The Revenue Program Option in the 2008 U.S. Farm Bill: Evaluating Performance Characteristics of the ACRE Program

Carl Zulauf and David Orden

Had only a farm program like the new ACRE state revenue program existed instead of the authorized 1996–2008 programs for corn, soybeans, and wheat, farm support expenditures would have occurred earlier but totaled less. In contrast, at the higher prices forecast for the three crops over the 2009–2012 crop years, spending per acre is expected to be higher for acres enrolled in the ACRE program than for acres enrolled in the traditional programs. These results reflect the different design features of the two programs: revenue versus price assistance and assistance levels that adjust with lagged market revenue versus fixed nominal support triggers. The design issues and policy questions raised for both domestic policy considerations and WTO compliance are discussed.

Key Words: farm policy, Food Conservation and Energy Act of 2008, Average Crop Revenue Election Program (ACRE), WTO domestic support commitments

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) provides farm commodity program participants with the choice of a traditional suite of fixed direct payment, marketing loan, and price counter-cyclical programs or a new Average Crop Revenue Election (ACRE) program suite. The ACRE suite, which was authorized for the 2009–2012 crop years, consists of (i) 80 percent of the traditional program's direct payments, (ii) marketing loans at 70 percent of the traditional program's loan rate, and (iii) a new state revenue program. Thus, the revenue program replaces the counter-cyclical program and substitutes for lower direct payments and loan rates.

Revenue programs have been discussed for decades (Harrington and Doering 1993) but ACRE is the first such program authorized by a farm bill. Another policy innovation is that, unlike the marketing loan and counter-cyclical programs which have fixed support triggers, ACRE's revenue risk assistance level (the annual trigger for ACRE payments) adjusts to changes in market revenue over time since it is set using moving averages. This innovation implies that ACRE does not create a floor under revenue. On the other hand, the high market revenues since 2006 will translate into a high initial ACRE revenue risk assistance level, which, everything else constant, increases the likelihood of payments from the ACRE revenue program compared to the traditional programs. More specifically, prices will have to decline by a greater proportion before marketing loan and counter-cyclical payments occur under the 2008 Farm Bill.

U.S. farm programs must meet not only domestic needs but also World Trade Organization (WTO) rules on agricultural domestic support policies. Because ACRE revenue payments are tied to current planted acres and market revenue, it is likely that the United States will classify them as product-specific measures within its Aggregate Measurement of Support (AMS). In contrast, a guiding

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principle during the as-yet-inconclusive Doha Round of negotiations has been to constrain expenditures on policies tied to current production and prices, while encouraging movement to policies decoupled from production decisions and market conditions. For example, the current draft Doha text implies that permitted U.S. annual support as notified in its annual Current Total AMS (CTAMS) would decrease to $7.6 billion (from the current ceiling of $19.1 billion) and new product-specific AMS caps would be imposed (WTO 2008). The ACRE program raises questions regarding compliance with these potential U.S. WTO commitments.

Under the 2008 Farm Bill, farmers and landowners have a choice between the traditional farm program suite and the ACRE farm program suite. For the first year that the ACRE program suite was available, preliminary sign-up results in 2009 indicated that for the three largest-acreage eligible crops the shares of corn, soybean, and wheat base acres enrolled in ACRE was 15.6 percent, 15.3 percent, and 12.7 percent, respectively (USDA 2009a). The sign-up decisions of farmers and landowners reflect their weighing of the trade-off of reduced direct payments and lower loan rates in exchange for eligibility for the revenue risk assistance payments in the context of their farm's situation and their anticipation of future market conditions. While not large, the initial double-digit sign-up rates for these large-acreage crops is likely high enough that ACRE or similar programs will remain part of the debate about farm policy in the coming years. For this reason, understanding the performance characteristics of this new program design versus the traditional programs is important.

In this article, we contrast and compare the differences in the level and temporal flow of payments by the ACRE and traditional program suites as alternative policy designs for corn, soybeans, and wheat. First, we conduct a historical, counterfactual analysis of the payments that the ACRE program suite would have made had it existed in place of the traditional programs suite during the 1996–2008 crop years. These counterfactual ACRE payments are compared with actual payments made to farmers during these crop years. Second, we forecast payments to corn, soybeans, and wheat by the traditional and ACRE suites over the 2009–2012 crop years.

In keeping with our objective to examine the performance characteristics of the two farm program suites as alternative policy designs, we assume for both the historical and forecast analysis that all acres of the three crops are either in the traditional suite or in the ACRE suite. Our objective is not to model the sign-up decisions of producers. Actual expenditure on farm programs over the 2009–2012 crop years will depend on the sign-up decision as well as the cost of each program option. Estimates of these expenditures can be derived from our results by parametrically applying the initial or other assumed future sign-up rates.

The next two sections of this article contain a discussion of the policy foundations of the ACRE program and the ACRE provisions in the 2008 Farm Bill. Parameters and procedures of the two analyses are then presented, followed by a discussion of the results for U.S. support payments and their implications under existing and potential U.S. WTO commitments. A concluding section summarizes and highlights some policy design issues raised by our analysis.

Current Programs versus ACRE Programs

Current farm programs provide three types of support: fixed direct payments, marketing loan payments, and counter-cyclical payments. Direct payments are a specific dollar amount per historical base acre. The dollar amount does not change with market prices or with the level of production, and thus the United States notifies these payments to the WTO under the Green Box.[1]

The policy objective of the marketing loan and counter-cyclical programs is to assist farmers with managing the systemic (i.e., market) risk of low prices that can last from one year to an extended period of years. This objective is implemented through fixed marketing loan and counter-cyclical support rates. Payments occur if market price drops below the support rate, which thus becomes a floor on the per unit value of a crop. Marketing

[1] Expenditures classified in the Green Box are exempt from the Uruguay Round limit on CTAMS if a program meets certain criteria defining it to be at most minimally distorting to trade. Expenditures in the Blue Box are exempt from the limit on CTAMS because they are associated with production-restricting programs. In addition, the *de minimis* criteria exempt support for specific commodities and for a single non-product-specific category from the CTAMS if it is less than 5 percent of the value of production.

loan payments are based on current production and prices, and thus are coupled under WTO rules and notified as product-specific AMS. Counter-cyclical payments are based on current prices but historical production. The United States currently classifies them in its non-product-specific AMS.

The policy objective of the ACRE revenue program is to assist farmers with managing the systemic risk of a decline in crop revenue that can extend from one to a short period of years, but to avoid creating a floor (Zulauf, Dicks, and Vitale 2008). Revenue is defined as the product of U.S. crop (marketing) year season average cash price received by farmers and the state yield per planted acre. A state revenue payment becomes available for a crop when actual state revenue is less than the state's revenue risk assistance level. Because ACRE's risk assistance level is calculated using moving averages of lagged U.S. prices and state yields, its risk assistance level increases (decreases) over consecutive years as market revenue increases (decreases). Thus, no floor exists on revenue. However, ACRE can provide assistance when revenue declines but prices remain above the fixed marketing loan and counter-cyclical support prices.

ACRE Program Provisions

The decision to elect ACRE begins with covered crops harvested in 2009 (USDA 2009a, U.S. Congress 2008). There are 22 covered crops, including barley, corn, upland cotton, oats, peanuts, sorghum, soybeans, and wheat. ACRE must be elected for a farm unit as recorded at the Farm Service Agency (an FSA farm); if no choice is made, the FSA farm remains in the traditional farm program suite. As long as an FSA farm is not in ACRE, the election of ACRE remains open. Once ACRE is elected, the FSA farm is enrolled through the 2012 crop. ACRE must be elected for all covered crops grown on the FSA farm; however, ACRE payments are crop-specific.

An ACRE revenue payment can occur if a state's actual revenue per planted acre is less than the state's revenue risk assistance level per planted acre for a crop for a crop year.

(1) ACRE revenue risk assistance level[2] per planted acre for state j, crop s, and crop year t = {0.90 × [Olympic average yield per planted acre for 5 most recent prior crop years$_{j,s,t}$] × [average U.S. cash price for 2 most recent prior crop years$_{s,t}$]}

(2) ACRE actual state revenue per planted acre for state j, crop s, and crop year t = {[yield per planted acre$_{j,s,t}$] × [higher of U.S. average price$_{s,t}$ or 70 percent of U.S. marketing loan rate$_{s,t}$]}.

ACRE's revenue risk assistance level cannot increase more than 10 percent from the prior year's level (called a cap) nor can it decrease more than 10 percent from the prior year's level (called a cup). The 10 percent cup, along with the use of historical moving averages, means that ACRE should provide farmers a longer period of time than the market provides to adjust to large, unexpected declines in market revenue. But, since there is no floor, farmers eventually have to adjust to lower market revenue if it persists over several years.

An FSA farm eligibility condition also exists. Specifically, an FSA farm's actual revenue must be less than the FSA farm's benchmark revenue for the crop.

(3) ACRE benchmark revenue per planted acre for FSA farm i for crop s and crop year t = {[Olympic average of FSA farm's planted yield for 5 most recent prior crop years$_{i,s,t}$] × [average U.S. cash price for 2 most recent prior crop years$_{s,t}$] + [FSA farm's per acre insurance premium$_{i,s,t}$]}

(4) Actual revenue per planted acre for FSA farm i for crop s and crop year t = {[FSA farm's yield per planted acre$_{i,s,t}$] × [U.S. average price$_{s,t}$]}.

An ACRE revenue payment is made to an FSA farm for an eligible crop when both the state payment condition is met and the FSA farm eligibility condition is met. A state's ACRE revenue payment per planted acre is capped at 25 percent of the state's risk assistance level.

(5) ACRE revenue payment for eligible FSA farm i in state j for crop s and crop year

[2] Separate revenue risk assistance levels exist for irrigated and non-irrigated land if at least 25 percent of a state's planted acres are irrigated and at least 25 percent are non-irrigated.

t = {[83.3 percent of FSA farm's planted acres$_{i,s,t}$ (becomes 85 percent for 2012 crop)] × [lesser of (ACRE state revenue risk assistance level per planted acre$_{j,s,t}$ minus state actual revenue per planted acre$_{j,s,t}$) or (25 percent of ACRE state revenue risk assistance level per planted acre$_{j,s,t}$)] × [(FSA farm's Olympic average yield for 5 most recent prior crop years$_{i,s,t}$) / (state's Olympic average yield for 5 most recent prior crop years$_{j,s,t}$)]}.

While ACRE revenue payments to an FSA farm depend on the acres planted to each eligible crop, an FSA farm cannot receive ACRE revenue payments on more acres than the FSA farm's total base acres. For most eligible crops, planted acres align with the conventional definition. However, for barley, corn, oats, sorghum, and wheat, FSA defined planted acres as harvested acres plus acres reported as failed acres to FSA. Failed acres are acres that were intended for harvest but were not actually harvested.

For each payment entity, ACRE fixed direct payments cannot exceed $32,000, or 20 percent less than the $40,000 limit for traditional program direct payments. For each payment entity, ACRE state revenue payments cannot exceed $65,000, the limit on counter-cyclical payments, plus the amount equal to the payment entity's 20 percent reduction in direct payments. The 2008 Farm Bill removed payment limits on the marketing loan program.

Analytical Procedures

The historical, counterfactual analysis was conducted beginning with the 1996 crop year. The Federal Agriculture Improvement and Reform Act of 1996 (1996 Farm Bill) eliminated annual land set-asides; gave farmers additional flexibility to make planting decisions, except for restrictions on planting fruits, vegetables, and wild rice on base acreage; eliminated most public stocks programs; and instituted fixed income payments (Nelson and Schertz 1996). These changes substantively altered the structure of farm support programs and had implications for their impact on production decisions and market prices (Orden, Paarlberg, and Roe 1999, Schertz and Doering 1999). Thus, the 1996 and later crop years are more representative of current crop production incentives and market conditions than years prior to 1996. The historical, counterfactual analytical period ended with the 2008 crop year, the latest year for which information was available on final prices, yields, and acres, and the last year for which ACRE was not available as a support option.

Direct income, marketing loan,[3] counter-cyclical, market loss, and oilseed programs made payments to corn, soybeans, and wheat over the 1996–2008 crop years (USDA 2009b). The direct income payment and marketing loan programs were included in the 1996 and subsequent farm bills. In response to large declines in farm prices and incomes, Congress instituted on an *ad hoc* basis market loss payments for corn and wheat for the 1998–2001 crop years and oilseed payments for soybeans for the 1999 and 2000 crop years. These programs became the counter-cyclical program in the Farm Security and Rural Investment Act of 2002 (USDA 2008).

For the counterfactual analysis, ACRE state revenue payments were calculated for corn for grain,[4] soybeans, and wheat using observed U.S. crop year cash prices, state production, state planted acres for soybeans, and state harvested acres plus state FSA failed acres for corn for grain and wheat.[5] Information was available for states that accounted for over 99 percent of U.S. corn, soybean, and wheat production (USDA 2009d). Data started with the 1991 crop year in order to construct the 5-year Olympic moving average of state yields for 1996. We contrast the estimated counterfactual payments assuming all corn for grain, soybean, and wheat acres were enrolled in the ACRE program with the actual payments made by the traditional programs during the 1996–2008 crop years.

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[3] Loan deficiency and market loan loss payments compose marketing loan payments.

[4] Corn harvested as silage is eligible for farm programs and thus for election into ACRE. However, to simplify the calculations, the analysis was conducted only for corn harvested for grain. Over the 1996–2008 crop years, harvested plus failed corn silage acres averaged 6.1 million acres, while harvested plus failed corn for grain acres averaged 71.9 million acres. Corn for silage acres averaged 7.8 percent of all corn acres over the 1996–2008 crop years.

[5] Failed acres were obtained from the Farm Service Agency. The first available crop year was 1995. For the 1991–1994 crop years, failed acres were estimated for state s and year t using the following linear regression and the data available for the 1995–2008 crop years: Failed acre$_{s,t}$ = f (planted acres$_{s,t}$ – harvested acres$_{s,t}$).

The second part of our analysis is a forecast comparison for the 2009–2012 crop years. As with the counterfactual analysis, the primary objective is to compare payments for the traditional suite of farm programs and the ACRE suite of farm programs assuming only one suite or the other is available. The forecast analysis is centered on the USDA forecasts of national U.S. acres, prices, and yields for the 2009–2012 crops (USDA 2009c). Payments are estimated for both the traditional suite of programs and the ACRE suite of programs.

In our analysis, U.S. yield per planted acre for soybeans for crop year t was calculated as [(forecast U.S. production$_t$) / forecast U.S. planted acres$_t$)]. For corn and wheat, U.S. yield per planted acre for crop year t was calculated as {[forecast U.S. production$_t$] / [forecast U.S. harvested acres$_t$ × (U.S. failed plus harvested acres in 2004–2008 / U.S. harvested acres in 2004–2008)]}. The U.S. forecasts for acres, prices, and yields for crop year t were turned into forecasts for individual states as follows: {U.S. forecast acres$_t$ (or prices$_t$ or yields$_t$) × [(average state acres (or price or yield) for 2004–2008) / (average U.S. acres (or price or yield) for 2004–2008)]}. These forecasts are the baseline values for each crop year. The forecast U.S. prices, state acres, and state yields are used to estimate ACRE state revenue payments. The forecast U.S. prices and forecast state prices are used to estimate counter-cyclical and marketing loan payments, respectively.

For the 2009 crop year, the ACRE state revenue risk assistance levels announced by the FSA (USDA 2009a) are used. The risk assistance levels are then updated for the 2010 through 2012 crop years, using the USDA forecast of U.S. price and the state yield forecasts derived from the USDA forecasts of U.S. yield.

Figure 1 presents the U.S. average crop year prices of corn, soybean, and wheat for the 1991–2008 crop years as well as the prices forecast by USDA for the 2009–2012 crop years. Also shown in Figure 1 is the gross revenue per acre obtained by multiplying the U.S. average crop year price by the U.S. average yield per planted acre for each crop. Over the 2009–2012 forecast period, there is a slight downward trend in corn price and revenue. After a one-year decline from 2008 to 2009, soybean and wheat prices and revenue decline slightly or are stable. Thus, the USDA forecasts reflect a continuation of the increased levels of prices and revenue that occurred during 2007 and 2008. However, prices and revenue are unlikely to remain as smooth as forecast by USDA.

We incorporate this uncertainty about prices and revenue for 2009–2102 into our analysis as follows. Percentage deviations of state planted acres, state yield per planted acre, and U.S. crop year price are calculated for each crop year from 1996 through 2006 relative to the moving average for the prior five years (e.g., the difference of the U.S. average price for crop year t from the average of the U.S. prices for crop years $t-1$ to $t-5$ is expressed as a percentage, and likewise for yields and acreage). These calculations result in 11 sets of percentage deviations which are applied to the USDA forecast of U.S. prices and the forecasts derived for state acres and yields for each crop year from 2009 through 2012. ACRE state revenue payments, as well as marketing loan and counter-cyclical payments, are estimated for each set of percentage deviations.

The averages of the 11 estimates of payments are the forecasted mean expenditures on the farm program for the given crop year in our analysis, assuming the benchmark USDA forecasts for the crop year, the historically observed percentage deviations for crop years 1996 through 2006, and that all acreage is enrolled in the specific program. The mean values of our forecast prices and revenue remain essentially at the levels of the USDA forecasts, but our estimates of the average level of farm support reflect the variability that would result from the applied sets of percentage deviations around the initial forecasts.

The percentage deviations for the 2007 and 2008 crop years are not included in the sets of deviations affecting the forecasts. The prices of corn, soybeans, and wheat were substantially higher during these two crop years than during the 1996–2006 period (Figure 1). Including the large percentage increase in prices for the 2007 and 2008 crop years would have increased the average percentage deviation (taking upward and downward price movements into account) of U.S. price from the one to two percent range for the 1996–2006 period to the nine to twelve percent range for the 1996–2008 period. Thus, including the percentage increases for 2007 and 2008 would have resulted in a mean price forecast across the sets of percentage deviations that would

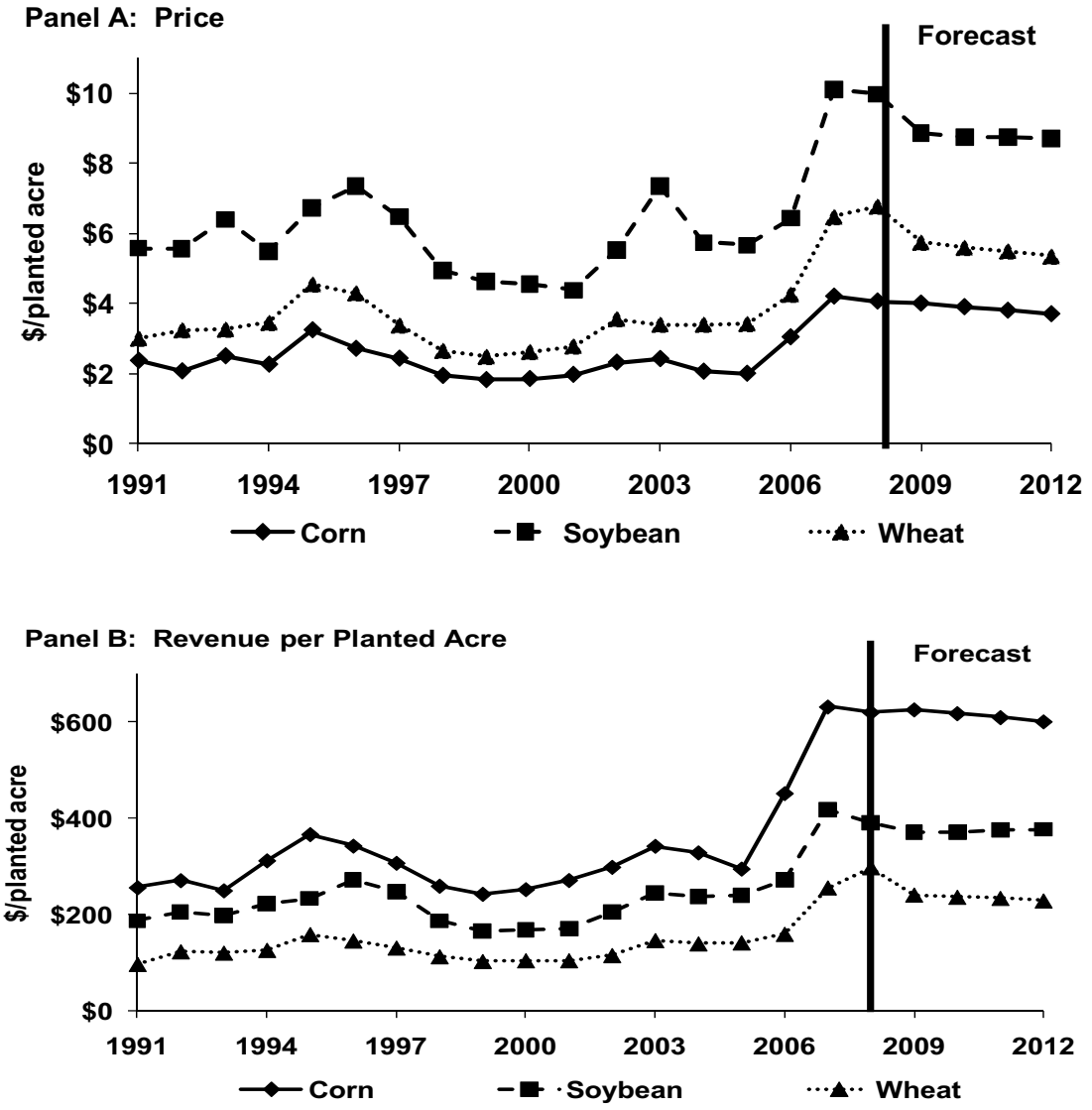


Figure 1. Price and Revenue per Planted Acre for Corn, Soybeans, and Wheat (U.S., 1991–2012 crop years)

Notes: For soybeans, planted acres are the conventional definition. However, for corn and wheat, the U.S. Department of Agriculture's Farm Service Agency (FSA) defined planted acres as harvested acres plus acres reported as failed acres to FSA. Failed acres are acres that were intended for harvest but were not actually harvested.

Sources: U.S. Department of Agriculture (USDA 2009d) and authors' original estimates.

have exceeded the USDA price forecast for the crop year.

The historical and forecast analyses do not include three constraints on ACRE state revenue payments: (i) the ACRE payment limit per legal entity, (ii) the ACRE FSA farm eligibility condition, and (iii) the restriction that an FSA farm cannot receive ACRE revenue payments on more planted acres than the FSA farm's total base acres. These constraints were not implemented because

of the lack of farm-level data needed to parameterize them. As a result, the analysis provides an upper-bound estimate on ACRE revenue payments for corn for grain, soybeans, and wheat.

Results

Counterfactual Historical Analysis

Had only the ACRE farm program suite been available for corn, soybeans, and wheat instead of the traditional program suite over the 1996–2008 crop years, total expenditures would have been 44 percent lower for the ACRE suite (Table 1). ACRE made $10 billion less in fixed direct payments, reflecting the 20 percent reduction. ACRE's 30 percent lower loan rates were estimated to eliminate all marketing loan payments, as the market prices observed for all crops, years, and states were above the ACRE marketing loan rates. In contrast, payments by the authorized marketing loan program totaled $27.7 billion to corn, soybeans, and wheat. ACRE state revenue payments were estimated to total $14.6 billion for the three crops combined, 69 percent less than the $47.8 billion in combined marketing loan, market loss, oilseed, and counter-cyclical payments actually made. By crop, total ACRE program payments (including fixed direct payments) were estimated to be 51 percent, 38 percent, and 32 percent less for corn, soybeans, and wheat, respectively, than total farm program payments actually made for the 1996–2008 crop years. Figure 2 presents the total annual payments by the farm programs authorized by Congress and the estimated annual payments that would have been made by the ACRE program suite.

A concern has been raised that ACRE can result in large government expenditures if a sharp decline in price occurs. Such an event occurred during the mid- to late 1990s (Figure 1). From the peak annual price to the low annual price, declines totaled 44 percent for corn (1995–1999), 40 percent for soybeans (1996–2001), and 45 percent for wheat (1995–1999). U.S. season average price declined by over 20 percent from the previous year's season average price in 1997 (wheat) and 1998 (corn, soybeans, and wheat). In addition, annual price declines of at least 10 percent occurred in 1996 (corn) and 1997 (corn, soybeans). These price declines were caused by an increase in production, due in part to an increase in corn and wheat yields from the below trendline yields of 1995 and in part to the elimination of annual acreage set-asides and increased planting flexibility authorized by the 1996 Farm Bill. In addition, demand was adversely affected by the Asian financial crisis that emerged during the fall of 1997.

For the 1996 through 1998 crop years, the counterfactual ACRE state revenue payments were estimated to total $3.2 billion for corn, $2.3 billion for soybeans, and $2.0 billion for wheat, as shown in the annual expenditures in Figure 3. In comparison, marketing loan payments, the only price program authorized by the 1996 Farm Bill, totaled $1.5 billion for corn, $1.2 billion for soybeans, and $0.5 billion for wheat. Across all three crops, estimated ACRE state revenue payments were 2.3 times higher than actual marketing loan payments during the 1996–1998 crop years. ACRE state revenue payments were larger because ACRE uses a two-year moving average of prices in determining its state revenue risk assistance level and because U.S. crop year prices during the 1995, 1996, and 1997 crop years were much higher than the loan rates fixed in the 1996 Farm Bill. Hence, prices had to decline further to trigger marketing loan payments than they did to trigger ACRE state revenue payments.

The limited risk assistance provided by the marketing loan program was a key reason that Congress authorized market loss payments beginning with the 1998 crop for corn and wheat and oilseed payments beginning with the 1999 crop for soybeans[6]. Market loss payments continued for corn and wheat through the 2001 crop, while oilseed payments for soybeans ended with the 2000 crop. Over the entire 1996 through 2001 crop year period, estimated ACRE state revenue payments to corn, soybeans, and wheat totaled

[6] The counter-cyclical program did not exist until the 2002 crop year. To provide perspective on what counter-cyclical payments might have been during the 1996–2001 crop years, a counterfactual analysis was conducted. Counter-cyclical program parameters for the 2002 crop year (base acres, base yield, target prices, and loan rates) were assumed for the earlier crop years. No counter-cyclical payments were estimated for the 1996 and 1997 crop years. However, maximum counter-cyclical payments were estimated for corn, soybeans, and wheat for each of the 1998–2001 crop years because, for these years, the U.S. crop year average cash price was below the U.S. loan rate. In total for 1998–2001, estimated counter-cyclical payments exceeded actual market loss (oilseed) payments: $11.6 versus $8.6 billion for corn, $2.2 versus $1.3 billion for soybeans, and $5.1 versus $4.9 billion for wheat.

Table 1. Total Payments by the ACRE Farm Program Suite and the Traditional Farm Program Suite for Corn, Soybeans, and Wheat (U.S., 1996–2012 crop years)

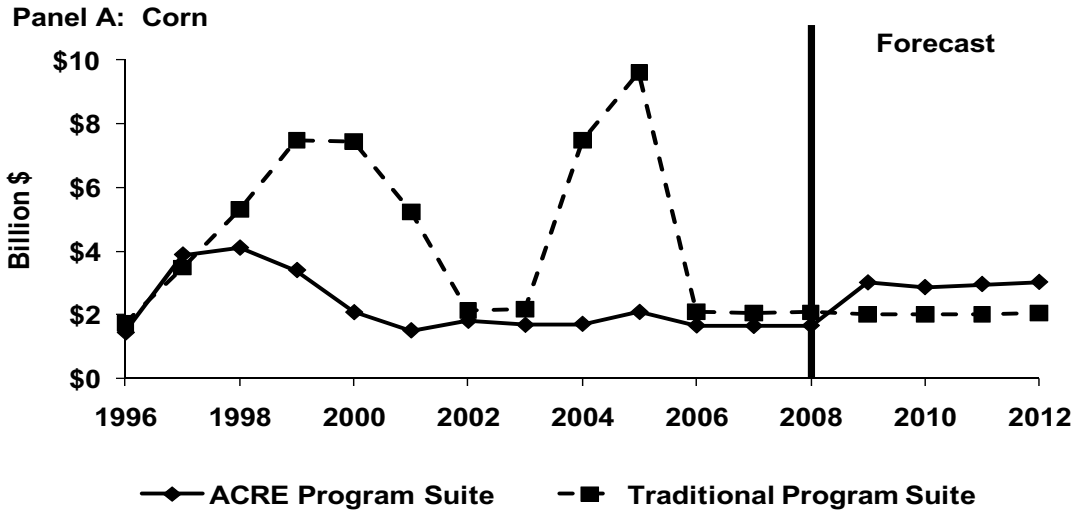
	Billion $			
Farm Program	Corn	Soybeans	Wheat	Total
PANEL A: TOTALS FOR 1996–2008 CROP YEARS				
Traditional suite of programs (actual payments)				
Direct payments	$29.2	$4.1	$16.6	$49.9
Marketing loan	$15.2	$9.9	$2.6	$27.7
Counter-cyclical/market loss/oilseed	$13.9	$1.3	$4.9	$20.1
Total	$58.3	$15.3	$24.1	$97.7
ACRE suite of programs (counterfactual estimates)				
Direct payments	$23.3	$3.3	$13.3	$39.9
Marketing loan	$0.0	$0.0	$0.0	$0.0
State revenue	$5.3	$6.2	$3.1	$14.6
Total	$28.6	$9.5	$16.4	$54.5
PANEL B: TOTALS FOR 2009–2012 CROP YEARS				
Traditional suite of programs				
Direct payments	$8.1	$2.3	$4.3	$14.7
Marketing loan	$0.0	$0.0	$0.0	$0.0
Counter-cyclical	$0.0	$0.0	$0.0	$0.0
Total	$8.1	$2.3	$4.3	$14.7
ACRE suite of programs				
Direct payments	$6.5	$1.8	$3.5	$11.8
Marketing loan	$0.0	$0.0	$0.0	$0.0
State revenue	$5.4	$5.8	$2.3	$13.5
Total	$11.9	$7.6	$5.8	$25.3

Sources: Payments by the traditional suite of farm programs for crop years 1996–2008 are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency (USDA 2009b). Payments by the ACRE suite of farm programs for all crop years and by the traditional suite of farm programs for crop years 2009–2012 are authors' original estimates.

$13.7 billion, less than the $14.8 billion in combined market loss and oilseed payments and less than the $19.5 billion in combined marketing loan payments.

Thus there are differences in the timing and the total level of payments between a counterfactual ACRE program suite and the traditional programs during 1996–2001. Over the 1996–2001 crop years, 55 percent of estimated ACRE state revenue payments occurred during the 1996–1998 crop years. ACRE revenue payments began to decline in the 1999 or 2000 crop year as its state risk assistance levels began to decline to reflect the decline in market revenue that was occurring. In contrast, over the 1996–2001 crop years, 55 percent of marketing loan, market loss, and oilseed payments occurred during the 2000 and 2001 crop years.

One other notable policy event during the historical analysis period was the $12.9 billion in marketing loan and counter-cyclical payments made to corn during the 2004 and 2005 crop years. These payments accounted for 44 percent of all marketing loan, counter-cyclical, and market loss payments to corn over the 1996–2008 crop years. In contrast, estimated counterfactual ACRE state revenue payments for corn totaled only $0.4 billion for the 2004 and 2005 crop years. The reason for the low ACRE payments was high yields during these years. For the United States, corn yield was a then record 160 bushels



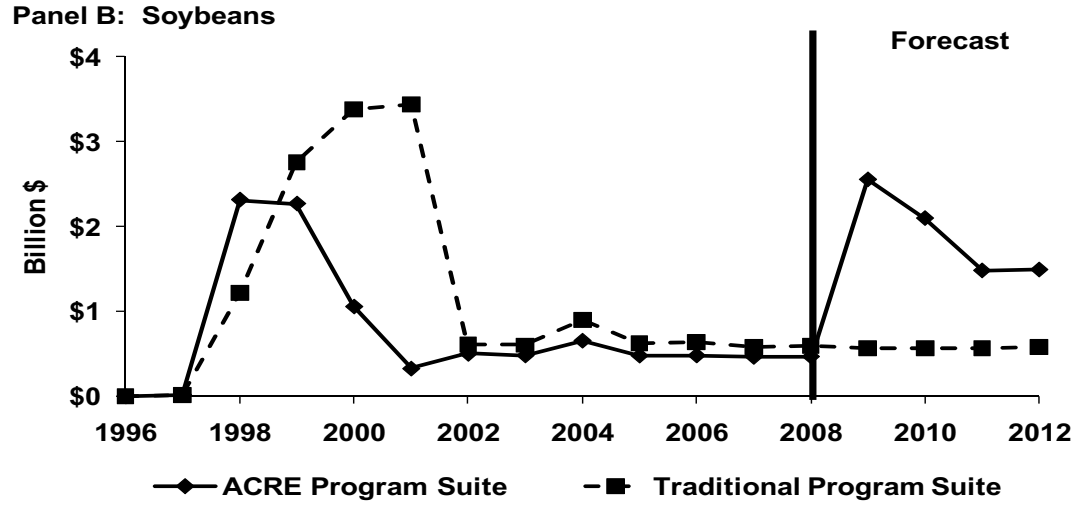


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Figure 2. Annual Total Payments by the ACRE Farm Program Suite and the Traditional Farm Program Suite for Corn, Soybeans, and Wheat (U.S., 1996–2012 crop years)

Sources: Payments by the traditional suite of farm programs for crop years 1996–2008 are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency (USDA 2009b). Payments by the ACRE suite of farm programs for all crop years and by the traditional suite of farm programs for crop years 2009–2012 are authors' original estimates.

per planted acre in 2004 and a relatively high 148 bushels in 2005. Because ACRE is a revenue program, yields are incorporated into its calculation of assistance payments. In short, this policy event illustrates the important role that yield deviations play in determining payments from the ACRE revenue program.

Forecast Analysis

Prices forecast by USDA for crop years 2009–2012 are substantially above the loan rates and target prices specified in the 2008 Farm Bill for corn, soybeans, and wheat. The average value of the 11 percent deviations for U.S. season average

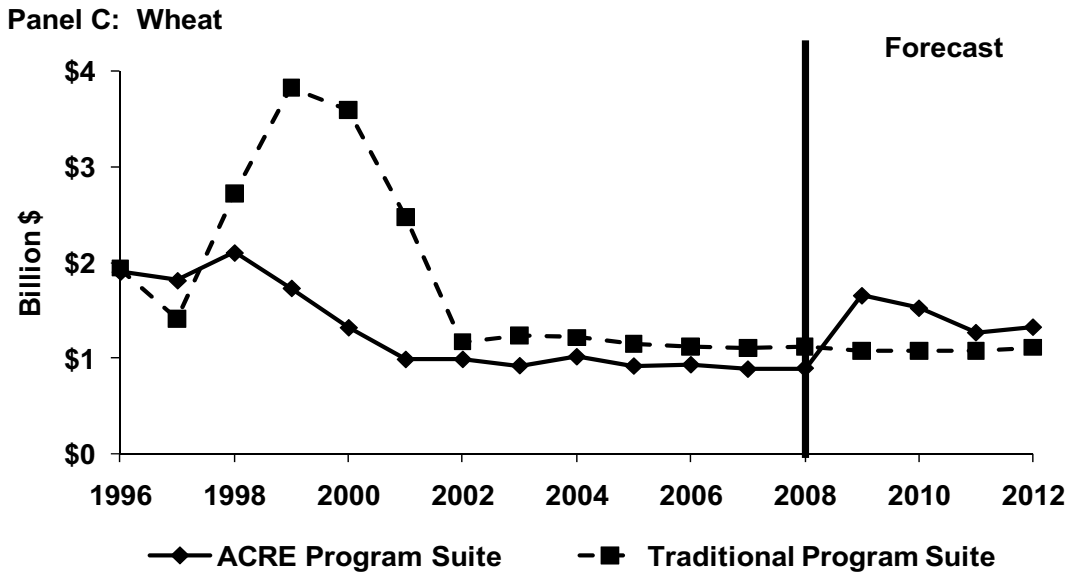


Figure 2 (cont'd.). Annual Total Payments by the ACRE Farm Program Suite and the Traditional Farm Program Suite for Corn, Soybeans, and Wheat (U.S., 1996–2012 crop years)

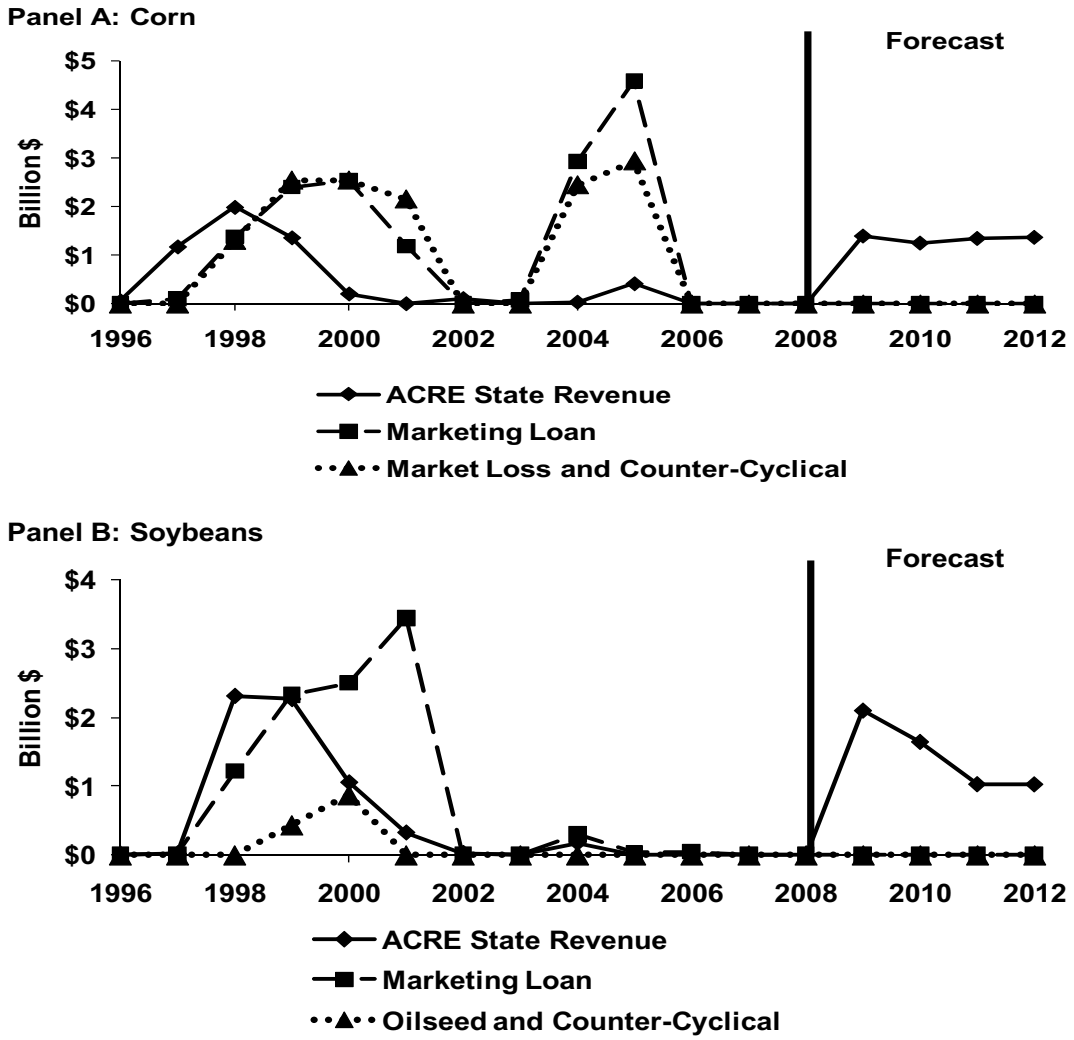
Sources: Payments by the traditional suite of farm programs for crop years 1996–2008 are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency (USDA 2009b). Payments by the ACRE suite of farm programs for all crop years and by the traditional suite of farm programs for crop years 2009–2012 are authors' original estimates.

price used in the forecast analysis was -0.9 percent for corn, +1.7 percent for soybeans, and +1.5 percent for wheat. However, percentage declines in price were as high as 28 percent for corn, 25 percent for soybeans, and 32 percent for wheat. Given these data parameters, forecast payments by the traditional marketing loan program were essentially zero in all cases. Market loan payments were forecast only for wheat during the 2010–2012 crop years. The largest average amount was $160,000 in 2012. Counter-cyclical payments were forecast only for wheat during the 2012 crop year. The average amount over the 11 sets of deviations was $5.5 million. Thus, assuming that all corn, soybean, and wheat acres were enrolled in the traditional farm program suite, almost all of the $14.7 billion dollars in payments forecast for this suite were direct income payments (Table 1). The reason that small marketing loan payments were estimated, even when counter-cyclical payments were estimated to be near zero, is because price can be less than the loan rate for brief periods, usually at harvest.

The total average forecast values for ACRE revenue payments encompass the outcomes resulting under the 11 sets of percentage deviations applied in our analysis (Table 1). The average and maximum annual payments resulting from these sets of percentage deviations are presented in Table 2 for each crop year and crop. The maximum values greatly exceed the average values because many of the sets of deviations resulted in zero or minimal payments.

Payments from the ACRE program suite were forecast to average a total of $25.3 billion under the applied sets of deviations and assuming that all corn, soybean, and wheat acres were enrolled in ACRE. The ACRE program suite is forecast to make more payments on average than the traditional program suite for every crop over the 2009–2012 crop years, as ACRE state revenue payments exceed the 20 percent reduction in direct payments.

The forecast average of ACRE revenue payments changes little for corn over the 2009–2012 crop years, but declines by approximately 50 percent for soybeans and wheat between the 2009 and 2011 crop years (Table 2 and Figure 3). These different time paths of forecast average ACRE revenue payments reflect the different time paths



cont'd.

Figure 3. Annual Payments by the ACRE State Revenue Program and by the Traditional Price-Based Programs for Corn, Soybeans, and Wheat (U.S., 1996–2012 crop years)

Notes: The traditional price-based programs include the counter-cyclical, marketing loan, market loss, and oilseed programs. Congress instituted on an *ad hoc* basis market loss payments for corn and wheat for the 1998–2001 crop years and oilseed payments for soybeans for the 1999 and 2000 crop years. These programs became the counter-cyclical program in the Farm Security and Rural Investment Act of 2002.

Sources: Payments by the traditional price-based programs for crop years 1996–2008 are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency (USDA 2009b). ACRE state revenue payments for all crop years and payments by the traditional price-based programs for crop years 2009–2012 are the authors' original estimates.

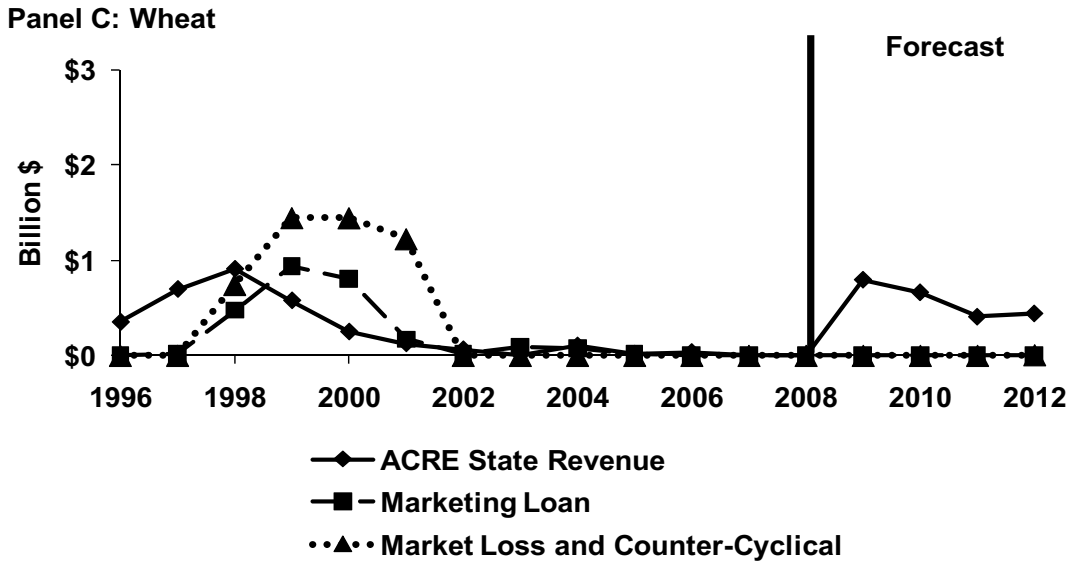


Figure 3 (cont'd.). Annual Payments by the ACRE State Revenue Program and by the Traditional Price-Based Programs for Corn, Soybeans, and Wheat (U.S., 1996–2012 crop years)

Notes: The traditional price-based programs include the counter-cyclical, marketing loan, market loss, and oilseed programs. Congress instituted on an *ad hoc* basis market loss payments for corn and wheat for the 1998–2001 crop years and oilseed payments for soybeans for the 1999 and 2000 crop years. These programs became the counter-cyclical program in the Farm Security and Rural Investment Act of 2002.

Sources: Payments by the traditional price-based programs for crop years 1996–2008 are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency (USDA 2009b). ACRE state revenue payments for all crop years and payments by the traditional price-based programs for crop years 2009–2012 are the authors' original estimates.

of USDA revenue forecasts and the use of moving averages to calculate the ACRE state revenue assistance level.[7] Corn revenue per acre is basically flat over the 2007–2012 crop years (Figure 1). Soybean and wheat revenue per acre declines from 2008 to 2009, then remains basically flat. A flat revenue time path reflects the offsetting impacts of a slight decline in price and a trendline increase in yields.

The forecasts for the 2009–2012 crop years assume that all acres are enrolled either in the traditional farm program suite or in the ACRE program suite. Actual expenditures on farm programs will depend not only on the cost of each program option but also on which program option is elected by farmers and landowners. For example, applying the preliminary ACRE sign-up rates (15.6 percent for corn, 15.3 percent for soybeans, and 12.7 percent for wheat) results in a forecasted average expenditure on the ACRE state revenue program for the 2009 crop year of $640 million instead of the $4.3 billion (Table 2) forecast assuming all acreage was enrolled. While the distribution of participation shares in future years is unknown, these shares are an important determinant of how much the United States may spend on farm programs.

[7] Subsequent to our forecast analysis, using information contained in the USDA Production and World Supply and Demand Estimates reports released in January 2010 and assuming the announced parameters for the 2009 crop year ACRE state revenue program and that all acres were enrolled in the ACRE program, ACRE revenue payments were estimated at $0.055 billion for corn, $0.002 billion for soybeans, and $1.396 billion for wheat, instead of the average values shown in Table 2 that sum to $4.29 billion. Although this updated information suggests that ACRE state revenue payments may be below the forecast average payments for the 2009 crop year, we retain the 2009 forecasts in our analysis as part of the illustration of the design features of the ACRE program suite.

Table 2. Forecast Payments by Year by the ACRE State Revenue Program for Corn, Soybeans, and Wheat, and Comparison with Product-Specific Caps Proposed in the Doha Round of World Trade Organization Negotiations (U.S., 2009–2012 crop years)

	Billion $			
Crop	2009	2010	2011	2012
Corn				
Average revenue payments	$1.40	$1.25	$1.35	$1.37
Maximum revenue payments over forecast cases	$6.05	$5.64	$5.89	$5.99
Number of forecast cases exceeding proposed Doha WTO product-specific cap	3	3	3	3
Soybeans				
Average revenue payments	$2.10	$1.64	$1.03	$1.03
Maximum revenue payments over forecast cases	$6.25	$5.43	$3.89	$3.92
Number of forecast cases exceeding proposed Doha WTO product-specific cap	4	4	4	4
Wheat				
Average revenue payments	$0.79	$0.66	$0.41	$0.44
Maximum revenue payments over forecast cases	$1.93	$1.71	$1.15	$1.23
Number of forecast cases exceeding proposed Doha WTO product-specific cap	7	7	5	5
Total average revenue payments	$4.29	$3.56	$2.78	$2.84

Note: Total number of forecast cases is 11.

Source: Authors' original estimates.

ACRE in World Trade Organization (WTO) Context

The ACRE state revenue program is *prima facie* coupled to current planting decisions and prices of specific crops. Thus, ACRE state revenue payments likely will be notified to WTO as product-specific AMS expenditures, and the level of payments will affect assessments of U.S. WTO compliance. Another consideration is whether the existing Uruguay Round WTO compliance rules remain in effect or are replaced by a new Doha Round agreement.

The United States has notified the WTO that it has been under its Uruguay Round Current Total AMS commitment of $19.1 billion for the 1995–2007 crop (marketing) years. The peak counterfactual estimated total annual ACRE revenue payment for corn, soybeans, and wheat over these years was $5.2 billion for the 1998 crop year. While this amount exceeds the $3.3 billion in AMS actually notified for corn, soybeans, and wheat, the notified CTAMS for 1998 was only $10.5 billion. The U.S. CTAMS is highest for 1999 and 2000, at $16.8 billion. However, estimated ACRE revenue payments for corn, soybeans, and wheat were less than the notified AMS for these crops: $4.2 versus $6.4 billion in the 1999 crop year, and $1.5 versus $7.2 billion in the 2000 crop year. Thus, the United States likely would have remained compliant with its Uruguay Round CTAMS commitment if the ACRE program suite instead of the authorized programs had existed over the 1996–2007 crop years.

Whether the United States would exceed its Uruguay Round commitment in the 2009–2012 crop years will depend on the amount of payments from the ACRE revenue program plus the other notified support. For 2007, the latest year for which information is available, the United States notified $6.3 billion in AMS market price support for dairy and sugar in its CTAMS and

only $7.4 million in marketing loan payments because of the relatively high prices (Blandford and Josling 2009). The sum of the highest forecast ACRE revenue payments to corn, soybeans, and wheat combined for a set of applied deviations for a crop year is $14.2 billion. Thus, it seems possible that the United States could exceed its current WTO CTAMS cap of $19.1 billion in a large ACRE revenue payment year. Nevertheless, under the average forecast level of ACRE revenue payments for corn, soybeans, and wheat, the United States would remain well below its existing commitment. In addition, changes in the 2008 Farm Bill may lower notifications for dairy by as much as $3.8 billion, creating additional CTAMS latitude in future notifications (Blandford and Orden 2008).

The draft Doha rules would, if agreed upon, impose tighter constraints on U.S. farm support programs. The U.S. CTAMS commitment would decline to $7.6 billion over a five-year phase-in period (WTO 2008). A new cap on Overall Trade Distorting Support (OTDS) would constrain the sum of CTAMS, product-specific, and non–product-specific *de minimis* support, and a redefined Blue Box support that would include countercyclical payments. The OTDS cap initially would be $32.3 billion, declining to $14.4 billion over five years. New product-specific AMS caps would be set immediately upon implementation of the agreement. For U.S. corn, soybeans, and wheat, the annual caps have been calculated to be $1.11, $1.12, and $0.23 billion, respectively, under the proposed rules (Blandford and Orden 2008).

In terms of the Doha OTDS and AMS commitments, the forecasts of large ACRE revenue expenditures under some sets of the percentage deviations result in the United States exceeding its eventual commitments if all corn, soybean, and wheat acreage is enrolled. However, we will focus the remaining discussion of the proposed Doha rules on the product-specific AMS caps because they are the most directly comparable to the results generated by our analysis.

Because of the higher prices forecast for 2009–2012, it is unlikely that the product-specific AMS caps for corn, soybeans, and wheat are likely to be a binding WTO compliance consideration for the traditional suite of farm programs at the loan rates and target prices enacted in the 2008 Farm Bill. However, the proposed product-specific AMS caps are a potential constraint given the forecast ACRE state revenue payments and assuming that all acres are enrolled in the ACRE program. The forecast average ACRE revenue payments for corn for each year from 2009 through 2012 are just over corn's $1.11 billion AMS cap (Table 2). Forecast average ACRE revenue payments exceed soybeans' $1.12 billion AMS cap in 2009 and 2010 and wheat's $0.23 billion cap in each year. The forecast averages reflect several cases of the applied percentage deviations that result in ACRE revenue payments much higher than the forecast averages. For corn and soybeans, the forecast payments exceed the Doha caps for each crop year in 3 and 4 of the 11 cases, respectively. For wheat, forecast payments exceed the Doha product-specific AMS cap for as many as 7 of the 11 cases for a crop year. Of course, the participation rate in ACRE will also affect this assessment. For example, if the share of base acres that signed up for the ACRE program suite in 2009 remains the same through 2012, total AMS expenditures on both suites of programs would remain below the Doha product-specific caps for corn and soybeans for all cases and years and in all but one case and crop year for wheat.

Summary and Discussion of Policy Issues Raised by ACRE

The Food, Conservation, and Energy Act of 2008 provides farm commodity program participants with the choice of a traditional suite of fixed direct payment, marketing loan, and price countercyclical programs or a new Average Crop Revenue Election (ACRE) suite of programs. The ACRE suite, which was authorized for the 2009–2012 crop years, consists of (i) 80 percent of the traditional program's direct payments, (ii) marketing loans at 70 percent of the traditional program's loan rate, and (iii) a new state revenue program. ACRE is the first revenue program authorized by a farm bill, and, unlike the fixed nominal support triggers of traditional commodity programs, has no floor on its annual revenue risk assistance levels that trigger payment eligibility.

A historical, counterfactual analysis provided estimates of payments that the ACRE suite of programs would have made had it existed instead of the traditional programs during the 1996–2008 crop years, assuming that all acres planted to

corn, soybeans, and wheat were enrolled. Also, payments were forecast for both farm program suites over the 2009–2012 crop years. As with the historical analysis, payments were forecast assuming all acres of corn, soybeans, and wheat were in either the traditional farm program suite or in the ACRE farm program suite. Although the 2008 Farm Bill allows farm program participants to choose between the two suites, the stark contrast that results from assuming that all acres are in one program suite at a time allows us to focus the analysis on the key policy design questions raised by the ACRE state revenue program.

One design question concerns the use of moving-average, market-based assistance levels versus fixed nominal assistance levels to trigger support. ACRE's use of moving averages of prices and yields eliminates a floor under revenue. In contrast, the fixed marketing loan and counter-cyclical support rates provide a floor under prices received by farmers. These contrasting design features are a key reason that the estimated counterfactual ACRE state revenue payments were greater than the actual marketing loan payments authorized by Congress over the 1996–1998 crop years, yet lower than the marketing loan payments (and also the marketing loan plus market loss and oilseed payments) over the 1996–2001 crop years. In addition, ACRE's use of moving averages of prices and yields allows its risk assistance level to increase as market revenue increases, in contrast to the fixed marketing loan and counter-cyclical support rates that remain constant unless they are changed by an act of Congress. These contrasting design features, in combination with the higher prices and revenue forecast for the 2009–2012 crop years, are key reasons that under the 2008 Farm Bill the ACRE revenue payments for enrolled acres are forecast to exceed marketing loan and counter-cyclical payments for corn, soybeans, and wheat. The different results between the historical, counterfactual analysis and the forecast analysis show how the relative timing, persistence, and likelihood of payments under the fixed support versus market flexible support depends on the balance between supply and demand and the resulting path of prices and revenue over time.

A second design issue concerns price versus revenue protection. ACRE revenue payments can occur when revenue declines, whether the cause is a decline in price, a decline in yield, or both. In contrast, price support programs provide payments, when prices are below the support rate even if revenue is average or above average. Such a situation occurred during the 2004 and 2005 crop years when marketing loan and counter-cyclical payments to corn totaled $12.9 billion. In contrast, only $0.4 billion in counterfactual ACRE revenue payments to corn were estimated, as record or high yields offset most of the impact of low prices. In short, revenue programs provide a different match than price programs with the incidence of risk.

The different match with the incidence of risk reflects the different designs of the ACRE revenue program and the traditional price-based programs, which in turn stems from their different policy objectives. The policy objective of the marketing loan program and counter-cyclical program is to assist farmers with managing the systemic risk of low prices that can last from one year to an extended period of years by providing a price floor. The policy objective of the ACRE revenue program is to assist farmers with managing the systemic risk of a decline in a crop's revenue that can extend from one year to a short period of years, irrespective of the level of revenue at which the decline occurs, but to avoid creating a floor. While it is clear that the relative importance of these risks depends on the balance between supply and demand, it is not clear whether farmers and policymakers prefer the match with the incidence of risk provided by the ACRE revenue program or the match with the incidence of risk provided by the traditional price support programs.

An important political economy question of sustainability arises with any policy instrument whose assistance level is tied to the market. Specifically, if only an ACRE revenue program were available, would Congress step in to increase payments in response to the decline in revenue payments that would occur during a period of extended low revenue? This question can be framed further by examining the period of declining and low prices of the mid- to late 1990s when Congress stepped in to create the market loss program in 1998 and the oilseed program in 1999. Over the 1996–1998 crop years, combined counterfactual ACRE payments for corn, soybeans, and wheat were estimated at $7.5 billion. Actual marketing loan payments were $3.2 billion. If the ACRE program had existed instead of

the 1996 Farm Bill program, would the larger payments have precluded Congress from increasing support in 1998? The following year, ACRE payments would have declined. Would Congress have stepped in at that point, negating the need for farmers to adjust over time to a lower revenue level under an ACRE program suite? Or could the political economy of farm support programs evolve to the point where revenue assistance during an initial decline without further intervention in a continuing period of low revenue becomes an acceptable outcome? Because it is unknown what future economic events will be, these questions are relevant to future deliberations over alternative farm policy options.

The policy design question of fixed versus market-based assistance levels also potentially impacts the United States' WTO commitments. Our analysis finds that it is unlikely that ACRE would cause the United States to exceed its current WTO commitment, although the possibility cannot be ruled out in a high payment year. However, should the 2008 proposed draft of the Doha Round negotiations be adopted, it is more likely that the ACRE state revenue program would make payments large enough to exceed new product-specific caps and other U.S. commitments, assuming that participation in ACRE is sufficiently large and given projected levels of acres, prices, and yields. Whatever the WTO situation that the United States faces, ACRE's design raises an important question about the distortion of market incentives and international trade by policy: Is the economic dislocation over a longer time horizon caused by a policy that establishes a floor more or less than the economic dislocation caused by a policy whose level of support is determined by the market and thus has no floor? While this question has received little attention, the answer to it within the context of the market conditions that will prevail in future years has significant implications both for the design of domestic policy instruments as well as for the development of compliance rules within WTO.

Both the current rules of the Uruguay Round and the potential rules of the Doha Round will continue to allow expenditures on programs that are tied to current production and/or prices. It thus behooves policymakers to create policy instruments that provide the best mix of policy performance attributes. The ACRE revenue program is in essence asking what policy performance attributes are desired given the market conditions that exist in the early twenty-first century. The answers are not obvious but provide a rich opportunity for economists to contribute to this debate, ranging from more robust estimates of core economic parameters, such as intertemporal and spatial price and revenue correlations, to empirical assessments of alternative policy designs as conducted herein, to further assessments of the political economy of farm policy options, to the development of new theoretical constructs with which to frame the economic and policy discussion.

References

Blandford, D., and T. Josling. 2009. "The WTO Agricultural Modalities Proposals and Their Impact on Domestic Support in the EU and the US." Paper prepared for the World Bank, Washington, D.C.

Blandford, D., and D. Orden. 2008. "United States: Shadow Domestic Agricultural Support Notifications." Discussion Paper No. 821, International Food Policy Research Institute (IFPRI), Washington, D.C. Available at http://www.ifpri.org/sites/default/files/publications/ifpridp00821.pdf (accessed December 15, 2009).

Harrington, D.H., and O. Doering. 1993. "Agricultural Policy Reform: A Proposal." *Choices* 8(1): 14–19.

Nelson, F., and L. Schertz (eds.). 1996. "Provisions of the Federal Agriculture Improvement and Reform Act of 1996." Agriculture Information Bulletin No. 729, Economic Research Service, USDA, Washington, D.C.

Orden, D., R. Paarlberg, and T. Roe. 1999. *Policy Reform in American Agriculture*. Chicago: University of Chicago Press.

Schertz, L., and O. Doering. 1999. *The Making of the 1996 Farm Act.* Ames, IA: Iowa State University Press.

U.S. Congress. 2008. Food, Conservation, and Energy Act of 2008. H.R. 2419, U.S. Congress, Washington, D.C. Available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h2419enr.txt.pdf (accessed December 30, 2008).

U.S. Department of Agriculture. 2008. "The 2002 Farm Bill: Provisions and Economic Implications." Administrative Publication No. AP-022 (E. Young, Coordinator), Economic Research Service, USDA, Washington, D.C. Available at http://www.ers.usda.gov/Publications/AP/AP022/ (accessed December 3, 2008).

____. 2009a. "Direct and Counter-Cyclical Program/ACRE." Farm Service Agency, USDA, Washington, D.C. Available at http://www.fsa.usda.gov/FSA/webapp?area=home&subject=dccp&topic=landing (accessed November 2009).

____. 2009b. "CCC Budget Essentials." Farm Service Agency, USDA, Washington, D.C. Available at http://www.fsa.usda.gov/FSA/webapp?area=about&subject=landing&topic=bap-bu-cc (accessed October 15, 2009).

____. 2009c. "USDA Agricultural Projections to 2018." Long-Term Projections Report No. OCE 2009-1, Office of the Chief Economist and World Agricultural Outlook Board, USDA, Washington, D.C.

____. 2009d. "Data and Statistics: Quick Stats." National Agricultural Statistics Service, USDA, Washington, D.C. Available at http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp (accessed November 2009).

World Trade Organization. 2008. "Revised Draft Modalities for Agriculture." Report No. TN/AG/W/4/Rev. 4, World Trade Organization, Geneva.

Zulauf, C., M.R. Dicks, and J.D. Vitale. 2008. "ACRE (Average Crop Revenue Election) Farm Program: Provisions, Policy Background, and Farm Decision Analysis." *Choices* 23(3): 29–35.