goods to enter their markets at a reduced or zero tariff rate, thus providing preferential treatment to the exports from countries that they deem eligible for special assistance.[2] The United States offers a number of preferential schemes, such as the Generalized System of Preferences (GSP) which applies to over 100 countries, the Caribbean Basin Initiative which provides trade preferences to certain Caribbean countries, and the African Growth and Opportunity Act, which is designed to stimulate exports from African countries. Each of these schemes aims to foster development in eligible countries by encouraging exports from them to the U.S. market. Under the African Growth and Opportunity Act for example, the United States applies a zero tariff to imports of preserved strawberries from eligible African countries, such as Namibia, while it applies a tariff of 11.9 percent—the "most favored nation" tariff rate—to imports of preserved strawberries from countries that do not qualify for preferences, such as Italy. The European Union also offers preferential treatment to exports of certain goods from African, Caribbean, and Pacific countries. Perhaps the European Union's most far-reaching preference scheme is the Everything But Arms initiative, under which exports of nearly all goods from least-developed countries enter the European market duty- and quota-free.

These preferential trade programs offer an advantage to beneficiary countries in that they are able to export certain products at a tariff rate that is below the rate applied to the same exports from countries outside these programs—the most-favored nation rate. The difference between the most-favored nation rate and the preferential tariff rate is a measure of the advantage that an exporting country enjoys for eligible products. In the example mentioned above, exporters who were deemed eligible under the African Growth and Opportunity Act, like Namibia, enjoyed a "preference margin" of 11.9 percent on exports of preserved strawberries to the U.S. market. Any broad-based reduction in most-favored nation agricultural tariff rates would lessen or "erode" the advantage that exporters currently enjoy under these preferential schemes. Thus, countries that currently benefit from the preference schemes could be harmed—or suffer "preference erosion"—as a result of a reduction in overall agricultural most-favored nation tariff rates.

Preference erosion has sometimes been used to argue for less ambitious tariff reductions as part of the ongoing Doha round of trade negotiations, based on the belief that more modest reductions will avoid harming developing countries that currently benefit from these schemes. For example, the European Union Commissioner for External Trade, Peter Mandelson (2005a; see also 2005b) has stated that "a tariff-cutting spree in Europe of the sort being demanded [referring to a U.S. proposal] would spell disaster, wiping out a possible two-thirds of their agricultural trade with Europe." This argument has been a predominant reason that the

[2] In 2003, the United States considered 143 developing countries eligible for preferences under the Generalized System of Preferences. Eligibility is based on a number of factors, including the country's share of exports in the U.S. market.

European Union has given for rejecting proposals made by the United States and others that call for far-reaching tariff reductions.

However, empirical studies demonstrate that the magnitude of any possible preference erosion is likely extremely modest, for three reasons. First, the value of preferences is small relative to total exports from beneficiary countries. For example, for sub-Saharan Africa, the value of preferences is only 4 percent of their exports to the European Union market, about 1.5 percent of their exports to the U.S. market, and only one-tenth of 1 percent of their exports to Japan (Brenton and Ikezuki, 2006). Second, preference schemes entail some costs of compliance for the exporting country. When traders request preferences, they must comply with administrative and technical requirements. The largest costs arise from complying with rules-of-origin requirements, which require demonstrating that exports that receive preferential treatment were not transshipped from somewhere else. Exporters must keep records to document that they have satisfied all the requirements to benefit from a preference scheme, and these costs amount to about 4 percent of exports on average (Francois, Hoekman, and Manchin, 2005). Indeed, the average preference margin reported in Hoekman, Martin, and Braga (2005) is less than 4 percent across preference-receiving countries, but larger in some cases, depending on the country grouping. Finally, preference schemes tend to be underutilized: utilization rates, defined as the ratio of the value of exports receiving preferential treatment to the value of all exports covered by preferential schemes, were as low as 50 percent in some cases.

In short, preference erosion could be a concern for particular products and countries—countries that rely on export earnings from products benefiting from the preference schemes. Some studies, such as the one by Alexandraki and Lankes (2004) conclude that individual countries could experience substantial losses in export earnings as a result of preference erosion, especially those that export bananas, sugar, and textile products. For example, they estimate that Mauritius could suffer a reduction in export earnings of nearly 20 percent as a result of lower sugar exports to the European Union. But the magnitude of any erosion is not large enough to warrant any sluggishness on ambitious cuts in agricultural tariffs.

In an effort to encourage countries to participate in multilateral trade liberalization, the International Monetary Fund (IMF) introduced the Trade Integration Mechanism in 2004 to support countries that experience a reduction in export earnings as a consequence of multilateral trade liberalization by making resources more predictably available under existing IMF arrangements. The Trade Integration Mechanism is designed to assist countries that face balance-of-payments shortfalls as a result of preference erosion, among other reasons.[3] Assistance under this policy is limited to multilateral liberalization and does not cover possible adverse

[3] The Trade Integration Mechanism also applies to situations in which a country experiences an adverse movement in its terms of trade as a result of multilateral agricultural trade liberalization, as well as a loss of export earnings due to the elimination of textile quotas in 2005.

effects that might arise as a result of unilateral liberalization. Since its inception, three countries—Bangladesh, the Dominican Republic, and Madagascar—have requested and obtained support under the Trade Integration Mechanism.

Conclusion

In economic terms, agricultural trade barriers in high-income countries are costly and distortionary. In political terms, agricultural trade barriers have been a roadblock to the Doha round of trade liberalization talks. But the case for removing agricultural trade barriers need not rest on exaggerations and misconceptions. The case for agricultural liberalization based on facts and analysis is quite compelling enough.

References

Alexandraki, Katerina, and Hans-Peter Lankes. 2004. "The Impact of Preference Erosion on Middle-Income Developing Countries." IMF Working Paper 04/169.

Anderson, Kym, and Ernesto Valenzuela. 2006. "The World Trade Organization's Cotton Initiative: A Tale of Two Issues." [World Bank] Policy Research Working Paper 3918.

Anderson, Kym, Will Martin, and Dominique van der Mensbrugghe. 2005. "Market and Welfare Implications of Doha Reform Scenarios." In *Agricultural Trade Reform and the Doha Development Agenda,* ed. Kym Anderson and William Martin, chap. 12. Washington, DC: World Bank.

Anderson, Kym, Will Martin, and Ernesto Valenzuela. 2006. "The Relative Importance of Global Agricultural Subsidies and Market Access." *World Trade Review,* 5(3): 357–76.

Baffes, John. 2005. "Cotton: Market Setting, Trade Policies, and Issues." In *Global Agricultural Trade and Developing Countries,* ed. M. Aksoy and J. Beghin, chap. 14. Washington, DC: The World Bank.

Brenton, Paul, and Takako Ikezuki. 2006. "The Value of Trade Preferences for Africa." In *Trade, Doha, and Development: A Window into the Issues,* ed. Richard Newfarmer, chap. 18. Washington, DC: World Bank.

Cernat, Lucian, Sam Laird, and Alessandro Turrini. 2003. *Back to Basics: Market Access Issues in the Doha Agenda.* Geneva: United Nations Conference on Trade and Development.

Diao, Xinshen, Agape Somwaru, and Terry Roe. 2001. "A Global Analysis of Agricultural Reform in WTO Member Countries." In *Agricultural Policy Reform in the WTO: The Road Ahead,* ed. Mary Burfisher, chap. 1. Washington, D.C.: U.S. Department of Agriculture, Economic Research Service.

Economic Research Service, U.S. Department of Agriculture. Various years. U.S. and State Farm Income Data. A data set available at http://www.ers.usda.gov/data/FarmIncome/finfidmu.htm.

European Commission. Various years (2001–2005). "The Agricultural Situation in the European Union." Available at http://ec.europa.eu/agriculture/funding/index_en.htm.

Food and Agriculture Organization (FAO). 2004. "Cotton: Impact of Support Policies on Developing Countries—A Guide to Contemporary Analysis." FAO Trade Policy Technical Notes. Available on FAO web page.

Francois, Joseph, Bernard Hoekman, and Miriam Manchin. 2005. "Preference Erosion and Multilateral Trade Liberalization." [World Bank] Policy Research Paper WPS3730.

Goldin, Ian and Kenneth Reinert. 2006. *Globalization for Development: Trade, Capital, Aid, Migration, and Ideas.* Washington, DC: World Bank.

Harcourt, Tim. 2004. "Milking the (Trade) Round . . . for all its Worth." http://www.austrade.gov.au/Milking-the-trade-round-for-all-its-worth/default.aspx.

Hertel, Thomas, and Roman Keeney. 2006. "What Is At Stake: The Relative Importance of Import Barriers, Export Subsidies, and Domestic Support." In *Agricultural Trade Reform and the Doha Development Agenda*, ed. by Kym Anderson and William Martin, 37–62. Washington, DC: The World Bank.

Hoekman, Bernard, Will Martin, and Carlos Braga. 2005. "Preference Erosion: The Terms of the Debate." In *Trade, Doha, and Development: A Window into the Issues*, ed. by Richard Newfarmer, chap. 28. Washington, DC: World Bank.

Hoekman, Bernard, Francis Ng, and Marcelo Olarreaga. 2006. "The Impact of Agricultural Support Policies on Developing Countries." In *Reforming Agricultural Trade for Developing Countries*, ed. Alex McCalla and John Nash, 100–131. Washington, DC: World Bank.

Mandelson, Peter. 2005a. "New EU Offer in Doha Talks." Statement, Brussels, October 28.

Mandelson, Peter. 2005b. "Where Next for Doha." *The Wall Street Journal*, November 3.

Organization for Economic Cooperation and Development. 2006. Database of Consumer and Producer Support Estimates. OECD. Available at http://www.oecd.org.

Stern, Nicholas. 2002. "Making Trade Work for Poor People." Speech delivered by Nicholas Stern, senior Vice President and Chief Economist of the World Bank, to the National Council of Applied Economic Research, New Delhi, India, November 28, 2002.

Stiglitz, Joseph, and Andrew Charlton. 2005. *Fair Trade For All: How Trade Can Promote Development.* New York: Oxford University Press.

Stuart, Liz, and Gonzalo Fanjul. 2005. "A Round For Free: How Rich Countries Are Getting A Free Ride On Agricultural Subsidies At the WTO." Oxfam Briefing Paper 76.

Tokarick, Stephen. 2005. "Who Bears the Cost of Agricultural Support Policies in OECD Countries?" *World Economy*, April, 28(4): 573–93.

Van der Mensbrugghe, Dominique. 2006. "Estimating the Benefits of Trade Reform: Why Numbers Change." In *Trade, Doha, and Development: A Window into the Issues,* ed by Richard Newfarmer, chap. 4. Washington, DC: The World Bank.