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Boxed In

Conflicts between U.S. Farm Policies and WTO Obligations

by Daniel A. Sumner

Executive Summary

Farm subsidy programs have long been contentious both in domestic policy debate and in global policy forums. Now a recent World Trade Organization ruling against U.S. cotton subsidies has thrown a spotlight on an additional problem: the conflict between U.S. farm programs and the international obligations of the United States as a member of the WTO. That problem is not confined to cotton. The subsidies conferred on numerous other commodities besides cotton are vulnerable to WTO challenge as well. In addition, there is a strong argument that the United States has been and will be in violation of its WTO commitments regarding the overall level of trade-distorting subsidies.

The cotton case has clarified the proper classification of U.S. farm subsidies into the "green" and "amber" boxes of the WTO Agriculture Agreement. The upshot of that clarification is that the United States has likely been exceeding the $19.1 billion cap on trade-distorting, amber-box subsidies that it agreed to abide by under the Agriculture Agreement. According to the calculations described in this paper, total U.S. amber-box subsidies to be included under the cap amounted to $29.1 billion in 2000 and $25.3 billion in 2001 and will likely total about $26.3 billion in 2006—all far in excess of the $19.1 billion limit.

Furthermore, U.S. farm programs for a variety of commodities may be suppressing market prices in violation of the WTO Agreement on Subsidies and Countervailing Measures. Economic simulations based on a model developed here show that U.S. subsidies depress world corn prices by 9 to 10 percent, world wheat prices by 6 to 8 percent, and world rice prices by 4 to 6 percent. Those price effects, together with other data on subsidy rates and costs of production, are large enough to raise concerns about serious prejudice to the interests of other WTO members.

U.S. farm programs are in need of a major overhaul to bring them into conformity with international obligations. Congress should therefore seize the opportunity to make real and durable improvements in agricultural policy when the current farm bill expires in 2007.

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The cotton case throws a new spotlight on a long-standing problem in U.S. farm policy.

Introduction

In September 2004 a dispute settlement panel in Geneva ruled that U.S. subsidy programs for upland cotton violate the United States' obligations under the World Trade Organization and recommended that the United States change its policies to bring them into conformity with WTO rules. A few months later, in March 2005, the WTO's Appellate Body upheld the panel's finding. Brazil, the complaining party in the dispute, has claimed the right to more than $1 billion in trade retaliation unless the United States fully implements the Appellate Body's recommendations.

The cotton case[1] throws a new spotlight on a longstanding problem in U.S. farm policy: the conflict between current subsidy programs and WTO rules. That problem is not confined to cotton. As shown in this study, the subsidies conferred on numerous other commodities besides cotton are vulnerable to WTO challenge as well. In addition, there is a strong argument that the United States has been and will be in violation of its WTO commitments regarding the overall level of trade-distorting subsidies.

Until 2004 the United States was protected from many of the possible WTO challenges to its farm programs by the so-called peace clause, a provision of the WTO Agreement on Agriculture that limited recourse to dispute settlement for agricultural subsidies. In the cotton case, Brazil was able to show that even the peace clause did not shield excessive U.S. cotton subsidies. The peace clause has expired, however, and therefore the threshold is lower for countries that are now considering WTO challenges to U.S. programs. Additional complaints may be filed at any time, enmeshing the United States in further controversy and putting its overall trade policy position increasingly on the defensive.

Meanwhile, the ongoing round of WTO negotiations promises to add to the United States' international obligations. At the center of the Doha Development Agenda (DDA), or Doha Round, are demands by less-developed countries and other major exporters of agricultural products that the United States and other industrialized countries substantially curtail their trade-distorting farm subsidies. The most recent U.S. proposal in the DDA agriculture negotiations offers substantial new disciplines on the domestic supports that are at the heart of U.S. farm policy. If the United States is successful with its own proposal, or if something along similar lines is incorporated into a DDA agreement, the United States will need to make substantial changes in its farm programs.

The Doha Round negotiations and the U.S. domestic farm policy debate are proceeding on similar schedules. The current U.S. farm legislation, the Farm Security and Rural Investment Act of 2002, is set to expire in 2007. Meanwhile, many trade experts look forward to a conclusion of the Doha Round that same year. In light of the ongoing controversy over the cotton case, the real possibility of additional cases, and the prospect of stronger obligations under a Doha Round agreement, the issue of consistency with WTO obligations is already having a major impact on the process of debating and crafting the next farm bill. The choice that Congress faces is clear: if the United States gets the kind of WTO agreement it is seeking, new legislation must reduce or eliminate most trade-distorting farm subsidies. Moreover, even if global subsidy cuts are not achieved by negotiation, the United States still risks being embroiled in more WTO disputes unless farm subsidies are brought in line with existing agreements. It is possible that a successful DDA agreement will include a new peace clause that could shield the United States from future cotton-type WTO claims. But that is likely only if the package also includes even greater cuts in U.S. subsidy programs than have been offered to date and tight product-specific subsidy limits. Of course, if the Doha Round should fail, there will be no trade "peace" and we should expect trade competitors to pursue even more WTO cases. Either way, and those familiar with the language of WTO rules will pardon the pun, the United States is boxed in.

The importance of ensuring consistency with WTO rules has not escaped Congress's attention. Sen. Saxby Chambliss (R-GA), chair of the Senate Committee on Agriculture,

recently assessed factors affecting the upcoming 2007 farm bill. After mentioning the role of budget deficits, he noted that the recent WTO cotton ruling is important for all commodities in the farm bill. "Every commodity has to look at this case and make decisions as to what changes we need to make within the particular titles to meet WTO requirements," Chambliss stated. "WTO is a great organization that has served us well to this point. We must be sure we're WTO-compliant in this next farm bill."[2]

Debate on the direction of new farm legislation is already under way. This study seeks to aid that debate by assessing the extent of possible conflicts between U.S. farm policies and WTO obligations. The assessment offered will look at WTO rules both as they exist today and as they may change as the result of a successful Doha Round agreement. I will conclude with a discussion of how farm legislation, including the next farm bill, can bring the United States into conformity with its international obligations.

The findings of this study will be of relevance not only to Congress but also to U.S. and other negotiators as they work toward completion of the DDA talks. Shortly after this paper is published, those talks will reach a critical juncture as a WTO Ministerial Conference convenes in Hong Kong on December 13–18, 2005. As in the past, agriculture is among the make-or-break issues for Hong Kong. As new limits on trade-distorting farm subsidies are being hashed out, it is certainly useful to have a clearer sense of the trade-distorting effects of current U.S. farm programs. In particular, negotiators who are crafting *new* disciplines on trade-distorting subsidies should be aware of how *existing* disciplines are being violated by the leading member of the WTO.

Before launching into the substantive analysis, a few initial caveats are in order. This study does not provide a detailed legal analysis of the prospects for winning WTO disputes against the United States. I do not speculate about which countries are most likely to bring WTO cases against U.S. farm programs, nor do I detail the legal arguments under which such cases would be pursued. The emphasis is on economic issues surrounding major commodity programs, with less attention paid to the relatively minor commodities and very specific markets. The economic analysis provided here does not claim to be comprehensive or exhaustive and thus should be considered as an effort to anticipate, not definitively resolve, the kinds of issues likely to be raised in additional WTO cases. Finally, this study does not evaluate the welfare consequences of U.S. farm policies for taxpayers, consumers, or farm resource owners in the United States or elsewhere. That is, I do not evaluate the costs and benefits of farm programs for various interest groups or for the overall economy. Instead, I limit the analysis to their consistency with WTO agreements.

Overview of U.S. Farm Programs

Farm subsidy policy in the United States began with the New Deal. Periodic farm legislation has renewed and revised the New Deal programs, but essential program features—commodity-based subsidies and regulations, along with supporting trade barriers—have remained. The inconsistency of these programs with an open-market trade policy has also been noticed for many decades.[3]

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Of course, since the 1930s the character of farming in the United States has changed radically. The number of commercial farms (those that provide the great bulk of farm production and from which the owners and operators derive a significant share of their livelihoods) has fallen from about five million to a few hundred thousand, while farm output has risen by a factor of 10.[4]

In keeping with the broader trend toward economic deregulation, farm legislation during the 1980s and 1990s made some modest steps toward market-based reform. When farm prices fell in the early 1980s, budget pressures and general dissatisfaction with program elements encouraged Congress to begin a very gradual process of reducing market distortions and increasing planting flexibility with the Food

Security Act of 1985 and the Federal Agriculture, Conservation and Trade Act of 1990. The Food and Agricultural Improvement and Reform (FAIR) Act of 1996 generally continued the movement toward more production flexibility and fewer direct production incentives that began with the 1985 act. For example, the FAIR Act replaced deficiency payments, which varied inversely with commodity prices, with contract payments that did not vary over time.[5] That turned out to be a one-sided agreement. When major commodity prices collapsed in 1998, Congress quickly passed ad hoc legislation to supplement farm incomes for program crop growers in a way that was counter to the thrust of the FAIR Act.[6]

The Farm Security and Rural Investment Act of 2002 was widely seen as a reversal of the reform path of the previous three farm bills. Support rates increased and payment rules created larger production incentives, especially compared with what might have been if the United States had continued on the policy path of the previous 17 years.[7] The 2002 act institutionalized additional payments tied to commodity prices through the new countercyclical program. It also allowed farmers to update program payment bases, which suggested that farmers might have more reason to expect that payments would be tied to actual production with a lag.[8] In addition, a new deficiency payment program for dairy products was created in response to low prices in that industry.[9]

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Today the main crop payment programs, which account for $10 billion to $20 billion per year in government outlays, are limited to wheat, feed grains (mainly corn but including barley among others), cotton, rice, and oilseeds (mainly soybeans but including peanuts among others). Those programs include marketing loan benefits, direct payments, and countercyclical payments. They differ in specific rules and, especially, in how closely they are tied to market prices and production of the program crop.

The marketing loan program confers on farmers benefits that are received in the form of loan deficiency payments, marketing loan gains, or certificate exchange gains. The program supports the effective price received by farmers by specifying a "loan rate" and providing payment per unit of production in the amount by which the market price for that commodity falls below the loan rate. The direct payments program is a successor to the contract payments program of the 1996 FAIR Act. Those payments are not tied to market prices or current production of the program crop but instead are calculated from a farm's historical production base (which was updated in 2002). A wide range of agricultural uses, including leaving the land fallow, is allowed, but planting fruits, vegetables, melons, tree nuts, or wild rice on program base removes payment eligibility. The annual rate of payment per unit of historical program crop base was set in the 2002 act. Countercyclical payments are similar to direct payments, with the important difference that the payment rate varies inversely with the price of the program crop.

Risk management subsidies include ad hoc disaster and income loss payments and, especially, subsidized crop insurance. Those benefits, which total two or three billion dollars per year, are spread widely and are a small share of revenue for most crops. Crop insurance benefits are not direct payments but a combination of premium subsidies and indemnity losses incurred by the government. The importance of crop insurance in the package of crop subsidies has grown over the past decade.

Unlike the program crops, dairy products and sugar are protected by high tariffs, which have ensured that in recent years the price support programs for those commodities have triggered little or no government outlays. Tight import barriers ensure that sugar prices in the United States are typically double or triple world prices. Most U.S. dairy product prices are above world price benchmarks by 20 to 70 percent. The dairy industry also receives support through a set of marketing regulations that raise prices and limit competition, especially in markets for beverage milk products. Finally, under the Milk Income Loss Contract program that expired on September 30, 2005, and has not (yet) been renewed, the dairy industry also received direct payments when market prices were low.

WTO Disciplines on Farm Subsidies

The World Trade Organization was created in 1995 as a result of the Uruguay Round of global trade talks. Before that time, the multilateral trading system created by the General Agreement on Tariffs and Trade had imposed only minimal restrictions on agricultural policy because of special exceptions that limited the application of GATT rules to farm products. The Uruguay Round agreements ended agriculture's exceptional status and for the first time extended meaningful, if modest, multilateral discipline to world farm trade. In particular, both the form and the amount of U.S. farm subsidies are subject to significant constraints imposed by WTO agreements.

In the first place, U.S. farm programs are governed by the sector-specific rules of the WTO Agreement on Agriculture. The Agriculture Agreement bans certain types of subsidies and places overall limits on the total permissible amount of other types. In addition to those special disciplines, the WTO Agreement on Subsidies and Countervailing Measures (commonly referred to as the SCM Agreement) sets rules that apply to subsidies conferred on goods of all kinds. Between them, the Agriculture Agreement and the SCM Agreement impose restrictions on individual support programs, support for specific commodities, and aggregate trade-distorting support for all farm goods.

The WTO rules pertaining to farm subsidies have not been modified since the Uruguay Round. However, talks on revising the rules of agricultural trade commenced in 2000 under the so-called built-in agenda of the Uruguay Round. Those negotiations were subsequently incorporated into a new round of world trade talks when the Doha Development Agenda, or Doha Round, was launched in November 2001. The DDA, if successful, will result in a substantial tightening of the rules affecting farm subsidies.

As new rules are being negotiated, however, the applicability of existing disciplines continues to be defined through the WTO dispute settlement process. In recent years, several important WTO disputes have dealt with agriculture. In 2003, for example, New Zealand and the United States prevailed in their complaint that Canadian export subsidies on dairy products were prohibited subsidies.[10] In 2005 Brazil prevailed in two major cases—one, mentioned above, related to U.S. subsidies on upland cotton, and the other involved European Union export subsidies on sugar.[11] The rulings in those cases, especially the cotton decision, have important implications for the consistency (or lack thereof) of U.S. farm programs with the requirements of the relevant WTO agreements.

Agriculture Agreement

The WTO Agriculture Agreement distinguishes between export and domestic subsidies on farm products. Whereas they are generally prohibited for other industries, export subsidies have been used in agriculture for many decades. The Agriculture Agreement continues to provide for exceptions to the general WTO ban on export subsidies. However, under Articles 8 and 9 of the agreement, the use of export subsidies is allowed only for products for which members agreed to phase down listed export subsides according to schedules published in 1994. The WTO panel and Appellate Body reports on Canadian dairy products clarified that export subsidies include any benefit contingent on exportation and need not be direct monetary payments. In addition, Article 10 of the agreement requires WTO members to establish (i.e., meet an initial burden of proof) that any exports above their commitment levels for subsidized exports be made without the use of subsidy.

Domestic supports—that is, all subsidies other than export-contingent ones—are divided into three different categories, or "boxes." Subsidies that fall into the "amber box" are restricted by upper limits on the total amount of support conferred on all commodities (there are no product-specific caps). The amounts of permissible "green-box" and "blue-box" subsidies are not limited by the Agriculture Agreement.

Amber-box policies, defined in Article 6 of the Agriculture Agreement, are those considered

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to affect production and distort trade, such as price supports, input subsidies, and subsidies linked to prices or production. Detailed rules limit a member's total amber-box support encompassing all commodities. *De minimis* amber supports are allowed to be 5 percent of the value of agricultural production for developed countries and 10 percent for developing countries. Those *de minimis* limits apply both product by product and for agricultural production as a whole for subsidies that are not product specific. WTO members with subsidies larger than *de minimis* levels have made reduction commitments expressed in terms of an Aggregate Measure of Support, or AMS. Defined in Article 1 of Annexes 3 and 4 of the Agriculture Agreement, the AMS includes all product-specific and non-product-specific support that does not qualify for exemption through *de minimis* or other provisions. For the United States, the maximum allowable AMS in any given year is now capped at $19.1 billion.

Green-box policies, specified in Annex 2 of the Agriculture Agreement, are government-funded domestic support measures unrelated to price and production, which are considered to cause at most minimal trade distortion. They include general government services in the areas of research, infrastructure, disease control, environmental protection, food safety, food subsidy for the poor, and regional development programs. Direct income support for producers, decoupled from (unrelated to) current production and prices, is also included in the green box.

The final category, blue-box policies, is amber-box policies with conditions designed to reduce distortion. As set forth in Article 6.5 of the Agriculture Agreement, subsidies that would otherwise qualify for the amber box are classified as blue-box supports when they require farmers to limit production. There are no product-specific caps on blue-box supports in the current agreement.

SCM Agreement

The Agreement on Subsidies and Countervailing Measures (SCM) defines subsidies and classifies them variously as prohibited, actionable, or nonactionable. The SCM Agreement applies to all trade in goods, not just agricultural trade, and explicitly notes where agricultural trade is an exception to the general rules.

Article 3 of the SCM Agreement defines prohibited subsidies to include (a) export subsidies, except where they are explicitly listed for gradual reduction under the provisions in the Agriculture Agreement, and (b) subsidies conditional on the use of domestic goods rather than imported goods. WTO members are obligated not to grant or maintain such subsidies regardless of their size or effect on trade.

Actionable subsidies, as defined by Articles 5 and 6 of the SCM Agreement, are ones that, although not prohibited per se, cause "adverse effects" to the interests of other WTO members. Such adverse effects include injury to a domestic industry, nullification or impairment of benefits under WTO agreements, and serious prejudice to the interests of another WTO member.

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Article 5(a) of the SCM Agreement allows members to argue that their domestic industries are materially injured by reason of subsidized agricultural commodities. Generally, members making those claims do so in the context of domestic trade remedy proceedings, such as antidumping or countervailing duty claims, not through WTO claims. Nullification and impairment under Article 5(b) of the SCM Agreement occur when a subsidy has the effect of countering trade benefits that a WTO member had reason to expect from tariff reductions or other market-opening measures. So, for example, if a WTO member reduces an import tariff in accordance with a multilateral WTO tariff negotiation but then institutes a domestic production subsidy that has the effect of limiting imports in a manner similar to the prior higher tariff, that member may be liable to a claim of so-called nonviolation nullification or impairment of the agreement to lower the original tariff.

The most important of the adverse effects for purposes of potential challenges to U.S. agriculture programs is specified in Article 6.3, which defines serious prejudice to the trade interests of another WTO member. In partic-

ular, a serious prejudice claim may arise when imports into the subsidized home market are displaced or impeded, exports to a third market are displaced or impeded, the subsidy causes significant price suppression or depression or lost sales for the complaining WTO member, or the subsidy causes an increase in the subsidizing member's world market share over a defined period.

The SCM Agreement provides for separate remedies for complaints by WTO members about other members' prohibited and actionable subsidies. WTO members found to provide prohibited subsidies are obligated to withdraw those subsidies expeditiously. Those found to provide actionable subsidies that cause serious prejudice must either withdraw the subsidy or otherwise remove the adverse effects of the subsidy within a defined period.

Until 2004 the SCM Agreement's applicability to farm subsidies was limited by the peace clause. According to Article 13 of the Agriculture Agreement, domestic farm supports that met all the requirements of the Agriculture Agreement could not be challenged as actionable subsidies under the SCM Agreement—provided that they did not grant support to a specific commodity in excess of that decided during the base year of 1992 (the most recent year for which data were available at the time the Uruguay Round was concluded). The Article 13 peace clause was in effect only for the "implementation period" of the Agriculture Agreement, defined as a nine-year period beginning in 1995. Accordingly, the peace clause has now expired.

Upland Cotton Case

The WTO dispute between Brazil and the United States over U.S. upland cotton subsidies was the first to address domestic agricultural support programs. The case also yielded groundbreaking interpretations of the serious prejudice provisions of the SCM Agreement as well as several other provisions of WTO agreements. In particular, in resolving whether Brazil's claims were blocked by the now-expired peace clause, the case shed important light on the categorization of farm programs into the various boxes delineated by the Agriculture Agreement.

The case involved several major challenges to U.S. cotton programs. On the substantive issues, Brazil made various separate claims about U.S. programs that support cotton. The most important claims of Brazil were that

1. so-called Step 2 payments to domestic users (payments designed to compensate for the difference between the price of U.S. cotton and the lower world price) constituted a prohibited domestic content subsidy;
2. Step 2 payments to exporters constituted a prohibited export subsidy;
3. export credit guarantees were prohibited export subsidies; and
4. production flexibility contract payments and direct payments, market loss assistance payments and countercyclical payments, marketing loan gains, the crop insurance subsidies for cotton, Step 2 payments, and export credit guarantees all supported cotton and contributed to serious prejudice of Brazil's interests, mainly by causing world cotton prices to be lower than they would otherwise have been and by causing the U.S. world market share to rise and to be higher than otherwise.[12]

Brazil claimed that the U.S. programs had those characteristics and effects over the 1999 to 2002 period and threatened to have them into the future.

Before those challenges could be adjudicated, Brazil was required to demonstrate that the terms of the peace clause were inapplicable. The peace clause expired in 2004, but since Brazil filed its case while the provision was still in effect, the case would have been stillborn without a finding that the United States did not qualify for its protections in this particular instance.

Brazil initiated the dispute by requesting consultations in September 2002. After two years of consultations, filings, and panel meetings with the parties, the WTO panel decision was released to the public in September 2004.[13] The WTO cotton panel ruled largely in favor

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of Brazil.[14] The United States appealed most aspects of the decision, and Brazil appealed on a few points. The appeal was heard by the Appellate Body in December 2004. Results of the appeals were released on March 3, 2005, with the United States losing on all of the issues it raised on appeal.[15] The United States has not yet implemented the WTO's rulings and recommendations.

In concluding that the peace clause did not block Brazil's claims, the panel and the Appellate Body found that U.S. farm programs granted support to cotton in excess of the amount decided during the base year of 1992. In reaching that conclusion, they determined in particular that certain programs that the United States claimed were green-box subsidies—namely, production flexibility contract payments and direct payments—were in fact more than minimally trade distorting and therefore did grant support to cotton. Because those programs prohibited production of fruits and vegetables on base land eligible for payments, the panel and the Appellate Body found that they more than minimally restricted the use of the land and thereby likely stimulated cotton production. The determination that those programs did not qualify as green-box subsidies in the peace clause context has significant implications for the categorization of U.S. farm programs for AMS purposes, and thus for whether the United States has been abiding by the $19.1 billion cap on permissible amber-box supports.

On the substantive issues in the cotton case, the WTO ruled that the Step 2 export program and the export credit guarantees for cotton (and other commodities) were prohibited export subsidies and that the Step 2 domestic program was a prohibited domestic content subsidy. Those prohibited domestic content and export subsidy programs were required by the panel's decision to be eliminated by July 2005.

The panel and the Appellate Body further found that certain domestic supports for cotton growers caused serious prejudice to Brazil's interests by causing significant price suppression in the world market for cotton. The panel restricted its ruling to the subsidies directly linked to world prices—specifically, market loss assistance and countercyclical payments, marketing loan gains, and Step 2 payments. Other, non-price-contingent subsidies (production flexibility contract payments, direct payments, and crop insurance subsidies) were not found to cause price suppression for cotton.

The panel based its finding of a causal link between U.S. cotton subsidies and price suppression on four main grounds:

1. The United States exerts a substantial influence on the world cotton market due to the relative magnitude of U.S. cotton production and exports.
2. The relevant U.S. subsidies are directly linked to world prices and therefore insulate U.S. cotton growers from low prices.
3. There was a temporal coincidence between U.S. subsidies and suppressed world prices.
4. There was a divergence between U.S. cotton growers' total costs of production and total revenue. Consequently, the panel concluded, "The effect of the subsidies was to allow United States producers to sell upland cotton at a price lower than would otherwise have been necessary to cover costs."[16]

Those criteria are of direct relevance in assessing whether U.S. subsidies for other commodities besides cotton are also causing significant price suppression.

In addition, in examining the effects of U.S. cotton subsidies on world prices, the panel took into account economic analysis provided by, among others, the author of this study in his capacity as a consultant for the government of Brazil during the dispute.[17] My analysis modeled the supply effects of removing each of the U.S. subsidy programs for upland cotton and placed the reduced supply caused by removing subsidies into a simulation model of global cotton supply and demand. The logic of the model was straightforward and traditional. Removing the cotton subsidy would lower the expected net revenue from planting cotton relative to that expected from alternative crops and thereby reduce U.S. cotton production and exports and

raise world market prices. The world price effect of removing U.S. subsidies would in turn be mitigated by increased production in other countries and by reduced use of the now higher-priced cotton. The larger the supply response to subsidy and the larger the role of the United States in the world market, the larger the world price effects. The larger the response by suppliers in other countries and the larger the demand response to higher prices, the more the price impact is mitigated. The results of the simulations showed that if the U.S. programs had not been in effect from 1999 through 2002, U.S. cotton production would have been lower by about 30 percent, U.S. cotton exports would have been lower by about 40 percent, and the world price of cotton would have been higher by about 12 percent.

Although the panel determined that the amount of price suppression was significant, it did not specify a quantitative amount by which it concluded prices had been suppressed. Nor did it specify a threshold that the effects of those programs must have exceeded. Nevertheless, the panel explicitly cited quantitative assessments of effects of U.S. farm programs on world prices and found them relevant and useful to an assessment of price suppression. Those findings were upheld by the Appellate Body.

The United States has not yet implemented the policy changes required by the WTO cotton ruling. Brazil seems determined to press for full implementation and has brought the case back to the WTO Dispute Settlement Body, pointing out that the United States is already months past its deadlines for compliance. The former secretary of trade and production in Brazil's Ministry of Agriculture has stressed the linkage of the cotton case with other potential cases. "If Brazil is persistent in the cotton challenge, and refuses a mediocre implementation result, the US will have to substantially reduce its domestic support for cotton," commented Pedro de Camargo Neto. "If this does not happen, the dispute settlement system will again have to produce essential jurisprudence on levels of trade-distorting support acceptable in international competition. Potential cases on rice, wheat or dairy would also have to go this route. Negotiation now is clearly preferable to litigation in the future."[18]

As noted by Camargo, the implications of the cotton case extend well beyond U.S. cotton policy. Specifically, the cotton case's clarifications of WTO disciplines under the Agriculture Agreement and the SCM Agreement raise the possibility of other inconsistencies between farm programs and WTO obligations.

First, in light of the cotton panel and Appellate Body's analysis of the peace clause, some programs that the United States has claimed as green-box subsidies for AMS purposes (particularly the direct payment program) are actually properly classified as amber-box supports. If those programs are reclassified consistent with the cotton decision, it appears that the United States has violated the Agriculture Agreement's $19.1 billion cap on amber-box subsidies and that such violations will recur in the future.

Second, the reasoning used in the cotton panel and Appellate Body's analysis of price suppression can be applied to U.S. farm programs for other commodities. Under the standards established in the cotton case, it appears that subsidies for other commodities besides cotton are vulnerable to claims of price suppression and serious prejudice under the SCM Agreement.

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Possible AMS Violations

The primary constraint imposed by the Agriculture Agreement on U.S. domestic farm subsidies is the $19.1 billion cap on amber-box supports. Exactly how constraining that cap really is—and whether the United States is abiding by that cap—hinges on what is and is not classified as belonging in the amber box.

The effectiveness of the WTO disciplines on domestic supports is undermined by the lack of any incentive for reporting program changes or AMS data in a timely fashion and calculating AMS on an annual basis. The United States and other WTO members have been very slow in making official notifications to the WTO of how they claim domestic sup-

port policies should be categorized for purposes of determining Aggregate Measures of Support. In particular, the United States has not updated its notification since 2001—that is, before the 2002 farm bill. In its original 2001 notification, the United States reported payments made through the production flexibility contract (PFC) as green-box supports. The 2002 farm bill replaced the PFC programs with direct payments. For present purposes it is assumed that the United States would likewise claim direct payments as green-box subsidies. Countercyclical payments, also created in the 2002 farm bill, have likewise not been reported to the WTO. However, on the basis of informal USDA discussions and the way they were presented in the cotton dispute, it is likely that the United States has considered them to be amber-box payments since they are tied to market price, but in the non-product-specific category because they do not require farmers to plant a specific crop.

Table 1 shows AMS calculations for 2000–06 based on the original U.S. 2001 notification to the WTO. (Note that the figures for 2005 and 2006 are based on estimates of the fiscal year 2006 president's budget, as updated for current price projections in July 2005 in the midsession review.) If these calculations are accepted, the United States has been and will remain in compliance with amber-box limits for the entire period under review. Total AMS for the United States during those years ranges from a low of $7.0 billion in 2004 to a high of $16.1 billion in 2000—all comfortably below the $19.1 billion cap.

In the cotton case, however, the panel and the Appellate Body rejected the United States' classification of PFC and direct payments as green-box subsidies for peace clause purposes. Although neither the panel nor the Appellate Body expressly determined that a program that failed to qualify for green-box status in a peace clause context would also fail to qualify for AMS purposes, such a conclusion is both reasonable and likely. And if PFC and direct payments are reclassified as amber-box support, a very different picture of U.S. compliance with the Agriculture Agreement emerges.

Total AMS amounts to $29.1 billion in 2000, $25.3 billion in 2001, and $26.3 billion in 2006—all far in excess of the $19.1 billion limit.

Table 2 and Figures 1 and 2 tell the story. Table 2 is identical to Table 1 except that PFC and direct payments have been reclassified as non-product-specific amber-box supports. That single shift has dramatic consequences. Specifically, calculations for 2000, 2001, and 2006 now show that the 5 percent *de minimis* threshold for non-product-specific support has been exceeded (Figure 1). Consequently, in those years non-product-specific support now counts as part of total AMS. The end result is that total AMS for those years amounts to $29.1 billion in 2000, $25.3 billion in 2001, and $26.3 billion in 2006—all far in excess of the $19.1 billion limit (Figure 2).

Other people have reached similar conclusions. In particular, Chad Hart at Iowa State University recalculated the U.S. total AMS for 1998–2001 in light of the cotton case. After shifting PFC payments out of the green box, he found that the United States exceeded the $19.1 billion cap for all four years.[19]

The rules for reporting subsidies in the AMS are complex, especially after the cotton case. However, under a reasonable interpretation of the AMS rules as suggested by the cotton ruling, it appears that the United States may have been out of compliance with its AMS commitments for several recent years and is likely to continue to be out of compliance in the future. Certainly, other members can make a plausible case that the United States has been violating and continues to violate its WTO obligations. It may be very difficult to bring a case, under current WTO notification rules, but the questionable status of the United States in this regard reduces U.S. credibility and makes the U.S. negotiating position more difficult. Other WTO members may not take U.S. commitments seriously during negotiations because they assume the United States cannot be trusted to keep its promises or live up to its obligations when there is no feasible legal remedy available to force the point.

Price Suppression and Serious Prejudice

The cotton case demonstrated that U.S. farm programs for at least one commodity are

Table 1
AMS Calculations for 2000 through 2006 Based on the 2000 and 2001 U.S. Notifications to the WTO ($ millions)

Measure Type	2000	2001	2002	2003	2004	2005	2006
Green box in U.S. notification							
General services	8,554	9,214					
Domestic food aid and public stockholding for food security	32,377	33,916					
Income supports (PFC and direct payments)	*5,068*	*4,100*	*3,968*	*3,857*	*5,278*	*5,287*	*5,237*
Payments for relief from natural disasters	2,141	1,421					
Structural adjustment (resource, retirement, or investment)	1,608	1,730					
Environmental payments	309	291					
Total green box	50,057	50,672					
Product-specific AMS							
Loan deficiency payments	6,273	5,592	5,380	693	461	4,411	5,124
Marketing loan gains	733	610	642	190	114	293	596
Cotton user payments	237	182	182	456	304	441	389
Certificate exchange gains	664	1,975	2,000	998	268	1,447	408
Other commodity payments[1]	2,660	76	5	1,321	9	990	970
Total commodity payments	10,567	8,435	8,209	3,658	1,156	7,582	7,487
Other product-specific support[2]	457	367	412	412	412	412	412
Market price support (dairy, sugar, peanuts[3])	5,840	5,825	5,515	5,515	5,515	5,515	5,515
Total product-specific AMS	16,864	14,627	14,136	9,585	7,083	13,509	13,414
Total product-specific AMS (after *de minimis*)[4]	16,802	14,413	14,007	9,497	7,018	13,385	13,291
Non-product-specific AMS							
Crop insurance indemnities not covered by premiums	1,396	1,770	2,892	1,869	1,481	1,481	1,481
Market loss assistance/countercyclical payments	5,463	4,640	0	3,705	1,027	2,513	5,913
Other non-product-specific AMS[5]	419	418	419	419	419	419	419
Total non-product-specific AMS	7,278	6,828	3,311	5,993	2,927	4,413	7,813
U.S. value of agricultural production[6]	189,520	198,502	194,984	216,592	241,241	239,600	240,400
Share in % (*de minimis* = 5%)	3.8%	3.4%	1.7%	2.8%	1.2%	1.8%	3.2%
Total non-product-specific AMS (after *de minimis*)	0	0	0	0	0	0	0
Total AMS	16,082	14,413	14,007	9,497	7,018	13,385	13,291

Sources: 2000 and 2001 U.S. Domestic Support Notification to WTO; estimates of the FY06 president's budget; Farm Service Agency's Budget Division; Risk Management Agency; Economic Research, U.S. Farm Income Forecasts.

[1] Other commodity payments include oilseed payments, deficiency payments, tobacco payments, peanut payments, peanut quota compensation payments, seed cotton payments, wool and mohair payments, and others.

[2] Other product-specific support includes storage payments and the commodity loan interest subsidy. The figures for 2002 to 2006 are based on the simple average of the 2000 and 2001 figures as reported by the United States to the WTO.

[3] In 2004 peanuts no longer had market price support.

[4] The *de minimis* deduction for 2002–06 is based on the ratio of the simple average of the AMS after the *de minimis* deduction in 2000 and 2001 and the simple average of the total product-specific AMS as reported by the United States to the WTO for 2000 and 2001.

[5] Other non-product-specific AMS includes water subsidies, grazing fees, crop disaster payments, state credit programs, and the farm storage facility loan program. 2000 and 2001 figures are based on the WTO notification. Values for later years are the simple average of the 2000 and 2001 figures.

[6] The value of production figures are based on ERS reports on farm cash receipts and its forecast for 2005. The 2006 figure is the simple average of U.S. agricultural cash receipts for 2004 and the estimate for 2005.

Table 2
AMS Calculations for 2000 through 2006, Based on 2000 and 2001 U.S. Notifications to the WTO, with PFC/Direct Payments Counted under Non-Product-Specific Support ($ millions)

Measure Type	2000	2001	2002	2003	2004	2005	2006
Green box in U.S. notification							
General services	8,554	9,214					
Domestic food aid and public stockholding for food security	32,377	33,916					
Payments for relief from natural disasters	2,141	1,421					
Structural adjustment (resource, retirement, or investment)	1,608	1,730					
Environmental payments	309	291					
Total green box	44,989	46,572					
Product-specific AMS							
Loan deficiency payments	6,273	5,592	5,380	693	461	4,411	5,124
Marketing loan gains	733	610	642	190	114	293	596
Cotton user payments	237	182	182	456	304	441	389
Certificate exchange gains	664	1,975	2,000	998	268	1,447	408
Other commodity payments[1]	2,660	76	5	1,321	9	990	970
Total commodity payments	10,567	8,435	8,209	3,658	1,156	7,582	7,487
Other product-specific support[2]	457	367	412	412	412	412	412
Market price support (dairy, sugar, peanuts[3])	5,840	5,825	5,515	5,515	5,515	5,515	5,515
Total product specific AMS	16,864	14,627	14,136	9,585	7,083	13,509	13,414
Total product-specific AMS (after *de minimis*)[4]	16,802	14,413	14,007	9,497	7,018	13,385	13,291
Non-product-specific AMS							
Income supports (PFC and direct payments)	*5,068*	*4,100*	*3,968*	*3,857*	*5,278*	*5,287*	*5,237*
Crop insurance indemnities not covered by premiums	1,396	1,770	2,892	1,869	1,481	1,481	1,481
Market loss assistance/countercyclical payments	5,463	4,640	0	3,705	1,027	2,513	5,913
Other non-product-specific AMS[5]	419	418	419	419	419	419	419
Total non-product-specific AMS	12,346	10,928	7,279	9,850	8,205	9,700	13,050
U.S. value of agricultural production[6]	189,520	198,502	194,984	216,592	241,241	239,600	240,400
Share in % (*de minimis* = 5%)	6.5%	5.5%	3.7%	4.5%	3.4%	4.0%	5.4%
Total non-product-specific AMS (after *de minimis*)	12,346	10,928	0	0	0	0	13,050
Total AMS	29,148	25,341	14,007	9,497	7,018	13,385	26,341

Sources: 2000 and 2001 U.S. Domestic Support Notification to WTO; estimates of the FY06 president's budget; Farm Service Agency's Budget Division; Risk Management Agency; Economic Research, U.S. Farm Income Forecasts

[1] Other commodity payments include oilseed payments, deficiency payments, tobacco payments, peanut payments, peanut quota compensation payments, seed cotton payments, wool and mohair payments and others.

[2] Other product-specific support includes storage payments and the commodity loan interest subsidy. The figures for 2002 to 2006 are based on the simple average of the 2000 and 2001 figures as reported by the United States to the WTO.

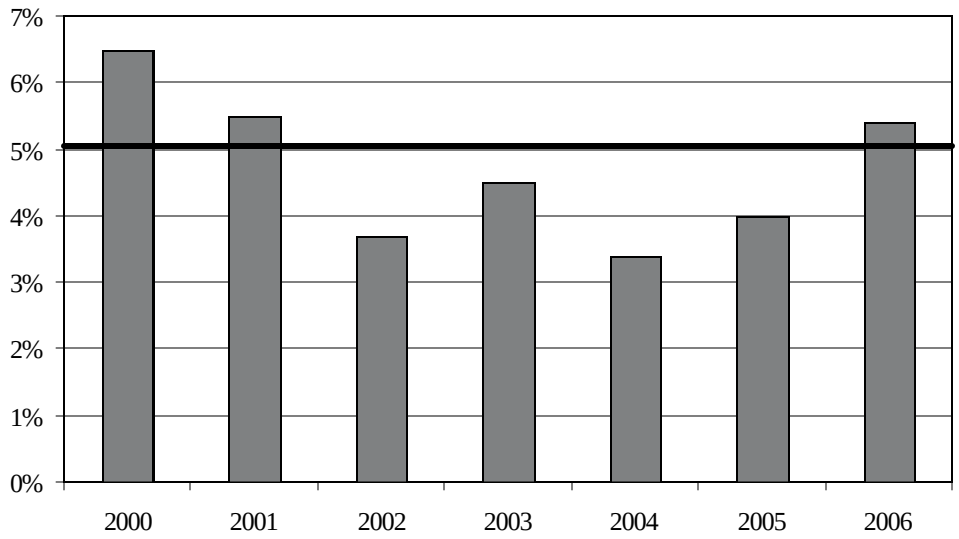
[3] In 2004 peanuts no longer had market price support.

[4] The *de minimis* deduction for 2002–06 is based on the ratio of the simple average of the AMS after the *de minimis* deduction in 2000 and 2001 and the simple average of the total product-specific AMS as reported by the United States to the WTO for 2000 and 2001.

[5] Other non-product-specific AMS includes water subsidies, grazing fees, crop disaster payments, state credit programs, and the farm storage facility loan program. Figures for 2000 and 2001 are based on the WTO notification; the simple average of the 2000 and 2001 figures is used for later years.

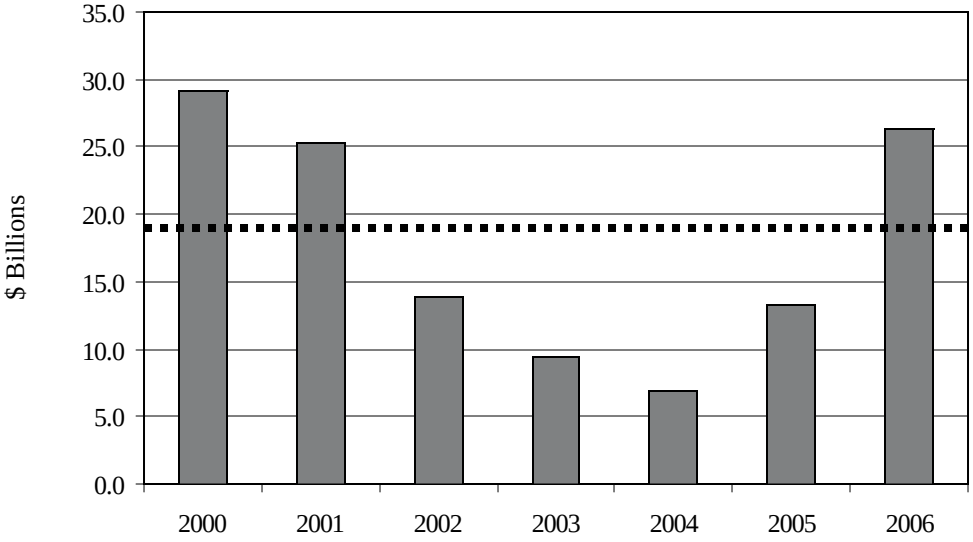
[6] The value of production figures are based on ERS reports on farm cash receipts and its forecast for 2005. The 2006 figure is the simple average of U.S. agricultural cash receipts for 2004 and the estimate for 2005. Only if U.S. value of production were to reach more than $261 billion would non-product-specific support be exempt under the *de minimis* rule.

Figure 1
Ratio of Non-Product-Specific Support to the U.S. Value of Agricultural Production, with PFC/Direct Payments Counted under Non-Product-Specific Support, 2000–06



Sources: The 2000 and 2001 U.S. domestic support notification to WTO; Estimates of the FY06 president's budget as updates for estimates for 2005 and 2006; Farm Service Agency's Budget Division; Risk Management Agency; Economic Research, U.S. Farm Income Forecasts.
Note: The bold horizontal line represents the 5 percent limit, which is the maximum for the *de minimis* exemption of non-product-specific support under WTO rules.

Figure 2
Total AMS with PFC/Direct Payments Counted under Non-Product-Specific Support, 2000–06



Sources: 2000 and 2001 U.S. domestic support notification to WTO; estimates of the FY06 president's budget; Risk Management Agency. USDA ERS value of production data, actual for 2001 and estimates for 2005 and 2006.
Note: Under this scenario, income support payments (production flexibility contract payments and direct payments), which were originally classified as green box, are included in the non-product-specific AMS category. The horizontal line represents the maximum U.S. AMS level as permitted by the WTO ($19.1 billion for the 2000–06 period).

The larger U.S. production is relative to the world market (and the larger subsidies are relative to U.S. production), the greater is the likelihood that subsidies have a significant effect on world prices.

violating WTO rules by causing serious prejudice to the interests of at least one other WTO member. The question now arises: is the cotton case just the tip of the iceberg? When the type of analysis conducted by the panel and the Appellate Body in the cotton case is applied to other U.S. commodity programs, is the United States vulnerable to additional adverse rulings?

A preliminary review of the evidence reveals that significant vulnerabilities do exist. Here my primary focus will be on evidence of price suppression, since it was on that ground that Brazil demonstrated serious prejudice in the cotton case. However, it should be remembered that the SCM Agreement affords other bases for claims of serious prejudice, including lost sales in the subsidizing member's home market or a third-country market and an increase in the subsidizing member's world market share.[20] None of those other bases has been litigated to final resolution, however. Accordingly, the relevant standards are not as clear, and therefore conclusions about possible violations are necessarily more tentative.

Since the major payment programs (in addition to those that benefit cotton) involve feed grains, wheat, rice, and oilseeds, I will concentrate on those commodities. Among the feed grains, I will restrict my attention to corn as the most important example. The feed grains programs also apply to barley, oats, and grain sorghum, but production of those crops is much smaller than production of corn. Wheat and rice are also important crops, with programs similar to those for the feed grains but featuring their own distinctive industry characteristics. Among the oilseeds, I provide analysis of soybeans. The other oilseeds are relatively minor crops compared with soybeans.[21] Of course, the fact that a crop accounts for a relatively small share of U.S. farm output does not preclude a WTO challenge in the event that a WTO member considers that subsidies for that crop cause harm to its interests. The analysis provided here for the headline crops gives a flavor of the issues and analysis applicable to other crops.

The analysis here will focus on three major factors: (1) the magnitude of subsidies relative to production, (2) the relationship of market revenues and subsidies to costs of production, and (3) a quantitative assessment of the effect of subsidies on market prices. Each of those factors relates to the analysis conducted by the panel in the cotton case. Thus, in considering whether the suppression of cotton prices was "significant," the panel took into account "the order of magnitude of the subsidies."[22] The larger the subsidies, the greater their presumed trade-distorting impact. Next, the divergence between market revenues and costs of production was one of the four reasons cited by the panel for finding a causal link between U.S. cotton programs and significant price suppression. Two of the other reasons cited by the panel—a substantial influence exerted by the United States on the world market and a temporal coincidence of suppressed world prices and U.S. subsidies—are examined in connection with assessing the effect of subsidies on market prices. The larger U.S. production is relative to the world market (and the larger subsidies are relative to U.S. production), the greater is the likelihood that subsidies have a significant effect on world prices. Furthermore, if the evidence does point to a significant effect on world prices, the temporal coincidence cited by the panel obviously exists.[23]

Magnitude of Subsidies

Table 3 details the amounts of specific subsidy programs and total production for corn, wheat, rice, and soybeans—as well as cotton for comparison purposes—for 2004, 2005, and 2006. Figure 3 summarizes those data for 2004 and 2005. Those subsidies vary across crops and from year to year depending on market conditions. Payments are generally higher when market prices are lower.

Many commodity prices were relatively high for crops marketed during fiscal year 2004 but were much lower in fiscal year 2005. For corn, the total subsidy was "only" about $2.8 billion in 2004 and the ratio of subsidy to value of production was about 12.6 percent. Subsidies will likely be about $6.4 billion and 28 percent of the value of production in 2005 and rise to about $8.8 billion and 44.6 percent of the value of production in 2006. Wheat subsides were more than 20 percent

Table 3
Major Program Subsidies, 2004–06 ($ millions)

	2004	2005 (est.)	2006 (est.)
		Corn	
Direct payments	2,115.4	2,121.0	2,095.6
Countercyclical	338.7	953.8	2,542.6
Loan deficiency	107.6	2,878.9	3,451.7
Marketing loan gains	25.2	218.6	456.3
Certificate exchange gains	1.1	34.0	38.4
Crop insurance[1]	203.6	197.9	197.9
Total subsidy	2,791.6	6,404.1	8,782.4
Value of production[2]	19,000.0	22,200.0	19,700.0
Ratio of subsidy to value of production	14.7%	28.8%	44.6%
		Wheat	
Direct Payments	1,146.2	1,138.4	1,138.1
Countercyclical	27.9	12.3	1,356.8
Loan deficiency	34.9	504.2	563.6
Marketing loan gains	0.7	15.8	41.0
Certificate exchange gains	0.0	7.2	8.0
Crop insurance[1]	274.5	353.0	353.0
Total subsidy	1,484.1	2,030.8	3,460.4
Value of production[2]	6,800.0	7,400.0	6,800.0
Ratio of subsidy to value of Production	21.8%	27.4%	50.9%
		Cotton	
Direct payments	622.2	617.7	604.1
Countercyclical	216.8	1,020.9	1,514.5
Loan deficiency	23.3	389.7	291.9
Marketing loan gains	10.0	10.6	37.8
Certificate exchange gains	159.2	1,373.7	339.9
User marketing (Step 2)	363.5	644.1	449.7
Crop insurance[1]	80.6	281.0	281.0
Total subsidy	1,475.6	4,337.7	3,518.9
Value of production[2]	6,500.0	5,400.0	5,400.0
Ratio of subsidy to value of production	22.7%	80.3%	65.2%
		Rice	
Direct payments	426.8	423.6	422.7
Countercyclical	124.0	15.7	145.3
Loan deficiency	202.1	41.2	21.9
Marketing loan gains	76.2	32.1	23.1
Certificate exchange gains	106.7	29.0	16.8
Crop insurance[1]	1.5	4.5	4.5
Total subsidy	937.3	546.2	634.2
Value of production[2]	1,200.0	1,700.0	1,600.0
Ratio of subsidy to value of production	78.1%	32.1%	39.6%
		Soybeans	
Direct payments	602.8	602.1	602.0
Countercyclical	0.0	148.0	-53.7
Loan deficiency	3.4	292.7	446.9
Marketing loan gains	0.2	8.2	27.4

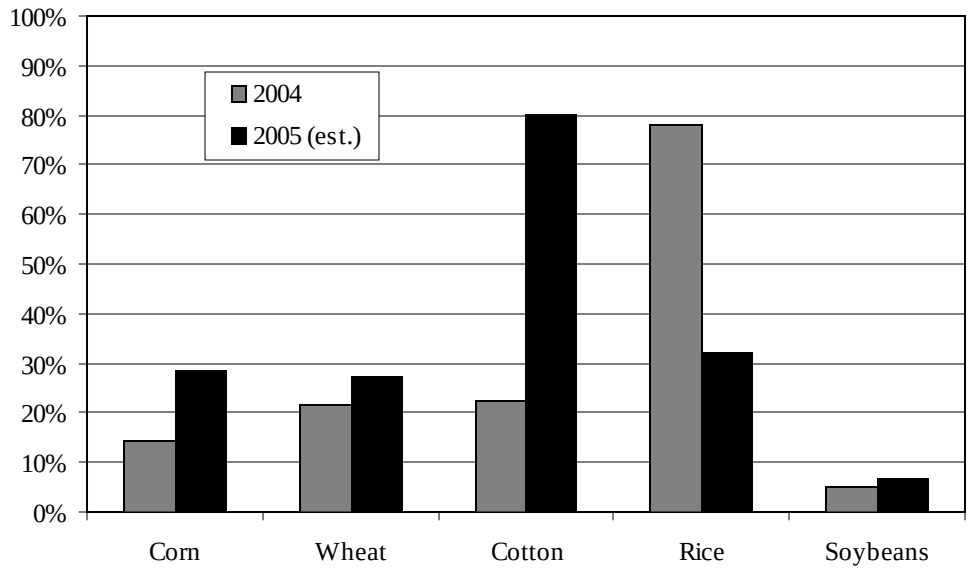
Continued on next page

Table 3—*Continued*

	2004	2005 (est.)	2006 (est.)
Certificate exchange gains	0.1	1.3	3.3
Crop insurance[1]	331.6	220.0	220.0
Total subsidy	938.1	1,272.3	1,245.9
Value of production[2]	17,300.0	18,400.0	18,000.0
Ratio of subsidy to value of production	5.4%	6.9%	6.9%

Source: USDA ERS farm income forecast, Farm Service Agency,
http://www.fsa.usda.gov/dam/bud/CCC%20Estimates%20Book/estimatesbook.htm.
Note: Fiscal year data: 2004 numbers are actual expenditures, 2005 and 2006 numbers are based on estimates from the 2006 president's budget updates by USDA.
[1] Figures given are crop insurance indemnities not covered by premiums. I use actual data for 2004 and the average of 2001 and 2004 in the columns for 2005 and 2006.
[2] I use actual data for 2004. Fiscal year 2004 was from October 2003 to September 2004. Since the harvest of these program crops occurs generally in the fall, I applied the 2003 calendar year data to the fiscal year data. I use USDA forecasts for 2005, which I apply to fiscal year 2006 subsidy figures.

Figure 3
Ratio of Program Subsidy to Value of Production for Corn, Wheat, Cotton, Rice, and Soybeans, 2004 and 2005



Source: Farm Service Agency Commodity Estimates Book for FY06 president's budget (released Feb 7, 2005), http://www.fsa.usda.gov/dam/bud/CCC%20Estimates%20Book/estimatesbook.htm,
and USDA ERS, http://www.ers.usda.gov/Data/FarmIncome/.
Note: Subsidy figures for 2005 are based on estimates from the 2006 president's budget. U.S. value of production data for 2005 are based on USDA forecasts. All subsidy data are based on fiscal year data; all value of production data are based on calendar year data. For example, for 2004, I divided the 2004 fiscal year data by the 2003 value of production data. Since the harvest of these program crops occurs generally in the fall, I applied the 2003 calendar year data to the fiscal year data.

of the value of production in both 2004 and 2005 and are expected to jump to 51 percent for 2006. Rice subsidies were about 78 percent of the value of production in 2004 before declining because of higher prices to about 32 percent in 2005 and about 40 percent in 2006. Subsidy rates are lower for soybeans compared with other program crops because soybean prices have been relatively high for several years.

This aggregated analysis shows large subsidies relative to the value of production, especially for corn, wheat, and rice. By comparison, cotton has the highest ratios of subsidy, in part because of the user marketing payments, otherwise known as Step 2 payments to buyers. Those subsidies were found to be prohibited subsidies in the WTO cotton ruling, and legislation is pending to eliminate them. Cotton subsidies jumped from a low of about 23 percent of the value of production in 2004, because of high global cotton prices, to about 80 percent in 2005. Cotton subsidies are expected to remain high at 65 percent in 2006.

Several issues arise in evaluating these subsidies in the context of WTO obligations. First, under rules allowing planting flexibility, some portion of the direct payments and countercyclical payments associated with a crop is received for program base land that is currently planted in other crops. Furthermore, some portion of the acreage planted in a program crop receives direct payments or countercyclical payments from another one of the crop payment programs. Nevertheless, the WTO cotton ruling made clear that a significant portion of the direct payments and countercyclical payments is appropriately considered support for the named program crop. Second, farmers do not know the actual rate of the marketing loan gains or the countercyclical payments that will prevail for a given crop year at the time the crop is planted. Instead, farmers make decisions based on their expectations of the payments they are likely to receive, depending on their forecast of program rules and crop prices and yields. Farmers respond to factors that affect their expectations, and so the recent history of program payments is crucial, as is any direct information about future payments—including their guaranteed nature regardless of fluctuations of market prices.

Third, there is a natural hierarchy of payments in terms of their likely effect on production and their effect on international markets and therefore on competing producers in other countries.[24] There is a developing consensus that the payment programs all provide significant production incentives, but there is not yet clear evidence on the magnitude of the effects.[25] Therefore some careful assessment of indirect evidence is needed to reflect the degree to which each program affects production incentives.

Economic reasoning and empirical evidence indicate that the marketing loan program provides the most important production-enhancing impact, followed by countercyclical payments, crop insurance, and direct payments. Percentage rates of subsidy in Table 3 and Figure 3 are based simply on the sum of all the major subsidy programs. A fuller treatment that focused on the effects of the subsidies would weigh each by its likely effect on production and give higher weight to the marketing loan gains and countercyclical payments than to the direct payments.

As noted, in the cotton case the panel found a causal link between price suppression and only the price-contingent subsidies (i.e., marketing loan, Step 2, and countercyclical payments). Subsidies not contingent upon price—i.e., direct payments (and their predecessor, PFC payments) and crop insurance subsidies—were not found to cause price suppression. However, it is important to note that the Appellate Body in the cotton case made an important qualification that non-price-based subsidies (such as direct payments and crop insurance) could contribute to production effects that could be the basis for a finding of serious prejudice. "We do not exclude the possibility that challenged subsidies that are not 'price-contingent' [to use the panel's term] could have some effect on production and exports and contribute to price suppression."[26] In addition, the recent *Korea—Commercial Vessels* panel found that it was appropriate to cumulatively assess all actionable subsidies in determining whether serious prejudice exists.[27] Thus, other panels faced with different sets of

Aggregated analysis shows large subsidies relative to the value of production, especially for corn, wheat, and rice.

The price-contingent subsidies alone for corn, wheat, and rice are still sizable relative to the total value of production.

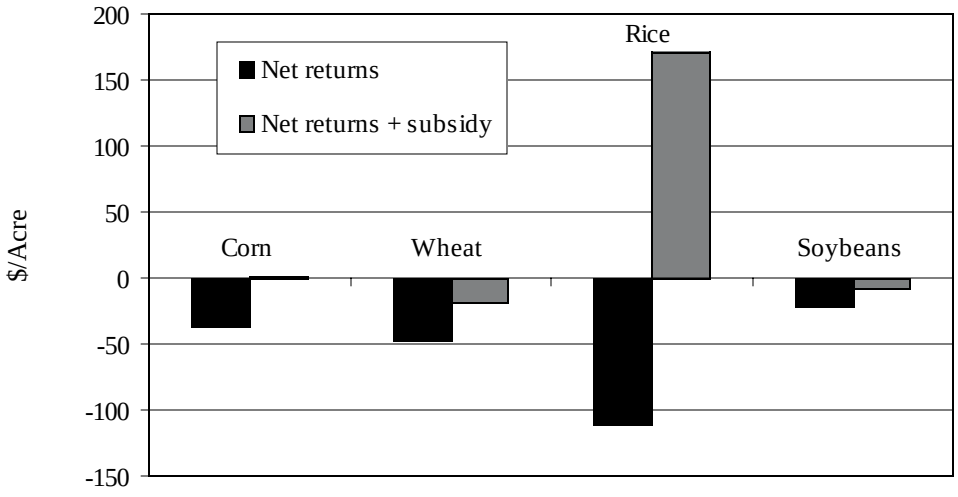
facts and arguments in future cases may reach different conclusions.

Furthermore, the fact remains that the price-contingent subsidies alone for corn, wheat, and rice are still sizable relative to the total value of production. To put matters in perspective, according to the data in Table 3, price-contingent subsidies for cotton during 2004–06 ranged from about 12 percent to 64 percent of production. By way of comparison, in 2006 price-contingent subsidies for corn will amount to about 33 percent of production, similar subsidies for wheat will amount to about 29 percent of production, and those for rice will amount to about 42 percent of production. In other words, the magnitude of price-contingent subsidies for these crops is comparable to that of the subsidies found to cause significant price suppression in the cotton case.

Costs vs. Revenues

Another way to assess the importance of subsidies for the major program crops is to examine subsidies in relation to market revenue and costs of production. Figure 4 shows that average costs of production as measured by U.S. Department of Agriculture surveys were well above market revenues for 2004. Figure 5 shows similar information for 2005. Table 4 provides more details and also offers data for 2003. Costs displayed in Figures 4 and 5 include all production costs and are appropriate for long-run analysis. Of course, some producers have costs below the averages while others have costs above the averages. In addition, it should be noted that some costs, especially land rents, themselves depend on subsidies. The most recent official cost surveys available from the USDA are for 2003, and, despite gradual increases in costs over time, I have used these per acre costs also for 2004 and 2005. For every case, the relevant tables demonstrate that per acre average cost of production is above per acre market revenue for every crop. Thus, the costs measured by USDA show that average farmers would lose money in every year if only market revenue was available. The tables also show that subsidies make up much of the losses.

Figure 4
Costs and Returns per Harvested Acre of Corn, Wheat, Rice, and Soybeans, 2004



Sources: USDA agencies RMA, FSA, WAOB and NASS, ERS.
Note: I apply the cost of production per acre based on surveys conducted in 2003 to the year 2004. Net returns are calculated by subtracting the cost of production per acre from the value of production per acre. Value of production per acre is calculated by dividing 2004 calendar year data by the 2004 acres harvested. Net returns plus subsidy then include the per acre subsidy, which was calculated by dividing the 2004 fiscal year data on total program payments by the number of acres harvested.

Table 4
Costs and Returns per Harvested Acre ($/acre)

	2003	2004	2005 (est.)
		Corn	
Costs of production[1]	349.8	349.8	349.8
Value of production[2]	317.4	312.8	279.1
Net return (value minus costs)	-32.4	-37.0	-70.6
Subsidy	23.3	37.9	105.3
Net returns plus subsidy	-9.1	0.9	34.7
		Wheat	
Costs of production[1]	191.41	191.41	191.41
Value of production[2]	125.26	143.8	137.1
Net return (value minus costs)	-66.2	-47.6	-54.3
Subsidy	19.2	29.7	37.3
Net returns plus subsidy	-46.9	-17.9	-17.0
		Rice	
Costs of production[1]	614.4	614.4	614.4
Value of production[2]	449.7	504.1	505.4
Net return (value minus costs)	-164.7	-110.3	-108.9
Subsidy	463.4	281.9	194.3
Net returns plus subsidy	298.7	171.6	85.4
		Soybeans	
Costs of production[1]	238.5	238.5	238.5
Value of production[2]	233.6	217.7	221.6
Net return (value minus costs)	-4.9	-20.8	-16.9
Subsidy	21.2	12.7	24.7
Net returns plus subsidy	16.3	-8.1	7.8

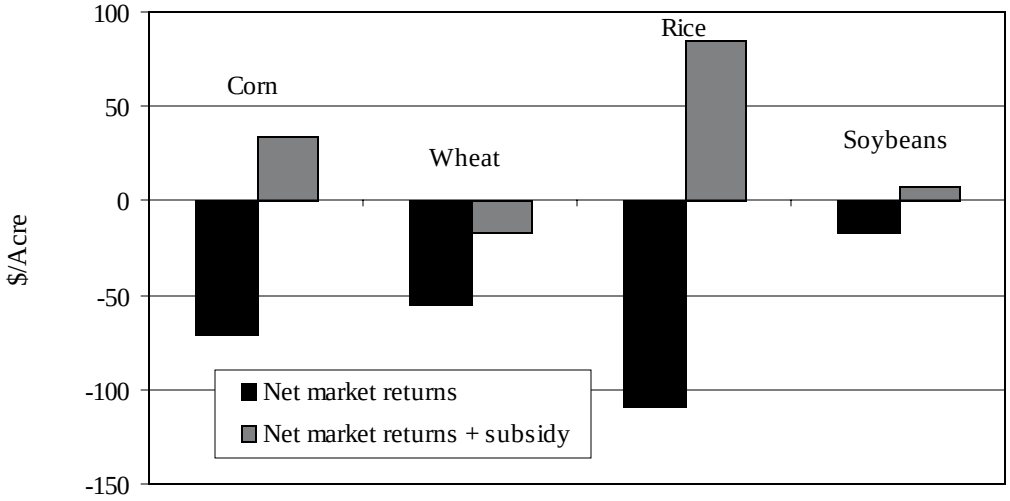
Sources: USDA agencies RMA, FSA, WAOB, and NASS.
[1] I apply the cost of production per acre based on surveys conducted in 2003 to all three years. Comparing cost of production in 2003 to that in prior years suggests that fuel and fertilizer expenses are the main differences. One would generally expect costs to rise gradually over time.
[2] Value of production per acre is calculated by dividing 2004 calendar year data by the 2004 acres harvested. Net returns plus subsidy then include the per acre subsidy, which was calculated by dividing the 2004 fiscal year data on total program payments by the number of acres harvested.

Representatives of commodity groups commonly argue in favor of subsidy programs by claiming that they simply could not remain in business without the subsidies. Brazil emphasized this point and quoted U.S. cotton industry sources in the WTO cotton case to the effect that U.S. cotton production is kept in the global market only by subsidies that allow farmers to continue to produce at what would be consistent losses but for the subsidy.

The panel in the cotton case found that the relationship between cotton costs and revenues provided key evidence of a causal link between U.S. subsidies and suppressed world prices. The fact that subsidies were covering losses showed that the subsidies were allowing cotton producers to maintain a higher level of output, and sell at lower prices, than otherwise would have been possible. Since similar divergences between costs and market revenues exist for other crops, other panels in future cases will be in a position to reach similar conclusions.

The fact that subsidies were covering losses showed that the subsidies were allowing cotton producers to maintain a higher level of output, and sell at lower prices, than otherwise would have been possible.

Figure 5
Costs and Returns per Harvested Acre of Corn, Wheat, Rice, and Soybeans, 2005 (est.)



Sources: USDA agencies RMA, FSA, WAOB and NASS, ERS.
Note: Value of production data for 2005 are based on USDA forecasts. I apply the cost of production per acre based on surveys conducted in 2003 to the year 2005. Net returns are calculated by subtracting the cost of production per acre from the value of production per acre. Value of production per acre is calculated by dividing estimated 2005 calendar year data by the 2005 acres harvested. Net returns plus subsidy then include the per acre subsidy, which was calculated by dividing estimated 2005 fiscal year data on total program payments by the number of acres harvested.

Estimating Price Effects

The data reviewed thus far show that subsidies for corn, rice, and wheat are large relative to market revenue and relative to costs of production. That evidence alone suggests that subsidies stimulate U.S. production of those crops. Basic economic reasoning therefore points to the conclusion that U.S. subsidies are exerting downward pressure on market prices.

Basic economic reasoning points to the conclusion that U.S. subsidies are exerting downward pressure on market prices.

To assess the magnitude of the impact on prices, I have developed a simple economic simulation model that is used to calculate examples of the likely effects of U.S. corn, wheat, and rice subsidies on world prices. This analysis is based largely on standard elasticities and assumptions used by USDA and other economists. Those calculations indicate that, similar to the findings for cotton, the U.S. programs for corn, wheat, and rice have suppressed world prices below what would have otherwise prevailed.

Before turning to the model and calculations, let us consider the issue more broadly. The United States is a significant exporter of corn, wheat, rice, and soybeans. Given the high degree of subsidization and the large export market shares of about 60 percent for corn, about 30 percent for wheat, and about 15 percent for rice in recent years, a strong case can be made that the excess exports caused by the subsidy programs suppress prevailing world market prices for those commodities. The United States has an export share of about 40 percent for soybeans (roughly equal to its world production share), but the rate of U.S. subsidy for soybeans has been relatively low in recent years and that makes the impact on global markets smaller.

The Appendix presents details of an economic simulation model that may be used to assess the impact of U.S. subsidies on market quantities and prices. That model begins with supply and demand equations that allow for the effect of subsidies on the quantity supplied in the United States. From those supply and demand equations I solve for market equilibrium and show how subsidies suppress world prices and how reduction or elimination of the

subsidies raises world prices.

Market price suppression caused by subsidies depends on the subsidy rate, the degree to which subsidies provide production incentives, the share of the subsidized production in the relevant market, the share of demand in each market, and the supply and demand elasticities in the United States and in the relevant market. (Supply elasticity is the percentage increase in quantity supplied caused by a percentage increase in price. Demand elasticity is the percentage decrease in the quantity demanded caused by percentage increase in price.)

Table 5 shows some sample calculations for the effects of corn, wheat, and rice subsidies on the world price of each commodity. The price increases that would result from eliminating the subsidies range from 10 percent for corn when the foreign supply response to price is relatively inelastic (0.25) to a low of 4 percent for rice when the foreign supply elasticity is 0.4.

Consider first the calculations for corn, looking at both the key parameters and the logic of the results. The first parameter measures per unit market returns relative to per unit government subsidy. Based on the data in Table 3, corn subsidies in 2006 are expected to total about $8.8 billion, and market revenue is expected to be about $20 billion. Accordingly, the value of this parameter is approximately 2.25 for corn. I assigned a fairly high degree of relative production effect (0.75) because most of the corn subsidy is accounted for by marketing loans (which are the most trade-distorting of the payment programs) and countercyclical payments (which also provide a relatively strong stimulus to production). Direct payments, whose stimulus to production is less, are a smaller share of the total subsidy for corn. The United States is the leading corn producer in the world, with a production share of 0.4 (i.e., 40 percent of world production). Based on the academic research literature, I use a U.S. supply elasticity of 1.0. This is larger than some econometric estimates, but those econometric estimates must be adjusted when used to assess the effects of substantial policy reform.[28] The foreign supply response is smaller than the U.S. supply response to market price because a significant share of world production is in locations that are relatively isolated from world market influences because of government policy. For example, China, a major corn producer, maintains policies that limit price transmission from the coast to inland regions. I use two alternative supply elasticities to reflect a range of views about supply response in other countries to world price movements.

The results for corn indicate that removing U.S. subsidies would allow the world price of

Table 5
Effects of Removal of Commodity Subsidy on World Market Price

Commodity	Market Returns over Subsidy (P/g)	Subsidy, Relative Production Effect (γ)	Implied Effective Subsidy Share (1-α)	Domestic Supply Share (δ_u)	Foreign Supply Elasticity (ε_r)	Demand Elasticity ($\eta_u = \eta_r$)	World Price Impact (dlnP)
Corn	2.25	0.75	0.25	0.4	0.50	-0.5	0.09
Corn	2.25	0.75	0.25	0.4	0.25	-0.5	0.10
Wheat	2.00	0.65	0.25	0.2	0.50	-0.25	0.06
Wheat	2.00	0.65	0.25	0.2	0.25	-0.25	0.08
Rice	2.60	0.60	0.23	0.1	0.40	-0.2	0.04
Rice	2.60	0.60	0.23	0.1	0.20	-0.2	0.06

Sources: Author's calculations based on equation A7. See Appendix for full explanation of the parameters. P, g, and γ are calculated as approximate values from data in Table 3 with the value for γ based on the relative importance of each subsidy type in the total. Supply share is based on USDA data for world product share except that for rice, of which much of the world production is produced and consumed on the same farm in remote areas of Asian countries or is protected by import tariff-rate quotas and is not subject to global market forces. The elasticities are based on estimates in the academic literature.

Note: The U.S. supply elasticity, ε_u, equals 1.0 in all scenarios.

Significant suppression of world market prices is only one possible basis for a finding of serious prejudice under the SCM Agreement.

corn to rise by 9 to 10 percent. That is comparable to the market price effect in the WTO cotton dispute.

The analysis for wheat is similar to that for corn with some different parameters. For wheat the overall subsidy is larger relative to market revenue, but direct payments, which provide less production incentive, account for a larger share of the subsidy total. Those two effects offset one another. U.S. wheat production is only 20 percent of the world total, and that dampens the influence of U.S. subsidies. However, the econometric literature finds that the price elasticity of demand for wheat is quite small (I use -0.25). That fact partially offsets the smaller U.S. share of production. With these parameters, I find that removing U.S. wheat subsidies would raise world wheat prices by 6 to 8 percent.

Finally, rice has a lower overall subsidy rate in recent years, and more of the subsidy comes from direct payments. Rice prices have been relatively high recently. In the past, rice subsidies often exceeded market revenue. While the U.S. share of overall world rice production is quite small, I use a U.S. production share of 10 percent in that part of world production that is potentially influenced by world price changes. (I assume the share of rice that potentially participates in the world market is about 25 percent of the total.)[29] The demand for rice is relatively unresponsive to market prices, and even that part of world supply that is in the market has relatively low price response. The bottom line is that, on a global basis, removing U.S. subsidies would raise the price of rice by 4 to 6 percent.

These estimates provide a reasonable order of magnitude of likely impacts. All seem significant. These figures mean that producers in other countries have suffered revenue losses in the range of hundreds of millions to billions of dollars. More detailed analysis may change these specific results, and, in particular, investigations that refined the parameter choices would influence the price impacts reported. However, the general range of the estimates would be robust to parameter value within a plausible span.

Furthermore, it should be recalled that the cotton panel did not include crop insurance and direct payments among the causes of serious prejudice. However, the Appellate Body noted that it could be appropriate to consider non-price-based subsidies in assessing serious prejudice. In assessing the effects of subsidies on prices, I use the best available economic evidence and include direct payments and crop insurance as subsidies that affect production and therefore prices. The economic logic is that to assess the overall effect of U.S. farm programs on prices, one should include the impacts of programs that may be individually small but nonetheless contribute to the aggregate impact. Indeed, that appears to be the logic behind the panel's decision in *Korea—Commercial Vessels* that the cumulative effect of all subsidies must be examined in determining whether serious prejudice exists. I do account for the relatively lower stimulus that non-price-contingent subsidies provide for production by assigning a lower value to the parameter for the relative production effect of the subsidies when direct payments account for a larger share of the total subsidy amount.

Other Serious Prejudice Claims

Significant suppression of world market prices is only one possible basis for a finding of serious prejudice under the SCM Agreement. In addition, serious prejudice can take the form of displaced or impeded imports into the subsidizing member's home market, displaced or impeded exports into third-country markets, lost sales in a market, or an increase in the subsidizing member's world market share. Also, price suppression claims can be limited to specific geographic markets or product submarkets.

The basic model developed in the Appendix is also applicable to these other claims. With appropriate data, the model may be solved for effects of subsidies on market quantities and market shares as well as price suppression in specific local markets. Nonetheless, a detailed assessment of U.S. vulnerability to these other kinds of serious prejudice claims is beyond the scope of this paper. A few preliminary comments, however, are in order.

First, the data reviewed here on the relative magnitude of subsidies and the relationship between costs and revenues are of relevance to

other types of serious prejudice claims besides price suppression. Whether a case involves lost sales or increased market share, it will be necessary for the complainant to establish a causal link between the subsidies under challenge and the claimed adverse effects. Just as the fact that subsidies are large relative to production supports the conclusion that their effect on price is significant, so should it also lend support to the argument that subsidies are boosting sales to particular markets or inflating the subsidizing member's overall world market share. The same can be said of the fact that subsidies are covering market losses. That fact provides powerful evidence that subsidized growers are maintaining higher levels of output at lower prices than would otherwise be the case, which in turn should make it possible for a future panel to find effects of subsidies on sales in particular markets or on overall market share.

In addition, whether a serious prejudice claim involves price suppression, depressed or impeded exports, lost sales, or increased market share, it seems obvious that claims restricted to particular geographic markets or product submarkets may sometimes be stronger than claims that embrace one commodity in the aggregate or in the entire world market. In other words, the effect on prices and quantities may be even stronger when one separates markets geographically or by variety, class, or type within the broad commodity category. So, for example, the United States is a large exporter of several classes of wheat, including hard red winter wheat, which is grown in Kansas among other places. If analysis focused on that class alone, the U.S. market share would be larger and impacts might be larger. Also, evidence on displacement of quantities might be more direct.

Identifying individual country or regional markets where a competitor faces U.S. commodities in head-to-head competition may be a promising approach for some potential complainants, given the size of the U.S. subsidies compared to costs of production or as a share of total revenue. For wheat, competitors such as Australia, Argentina, and Canada that also ship to markets in Japan, China, Mexico, and other countries would be in a position to show displacement by reason of U.S. subsidies. Japan, Mexico, and Taiwan are major markets for U.S. corn, and displacement of corn exports from Argentina is likely.

Rice markets are differentiated between short- and medium-grain japonica rice, which is consumed in Japan and Korea and part of China, and long- and medium-grain indica rice, which is produced and consumed in south China and the rest of South Asia and Southeast Asia. The United States produces japonica rice in California and indica rice in the South. The rice program applies equally to both, and the U.S. subsidy program affects markets for both types of rice. For japonica rice, Australia and China are major export competitors. For indica rice, Thailand, Uruguay, and India, among other countries, are major competitors. While the United States has a relatively small share of the overall global market for indica rice, in Central and Latin America and the Caribbean, it has a significant share. Uruguay has recently claimed that U.S. exports to those and other markets hinder its ability to market nonsubsidized indica rice that competes directly with heavily subsidized U.S. rice.

Other potential claims may focus on lost sales in the U.S. market. Such a focus might be appropriate, for example, for wheat imports from Canada and rice imports from Thailand and a few other countries. Exporters would argue that their shipments to the United States would be larger if U.S. subsidies did not stimulate production and lower the market price in the United States. The United States currently imports only a few percent of domestic consumption of wheat and about 10 percent of domestic consumption of rice. Those imports would be larger if the U.S. farm programs did not create less favorable economic conditions for imports.

Dairy and Other Products

Aside from the major payment programs discussed above, dairy industry supports probably create more vulnerability to WTO claims than any remaining farm subsidies. Dairy programs are varied, complex, and pervasive, and the dairy price support program is a major contributor to the product-specific AMS. U.S. dairy

Aside from the major payment programs, dairy industry supports probably create more vulnerability to WTO claims than any remaining farm subsidies.

producers are protected by a set of tariff-rate quotas that keep prices high in the United States relative to world prices, primarily for products containing a high share of milk fat. (The United States is more competitive in the market for products high in nonfat solids.) Behind the tariff wall, the United States operates a price support program under which the government buys U.S.-produced butter, nonfat dry milk, and cheese whenever market prices are ready to fall below the "purchase prices" established through the price support scheme. The purchases are usually near zero but have been high occasionally in recent years. Current projections are for purchases to be very small over the next few years, but dairy markets are volatile and this situation may change with little warning.

The Milk Income Loss Contract program was new in 2002 and paid out more than one billion dollars when milk prices were low. The program has not made payments in the past year, and current projections are for higher prices and hence little MILC activity. The MILC program expired on September 30, 2005, but legislation to renew it is pending.

The milk marketing order system has operated since the New Deal. In essence, the marketing orders set minimum price differentials for milk used for beverage and other "soft" and more perishable products so that overall dairy farm revenue increases. The benefits are distributed to farmers through a weighted average "pool" price so that even a farmer whose milk is used solely for cheese shares in the benefits of the higher price for beverage milk. The price discrimination and pooling schemes under the milk marketing orders stimulate overall milk production and divert milk from beverage products that are generally not traded internationally to the production of cheese, milk powder, and butter, which are the main traded dairy products. The added supply of those "hard" tradable products depresses their prices and creates a disincentive to import and an added incentive to export processed milk products. This program seems ripe for a WTO challenge by Australia, New Zealand, or other competitive dairy exporters on the basis that it has reduced access for exports to the U.S. market.

Resolving the conflict with WTO rules will require significant changes in U.S. farm policy.

Many farm commodities receive significantly less subsidy than the commodities already considered. The less subsidized commodities include beef, pork, poultry, hay, most fruits, tree nuts, melons, and vegetables. Many of those commodities do receive subsidies for export promotion, crop insurance, and irrigation. They periodically receive disaster assistance and ad hoc support when market prices are unusually low. Many also are eligible for marketing orders that include special levies that support research and promotion. Some of that government support is explicitly in the green box, and some is considered non-product-specific under AMS rules. Remaining support is typically low relative to the value of commodity production and so would likely fall into the *de minimis* category.

Nevertheless, it is possible that detailed analysis might reveal prohibited subsidies for one or more of those commodities (e.g., because the program provides a benefit not available to an imported commodity in the U.S. market). Such instances of prohibited subsidies may be important for particular countries and commodities. However, it is unlikely that there are any major WTO concerns regarding domestic support for those commodities.

The U.S. sugar industry is highly subsidized. However, benefits for U.S. sugar producers derive mainly from the import tariff-rate quota scheme. The domestic price support and related programs are facilitated by the trade barriers. The price support scheme contributes more than one billion dollars to the U.S. AMS while providing relatively little in the way of benefit to the U.S. industry or additional trade distortion above that caused by the tariff-rate quota. Removing the price support would cause relatively little effect on world markets because the tariff-rate quota keeps the domestic price of sugar above the support price.

Finally, subsidies for irrigation water and grazing livestock on government-owned land are worthy of mention. Both are now classified as non-product-specific amber-box subsidies. Grazing fee subsidies are small in aggregate, and subsidies are generally low relative to market revenue for the beef industry, which receives most of the benefits.

Those subsidies are unlikely to contribute to WTO violations. Irrigation subsidies are larger and benefits are more widespread, but they are also likely to be small relative to total crop revenue. For some commodities, such as almonds grown in California, irrigation subsidies may be significant. However, the amount of subsidy is inordinately difficult to measure. One estimate is that a subsidy of about $40 per acre (on average) may apply to about 550,000 acres of almonds.[30] The total irrigation subsidy for almonds is about $22 million, compared to total crop value of about $2 billion. In the WTO cotton case, Brazil chose not to add irrigation subsidies to the list of programs supporting cotton because they were thought to be difficult to tie to a specific crop and were small relative to the magnitude of cotton program subsidies and crop insurance.

The Need for Farm Policy Reform

For decades, farm subsidies have been criticized for the burdens they impose on taxpayers and consumers. More recently, the negative environmental impact of farm subsidies has received increasing attention, as has the harm caused by subsidies to farmers in poor countries.[31] The analysis in this paper reveals yet another problem with U.S. farm programs—namely, the likelihood that they violate the United States' international obligations as a member of the World Trade Organization.

Resolving the conflict with WTO rules will require significant changes in U.S. farm policy. Regardless of whether the Doha Round succeeds in imposing additional constraints on subsidization of agriculture, the 2007 farm bill will need to institute substantial reforms. Otherwise, the cotton case is likely to be only the first in a series of contentious disputes between the United States and its trading partners.

First, Congress needs to ensure that the $19.1 billion cap on annual amber-box subsidies is not exceeded. The 2002 farm bill did contain a "circuit breaker" designed to keep subsidies within the cap, but it is clearly ineffective. In order to bring the AMS down, the United States could modify its grain and oilseed programs (the cotton ruling already requires modification of cotton programs). In addition, the United States could eliminate the dairy and sugar price support programs, which provide little current support to those industries because domestic market prices are held above the price support rates by high tariffs and tight tariff-rate quotas.

Merely abiding by longstanding AMS limits, however, would not insulate the United States from future WTO challenges. Now that the peace clause has expired, there is no legal bar to challenging a wide range of U.S. farm programs for causing serious prejudice in violation of the SCM Agreement. And as the analysis above has shown, many U.S. programs are ripe for challenge.

The data on corn, wheat, and rice programs indicate that there are plausible claims that those subsidies cause serious prejudice to competitors in the U.S. domestic market or international markets. The same analysis applies to feed grains in addition to corn and may apply in the future to oilseeds if market prices decline. Although not discussed here in detail, peanut subsidies represent another vulnerable program. The remedy for those adverse effects is to eliminate the programs, reduce the subsidy amounts, or reduce the degree of linkage to production. Other than simply eliminating the most distorting programs, the most natural approach would be to reduce the loan rates and the target prices so that total subsidies are lower and producers are less shielded from market signals. Since the WTO Appellate Body has not provided guidance, it is not obvious how large the reductions in subsidy rates would need to be to cause the programs to fall below the serious prejudice threshold.

The U.S. dairy marketing order program creates additional exposure to subsidy claims by WTO members. That program shifts milk from fluid use, which does not compete directly with imports, to manufactured dairy products that are far more readily traded. The net result is a lower price of the tradable products and displacement of imports or stimulation of exports. Milk marketing orders also transfer

Merely abiding by longstanding AMS limits would not insulate the United States from future WTO challenges.

income among dairy farmers and consumers in the United States with relatively little net benefit to dairy farmers as a whole. A natural approach to avoiding serious prejudice caused by the milk marketing orders would be to eliminate the program. Failing that, reducing the price differentials would reduce the impact.

Meanwhile, in the event a successful DDA agreement is reached, the constraints on U.S. farm programs are likely to tighten considerably. In addition to significant cuts in border measures such as tariffs, the most recent U.S. proposal in the agriculture negotiations calls for (1) a 60 percent cut in the total amber-box limit (that is, a cut in the cap from $19.1 billion to $7.6 billion); (2) product-specific AMS caps based on 1999–2001 levels; (3) a cut in the *de minimis* threshold to 2.5 percent for developed countries and 5 percent for developing countries; and (4) a limit for blue-box subsidies set at 2.5 percent of total production value per commodity.

Whatever the ultimate outcome of the Doha Round negotiations, U.S. farm programs are in need of a major overhaul to bring them into conformity with international obligations.

The proposal offers somewhat less than meets the eye, since the United States has also proposed redefining the blue box to include countercyclical payments. If that redefinition were made, the current *de minimis* of 5 percent would for all practical purposes be maintained—2.5 percent still called *de minimis* and another 2.5 percent in the new blue box. That said, a 60 percent cut in the overall amber-box maximum, particularly when combined with product-specific AMS caps (especially using a more recent base period when subsidies were not at record high levels), would require significant cuts in domestic supports.

It is unclear that even a 60 percent cut in the AMS limit would end U.S. vulnerability to serious prejudice claims. The United States, however, is proposing to end that vulnerability another way: by creating a new peace clause to forestall claims under the SCM Agreement. A number of WTO members have already voiced strong opposition to that proposal, so its ultimate inclusion in a DDA agreement is not likely without significant additional movement by the United States in cutting amber- and blue-box subsidies. The experience of the cotton case and the analysis presented here suggest that skepticism about a new peace clause is appropriate. By allowing claims of serious prejudice and other adverse effects under the SCM Agreement, current WTO rules impose important discipline on trade-distorting farm subsidies. If that discipline is to be relaxed by renegotiation of the peace clause, it is vital that tougher rules in a new Agriculture Agreement ensure that the capacity of farm programs in the United States and elsewhere to inflict serious prejudice be brought under firm control. Otherwise, the Doha Development Agenda—dedicated in its very name to advancing the economic prospects of developing countries, especially in the agricultural sector—could end up weakening rather than strengthening the existing rules on trade-distorting farm subsidies.

All told, it is uncertain that even the latest U.S. proposal in the DDA agricultural negotiations (which the European Union, Japan, and others have claimed goes too far) would suffice to constrain the trade-distorting effects of domestic supports. Accordingly, if a deal involving a new peace clause is to be seriously contemplated, it should also include provisions in addition to AMS limits that deal directly with the problem of serious prejudice. One possible solution is to extend peace clause protection only if certain criteria relevant to serious prejudice are met. For example, thresholds could be set for the size of domestic supports relative to market revenue as well as for market share. If those thresholds were exceeded, the peace clause would not apply. In addition, provisions need to require early reporting of the subsidy categories to which program benefits are to be assigned and preliminary AMS calculations so that they can be monitored effectively.

Whatever the ultimate outcome of the Doha Round negotiations, U.S. farm programs are in need of a major overhaul to bring them into conformity with international obligations. Congress should therefore seize the opportunity to make real and durable improvements in farm policy. Doing the minimum, and relying on cosmetic changes in lieu of substantive reform, would represent a regrettable failure of U.S. international leadership as well as domestic policymaking.

Appendix: Explanation of Simulation Model

The text discusses the key parameters that determine the magnitude of the potential effects of U.S. farm subsidies on quantities marketed and world prices of subsidized commodities. Table 5 provides illustrative calculations for the world price effects of U.S. farm subsidies for major representative crops. This appendix develops some simple algebra that shows analytically the effects of farm subsidies on market prices. The simulation model developed here can be used to assess the approximate magnitude of the effect of subsidies on market prices and quantities and to assess the factors that influence the magnitude of the effect.

I abstract from many complexities that would be important to get more precise estimates. The simple model laid out here does not represent the depth of analysis that would be appropriate to support a trade remedy proceeding or a serious prejudice claim before a WTO panel. In those settings more empirical and institutional detail would be used in the model development. Furthermore, the parameters of a simulation model would likely be grounded more fully in econometric estimation. Finally, I note that producers respond, not to realized market prices or subsidy outcomes for a crop year, but to the expected prices and expected rates of subsidy that apply at the time of planting and other key decisions in the production cycle. In applying the model one would incorporate expectations into the data used for the simulation. Here I abstract from the case when expected prices deviate from realized prices faced by buyers. Nonetheless, I believe the simplified approach developed here is useful for an initial assessment.

Let us consider the following simple equations that are specified in logarithmic differential form. They represent the supply and demand for the commodity in the United States, shown by subscript u, and in the rest of the world, shown by subscript r:

$$\text{(A1)} \quad d\ln S_u = \varepsilon_u (d\ln R_u)$$

$$\text{(A2)} \quad d\ln D_u = \eta_u (d\ln P)$$

$$\text{(A3)} \quad d\ln S_r = \varepsilon_r (d\ln P)$$

$$\text{(A4)} \quad d\ln D_r = \eta_r (d\ln P).$$

In these equations, the term dlnS stands for the approximate percentage (or proportional) change in the quantity supplied, dlnD stands for the approximate percentage change in the quantity demanded, and dlnP stands for the approximate percentage change in market price. The parameters ε_u and ε_r are the price or per unit revenue elasticities of supply in the United States and the rest of the world. The parameters η_u and η_r are the price elasticities of demand in the United States and the rest of the world.

The variable R_u comprises market price, P, plus effective per unit revenue received from government subsidy, denoted G. For U.S. producers, effective revenue per unit is therefore written as $R_u = P + G$. The variable G is not simply per unit revenue from government payments and other subsidies; it reflects the degree to which those subsidies affect production. Revenue from government programs may be partly decoupled and hence may not provide as much production incentive as revenue from the market. Alternatively, per unit revenue from government programs could have a stronger production effect than market revenue. This could occur, for example, if government revenue is considered more secure than market revenue and producers respond more to the secure government revenue than to market revenue, which carries more uncertainty. I define a policy parameter γ to represent the degree to which government revenue provides a production incentive relative to revenue from the market. I incorporate this concept in the model by defining $G = \gamma g$, where g is the per unit government support as conventionally measured. The variable G is a measure of subsidy in price equivalent terms. Hence, we may consider R_u as the effective price equivalent facing U.S. producers.

In log differential terms, per unit revenue may be written as

$$d\ln R_u = \alpha\, d\ln P + (1-\alpha) d\ln G = \alpha\, d\ln P + (1-\alpha) d\ln\gamma + (1-\alpha) d\ln g.$$

The expression dlnG is the approximate per-

centage change in the effective government subsidy (measured as a price subsidy equivalent). A percentage reduction in G may be achieved by reducing the degree of production incentives inherent in the support, $d\ln\gamma$, or by reducing the level of support, dlng. The parameter α is the share of market price in effective producer revenue per unit. That is, $\alpha = P/R_u$ and $(1-\alpha) = G/R_u$.

Clearly the parameter α is closely related to the subsidy parameter γ:

$$(1-\alpha) = (\gamma g)/(P + \gamma g) = (\gamma/(\gamma + P/g).$$

In this expression, the share of production-enhancing government support in production-enhancing revenue, $(1-\alpha)$, depends on the degree of production incentive inherent in the government programs (relative to the production incentive in market price), γ, and on the ratio of market revenue to full revenue from government support, P/g.

As specified in log differential forms, these equations abstract from product differentiation, trade barriers, transport costs, and other factors that cause differences between a commodity price in the United States and the price in the rest of the world. Furthermore, to focus on the effects of changes in U.S. subsidies, I do not include in the model effects of subsidies in other countries. Such subsidies in Europe and elsewhere surely affect the level of prices, but our attention is on the effects of a percentage change in U.S. subsidies, holding other factors constant. That is appropriate in order to isolate how U.S. subsidies affect world prices. In a model with a different focus one would incorporate other variables of interest. For example, in modeling a global reduction in subsidies, we would want to consider the simultaneous reduction of all subsidies and trade barriers.

Next let us sum the quantity supplied from each source to get the world supply in log differential form and perform the similar calculation on the demand side. These may be written as

$$\begin{aligned}(A5)\ d\ln S_w &= \delta_{su} d\ln S_u + (1-\delta_{su}) d\ln S_r \\ &= \delta_{su}\varepsilon_u d\ln R_u + (1-\delta_{su})\varepsilon_r d\ln P \\ &= \delta_{su}\varepsilon_u \alpha\, d\ln P + \delta_{su}\varepsilon_u(1-\alpha) d\ln G \\ &\quad + (1-\delta_{su})\varepsilon_r d\ln P \\ (A6)\ d\ln D_w &= \delta_{du} d\ln D_u + (1-\delta_{du}) d\ln D_r \\ &= \delta_{du}\eta_u d\ln P + (1-\delta_{du})\eta_r d\ln P\end{aligned}$$

where δ_{su} is the share of U.S. production in world production and δ_{du} is the share of U.S. consumption in world consumption.

Next we set $d\ln S_w = d\ln D_w$ and solve for dlnP:

$$\begin{aligned}(A7)\ d\ln P = -[&\delta_{su}\varepsilon_u(1-\alpha) d\ln G]/-[\delta_{du}\eta_u + \\ &(1-\delta_{du})\eta_r - (\delta_{su}\alpha\varepsilon_u + (1-\delta_{su})\varepsilon_r)].\end{aligned}$$

Equation A7 provides a framework for assessing the effect of changes in the U.S. commodity subsidy rate, G, on the market-clearing world price. Elimination of the U.S. subsidy, dlnG = -1.0, causes a percentage increase in market price by the magnitude, $-(\delta_{su}\varepsilon_u(1-\alpha))/[(\delta_{du}\eta_u + (1-\delta_{du})\eta_r) - (\delta_{su}\varepsilon_u\alpha + (1-\delta_{su})\varepsilon_r)]$, which is positive because we are considering a subsidy reduction and the demand elasticities η_u and η_r are negative and the supply elasticities ε_u and ε_r are positive. Of course, the shares are all positive and less than or equal to 1.0.

To get a better feel for the interpretation of equation A7, consider a sample calculation. Consider a commodity for which the subsidy provides a production incentive that is on average 75 percent as strong as market revenue ($\gamma = 0.75$) and for which the market revenue is twice the magnitude of the revenue from government payments (P/g = 2.0). With these subsidy parameters, using the expression derived above, $(1-\alpha) = 0.273$. Now to complete the calculation, assume the U.S market share in supply is 0.4, the U.S. market share in demand is 0.20, the U.S. supply elasticity is 1.0, the foreign supply elasticity is 0.5, and the demand elasticity in each market is -0.5. Putting these values into equation A7 we get

$$\begin{aligned}d\ln P &= [-(0.4)(1.0)(0.273)]/[(0.2)(-0.5) + (0.8) \\ &\quad (-0.5) - (0.4)(1.0)(0.727) -(0.6)(0.5)] \\ &= -(0.109)/(-1.09) \\ &= 0.10.\end{aligned}$$

Notes

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1. The United States also produces a relatively small amount of Pima cotton that is not eligible for most support programs provided for upland cotton. The WTO case dealt solely with upland cotton. That said, henceforth I will use the terms cotton and upland cotton interchangeably.

2. Quoted in Jim Wiesemeyer, "Washington Agenda: Sept. 12-16, 2005," Informa Economics, Inc., Washington, September, 12, 2005.

3. D. Gale Johnson, *Agriculture and Trade: A Study of Inconsistent Policies* (New York: John Wiley and Son, 1950).

4. Bruce Gardner, *American Agriculture in the Twentieth Century* (Cambridge, MA: Harvard University Press, 2002).

5. Paul C. Westcott and C. Edwin Young, "U.S. Farm Program Benefits: Links to Planting Decisions & Agricultural Markets," *Agricultural Outlook*, AGO-275, October 2000, pp. 10–14.

6. Bruce Gardner, "Agricultural Relief Legislation in 1998: The Bell Tolls for Reform," *Regulation* 22, no. 1 (1998).

7. Daniel A. Sumner, " Implications of the USA Farm Bill of 2002 for Agricultural Trade and Trade Negotiations," *Australian Journal of Agricultural and Resource Economics* 46, no. 3 (March 2003): 117–40.

8. Joe L. Outlaw, "A Discussion on the 2002 Farm Bill: The Facts We Really Need to Know," Texas A&M University Agriculture and Food Policy Center, AFPC ID: PR-2002-4, http://www.afpc.tamu.edu/pubs/8/382/victoriaagpolicy.ppt.

9. Roger Claassen, "Farm Bill Side by Side: Conservation Programs, Details and Analysis," U.S. Department of Agriculture, Economic Research Service, Web product, May 2002, http://www.ers.usda.gov/features/farmbill/analysis/conservationoverview.htm; P. Westcott, C. E. Young, and M. Price, *The 2002 Farm Act, Provisions and Implications for Commodity Markets*, USDA Economic Research Service, November 2002; Sumner, "Implications of the USA Farm Bill of 2002."

10. *Canada—Measures Affecting the Importation of Milk and the Exportation of Dairy Products.* Documentation regarding this dispute is available at http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds103_e.htm.

11. *European Communities—Export Subsidies on Sugar*. Documentation regarding this dispute is available at http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds266_e.htm.

12. Brazil also claimed that U.S. cotton subsidies caused serious prejudice by increasing U.S. world market share. That claim did not prevail at the panel level, and Brazil's appeal to the Appellate Body was unsuccessful.

13. *United States—Subsidies on Upland Cotton: Report of the Panel*, WT/DS267/R, World Trade Organization, Geneva, September 8, 1994 (cited hereinafter as Panel report).

14. See Randy Schnepf, "U.S.-Brazil WTO Cotton Subsidy Dispute," Congressional Research Service Report for Congress, Order Code RL32571, September 10, 2004.

15. *United States—Subsidies on Upland Cotton: Report of the Appellate Body*, WT/DS267/AB/R, World Trade Organization, Geneva, March 3, 2005.

16. Panel report, paras. 7.1348, 7.1349, 7.1351, 7.1353.

17. Daniel A. Sumner, "A Quantitative Simulation Analysis of the Impacts of U.S. Cotton Subsidies on Cotton Prices and Quantities," presented to the WTO Cotton Panel, October 2003.

18. Pedro de Camargo Neto, "An End to Dumping through Domestic Agricultural Support," *Bridges* 9, no. 8 (August 2005): 3–4, http://www.ictsd.org/monthly/bridges/BRIDGES9-8.pdf.

19. Chad E. Hart, "The WTO Picture after the Cotton Ruling," *Iowa Ag Review* 11, no. 2 (Spring 2005), CARD, Iowa State University.

20. In addition, two other types of "adverse effects" are specified in Article 5 of the SCM Agreement: injury to the domestic industry of a WTO member, and nullification and impairment of tariff concessions and other benefits. An examination of U.S. vulnerability to WTO claims on those grounds is beyond the scope of this paper.

21. In particular, I will leave aside detailed discussion of peanut subsidies. The peanut program, initiated in 2002, replaced a price support and marketing quota and now includes the same basic features as the program for soybeans. The new peanut program created additional production incentives that could give rise to WTO violations

by adversely affecting imports into the U.S. market or stimulating U.S. exports that displace exports of other countries.

22. Panel report, para. 7.1332.

23. The fourth reason cited by the panel was that the cotton subsidies found to cause price suppression were linked to world prices and consequently insulated U.S. cotton growers from world prices. The linkage that existed for marketing loan and countercyclical payments in support of cotton exists in equal measure for those programs as applied to other commodities. Cotton growers also received price-contingent benefits in the form of Step 2 payments that are not available for other commodities. The analysis in this study includes the effect of non-price-contingent subsidies (direct payments and crop insurance subsidies) that were not included among the subsidies found to cause price suppression by the panel in the cotton case.

24. For a review of the economics of the production effects of various types of subsidies, see Daniel A. Sumner, "A Quantitative Simulation Analysis of the Impacts of U.S. Cotton Subsidies on Cotton Prices and Quantities," Presented to the WTO Cotton Panel, October 26, 2003, available online at http://www.fao.org/es/ESC/en/20953/22215/highlight_47647en_sumner.pdf.

25. See Barry K. Goodwin and Mishra, "Another Look at Decoupling: Additional Evidence on the Production Effects of Direct Payments." *American Journal of Agricultural Economics* 87 no. 5, forthcoming December 2005; and Nigel Key, Ruben N. Lubowski, and Michael J. Roberts, "Farm-Level Production Effects from Participation in Government Commodity Programs: Did the 1996 Federal Agricultural Improvement and Reform Act Make a Difference?" *American Journal of Agricultural Economics* 87 no. 5, forthcoming December 2005.

26. *United States—Subsidies on Upland Cotton: Report of the Appellate Body*, WT/DS267/AB/R, World Trade Organization, Geneva, March 3, 2005, footnote 589.

27. "We do not agree with Korea that we are legally bound to separately determine the degree of price suppression or price depression that may be caused by each of these subsidies individually. Pursuant to [Annex IV and Article 6.1(a)], in determining the ad valorem subsidization of a production, subsidies under different programs were to be aggregated. Any rebuttal under SCM Article 6.2 of a presumption of serious prejudice arising therefrom also presumably could have been presented in respect of the effects of the aggregate subsidies. *Korea—Subsidies for Commercial Vessels: Report of the Panel*, WT/DS/273/R, World Trade Organization, Geneva, (November 2005), para. 7.616.

28. See J. D. McDonald and D. A. Sumner, "The Influence of Commodity Programs on Acreage Response to Market Price: With an Illustration Concerning Rice Policy in the United States," *American Journal of Agricultural Economics* 85, no. 4 (November 2003): 857–71.

29. Much of the rice in the world is consumed in the same villages, and often on the same farms, where it is produced. Only about 5 percent of world rice production enters international trade, and the United States is traditionally among the top three or four exporters.

30. Daniel A. Sumner and Henrich Brunke, "Commodity Policy and California Agriculture," Chapter 6 in *California Agriculture: Dimensions and Issues*, Jerry Siebert, ed. (Emeryville, CA: Autumn Press, 2004), pp. 157–80.

31. For a general overview of the need to reform U.S. farm policies, see Daniel Griswold, Stephen Slivinski, and Christopher Preble, "Ripe for Reform: Six Good Reasons to Reduce U.S. Farm Subsidies and Trade Barriers," Cato Institute Trade Policy Analysis no. 30, September 14, 2005, http://www.freetrade.org/pubs/pas/tpa-030.pdf.

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