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ACRE in the U.S. Farm Bill and the WTO

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By Carl Zulauf and David Orden *

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ACRE IN THE U.S. FARM BILL AND THE WTO

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ABSTRACT

Two counterfactual analyses investigate the new ACRE program. Had ACRE existed instead of the programs authorized during 1996-2006 for corn, soybeans, and wheat, farm program spending would have totaled less. Estimated ACRE revenue payments increase 78 percent when calculated by applying the annual 1996-2006 percentage variations to USDA forecast average 2009-2012 acres, prices, and yields. Traditional marketing loan and counter-cyclical payments are estimated near zero. Policy design issues concern the merit of revenue versus price protection, fixed support targets versus support adjusting with lagged market revenue, and the economic dislocation and WTO compliance from alternative policy instruments.

KEY WORDS: Farm Policy, *Food Conservation and Energy Act of 2008*, Average Crop Revenue Election Program (ACRE), WTO Domestic Support Commitments

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ACRE IN THE U.S. FARM BILL AND THE WTO

The *Food, Conservation, and Energy Act of 2008* (2008 Farm Bill) provides farm commodity program participants with the choice of a traditional suite of 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 80 percent of direct payments, marketing loans at 70 percent of the loan rate, and 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) but ACRE is the first such program authorized by a farm bill. Proponents argue that a revenue program addresses the gap in the farm safety net that arises because the marketing loan program provides little protection when individual farm yields are low. They also argue that revenue programs address the inconsistency that marketing loan and counter-cyclical payments can occur when revenue is above average because high yields more than offset low prices.

ACRE contains another policy innovation. Its revenue guarantee adjusts to changes in market revenue over time. ACRE's policy objective is to provide assistance when market revenue declines over a few years but not to preclude producer adjustments by creating a floor. Thus, ACRE provides less assistance than traditional programs during periods of chronically low prices that persist more than a few years. However, the high prices and resulting high market revenues of 2007 and 2008 will translate into a higher ACRE revenue guarantee, meaning that ACRE could make payments if market revenue declines from these levels. In contrast, marketing loan and counter-cyclical payments will occur only if prices fall more precipitously.

U.S. farm programs must meet not only domestic needs but also World Trade Organization (WTO) rules on agricultural trade and domestic support policies. While the Doha Round of negotiations has not produced a replacement for the existing Uruguay Round rules, a potential framework has been drafted in substantial detail (WTO). A guiding principle in the draft framework is to constrain expenditures on policies tied to current production and prices, while encouraging movement to policies decoupled from production decisions and market conditions. The draft Doha text lowers permitted U.S. annual expenditures on coupled programs in its total Aggregate Measure of Support (AMS) from \$19.1 to \$7.6 billion. Because ACRE's revenue payments are tied to current planted acres and market revenue, they are likely to fall into the AMS category.

Given the preceding discussion, the objective of this article is to compare the ACRE and traditional farm program suites in terms of providing domestic support and in terms of U.S. WTO commitments. Specifically, two counterfactual analyses are conducted. One calculates payments that the ACRE suite of programs would have made had it existed during the 1996-2006 crop years and assuming all corn, soybean, and wheat acreage were enrolled. These counterfactual ACRE payments are compared with actual payments made to farmers during the 1996-2006 crop years, providing insights into differences in the levels and temporal flow of payments from the two program suites. The second counterfactual analysis uses the annual percentage variations in acres, prices, and yields in the temporal order they occurred over the 1996-2006 crop years but applies them to the U.S. Department of Agriculture (USDA) forecast of average U.S. acres, prices, and yields for the 2009-2012 crop years. This approach provides a possible eleven-year path of ACRE expenditures grounded in historical experience but adjusted to reflect a contemporary expectation of higher revenues in the future.

The next two sections of this paper 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 counterfactual analyses are then presented, followed by a discussion of the results and implications for U.S. support payments and existing and potential U.S. WTO commitments.

Comparison: Current Programs versus ACRE State Revenue Program

Current farm programs provide three types of support: fixed direct payments, marketing loan and counter-cyclical. The direct payment program pays farmers a specific dollar amount per historical base acre. The dollar amount does not change with market prices or with the level of production. Direct payments are decoupled from current production and prices under WTO rules, although some challenges have been raised regarding their classification.

The policy objectives of the marketing loan and counter-cyclical programs are to assist farmers with managing the systemic (e.g., market) risk of chronically low prices that extend over a period of years. This objective is implemented by establishing fixed marketing loan and counter-cyclical support rates that provide a floor on the per unit value of the crop. Payments occur if market price drops below the support rates. Marketing loan payments are based on current production and prices, and thus are considered coupled under WTO rules. Counter-cyclical payments are based on current prices but historical production. They are considered partially decoupled, with negotiations continuing over how to classify them in the WTO.

ACRE's policy objective is to assist farmers with managing the systemic risk of a decline in a crop's revenue over a short period of years, but to avoid creating a floor (Zulauf, Dicks, and Vitale). Revenue is defined as U.S. price times state yield per planted acre. A floor is avoided by using moving averages of U.S. prices and state yields to calculate ACRE's revenue guarantee.

Thus, the guarantee increases (decreases) as market revenue increases (decreases). A state revenue payment occurs for a crop when actual state revenue is less than the state's guarantee.

Tying the ACRE guarantee to market revenue allows changes in supply and demand factors, including the cost of production, to be incorporated into the guarantee. For example, if costs increase faster than production efficiency, supply will decline *ceteris paribus*. Given that the short-run demand for crops is inelastic, price and revenue should increase, resulting in an increase in ACRE's revenue guarantee. But, if production efficiency increases faster than costs, ACRE's revenue guarantee should decline as the resulting increase in production leads to lower prices and revenue *ceteris paribus*.

Unlike the marketing loan and counter-cyclical programs, ACRE's revenue program will not provide extended protection against chronically low prices. On the other hand, ACRE can provide assistance when prices and cost of production increase above the fixed marketing loan and counter-cyclical support rates.

ACRE Provisions in the *Food, Conservation, and Energy Act of 2008*

The decision to elect ACRE begins with covered crops harvested in 2009 (U.S. Congress). Covered crops are barley, corn, cotton, oats, peanuts, sorghum, soybeans, and wheat. ACRE must be elected—if no choice is made, a farmer remains in the traditional farm programs. As long as a farmer is not in ACRE, the election of ACRE remains open. Once ACRE is elected, a farmer is enrolled through the 2012 crop. ACRE must be elected for all covered crops grown on the farm; however, ACRE payments are crop specific.

An ACRE revenue payment is triggered for a crop if a state's actual revenue per planted acre is less than the state's revenue guarantee per planted acre for the crop for the crop year.

- (1) ACRE state revenue guarantee¹ per planted acre for state j , crop s , and crop year t =
 $\{0.90 \bullet [\text{Olympic average yield per planted acre for 5 most recent crop years}_{j,s,t}] \bullet$
 $[\text{average U.S. cash price for 2 most recent crop years}_{s,t}]\}$.
- (2) ACRE actual state revenue per planted acre for state j , crop s , and crop year t =
 $\{[\text{yield per planted acre}_{j,s,t}] \bullet [\text{higher of U.S. average price}_{s,t} \text{ or } 70\% \text{ of U.S. marketing}$
 $\text{loan rate}_{s,t}]\}$

ACRE's revenue guarantee cannot increase more than 10 percent from the prior year's revenue guarantee (called a cap) nor can the guarantee decrease more than 10 percent from the prior year's guarantee (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 will have to eventually adjust to lower market revenues.

A farm eligibility condition also exists for the receipt of an ACRE payment. Specifically, a farm's actual revenue must be less than the farm's benchmark revenue for the crop.

- (3) Farm's ACRE benchmark revenue per planted acre for crop s and crop year t =
 $\{[\text{Olympic average of the farm's planted yield for the 5 most recent years}_{s,t}] \bullet [\text{average}$
 $\text{U.S. cash price for 2 most recent crop years}_{s,t}] + [\text{per acre insurance premium}_{s,t}]\}$
- (4) Farm's actual revenue per planted acre for crop s and crop year t =
 $\{[\text{farm's yield per planted acre}_{s,t}] \bullet [\text{U.S. average price}_{s,t}]\}$

The farm revenue loss condition reduces the cost of ACRE but also addresses the concern that a farm can receive marketing loan and counter-cyclical payments when it has above-average revenue. Including the insurance premium in a farm's benchmark revenue provides an incentive to buy crop insurance. No similar incentive exists for the traditional farm programs.

If a farm's revenue loss condition is met, its ACRE revenue payment is determined as follows.

- (5) An eligible farm's ACRE revenue payment for crop s and crop year t =

$$\{[83.3\% \text{ of the farm's planted acres}_{s,t} \text{ (becomes 85\% for 2012 crop)}] \bullet [\text{lesser of (ACRE state revenue guarantee minus state actual revenue per planted acre}_{s,t}) \text{ or } (25\% \text{ of ACRE state revenue guarantee per planted acre}_{s,t})] \bullet [(\text{farm's Olympic average yield for 5 most recent crop years}_{s,t}) / (\text{state's Olympic average yield for 5 most recent crop years}_{s,t})]\}$$

While ACRE revenue payments depend on the acres planted to each crop, a farm cannot receive ACRE revenue payments on more acres planted to eligible crops than the farm's total base acres. Capping the state revenue payment at 25 percent of the state guarantee reduces program costs. It also reduces potential double payments from crop insurance and ACRE because farmers commonly buy insurance with coverage of 75 percent or lower.

For a person or legal entity, ACRE's direct payments are limited to \$40,000, the limit for traditional direct income payments, minus the amount equal to the 20 percent reduction in direct payments. ACRE's revenue payments can not exceed \$65,000, the limit on counter-cyclical payments, plus the amount equal to the 20 percent reduction in direct payments. The 2008 Farm Bill removed limits on marketing loan payments.

Analytical Parameters

Counterfactual analyses were conducted for the three largest acreage U.S. program crops: corn, soybeans, and wheat. The historical period used for these analyses began with 1996. The *Federal Agriculture Improvement and Reform Act of 1996* eliminated annual land set asides; gave farmers the freedom to make planting decisions, except for limits on planting fruits and

vegetables; eliminated most public stocks programs; and instituted fixed income payments (USDA, Economic Research Service, 1996). These changes substantively reduced the impact of farm programs on production and market prices (Orden, Paarlberg and Roe; Schertz and Doering). Thus, the 1996 and latter crops years are more representative of current conditions than years prior to 1996.

The counterfactual analytical period ended with the 2006 crop year. By the end of this crop year, prices of corn, soybeans, and wheat had increased enough to not only eliminate marketing loan and counter-cyclical payments but also to raise questions about whether the stationary range of prices that began in 1974 (Kenyon, Jones and McGuirk) remained valid, or whether a new range of prices existed.

Payments to corn, soybeans, and wheat from the direct income, marketing loan², counter-cyclical, and market loss programs for the 1996-2006 crop years were collected from USDA, Farm Service Agency. The market loss and associated oilseed payment program were instituted by Congress on an *ad hoc* basis once farm prices and income faltered in 1998. These payments, which began with the 1998 crop year for corn and wheat and with the 1999 crop year for soybeans, were incorporated into the *Farm Security and Rural Investment Act* of 2002 as the counter-cyclical program (USDA, Economic Research Service, January 2008).

For the first counterfactual analysis, ACRE state revenue payments were calculated assuming that the ACRE suite of programs had existed for the 1996-2006 crop years. State yield per planted acre could be calculated for 42 states, accounting for over 99 percent of U.S. acres planted to corn, soybean, and wheat from 1996 through 2006 (USDA, National Agricultural Statistics Service). Observed state planted acres, state production, and U.S. crop year cash prices³ were used. All acres planted to corn⁴, soybeans, and wheat were assumed to be enrolled

in the ACRE program. Data started with the 1991 crop year in order to have enough observations to construct the 5-year Olympic moving averages of state yields for 1996.

The second counterfactual analysis used the percent deviations from average values observed for acres, prices, and yield for the 1996-2006 crop years, but it applied the percent deviations to the average acres, prices, and yields⁵ forecast by USDA, Office of the Chief Economist in February 2008 for the 2009-2012 crop years. The prices and yields forecast for 2009-2012 are higher than the average prices and yields observed during the 1996-2006 crop years (Table 1). Thus, the second counterfactual analysis has a higher level of revenue per planted acre. The dollar value of ACRE payments for a given percent decline in revenue will be higher when revenue is higher.

The average forecast U.S. planted acres was turned into a forecast for individual states by using the ratio of (average state planted acres for 1996-2006) / (average U.S. planted acres for 1996-2006). A similar calculation was used to derive individual state forecasts for average yields over the 2009-2012 crop years. The average forecast state planted acres, state yield per planted acre, and U.S. price were converted into annual observations by using the observed percent deviation of the variable for a crop year between 1996 and 2006 from the variable's average value for the 1996-2006 crop years. To illustrate these calculations, the individual observation on state j 's acres planted to crop s based on the observed percent deviation for crop year t was calculated as: $\{[2009-2012 \text{ forecast average planted acres}_{j,s}] \bullet [\text{acres planted}_{j,s,t} / 1996-2006 \text{ average planted acres}_{j,s}]\}$. ACRE state revenue payments were calculated using these hypothetical state planted acres, state planted yields, and U.S. prices derived for the 11 annual observations. For the second counterfactual analysis, payments also were estimated for the traditional price based farm programs.

The approach utilized for the second counterfactual analysis of applying 1996-2006 percentage deviations of acres, prices and yields to forecast average levels for 2009-2012 was chosen because the time paths of acres, prices, and yields result from a complex interplay of economic parameters and random shocks. The economic parameters include supply and demand elasticities, correlations between U.S. price and state yields, correlations between state yields across crop years, and correlations between U.S. prices across crop years. Little is known with statistical accuracy about the mean value and other distributional attributes of these economic parameters in the market environment that has existed since the major policy changes of the 1996 Farm Bill. The use of time-ordered, historical percent deviations from average values provides a measure of variation that has been observed and thus could occur again.

Neither analysis included three constraints that limit ACRE revenue payments: (1) the limit on ACRE revenue payments per legal entity, (2) the restriction that ACRE revenue payments cannot be received on more planted acres than the total base acres on the farm⁶, and (3) the payment eligibility condition that a farm's actual revenue for the crop must be less than the farm's benchmark revenue for the crop. These constraints were not implemented because of the lack of farm level data needed to parameterize them. As a result, the two analyses provide an upper bound estimate on ACRE state revenue payments for corn, soybeans and wheat.

Results 1 – Historical Acres, Prices, and Yields Analysis

ACRE state revenue payments for corn, soybeans, and wheat over the 1996-2006 crop years were estimated to be 22 percent smaller, or \$4.5 billion less, than the actual payments made by the counter-cyclical program and its predecessor, the market loss program (Table 2). No payments were estimated for the ACRE marketing loan program. Its 30 percent lower loan

rates were less than the market prices observed for all crops, years, and states. In contrast, the authorized marketing loan programs made \$27.6 billion in payments to corn, soybeans, and wheat. Direct payments to these crops totaled \$42.5 billion over the 1996-2006 crop years. Thus, the 20 percent reduction contained in the ACRE suite of programs would have resulted in \$8.5 billion less in direct payments. In total, estimated counterfactual payments if the ACRE suite of programs had existed for the 1996-2006 crop years were \$40.6 billion, or 45 percent, less than payments made by the farm programs authorized by Congress. Payments by the ACRE program suite for corn, soybeans, and wheat were estimated to be 52 percent, 39 percent, and 32 percent less, respectively.

Over the 1996-2006 crop years, the dominant negative market event for crop producers was the sharp decline from the high prices during 1995-1996. This decline reflected increased production, due in part to the elimination of annual acreage set asides, and the adverse demand effects of the Asian financial crisis that emerged during the fall of 1997. To examine program performance in response to this market event, Figure 1 presents the estimated ACRE revenue payments as well as marketing loan and counter-cyclical/market loss payments by year for corn, soybeans, and wheat.

ACRE state revenue payments occurred for the 1997 crop year for corn (\$1.2 billion) and wheat (\$0.7 billion). In contrast, marketing loan payments for the 1997 crop year were only \$0.1 million for corn and nothing for wheat. For soybeans, neither program began making payments until the 1998 crop year. ACRE revenue payments totaled \$2.3 billion versus \$1.2 billion for marketing loan payments. Thus, in general the counterfactual ACRE revenue program was estimated to make larger payments earlier. The reason is that the two-year moving average of prices in ACRE's revenue guarantee contained the high prices of the 1995 and 1996 crop years.

These prices were higher than the loan rates fixed in the 1996 Farm Bill. Hence, prices had to decline further to trigger marketing loan payments than ACRE state revenue payments⁷.

ACRE revenue payments began to decline by the 1999 or 2000 crop year (Figure 1). This decline occurred because ACRE's revenue guarantee is not fixed, but moves with market revenue, which in this case declined. In examining payments by individual years, only five percent of \$5.2 billion in ACRE revenue payments to corn over the 1997-2001 crop years occurred for the 2000 and 2001 crop years. In contrast, 52 percent of the \$16.2 billion in marketing loan and market loss payments to corn over the 1997-2001 crop years occurred for the 2000 and 2001 crop years. For soybeans, 63 percent of the \$10.8 billion in marketing loan and oilseed payments, but only 23 percent of the \$6 billion in ACRE revenue payments, over the 1997-2001 crop years occurred in 2000 and 2001. The same comparison for wheat is 50 percent of \$7.3 billion in marketing loan and market loss payments versus 18 percent of the \$2.7 billion in ACRE revenue payments. Thus, total marketing loan and market loss payments were higher than total ACRE state revenue payments. However, half or more of the marketing loan and market loss payments occurred four to five years after the decline in prices and revenue began.

One other noticeable policy event over these 11 crop years was that \$12.8 billion in marketing loan and counter-cyclical payments were 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 1996-2006 crop years. However, because corn yield was a record 158 bushels per planted acre in 2004 and a relatively high 147 bushels in 2005, U.S. revenue per planted acre was \$20 higher in 2004 and only \$12 lower in 2005 than the average revenue for the 1996-2006 crop years⁸ (Figure 1). In contrast, ACRE state revenue payments

were estimated to total only \$0.5 billion for the 2004 and 2005 crop years because the high yields in these years would have been taken into account.

An analysis of the results by individual state and crop found that for 38 percent of the years in which an ACRE state payment occurred for corn, the state's yield was 10 percent lower than the state's five-year Olympic moving average yield. The comparable shares were 50 percent for soybean and 48 percent for wheat. The importance of declines in state yields was greater for states that produced a smaller share of U.S. output. This finding is consistent with the expectation that deviations in state yields as well as the correlation between changes in state yield and changes in U.S. price are a determinant of ACRE state revenue payments.

Results 2 – Average 2009-2012 Acres, Prices, and Yields Analysis

Consistent with the expectation noted above, estimated ACRE revenue payments for corn, soybeans, and wheat were \$12.2 billion, or 78 percent, higher at the higher prices and yields forecast by USDA for the 2009-2012 crop years (Table 3). ACRE revenue payments increased 119 percent for corn, 65 percent for soybeans, and 34 percent for wheat. Due to the higher prices forecast for 2009-2012, marketing loan and counter-cyclical payments were estimated to occur only for wheat and only at the support levels set for the traditional programs in the 2008 Farm Bill⁹. Adding in direct payments, total payments by the ACRE suite of programs were estimated to be \$61.8 billion when based on 2009-2012 average acres, prices, and yields. In contrast, total payments by the traditional suite of farm programs were estimated to be \$43.4 billion, with almost all being direct income payments. Thus, ACRE is the more costly farm program suite when acres, prices, and yields are assumed to be average forecasted 2009-2012 levels rather than observed 1996-2006 levels.

Because the percent deviations of state acres, U.S. prices, and state yields are the same for both analyses, the temporal patterns of ACRE revenue payments are also similar (Figure 2). In both counterfactual analyses, these payments were highest for the 1998 observation. ACRE revenue payments for the 1998 observation were estimated to be \$9.8 billion—\$4.8 billion for corn, \$3.8 billion for soybeans, and \$1.2 billion for wheat—at the 2009-2012 forecast average acres, prices, and yields. Total ACRE revenue payments were slightly smaller at \$7.8 billion for the 1999 observation, then declined to \$2.7 billion for the 2000 observation and \$0.8 billion for the 2001 observation. The decline in payments reflects the downward adjustment in ACRE's revenue guarantee over these observations due to declining revenues from the market even with the higher average revenues that are assumed to occur.

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 revenue payments likely will be notified to WTO as product-specific payments under the AMS. The U.S. has notified WTO that it has been under its Uruguay Round AMS cap for the 1996-2005 crop (marketing) years. No official notification has been submitted for the 2006 crop year, but it can be anticipated that the U.S. will be within its AMS cap because prices were relatively high for most U.S. crops (Blandford and Orden).

The implications of ACRE for U.S. WTO compliance hinges on two determinants¹⁰. One is the level of payments made by the ACRE revenue program. The second is whether the existing Uruguay Round WTO compliance rules remain in effect or are replaced by a new Doha Round agreement.

The two counter-factual analyses illustrate that key factors affecting the level of ACRE revenue payments are the levels of prices and yields. At prices, and yields that occurred from 1996-2006, the estimated payments of \$15.6 billion from the ACRE state revenue program were less than the \$27.6 billion in payments from the traditional marketing loan program for this period. Moreover, the peak total payment from the ACRE state revenue program for corn, soybeans, and wheat of \$5.4 billion for the 1998 crop year was less than the peak payment of \$5.9 billion for the 2000 crop year from the traditional marketing loan program (Figure 1) or the notified AMS for 2000 for corn, soybeans, and wheat of \$7.2 billion¹¹. Thus, the U.S. likely would have remained compliant with its Uruguay Round AMS commitment if the ACRE program suite had existed over the 1996-2006 crop years. However, its reported annual AMS levels would have shifted due to the different time pattern of ACRE revenue payments.

At the average acres, prices, and yields forecast for 2009-2012 and applying the deviations from averages observed for the 1996-2006 crop years, ACRE revenue payments for corn, soybeans, and wheat were estimated to have increased to \$27.8 billion, or \$0.2 billion higher than actual 1996-2006 marketing loan payments. Peak annual ACRE revenue payments of \$9.7 billion exceeded the notified AMS for corn, soybeans, and wheat in 2000 by \$2.5 billion. The highest annual total AMS notified by the U.S. was \$16.8 billion for 1999 and 2000. This notified amount is \$2.3 billion less than the U.S. AMS cap of \$19.1 billion. Combining these various considerations, the possibility exists that the ACRE revenue program could cause the U.S. to exceed its Uruguay Round AMS cap in a peak payment year. However, changes to the U.S. dairy support program enacted in the 2008 Farm Bill may reduce the notified support in the AMS for dairy products. Blandford and Orden estimate this reduction could be as much as \$3.6

billion by 2014. Thus, changes to the dairy program in the 2008 Farm Bill would seem to make the probability of the U.S. exceeding its current WTO AMS cap small.

Blandford and Josling and Blandford and Orden also found that ACRE revenue payments for corn, soybeans, and wheat at price levels forecast for coming years are unlikely to exceed the U.S. Uruguay Round AMS cap. Their studies used time-paths of price deviations drawn from the 1970s, 1980s and 1990s in combination with forecast levels of U.S. national production¹².

The draft Doha rules would, if agreed upon, impose tighter constraints on U.S. support programs. Total U.S. AMS commitment would decline to \$14.3 billion from \$19.1 billion upon implementation, then linearly to \$7.6 billion in the fifth year (WTO). A new cap on Overall Trade Distorting Support (OTDS) would also constrain the sum of total AMS, product-specific and non product-specific *de minimis* support, and a redefined “blue box” support which would include counter-cyclical payments. The OTDS cap initially would be \$32.3 billion, declining to \$14.4 billion over five years. In addition, new product-specific AMS caps would be set for U.S. corn, soybeans and wheat at \$1.4, \$1.12, and \$0.23 billion, respectively, upon implementation. The cap for corn would decline further over three years to \$1.11 billion.

Using actual 1996-2006 acres, prices, and yields, estimated ACRE revenue payments would have exceeded the Doha draft product-specific caps for corn and soybeans in the 1998 and 1999 crop years and for wheat in the 1996-2000 crop years. Moreover, total ACRE revenue payments to corn, soybeans, and wheat equaled \$5.4 and \$4.4 billion in 1998 and 1999, respectively. The other support included in the notified AMS totaled \$7.1 billion in 1998 and \$10.1 billion in 1999 (excluding marketing loan program payments for corn, soybeans, and wheat, and also soybean oilseed payments in 1999 included as product-specific AMS that the counterfactual ACRE programs would have replaced). Thus, the U.S. notifications with these

ACRE payments would substantially have exceeded the draft U.S. total AMS cap set at \$7.6 billion for the end of the transition period. The Doha draft OTDS cap also would be exceeded in these years if *de minimis* support for other crops (excluding the crop market loss payments for corn and wheat replaced by the counterfactual ACRE revenue payments) were added to the AMS.

At the higher average prices and yields forecast for 2009-2012, WTO Doha draft compliance considerations are exacerbated for ACRE when percentage deviations from 1996-2006 are applied. The Doha draft product-specific AMS caps are exceeded for corn when using the 1997-1999 deviations, for soybeans when using the 1998-2000 deviations, and for wheat when using the 1996-2001 deviations. In addition, ACRE revenue payments for corn, soybeans, and wheat of \$9.7 billion when using the 1998 deviations and of \$7.8 billion when using the 1999 deviations would have exceeded the draft total AMS cap. Thus, it appears likely that the U.S. could exceed the draft Doha constraints, especially if prices and yields are higher in the future than over the 1996-2006 crop years.

The higher prices forecast for 2009-2012 would ease WTO compliance considerations for the traditional suite of farm programs at the loan rates and target prices enacted in the 2008 Farm Bill. Under this scenario, total marketing loan and counter-cyclical payments are estimated to be zero for corn and soybeans, and less than \$1 billion for wheat. However, if prices return to their 1996-2006 crop year levels, then payments from these programs likely would violate the Doha draft WTO constraints. Marketing loan payments exceeded the Doha draft product-specific limits in crop years 1998-2000 and 2004-2005 for corn, 1998-2001 for soybeans, and 1998-2000 for wheat. Moreover, U.S. notified AMS exceeded the Doha draft total AMS cap for the U.S. in all years between 1998 and 2005, excluding 2003 (Blandford and Orden).

Summary, Conclusions, and Implications

The *Food, Conservation, and Energy Act of 2008* provides farm commodity program participants with the choice of a traditional suite of direct payment, marketing loan, and price counter-cyclical programs or a new Average Crop Revenue Election (ACRE) suite of programs. The ACRE suite consists of 80 percent of direct payments, marketing loans at 70 percent of the loan rate, and a new state revenue program. ACRE is the first revenue program authorized by a farm bill. Unlike traditional commodity programs, ACRE's revenue guarantee is not a floor but adjusts over time to changes in market revenue.

Two counterfactual analyses were conducted to investigate ACRE. One calculated payments that the ACRE suite of programs would have made had it existed during the 1996-2006 crop years and assuming all acres planted to corn, soybeans, and wheat were enrolled. The second assessment applied the percent variations in acres, prices, and yields that occurred over the 1996-2006 crop years to USDA forecasts of average U.S. acres, prices, and yields for the 2009-2012 crop years.

These analyses provide insights into several policy trade-offs raised by the ACRE revenue program. One is the trade-off between revenue and price protection. Price programs provide no payments if yields are low and prices are high; however, ACRE revenue payments can occur when state yields are low and the percent decline in state yield is relatively greater than the percent increase in U.S. price. Price programs provide payments, potentially large payments, if yields are high and prices are low even when revenue is average or above average. Such a situation occurred during the 2004 and 2005 crop years when marketing loan and counter-cyclical payments made to corn totaled \$12.8 billion. In contrast, counterfactual ACRE revenue payments were estimated to total only \$0.5 billion for 2004 and 2005 because record or

high yields offset most of the impact of low prices. In short, revenue programs provide a different flow of government payments than price programs and thus provide a different match with the incidence of risk.

A second policy trade-off stems from the moving-average, market-based determination of the ACRE revenue guarantee. This feature eliminates the existence of a floor that can provide continuing payments when prices are chronically low. However, it allows support levels to increase when price increases. It is therefore not surprising that, had the ACRE program suite existed over the 1996-2006 crop years, its payments were estimated to be smaller than payments from the traditional fixed price programs. The reverse was found at the higher prices and yields forecast by USDA for the 2009-2012 crop years.

The different time paths and levels of payments occur because fixed price programs and the ACRE revenue program address different risks. Policy objective of the marketing loan and counter-cyclical programs are to assist farmers with managing the systemic risk of chronically low prices that extend over a period of years. In contrast, policy objective of the ACRE revenue program is to assist farmers with managing the state systemic risk of a decline in a crop's revenue over a short period of years, but to avoid creating a floor. The relative importance of these risks will depend in large part on whether chronic "surplus" production capacity exists that will keep prices below legislated fixed support levels. An important, related political economy question is whether Congress would step in to thwart the built-in decline in ACRE revenue payments if prices remain low, as it did when the market loss program was created in the late 1990s.

The third policy trade-off relates to the distortion of market incentives and international trade. Depending on the level and path that prices take, both traditional price programs and the

ACRE revenue program have the potential for large payments. However, ACRE payments will decline as its guarantee adjusts to lower prices and revenues. No adjustment occurs with the traditional marketing loan and counter-cyclical programs. ACRE therefore raises a policy question that has received little attention: Is the economic dislocation caused by 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? The answer to this question has implications both for the design of domestic policy instruments as well as for the development of compliance rules within WTO.

Both the rules of the Uruguay Round and potential Doha Round will continue to allow expenditures on programs that are tied to current production and/or prices. It thus behooves policy makers to create policy instruments that provide the best mix of policy performance attributes. The ACRE program is in essence asking what policy performance attributes are desired given the market conditions that exist in the early 21st 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 elasticities and inter-temporal and spatial price and revenue correlations, to the development of new theoretical constructs to frame the discussion.

Endnotes

1. Separate revenue guarantees are created 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.
2. Loan deficiency and market loan loss payments compose marketing loan payments.
3. Substantial debate has occurred over how to calculate the 2-year moving average of U.S. price. This study employs the two most recent crop years for which any information exists on prices. This method is used in the interim final regulations by USDA, Commodity Credit Corporation. To illustrate, the ACRE state revenue target for the 2006 crop year was calculated using the U.S. price for the 2004 and 2005 crop years.
4. Acres planted to corn included both acres planted for grain and silage. Acres harvested for silage in a state were assigned the yield for acres harvested for grain in the state.
5. USDA forecasts yield per harvested acre. It was converted into a forecast yield per planted acre as follows: $\{[\text{forecast U.S. harvest yield}] \bullet [(\text{average U.S. planted yield for 1996-2006 crop years}) / (\text{average U.S. harvest yield for 1996-2006 crop years})]\}$.
6. The constraint that planted acres on which an ACRE revenue payment is received cannot exceed base acres applies to individual farms. However, some perspective on this constraint can be gained by examining national data. In 2003, base acres of corn, soybeans, and wheat were 87.8, 53.5, and 76.2 million, respectively (USDA, Economic Research Service, November 2008). These base acres sum to 217.5 million. Planted acres for the 1996-2006 crop years (with forecast planted acres for 2009-2012 in parenthesis) were 79.1 (91.8) million for corn, 72.6 (68.9) million for soybeans, 63.0 (58.1) million for wheat, and 214.7 (218.8) million in total (Table 1). For these crops,

total base acres and total planted acres do not differ by much. Hence, while the constraint on ACRE payment acres can have significance for individual farms, this comparison suggests its national impact is muted.

7. 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. It was assumed that the counter-cyclical program parameters for 2002 (base acres, base yield, target prices, and loan rates) existed during the earlier crop years. Counter-cyclical payments of \$2.9, \$0.6, and \$1.3 billion for corn, soybeans, and wheat, respectively, were estimated to have occurred for each crop year from 1998 through 2001. In each of these years, average U.S. cash price was below the U.S. loan rate, resulting in maximum counter-cyclical payment. For each crop, total counter-cyclical payments exceeded total market loss 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. Even though \$0.1 billion of loan deficiency payments were made to corn during the 1997 crop year, no counter-cyclical payments were estimated for corn for this crop year. The reason is that the 1997 season average U.S. price for corn was \$2.43. It exceeded the counter-cyclical payment price of \$2.32, which was the target price of \$2.60 minus the direct payment rate of \$0.28. The small marketing loan payments occurred because corn prices were below the loan rate for a brief period in a few states.
8. If the high revenue year of 2006 is eliminated from this calculation, U.S. revenue per planted corn acre was \$35 higher in 2004 and \$2 higher in 2005 than the average revenue for the 1996-2005 crop years.

9. The \$0.1 billion in estimated wheat marketing loan payments for 2009-2012 forecast acres, prices, and yields occurred in 14 states scattered across observation years 1998 through 2001. The \$0.8 billion in estimated wheat counter-cyclical payments for 2009-2012 forecast acres, prices, and yields occurred in observation years 1998 through 2000.
10. U.S. notifications are under several challenges in the WTO. Outcomes of these challenges could alter this assessment of compliance, both for ACRE and traditional farm programs, but is not addressed herein. See Blandford and Orden for discussion.
11. Besides marketing loans, the U.S. AMS notification for 2000 included loan forfeiture, certificate gains, storages and interest costs, and soybean oilseed payments. These items totaled \$1.3 billion in notified product-specific AMS for corn, soybeans and wheat.
12. To explore the effect of aggregation on estimated payments, ACRE revenue payments were estimated using 2009-2012 U.S. forecast acres, prices, and yields and percent deviations of U.S. acres, prices, and yields from their average values during 1996-2006. They totaled \$20.4 billion, compared with \$27.8 billion in total payments estimated using state level data (Table 3). The comparison by crop (with the state based estimate in parenthesis) was \$7.1 (\$12.9) billion for corn, \$10.2 billion in both analyses for soybeans, and \$3.1 (\$4.7) billion for wheat. ACRE payments were expected to be higher for state than national data because yield variability is greater at the state level. However, the same estimate for soybeans in both counterfactual analyses indicates that other factors are also affecting the outcomes. A likely factor is the relative importance of declines in U.S. price and of declines in state yield to triggering ACRE revenue payments. The greater is the relative importance of declines in U.S. price, the closer should be the state and national estimates.

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Table 1. Average Annual Price, Yield, Revenue, and Planted Acres, Corn, Soybeans, and Wheat, U.S., 1996-2006 Crop Years and Forecast 2009-2012 Crop Years

Period by Crop	Cash Price per Bushel	Yield per Planted Acre	Revenue per Planted Acre	Planted Acres (million)
Corn				
1996-2006	\$2.23	136.7	\$305	79.1
2009-2012	\$3.60	158.0	\$569	91.8
Soybeans				
1996-2006	\$5.73	38.4	\$220	72.6
2009-2012	\$8.81	42.6	\$375	68.9
Wheat				
1996-2006	\$3.30	34.4	\$113	63.0
2009-2012	\$4.66	36.6	\$171	58.1

Note: Yield per planted acre is estimated by applying the average ratio of planted to harvest yield for the U.S. over the 1996-2006 crop years to the yield per harvested acre forecast by the U.S. Department of Agriculture. U.S. yield per harvested acre is forecast to average 160.30 bushels for corn, 43.25 bushels for soybeans, and 43.25 bushels for wheat.

Sources: U.S. Department of Agriculture, National Agricultural Statistics Service (December 2008) and U.S. Department of Agriculture, Office of the Chief Economist (February 2008).

Table 2. Cumulative Actual Expenditures on Traditional Suite of Farm Programs and Estimated Cumulative Counterfactual Expenditures on ACRE Suite of Farm Programs, Corn, Soybeans, and Wheat, U.S., 1996-2006 Crop Years

Farm Program	Corn	Soybeans	Wheat	Total
	Billion \$			
Traditional Suite of Programs				
Direct Payments	\$25.1	\$3.0	\$14.4	\$42.5
Marketing Loan	\$15.1	\$9.9	\$2.6	\$27.6
Counter-Cyclical/Market Loss	\$13.9	\$1.3	\$4.9	\$20.1
Total	\$54.1	\$14.2	\$21.9	\$90.2
ACRE Suite of Programs				
Direct Payments	\$20.1	\$2.4	\$11.5	\$34.0
Marketing Loan Payments	\$0.0	\$0.0	\$0.0	\$0.0
State Revenue Payments	\$5.9	\$6.2	\$3.5	\$15.6
Total	\$26.0	\$8.6	\$15.0	\$49.6

Sources: ACRE state revenue payments are original estimates. Payments for the traditional suite of farm programs are actual payments reported by the U.S. Department of Agriculture, Farm Service Agency.

Table 3. Cumulative Estimated Expenditures on Traditional and ACRE Suites of Farm Programs for Counterfactual Analysis Based on 2009-2012 Forecast Average Acres, Prices, and Yields with Percentage Deviations for 1996-2006 Applied, Corn, Soybeans, and Wheat, U.S.

Farm Program	Corn	Soybeans	Wheat	Total
	Billion \$			
Traditional Suite of Programs				
Direct Payments	\$25.1	\$3.0	\$14.4	\$42.5
Marketing Loan	\$0.0	\$0.0	\$0.1	\$0.1
Counter-Cyclical	\$0.0	\$0.0	\$0.8	\$0.8
Total	\$25.1	\$3.0	\$15.3	\$43.4
ACRE Suite of Programs				
Direct Payments	\$20.1	\$2.4	\$11.5	\$34.0
Marketing Loan Payments	\$0.0	\$0.0	\$0.0	\$0.0
State Revenue Payments	\$12.9	\$10.2	\$4.7	\$27.8
Total	\$33.0	\$12.6	\$16.2	\$61.8

Source: original estimates.

FIGURE 1. Historical Marketing Loan and Market Loss/Counter-Cyclical Payments, Estimated Counterfactual ACRE State Revenue Payments, and Deviation of Revenue from Average Revenue per Acre, Corn, Soybeans and Wheat, U.S., 1996-2006 Crop Years

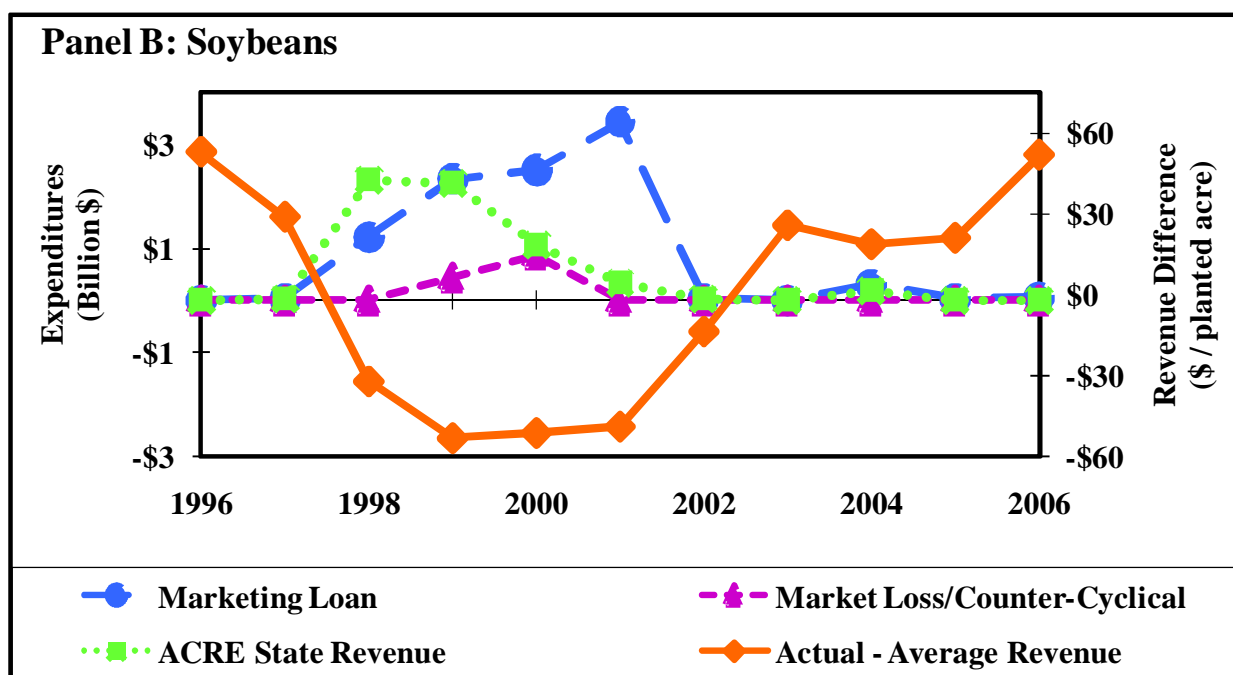
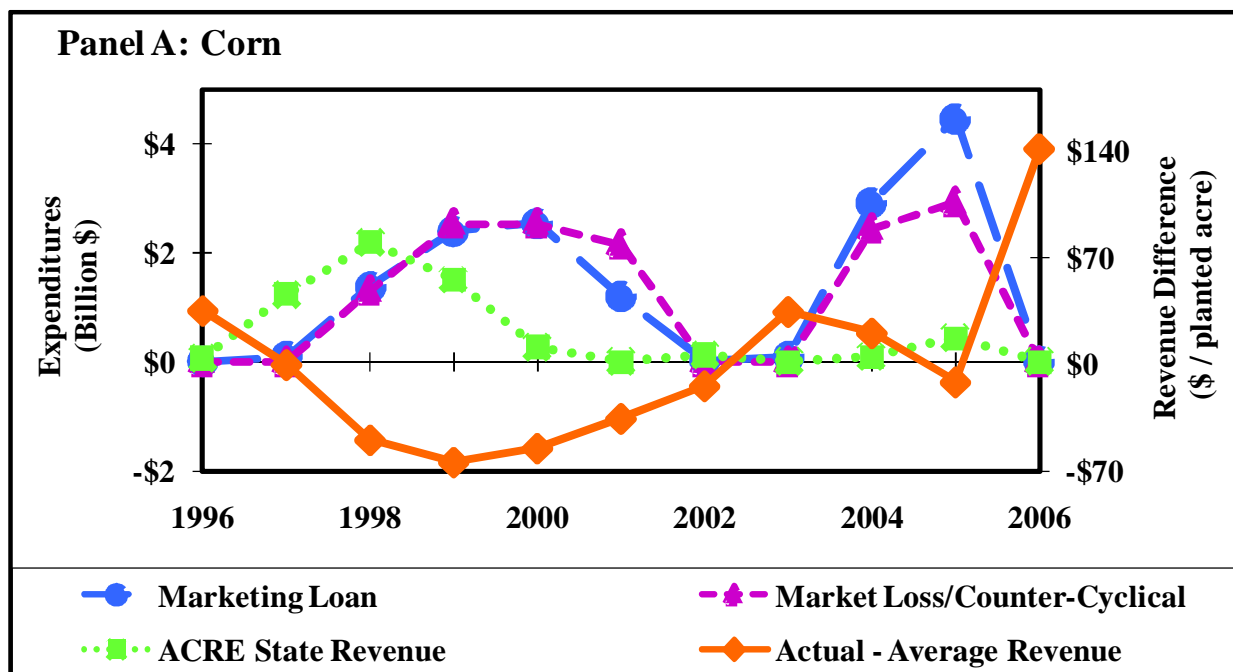
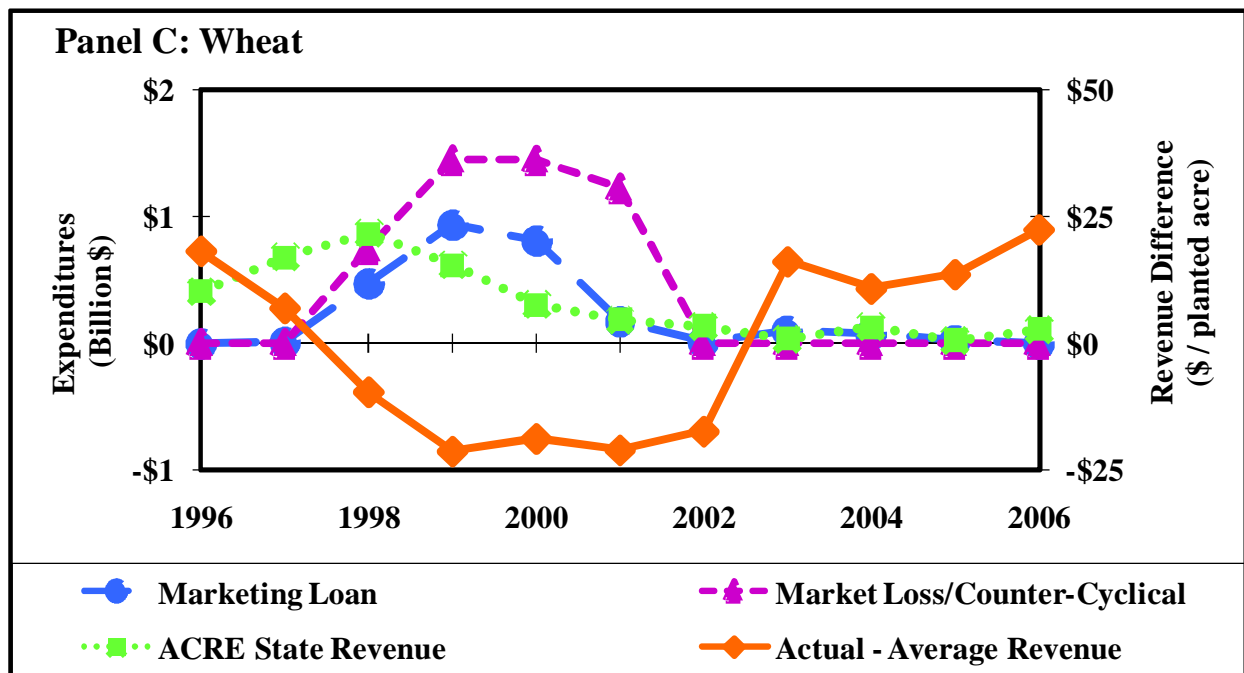


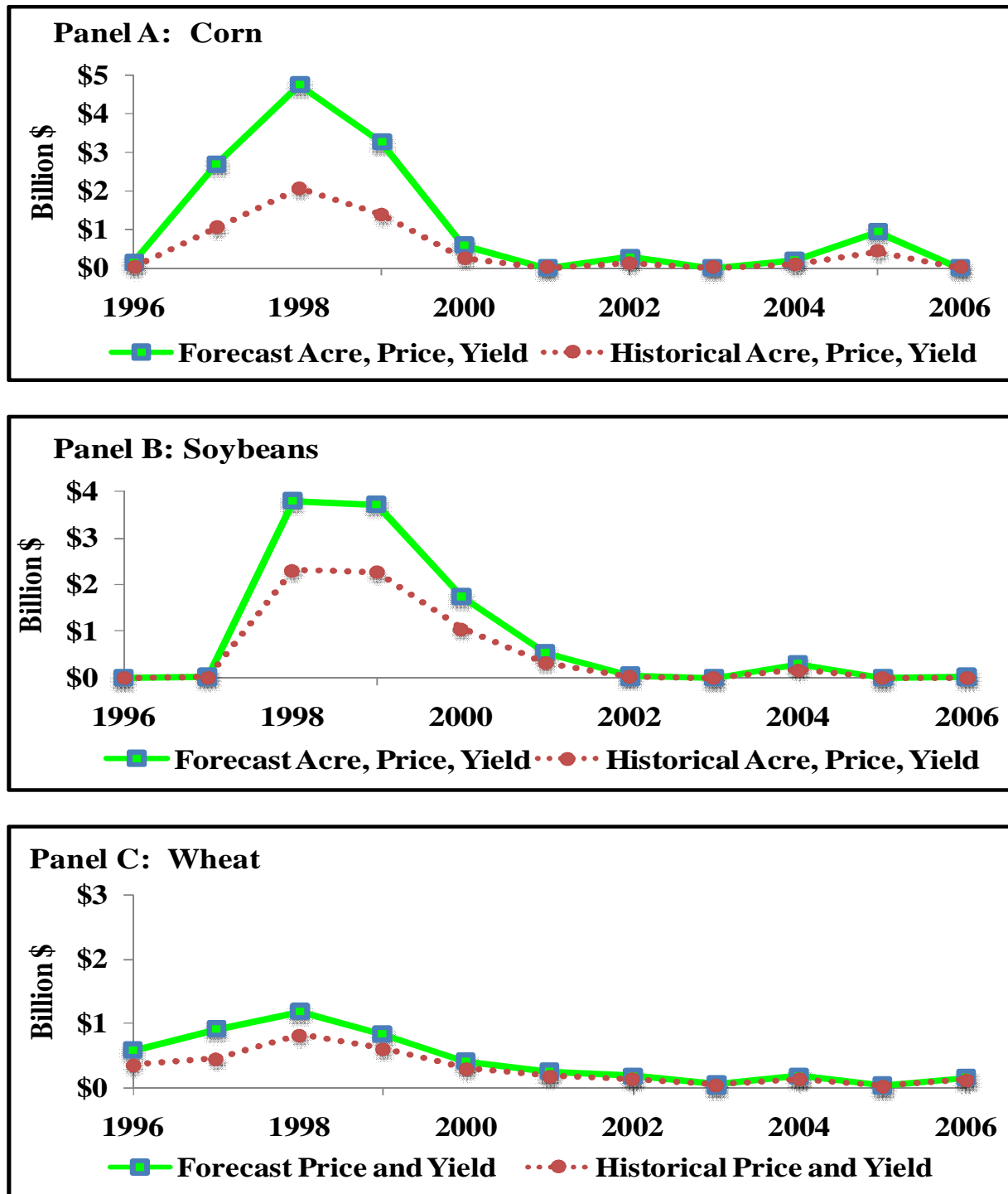
FIGURE 1 (continue)



Note: Actual revenue for a crop year is [(average U.S. crop year price) • (average U.S. yield per planted acre)]. Average revenue is for the 1996-2006 crop years.

Sources: ACRE revenue guarantee payments are original estimates. Payments for the other two programs are actual payments reported by U.S. Department of Agriculture, Farm Service Agency.

FIGURE 2. Counterfactual ACRE State Revenue Payments for 1996-2006 Observed Acres, Prices, and Yields and for 2009-2012 Forecast Average Acres, Prices, and Yields with Percent Deviations for 1996-2006 Applied, Corn, Soybeans and Wheat, U.S.



Note: Forecast values are from U.S. Department of Agriculture, Office of the Chief Economist.

Source: original estimates.