TABLE 3.5

U.S. non-product-specific AMS

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
						(US$ billion)							
Irrigation projects	0.38	0.38	0.35	0.35	0.32	0.32	0.30	0.30	0.30	0.27	0.27	0.24	0.24
Livestock grazing	0.04	0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.04	0.05	0.04	0.04	0.04
Crop and revenue insurance	0.91	0.64	0.12	0.75	1.51	1.40	1.77	2.89	1.86	1.12	0.76	1.61	0.80
Crop market loss assistance (MLA) payments	0.00	0.00	0.00	2.81	5.47	5.46	4.64	0.00	0.00	0.00	0.00	0.00	0.00
Countercyclical payments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	0.54	4.29	4.75	1.49	0.89
Other	0.05	0.05	0.05	0.63	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05
Total	1.39	1.11	0.57	4.58	7.41	7.28	6.83	5.10	2.80	5.78	5.86	3.43	2.02

Source: WTO notifications.

between $0.5 and $5.5 billion.

The NPS de minimis exclusion has proved to be important to the U.S. notifications. Table 3.6 presents several alternative summations of the notified U.S. support. The size of the de minimis exemption has been equivalent to more than 40 percent of the notified Total AMS (after de minimis) on average, and it almost reached 70 percent in 2002. If the United States had not been able to use this exemption, it would have exceeded its Total AMS commitment in 1999-2001.

A notification issue for the United States is the status of some of its programs in light of the Brazilian cotton case (WTO 2005) and subsequent challenges to its support payments by Brazil and Canada (WTO 2007a, 2007b). The cotton case ruling casts doubt on whether U.S. fixed direct payments qualify as green-box decoupled income support[9]. Had they been notified as amber support, the United States would have violated its Total AMS commitment in a number of years. Table 3.6 shows that if direct payments were notified as non-product-specific support (following the approach used by the United States for countercyclical payments) the Total AMS binding would have been exceeded in 4 of the 13 years for which notifications have been made. If crop MLA, countercyclical and fixed direct payments were counted as product-specific support (based on the precedent of the cotton case ruling) the United States would have exceeded its commitment in 5 of the 13 years.

However these notification issues are resolved, in the aggregate government payments have played a discernible countercyclical role in stabilizing U.S. farm income. Figure 3.1 shows the relationship between prices received by farmers, total payments received under government farm programs, and farm cash income for the period 1996-2006. When prices decline government payments account for an increasing share of both gross and net farm income, as demonstrated by the period 1996-2000. The opposite relationship applies when prices increase, as demonstrated by the period 2002-2004. Payments have ranged between 10 percent and 40 percent of farm annual net cash income.

3.3 Effects of support policies

The principal focus of attention in terms of potential production and trade distortions has been on those programs that act to support prices received by U.S. farmers. This is because these are the elements of policy that are likely to have the

[9] This finding rests largely on exclusion of fruit and vegetable production from base acreage. The FCE Act included only a small pilot program to allow base-acreage production of certain fruits and vegetables (for processing on 60,000 acres in seven Midwestern states). Any such acreage planted is ineligible for support payments during that year. Blandford and Orden (2008), Blandford and Josling (2007) and Sumner (2006) provide additional discussion of potential WTO challenges to the U.S. notifications.

TABLE 3.6.

Alternative summations of notified U.S domestic support, 1995-2007

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
						(US$ billion and %)							
URA AMS Binding	23.08	22.29	21.49	20.70	19.90	19.10	19.10	19.10	19.10	19.10	19.10	19.10	19.10
Total amber [a]	7.70	8.17	7.04	15.13	24.30	24.14	21.46	16.33	10.19	18.09	18.92	11.34	8.52
As percent of binding	33	37%	33%	73%	122%	126%	112%	85%	53%	95%	99%	59%	45%
De minimis/total AMS	24	38%	13%	46%	44%	44%	49%	69%	47%	56%	46%	47%	36%
De minimis/total amber	19%	28%	11%	31%	31%	30%	33%	41%	32%	36%	32%	32%	27%
Total AMS+NPS (with DPs) [b]	6.21	5.90	6.24	20.63	29.74	29.15	25.34	20.04	6.95	11.63	12.94	7.74	6.26
As percent of binding	27%	26%	29%	100%	149%	153%	133%	105%	36%	61%	68%	41%	33%
Total AMS + CCPs + DPs [c]	6.21	11.08	12.52	18.86	27.80	27.33	23.15	16.74	12.76	21.18	22.91	14.41	12.33
As percent of binding	27%	50%	58%	91%	140%	143%	121%	88%	67%	111%	120%	75%	65%

Source: WTO notification

[a] Total amber is defined as total AMS + *de minimis*.

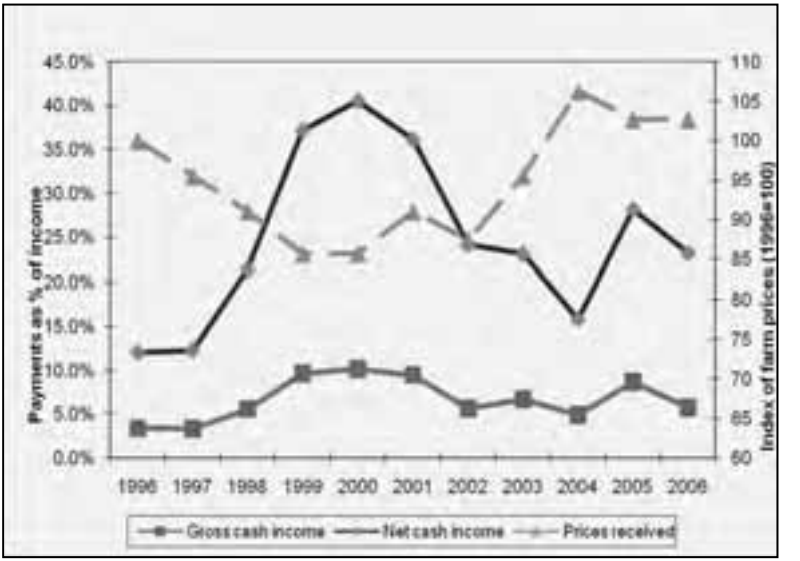
[b] Fixed direct payments (DPs) only count against the total aggregate measure of support (AMS) limit (and are added to the total AMS), if their inclusion in the non product-specific (NPS) causes this to exceed the *de minimis* level. Fixed direct payments exclude buyout payments for peanuts and tobacco included in notified green box decoupled income support.

[c] Assumes that crop market loss assistance (MLA) payments, countercyclical (CCP) payments and fixed direct payments (excluding buyout payments) are re-classified as product-specific support.

greatest impact on the total output of U.S. agriculture and to influence the mix of products. There is also interest in the potential effects of non-product-specific measures that are not linked to current production or reduce risk, and to certain

FIGURE 3.1

U.S. farm prices and importance of government payments for farm income



Source: Computed from data from ERS (USDA) and NASS.

categories of policies notified in the green box, in particular, fixed direct payments and to a lesser extent agri-environmental and disaster payments.

Among the price support policies, the dairy and sugar programs are likely to be the most trade distorting, other things being equal. The United States is a net importer of these commodities and the price support programs rely upon import tariffs and TRQs to limit supply and to keep domestic prices at or above legislated levels. Domestic supply and demand for sugar have been kept roughly in balance such that the government has not accumulated stocks. When domestic supplies of milk have been large the U.S. government has acquired stocks of dairy products, which have been disposed of through domestic food assistance programs, food aid programs, or the use of direct export subsidies. The United States has notified significant market price support for both of these commodities to the WTO as shown in Table 3.4, but the extent that this reflects the impact of current programs on the market or producer incomes is somewhat obscured, particularly in the case of the dairy program.

The other main price support programs rely primarily on payments to producers when domestic prices fall to loan-rate levels. The fact that support payments linked directly to current production and prices are likely to be trade distorting, since they exert a direct impact on U.S. production and exports of agricultural products, is reflected in these programs being notified to the WTO in the product-specific AMS category[10].

The effects of payments based on current output are illustrated by Skully (2009, chapter 2 of this report). Empirically, Westcott and Price (2001) analyzed the impact of marketing loan/loan deficiency payments for the period 1998-2005, using projected data for 2000-2005. They estimate that as a result of price support, planted acreage for major crops was increase by 2-4 million acres during the period 1999-2001, when commodity prices were low and the level of loan-rate-related government payments was high. Projections of higher commodity prices and lower government payments result in smaller effects on planted acreage in subsequent years. Higher returns generated increased exports and the effects were most pronounced for rice and upland cotton. Export prices for rice were estimated to have been reduced by 10 to 20 cents per hundredweight and cotton prices by 1 to 5 cents per pound due to the marketing loan programs. Because land can be reallocated among various crops depending on relative returns, Westcott and Price find that the prices of some crops were increased by the program; for example, corn prices were increased by 3 to 4 cents per bushel in 2001-2003 due to a shift of acreage into soybeans in response to higher returns for that commodity created by the support program.

3.3.1 Distortionary impact of direct and countercyclical payments

Producers are likely to adjust their production plans in response to government payments if these affect the relative profitability of alternative crops. In order for such effects to be apparent, the amount of payment received from the government must increase with the volume of production. The fixed direct and countercyclical payments are determined on the basis of past production of individual commodities, so the level of payments to a producer does not depend on current production on the land upon which the calculation of payments is made.

[10] As a net exporter of these commodities other explicit measures also have been used to stimulate exports. These measures, for which full discussion lies beyond the scope of this chapter, have been declining in importance, although dairy export subsidies reemerged in 2009. The Export Enhancement Program (EEP) provided direct export subsidies for grains and oilseeds, but was eliminated in the 2008 FCE Act. Export credit programs are also used to stimulate exports to certain markets. Following the 2005 WTO panel ruling in the Brazilian cotton case the United States took action to address such effects with respect to cotton export subsidies, in particular, and credit guarantee programs, more generally. The new structure responds to a key finding of the WTO panel that the fees charged by the programs should be risk based. Strengthening commodity prices have also led to a decline in the use of in-kind food aid (e.g., P.L.480) to dispose of surpluses. See Blandford, Laborde and Martin (2008) for further discussion of U.S. export subsidies.

Given this decoupling, it might seem unlikely *a priori* to find evidence of an effect of these payments on production. However, there are several mechanisms through which such an effect might occur. Skully (2009) develops these arguments in depth and provides an extensive review of the empirical evidence on their magnitude.

An earlier review of the evidence on the impact of the PFC and MLA payments examined the results obtained using a variety of analytical approaches (Abler and Blandford 2005). These included producer surveys, synthetic models, and econometric studies of the impact of direct payments, as well as related studies on the impact of capital constraints, risk response and risk aversion, and producer entry/exit and structural change. Abler and Blandford concluded that empirical studies support the view that the decoupled payments had some impact on production, but that it was difficult to disentangle the relative importance of the possible mechanisms that led to this effect. Empirical studies indicated that the payments may have influenced planted area and possibly the use of variable inputs, particularly farm household labor, but the estimated impacts were generally modest. In the econometric studies reviewed, direct payment variables were sometimes statistically significant, but when they were they implied in most cases that each type of payment increased planted area and on-farm work hours by less than 5 percent. The empirical estimates suggested that the payments had a significant effect on land values and rental rates. Given the importance of the rental market for land in the United States, it appeared that there was a relatively high pass-through of the additional income generated by the payments to landowners, many of whom are not the actual operators of the land. In as much as increases in land costs distort the overall cost structure, the payments may act to reduce the international competitiveness of U.S. agriculture over the medium to long term.

Since the Abler and Blandford review was published there have been further studies of the impact of direct payments. Goodwin and Mishra (2005, 2006) extend their earlier work based on farm level survey data to include payments under the 2002 FSRI Act. The results support the conclusions summarized above about the impact of the payments on acreage decisions. Their estimates are of acreage elasticities with respect to the payments in the range of 0.01 to 0.03 for the major crops. They find higher effects for payments linked to prices, for example, an elasticity of 0.1 for corn. They find evidence that the payments allow farmers who are highly leveraged to overcome credit constraints and to maintain output at a higher level than otherwise. De Gorter, Just and Kropp (2008) present theoretical arguments that fixed and countercyclical payments can have substantial effects by deterring exit and affecting choice of output levels. They provide empirical evidence of substantial effects from the U.S. milk income loss contract payments, especially in their short-run analysis. Kirwan (2009) concludes that less of the value of fixed direct and countercyclical payments is passed through to landowners than earlier studies have implied. He finds that 75 percent of the values of these payments are

retained by operators of rented land, with only 25 percent reflected in rental rates. While Kirwan does not address the production effects of these payments, retention of the subsidies by farm operators could enhance their production effects along the lines discussed above.

3.3.2 Distortionary impact of crop and revenue insurance

Crop and revenue insurance programs provide additional, risk-based subsidies. Schnepf and Heifner (1999) argue that subsidized insurance can affect production through three principal mechanisms: by increasing expected returns per acre it provides an incentive to expand the area in production; by providing higher premium subsidies for riskier crops on riskier land; and by encouraging production in unfavorable areas.

Young, Vanderveer and Schnepf (2001) analyze the projected impact of crop insurance subsidies for 2001-2010 by converting estimated county-level, crop-specific subsidies on premiums, indemnities, and liabilities into regional commodity-specific price wedges and incorporating these into a model that accounts for intra- and inter-regional shifts in acreage and cross-commodity price effects. Due to riskier production conditions, the price wedges tend to be higher in the Plains States. They are as high as 16 percent for cotton and 14 percent for wheat with respect to farm-level prices in 2000/01. The national average subsidy for cotton is estimated to be roughly 4 cents per pound or 7 percent of the season average price. The authors project that crop insurance subsidies would increase annual plantings over 2001-2010 by roughly one million acres (0.4 percent). Additional wheat plantings account for almost 500,000 acres, more than half of the increase in total plantings, and higher cotton acreage accounts for about a fourth of the total increase. Insurance subsidies are estimated to reduce prices for wheat, cotton and rice by roughly 3 percent. The effect on feedgrain prices is a more modest 0.5 percent, and there is a negligible impact on soybean prices. Smith, Goodwin and Glauber (2003) review econometric evidence on the impact of crop insurance subsidies on area planted to major crops. They also conclude that this evidence supports the conclusion that subsidies have a positive effect on area planted but that the effect is relatively small.

There have been fewer assessments of the production effects of recent disaster assistance payments. Young and Westcott (2000) note that since most disaster payments are made after production decisions have been taken, they are not likely to affect producers' current decisions. However, they also observe that if such payments are provided on a regular and consistent basis, as was the case in the late 1990s, they may influence production decisions by truncating the lower tail of the revenue distribution. Producers may be encouraged to keep riskier land in production and average production might be increased. They argue that the effect will be more pronounced the closer the linkage between disaster payments

and losses associated with individual commodities, but do not provide empirical estimates of the impacts.

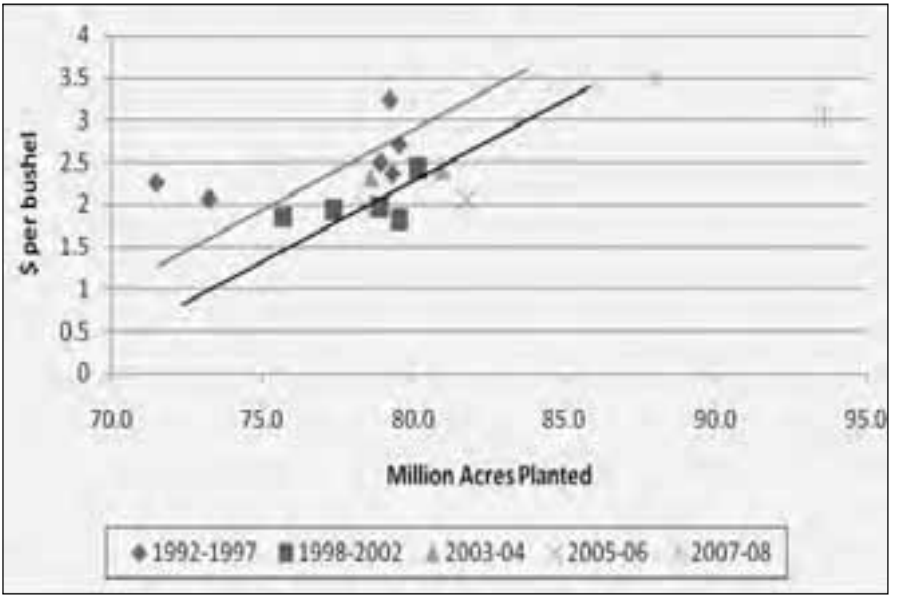
3.3.3 Overview of distortion levels

Gardner (2008) gives an illustration of how the effects across multiple subsidies might add up for national corn production, which we replicate and extend in Figure 3.2. The basic argument is that the supply curve of corn (planted acres plotted against lagged average annual price) appears to have shifted downward when the period 1998-2006 is compared to 1992-1997. Part of this shift is attributed to lower costs due to technical change, part to loan-rate-related payments during 1998-2006 providing farmers with higher per-unit revenue than market prices, and part to a residual that may capture the effects of various other support policies through the FAIR Act and subsequent payments. In rough terms, the vertical shift of about sixty-five cents per bushel, (roughly 25 percent of the 1992-1997 average price) may be explained up to one half by technological change and 40 percent by price support payments, leaving a residual that can be attributed to the effects of other support policies of 10 percent (with maximum cost-reducing technical change) to an implausible 60 percent (assuming no technical change). If Westcott and Price are right that loan-rate-related support payments and the removal of base acreage planting restrictions led acreage to shift from corn to soybeans, then the supply curve for corn would have shifted even further downward than shown in Figure 3.2 without the cross-commodity effects.

Another perspective on the distorting level of U.S. farm program expenditures comes from constructing a weighted distortion-effect index of payments by year. We constructed such an index for the U.S., applying weights along lines suggested by Skully (2009) to the key support expenditures. Based upon work by the OECD, Skully proposes that "illustrative coefficients" of the relative distorting effects of various policies would be:

- 1.0 for market price support (applied for dairy and sugar);
- 0.9 for payments based on current output (applied to price-linked and "other" product-specific AMS shown in Table 3.4);
- 1.3 for production-enhancing, non-land input-based payments (applied to non-product-specific AMS other than MLA and countercyclical payments and crop and revenue insurance subsidies);
- 0.4 for payments based on current area, animal numbers, revenue or income (A/An/R/I), applied to environmental payments for working lands and livestock operations, crop and revenue insurance subsidies and disaster payments;
- 0.1 for payments based on non-current A/An/R/I (applied to decoupled income support); and
- 0.05 for other, non-commodity payments (not included in our index).

FIGURE 3.2
Shifting corn supply curve

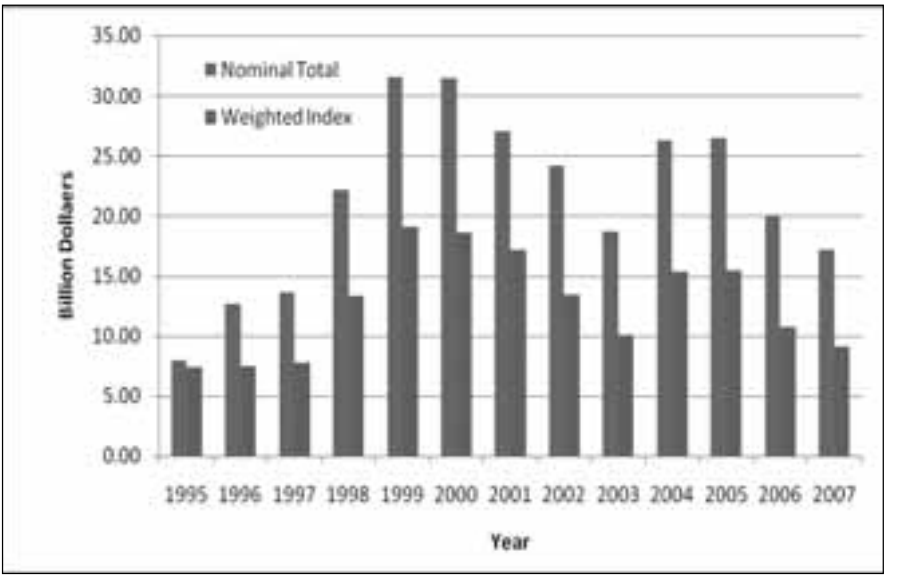


Source: Adopted and updated from Gardner (2009).

We also apply a weight of 0.25 to MLA and countercyclical payments, reflecting a distorting effect assumed to be somewhat larger than for fixed direct payments for the reasons discussed by Skully and above.

Figure 3.3 shows the aggregated nominal value of the included support and the distortion-effect index constructed for the U.S. over 1995-2007 using the assumed weights and the MPS and expenditures reported in the WTO notifications. The nominal total of support follows a generally similar pattern to the other measures shown in Table 3.6. Annual values are independent of a binary decision whether non-product-specific AMS exceeds the de minimis threshold (a factor affecting the measure "Total AMS+NPS (with DPs)" shown in the table). The nominal support values shown in Figure 3.3 also exceed those in the measures shown in Table 3.6 because additional support from the green box is included. The index dampens the values and variability of the nominal support. The two measures are similar in 1995 then a larger gap arises when PFC payments were introduced in 1996. The gap increases in 1998 and again in 1999 as MLA and other additional non-product-specific support was added. The gap narrows between 2000 and 2001 for multiple reasons: reductions in decoupled income support and disaster payments, and price-linked and emergency product-specific AMS, each explain about 40 percent

FIGURE 3.3
Nominal value and weighted distortion-effect index for U.S. domestic support



Source: Authors' calculations.

of the decline in the difference between the nominal value of the support and the weighted distortion-effect index with the remaining 20 percent due to lower MLA payments and crop and revenue insurance subsidies.

The value of the index also exceeds the U.S. notified Total AMS (Table 3.2) in all years. This difference increases through 2002 due to rising contributions to the index from green-box and non-product-specific components, then fluctuates from 2003-2007. Expenditures on the included environmental payments rise steadily but contribute only a small part of the index values. The index component from non-product-specific AMS declines after 2001. Variability in disaster relief expenditures dominates these two trends. Overall, were the index rather than Total AMS subject to the U.S. Uruguay Round commitment, its value just exceeds that limit in 1999 and comes within $1 billion in 2000, but otherwise is well within the commitment of $19.1 billion. The index is a useful overall indicator of the net distorting effect of U.S. support across various programs weighted by their relative distortionary effect. However, it does not provide evidence of the extent of distortion to production or prices in an absolute sense, since the effects of various programs are measured only relative to the effects of market price support.

3.3.4 Increasing productivity and efficiency

For the most part, the discussion above leaves out three components central to U.S. farm support: policies aimed at raising productivity (shown in the Gardner analysis to be critical to evaluating effects of support policies even over relatively short periods), conservation and environmental programs, and the recent expansion of support for ethanol production. Policies designed to increase productivity in U.S. agriculture center on the provision of public funding for agricultural research and extension, which is reinforced by private sector activities in these areas. Data on private sector research expenditures are difficult to obtain. However, according to estimates by USDA's Economic Research Service (ERS 2009a) the private sector's share of total agricultural research and development expenditure, which was less than 50 percent in the early 1970s, had risen to almost 60 percent by the late 1990s. In addition to the commercial return that may accrue from the development and diffusion of new products, such as seed varieties, investment in private sector research and development (R&D) is influenced by a generally favorable tax and regulatory environment in the United States.

There is some concern that the rate of innovation may be slowing in U.S. agriculture and that productivity growth has declined. Some recent data suggest nearly a halving in average annual productivity growth (to 1.11 percent from 1990-2002 compared to 2.01 percent from 1950 to 1989). Alston and Pardey (Farm Foundation 2007) attribute this drop in productivity growth to declining public-sector investment in agricultural research and redirection of that research from productivity to issues related to the environmental, health and food safety. Nevertheless, recent estimates by the ERS (2009b) indicate continued productivity growth. The data show that total factor productivity has tripled since 1948, increasing at an annual rate of 1.7 percent between 1999 and 2006. These figures tend to support the view that R&D policy for agriculture, broadly defined, continues to be successful in promoting increased productivity in the sector.

In addition to support for research and extension, government support for infrastructure, particularly transportation, is important for U.S. agriculture. Recent estimates indicate that this constitutes a major part of total federal government support for rural areas in the United States (Hill and Blandford 2008)[11]. The construction and maintenance of roads and highways and locks and dams for inland waterways are important in maintaining an efficient food and agricultural system by reducing input costs at the farm level and the cost of transporting agricultural commodities to markets.

[11] With the exception of some support provided for irrigation infrastructure, which is included as non-product-specific support, infrastructural support expenditures that benefit agriculture are not included in U.S. support notified to the WTO.

Public support for R&D and infrastructure enhances the international competitive position of U.S. agriculture. Even so, these forms of support are rarely criticized either domestically or internationally[12]. Most analysts would argue for the public good aspects of R&D and similar expenditures—that consumers in the United States and elsewhere are the ultimate beneficiaries and that many technological advances are ultimately transferred to other countries. With these public good dimensions, any competitive advantage accorded to U.S. agriculture is likely to be short term in nature. Increased productivity in the food system and lower distribution costs tend to translate into welfare-enhancing lower food prices.

One policy issue that arises is whether there is a causal linkage between U.S. farm support programs, particularly price and income support, and the adoption of new technology. The logic for such a linkage is that since support programs increase and stabilize the returns to farming, they may affect both the supply of new technology to the sector and the demand for such technology by the sector. There is certainly evidence that farmers are more willing to spend on inputs (particularly land and capital inputs, such as machinery) when their incomes are high. Many agribusiness firms that supply inputs to farmers have supported the continuation of commodity programs in recognition of this fact. However, as reviewed by Gardner (2002), the empirical evidence does not show a strong linkage between agricultural support policies and the adoption of new technology and the rate of technological change[13].

3.3.5 Addressing environmental objectives

There can be little doubt that many agri-environmental measures affect production. However, competing producers are unlikely to object to land-idling measures that reduce production levels, even though trade may strictly speaking be distorted as a result. In contrast, agri-environmental programs for working lands and livestock operations may increase output by helping farmers to use more intensive production methods while reducing the environmental footprint of their activities.

Central to the international policy debate on the use of agri-environmental payments is the extent to which these payments correct for market failure by internalizing externalities or promoting the supply of public goods. In as much as they achieve these goals, U.S. agri-environmental programs act to correct market

[12] A recent analysis of U.S. green-box expenditures was critical of the potential impact that R&D has on the international competitive position of U.S. agriculture (UNCTAD 2006).

[13] Ahearn et al. (2005), using panel data for farms in 48 states across four years from 1982 to 1986, find a small but statistically significant positive relationship between the amount of commodity payments received by farms and their total factor productivity. They find a much stronger relationship between state-level expenditures on R&D and productivity. Key et al. (2005) find that commodity payments tended to increase scale and farm size in U.S. agriculture over the period 1987-2002.

distortions, rather than creating them (Blandford 2006). Since the level of payment is typically related to the costs of correcting for market failure, it is difficult to talk about the distortionary impact of these policies since markets would be distorted in their absence. Still, the history of resorting to long-term land idling to prop up low market prices has to be taken into account. The current mix of policies probably does not achieve maximum environmental benefits for the level of expenditures made.

3.3.6 Ethanol

Issues related to ethanol subsidies and mandates are increasingly germane. The United States currently notifies its ethanol tax credits to the WTO as an industrial subsidy under the Subsidies and Countervailing Measures (SCM) Agreement, not as an agricultural subsidy. However, ethanol is included in the set of products defined as agricultural under the Uruguay Round agreements. The tax revenue forgone could be appropriately notified in the Total AMS on this basis. At issue would be whether the tax credit is a "measure directed at processors" that is subject to inclusion in the AMS under Annex 3 "to the extent that such measures benefit producers of the basic agricultural product." Because ethanol policies affect corn prices, the fuel blender's tax credit might alternatively be judged to be a measure directed at producers and affecting the price of corn as a basic agricultural product. This would correspond to the way the United States formerly notified Step 2 payments to processors of domestic cotton as part of the cotton product-specific AMS[14].

The use of mandates versus tax credits also raises an issue of what policies are judged included among "all of its domestic support measures in favour of agricultural producers" that are subject to disciplines under the Agreement on Agriculture. As shown by de Gorter and Just (2007), when there is no binding mandate, the tax credit adds substantially to the level of production of ethanol, its price, and the price and output of corn. When there is a binding mandate, the effects of the tax credit itself are minimal or zero. In the latter case, it is the binding mandate that has the main effect on ethanol and corn production and prices and, one can argue, should be disciplined under the AMS.

A few calculations from the simplified de Gorter and Just empirical model demonstrate the impact of ethanol policies. They examine the situation in 2006 with a base-scenario corn price of $3.03, corn production of 10.5 billion bushels, an ethanol price of $2.32, and ethanol use of 6.7 billion gallons. The base case incorporates the existing tax credits and assumes there is no binding mandate. The elimination of the tax credit results in a corn price of $2.29, corn production of 9.4

[14] While the Step 2 payments were eliminated after being found inconsistent with WTO rules in the Brazilian cotton case, the FCE Act created new subsidies to processors of both domestic and imported cotton. It will be interesting to observe how the United States next decides to report these subsidies to see whether an analogy between cotton processor subsidies and ethanol processor tax credits can continue to be drawn.

billion bushels, an ethanol price of $2.06, and zero domestic ethanol production. With a binding mandate to increase ethanol production by 3 billion gallons, the corn price rises to $3.55, corn production to 11.2 billion bushels, the ethanol price to $2.51, and ethanol use to nearly 10 billion gallons.

Beyond determining the effects of alternative ethanol policies there is again the question of who potentially suffers injury from these policies. Mandates and tax concessions themselves do not harm potential exporters of ethanol or corn. Instead, it is net food-importing countries or livestock producers facing higher costs that may be adversely affected. There is no remedy under the SCM Agreement for importers who are affected by higher world prices due to subsidy policies, so this agreement would not be applicable to disciplining ethanol subsidies and mandates except to the extent that world gasoline prices are depressed.

3.4 Future policy directions

Are there viable avenues for U.S. farm policy to become less distortionary than in the past given it rationale and goals, its specific programmatic components, and assessments of their effectiveness and distortionary effects? To address this question, we briefly examine the possible constraints on future domestic support (including the new ACRE program) under the WTO and the political economy of U.S. policy decision making.

3.4.1 WTO constraints

The WTO provides one set of possible constraints on U.S. policies. These constraints can be evaluated under the existing Agreement on Agriculture or under the December 2008 draft modalities in the Doha Round negotiations (WTO 2008). Either assessment rests on a projection of future market conditions and support expenditures. We utilize a spreadsheet-based domestic support simulator developed by Blandford and Josling (2007) to make these assessments. Projections were derived for the major categories in the U.S. notifications through 2016, using program parameters from the 2008 FCE Act and the USDA's commodity baseline for prices and quantities (USDA 2009). Despite the deep 2008-2009 recession, overall the commodity prices used in the projections are relatively high due to a range of factors, including domestic demand for biofuels and strong overseas demand for U.S. commodities resulting from income growth, dietary change, and a weak dollar.

Green-box support is projected to increase steadily from the last officially notified amount of $76 billion in 2007 to roughly $92 billion in 2016, primarily due to increased expenditures on domestic food assistance programs projected on the basis of their recent growth rates. Expenditures on agri-environmental programs are

projected to increase from a notified value of $3.8 billion in 2007 to over $6 billion in 2016. Our estimates incorporate continuation of fixed direct payments adjusted for possible participation in the ACRE program discussed below.

The projected product-specific AMS varies from year to year, but relatively high commodity prices foreseen by USDA and other analysts imply that the projected support expenditures for major crops are extremely modest, typically averaging less than $0.3 billion per year. The notified product-specific AMS commodity payments would qualify as *de minimis* if there are no ACRE state revenue guarantee expenditures. On the basis of these projections, the Total AMS (after *de minimis*) would amount to roughly $3.4 billion in 2016, composed entirely of market price support for dairy and sugar. This would leave an unused leeway of $15.7 billion under the current Total AMS commitment of $19.1 billion.

There are also only modest countercyclical payments for peanuts and more significant but declining payments for cotton with the commodity prices assumed in the projections. Crop and revenue insurance subsidies are expected to be relatively high, averaging roughly $4.7 billion per year[15]. The projected non-product-specific support averages roughly $5.0 billion annually. With a projected value of production of roughly $266 billion by 2016, this leaves room for about $8.5 billion of additional NPS spending without crossing the *de minimis* threshold. Thus, combined expenditures in the Total AMS (after *de minimis*) and NPS *de minimis* categories could increase by more than $24 billion in 2016 over their projected level without violating any U.S. Uruguay Round WTO obligations.

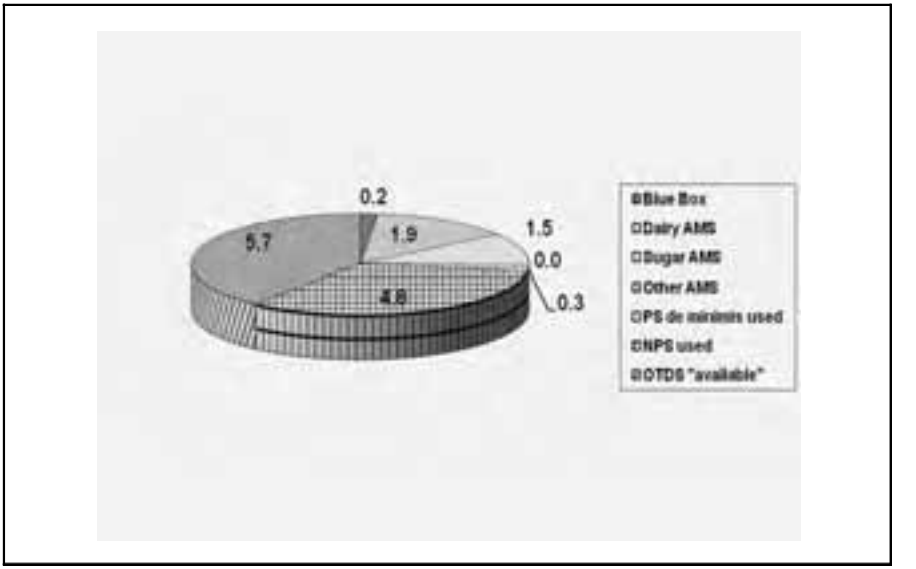
The strengthened disciplines of the Doha draft modalities would reduce the U.S. leeway for providing trade-distorting support. When fully phased in, which we assume in our analysis to occur by 2016, the Doha Round draft modalities imply a final U.S. Overall Trade Distorting Support (OTDS) constraint of just under $14.5 billion. A 60 percent reduction in the Total AMS commitment reduces its limit to $7.6 billion. The product-specific and non-product-specific *de minimis* thresholds would be reduced immediately from the current 5 percent to 2.5 percent of the value of production. Total blue-box payments would be limited to a maximum of $4.8 billion, with expansion of the eligibility criteria to include U.S. countercyclical payments. New product-specific AMS and blue-box caps would impose additional constraints. The product-specific AMS for cotton would be cut to roughly $143 million under special rules.

Figure 3.4 shows the projected blue-box, Total AMS, and product-specific and non-product-specific *de minimis* expenditures for 2016. Their sum is compared with the potential limit on OTDS by showing unused spending within that constraint.

[15] Subsidies were lower in 2007 despite relatively high prices because the loss ratio proved to be only 0.55. The loss ratio is assumed to be 1.0 each year for projected crop and revenue insurance subsidies.

FIGURE 3.4

Projected composition of support in 2016 and "available" OTDS (US$ billion)



Source: Authors' estimates.
Note: difference of sum in figure from OTDS limit is due to rounding error.

Sugar is the principal commodity that appears to pose a problem in terms of meeting the proposed U.S. commitments. Its projected AMS of $1.5 billion in 2016 exceeds the Doha draft modality cap on support for that commodity by almost $0.4 billion[16]. The projections also suggest that cotton countercyclical payments could cause the Doha blue-box cap on that commodity to be violated in some years[17].

More generally, with the relatively high projected prices there is still some flexibility for other forms of support. If the economic environment that is foreseen in USDA's price projections materializes, the projected support leaves room for various additional OTDS expenditures of $5.7 billion. More than half of the estimated latitude available reflects the redefinition of the dairy support program in the FCE Act, which is assumed to reduce the projected dairy AMS by as much

[16] The inclusion of a provision in the 2008 FCE Act to divert government purchases of sugar to the production of ethanol opens up the possibility that the sugar program (or some part of it) could be defined as a bioenergy program. This might also be used to relieve any pressure on sugar protection that arises from product-specific domestic support constraints or changes in market access (tariffs and TRQs) under a new WTO agreement.

[17] These results assume the U.S. does not exercise an option to increase its blue box product-specific caps by reducing its product-specific AMS caps. See Blandford and Orden (2008) for discussion of this option.

as $3.6 billion. Otherwise, the projected U.S. dairy market price support would exceed the final product-specific cap under the proposed rules and would nearly exhaust the final proposed U.S. Total AMS commitment in 2016. Dairy support prices were temporarily increased by about 15 percent in July 2009 and milk market loss contract payments were expected to exceed $1 billion for that year. Without the redefinition of dairy support in 2008 the U.S. would likely have exceeded the proposed Doha binding if it had been fully implemented in 2009. The temporary increase in support prices would have made the excess larger. With the redefinition of dairy market price support in the FCE Act, the U.S. is able to increase support prices and market loss payments for dairy products (as in 2009) under the Doha rules without violating its commitments, assuming relatively high projected prices for other commodities materialize.

The continuation of current legislation with relatively high prices leaves room in our assessment for 2016 for the U.S. to raise various target prices or loan rates, increasing blue-box or product-specific AMS expenditures from projected levels of $0.2 billion and $3.4 billion, respectively, to the limits of $4.8 billion and $7.6 billion, providing that support remained under product-specific caps for each commodity. However, pushing both of these categories of support to their limits simultaneously would reduce allowed *de minimis* NPS support to only about $2 billion given the OTDS commitment, which is less than the projected NPS support level. An alternative would be to expand the use of non-product-specific support up to the limit imposed by the *de minimis* threshold of $6.6 billion in 2016, which would leave room for product-specific AMS and blue-box support totaling $7.9 billion. The product-specific constraints under the Doha Round draft modalities could impose some additional limits beyond the flexibility at the aggregate level. As noted, sugar poses problems for the product-specific AMS commitment even if world sugar prices are high because of the way MPS is calculated and notified. The stringent modalities for cotton create an issue in terms of meeting blue-box commitments, particularly if projected high cotton prices do not materialize. Other product-specific caps, such as the AMS for corn, would limit expenditures to levels well below those observed in the current decade.

3.4.2 The new ACRE program

ACRE state revenue guarantee payments triggered by market variability could affect the assessment of the possible effects of strengthened Doha Round disciplines on U.S. domestic support shown in Figure 6. The optional ACRE program only makes payments when revenue in a state for a crop falls below a moving average of past levels. ACRE payments can be triggered by a decline in the U.S. price, state yields, or a combination of the two[18]. Price and yield projections largely reflect recent trends and exhibit limited variability, so ACRE payments tend not to be triggered in the

[18] Payments to individual farms also depend on those farms demonstrating a loss of revenue.

projections, but historical data for prices and yields inevitably prove more variable. The level of state revenue guarantee payments will depend on the levels of per-acre crop revenue in the reference period, revenue variability from its initial values, and the percentage of farmers signing up for the ACRE program in place of the more traditional support options.

The potential magnitude of ACRE payments is illustrated for corn, soybeans and wheat by Zulauf and Orden (2009). Assuming for illustration that all acreage were enrolled in the ACRE program, they examine the annual payments that would have been made during 1996-2006 given prices, yields and acreage of that period and compare those payments to the expenditures made under the actual programs in effect. They then apply the same sequence of percentage variations in prices, yields and acres to the higher revenues forecast by USDA for the 2009-2012 crops and examine ACRE payments from this higher revenue base if the variability of the 1996-2006 period were repeated. The 1996-2006 period includes sharp declines from initial high prices totaling 44 percent for corn (1995-1999), 40 percent for soybeans (1996-2001), and 45 percent for wheat (1995-1999). Yields per planted acre were calculated for 42 states individually, accounting for over 99 percent of U.S. acres planted to the three crops.

Aggregate results for the two periods are shown in Table 3.7. Had corn, soybean and wheat acreage all been in an ACRE program during 1996-2006 instead of the programs that existed, there would have been no loan-rate-related price support payments and fixed direct payments of $34 billion for these three crops would have been 20 percent lower than they were. The state revenue guarantee payments would have totaled $15.6 billion. The bulk of the guarantee payments would have occurred when prices fell during 1997-1999. A marked difference between the ACRE program and the existing programs is that countercyclical and price support payments for corn totaled $12.8 billion during the 2004 and 2005 crop years because of relatively low prices. Corn yields were also relatively high in this period and revenue did not decline sharply. Had all acreage been in ACRE, the state revenue guarantee payments for corn would have been only $0.5 billion for these years. Overall, had ACRE been the support program, and had Congress not enacted additional support, total payments would have been $49.6 billion compared to $90.2 billion that occurred under programs actually in place[19].

Payments under ACRE are higher when the variations from 1996-2006 are applied to forecast average prices, yields and acreage for 2009-2012. With higher prices and yields compared to the earlier period, crop revenues were projected to be 50 percent to 90 percent higher per acre. ACRE payments are larger when

[19] Of course, farmers anticipating these lower payments would not have opted for an optional ACRE program in 1996-2006, but the point here is to illustrate the hypothetical levels and timing of payments had such a program been the only support option.