ERS Report Summary

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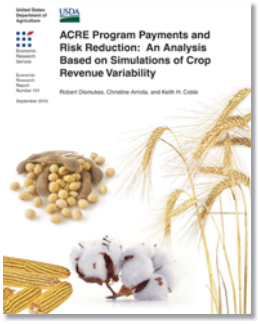

This is a summary of an ERS report.

Find the full report at ***www.ers.usda.gov/publications/err101***

ACRE Program Payments and Risk Reduction

An Analysis Based on Simulations of Crop Revenue Variability

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Using crop revenue as the basis for agricultural payments has long been proposed as a way to reform U.S. farm programs. Proponents recognize that revenue is more closely related to farm income than either prices or yields individually. Thus, a revenue-based program can more efficiently stabilize farm income than price-based commodity programs, while lessening annual variability in Government program costs. The Average Crop Revenue Election program or ACRE, an alternative to price-based commodity programs which was first available to producers in 2009, uses a combination of State- and farm-level revenue guarantees that are determined from recent historic prices and yields. This report examines and simulates crop revenue variability for producers of four crops—corn, soybeans, wheat, and cotton—and estimates potential ACRE payments from a broad range of possible revenue outcomes. We analyze how ACRE payments and their effect on farm-level revenue variability would be distributed across crops and production regions. The four crops included in our model accounted for about half of the value of production of U.S. crops between 2002 and 2007 and more than 90 percent of the value of crops for which ACRE is available.

What Is the Issue?

Historic prices and yields that determine ACRE guarantees can change, and future prices and yields that determine payments are not known with certainty. ACRE revenue guarantees are based on a "moving" 2-year average of (national) market prices and 5-year Olympic averages (dropping the highest and lowest values) of State- and farm-level yields. ACRE payments are triggered when both the farm and State revenues fall below guarantee levels at the end of a crop year. The capability of ACRE guarantees to reflect recent prices and yields and to change over time are major differences between ACRE and commodity programs based on fixed target prices and loan rates. If direct and countercyclical payments are designed to combat unexpectedly low market prices, then the ACRE program can be seen as risk protection for producers adjusting to an era of historically high crop prices. As such, its potential benefits are more pronounced for producers of corn, soybeans, and wheat, who can foresee high expected payments based on recent high prices. The prospects for cotton producers under ACRE in the near term are more mixed. Because revenue variability for a particular crop differs across farms and regions, the potential benefits of ACRE also vary.

What Did the Study Find?

ERS researchers develop a simulation model of crop revenue variability at the State and farm levels for an extensive set of representative farm acres of corn, soybeans, wheat, and cotton. This model is used to analyze the distribution, by crop and region, of potential payments and risk reduction from ACRE.

Key variables in determining crop revenue and ACRE payments are prices, yields, and their interactions, factors that differ across crops and regions. Because crop prices depend largely on world markets, variability in the price for a crop is similar across much of the United States. Yields, in contrast, depend on factors such as weather, diseases, and insects that can affect wide areas at once but are often localized.

An ACRE payment is triggered when annual revenue falls below 90 percent of the benchmark measured at the State level *and* when the farm's annual revenue falls below its benchmark. The magnitude of the ACRE payment depends on the size of the State revenue shortfall, relative to its guarantee, as well as the farm's average yield relative to the State average. Because of this complexity, ACRE payments are not directly related to variability in farm-level revenue.

As such, ACRE is ineffective in covering idiosyncratic risks, shortfalls on an individual farm that are uncorrelated with more widespread losses, and more targeted at systemic or statewide risk. The strength of systemic risk—and thus, the relative effectiveness of ACRE in reducing risk—depends on the level of price variability, the difference between historical prices and expected market prices at a particular time, and the degree to which yield losses on one farm are matched with yield losses on other farms in the State. ACRE is most effective in reducing risk when crop price, which under ACRE is the same for all States and farms, causes revenue to change substantially and when yield losses are widespread.

The effectiveness of the ACRE program in reducing risk, or variability of farm revenue for a crop, is strongly related to the correlation between the farm's revenue variability and variability in State average revenue. The strength of this farm-State correlation differs across crops, States, and across farms within States. It is stronger for corn and soybeans, on average (at the U.S. level weighted by acres planted for farms and States), than it is for wheat and cotton. For example, the top two States in corn and soybean acreage, Iowa and Illinois, have average farm-State revenue correlations of 0.60 and above. In contrast, the top two States in wheat acreage, Kansas and North Dakota, and the top two States in cotton acreage, Texas and Arkansas, have average farm-State revenue correlations of about 0.30 to slightly higher than 0.4.

ACRE payment amounts—based on simulations with expected market prices equal to 2009 guarantee prices—vary across regions, but tend to be highest in the most productive crop regions, as reflected in consistently high yields. ACRE payments for corn and soybeans, for instance, would be high in Midwest areas with high average yields, even though these areas have low yield and revenue variability. For cotton, ACRE payments would be high for irrigated acreage in California and Arizona, where yield levels are high and variability low, and low for Texas, where yield levels are low and variability high.

The geographic distribution of risk reduction for each crop is similar to its ACRE payment distribution: areas where risk reduction is strong tend to be areas with above-average ACRE payments. For soybeans, risk reduction is highest for representative farms in the Midwestern Corn Belt, areas with large shares of planted acres and production, and lowest in Atlantic Coast States, such as North and South Carolina. For corn, risk reduction is also highest in the Corn Belt, though many farms in other corn-producing areas also receive relatively high risk reduction. For wheat, risk reduction is strong in Kansas and North Dakota, major wheat-producing States, but also strong in Ohio, Michigan, and Indiana, States with small shares of U.S. acreage and production. Expected risk reduction for wheat is below average for almost all of the representative farms in Oklahoma and Texas, States with relatively low expected ACRE payments. For cotton, risk reduction from ACRE is also low in the plains of Texas and highest in the irrigated areas in California and Arizona.

How Was the Study Conducted?

The study used data from USDA's National Agricultural Statistics Service and Risk Management Agency to construct a model that simulates random yields, prices, and revenues at farm and State levels for corn, soybeans, wheat, and cotton. The model accounts for correlations among the random variables by use of empirical sampling techniques. The model is national in scope and represents more than 90 percent of the average annual planted acres for corn, soybeans, and wheat and more than 80 percent of the planted acres for cotton.