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Risk-Free Farming?

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The direction of U.S. farm policy changed with the passage of the 2002 farm bill and the 2000 Agricultural Risk Protection Act. Previous farm bills, together with the old crop insurance program, had gradually moved the crops sector toward greater market orientation, with farmers taking on more market risk in exchange for greater planting flexibility. But the beginning of this decade brought with it increased protection against both adverse price movements and crop losses. These policy changes were brought about largely at the behest of farm commodity organizations, who argued that they needed increased protection against the vagaries of weather and market conditions. As we will demonstrate, the reduction in risk that U.S. crop farmers obtain from crop insurance and commodity programs is now so dramatic that we may have entered a new era of risk-free farming.

The U.S. proposals for farm policy reform to the World Trade Organization (WTO) would, if adopted, move U.S. farm policy back toward its previous trajectory of greater market orientation. However, the WTO talks have stalled, so it is worthwhile to take a step back and assess where U.S. policy currently stands. We use illustrations of the distribution of returns with and without government programs to show the impacts of these programs on farm financial risk in a single growing season. The assessment begins with a review of the U.S. farm policy legislation process and whom it most benefits.

What Type of Producer Benefits from U.S. Farm Policy?

Evidence would suggest that U.S. farm policy is primarily designed to meet the interests of commodity associations. Early in 2001, Larry Combest, then the chairman of the House agriculture committee, asked the National Corn Growers Association, the National Cotton Council, the American Soybean Association, the Rice Growers Association, the Wheat Growers Association, the National Barley Growers Association, and other associations what farm program provisions they wanted to see in the new farm bill. Chairman Combest, along with the members of the House and Senate agriculture committees, then designed a bill to meet their wishes. The legislation passed through Congress and was signed into law by the president in May 2002.

These commodity associations are national associations of farmers. It seems self-evident that the associations represent the interests of their farmer-members. But typically, the association leaders are chosen from the most successful farmers, who often have large, well-financed operations with lower-than-average costs and higher-than-average volumes.

Profit incentives in a commodity system lead crop producers to focus on low costs and high yields. Thus, commodity organizations, who are led by the most successful commodity producers, will tend to support farm policies that support the kinds of farm operations that are most successful in a commodity system.
Before examining the financial effects of the various government programs, let’s look at a representative farm’s financial picture without farm programs. At planting time, U.S. farmers do not know either the price they will receive for their crops or what their harvested yield will be. To capture this uncertainty, we build a representative farm and repeat a crop year 5,000 times and record the outcome. There are 5,000 different yield and price outcomes. We chose a representative corn farm in Boone County, Iowa, with a local expected farm price set at $2.15/bushels (bu) and an expected yield of 150 bu per acre (ac). The standard deviation of price is set at $0.45/bu and the standard deviation of yield is 43 bu/ac.

A histogram constructed from the 5,000 revenue draws is shown in Figure 1. The histogram shows the range of possible revenue outcomes as well as the probability of outcomes. Variable costs of $150 are subtracted so that the distribution shows net revenue. One measure of the amount of risk that a farmer faces is the probability that revenue will not be adequate to cover a certain level of variable production costs. A farmer who covers variable costs has some money left over to pay off fixed expenses. Figure 1 shows that that average net returns for this corn farmer are about $163/acre. There is a very low probability (4 percent) that net returns are negative. On average, this farmer will
have approximately $163 left over to pay all other expenses, including land, fixed machinery expenses, and management. For a cash renter, land costs would increase variable costs and the entire histogram would shift to the left, which demonstrates the increased risk that cash renters face relative to owner-operators.

Most other U.S. crop farmers face relatively more risk than this corn farmer. Iowa corn farmers have the advantage of highly productive soils and a natural hedge between price and yield. When yield is low, the price is likely to be higher than expected, thus buffering the negative impacts of low yields. And low prices are likely caused by a bumper crop in Iowa, which helps insulate Iowa corn farmers from financial trouble.

**IMPACT OF GOVERNMENT PROGRAMS AND CROP INSURANCE**

Now let’s look at the effects of government programs on the financial risks of this farm. The effects of all the programs are revealed by comparing the distribution of market plus government receipts to the distribution shown in Figure 1.

Figure 2 shows the aggregate effect of these programs on a farmer’s risk. As can be readily seen, the amount of risk that this farmer faces is now significantly reduced and the expected returns over variable costs are dramatically increased. Average net returns increase 46 percent to about $239/ac with the programs in place. Perhaps the best way to characterize the effects of the programs is that with the programs in place there is now less than a one-in-six chance that total revenue will fall below $163/ac, which is the average revenue without the programs. As shown in Figure 2, there is no chance that farmers in Boone County will not be able to cover their non-land variable costs. It is in this sense that we can speculate that corn farming in Boone County has become “risk free.”

**THE PICTURE FOR WHEAT AND COTTON**

Figures 3 and 4 depict pictures of risk for a wheat farmer in Reno County, Kansas, and a cotton farmer in Tallahatchie County, Mississippi. The pictures for wheat and cotton are similar to that of corn but there are some significant differences. Without government programs, wheat producers in this Kansas County have a small probability of negative returns. Payments and crop insurance subsidies increase the average return to wheat farming by 72 percent. This compares to the 46 percent increase for the corn farmer. The probability that returns over variable costs fall below $60—which is the average return with no programs—is approximately 7 percent. Thus, if we define risk as the probability that returns over variable costs are less than expected returns under no government programs, then the programs combined with crop insurance have essentially reduced the risk for wheat farming to near zero.

The impact from government programs is even more dramatic for cotton. Based on an expected local price of $0.52 per pound (lb), an average yield of 700 lb/ac, and variable costs of $325/ac, the expected market returns over variable costs for our Mississippi cotton farmer are only $39/ac. And the probability that...
market returns will be greater than variable costs is only 54 percent. Government programs increase expected returns by 516 percent to $200/ac. And the probability that returns over variable costs fall below expected revenue with no government programs is zero. Thus, government has taken the risk out of cotton farming.

U.S. crop producers largely have obtained what they sought: risk-free farming courtesy of government programs. This conclusion implies nothing about the relative merits of the various programs or whether the programs should be modified. But the programs do create the incentive for farmers and landlords to focus on growing the commodities that are supported by farm programs. Furthermore, an increased incentive to plant those hybrids and varieties that have the highest yields and lowest costs is what we would expect from a program designed to meet the interests of the most efficient producers of commodities. The programs would look quite different had the durum wheat and white corn producers been instrumental in their design.

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“Targeting” Efficiency in the Conservation Security Program

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targeting of watersheds will be equally beneficial.

In an attempt to provide some insight into the potential importance of targeting funds to various watersheds, we employed a water quality model, the Soil and Water Assessment Tool, to simulate adoption of conservation tillage (one of the practices included in the CSP) in the Des Moines River Watershed and the Iowa River Watershed. We combined this model with an economic model predicting the costs of obtaining adoption of conservation tillage in these watersheds based on a payment program like the CSP. To highlight the potential consequences of targeting, we consider two scenarios: full adoption of conservation tillage in the Des Moines River Watershed with no additional adoption in the Iowa River Watershed and the opposite adoption pattern (no new adoption in the Des Moines River and full adoption in the Iowa River Watershed).

Table 1 shows the levels of sediment (based on a 20-year projected average) and the estimated costs at the watershed outlets. As columns 1-3 indicate, the estimated percentage reduction in sediment erosion between the two scenarios is about the same (about 6 percent), but the original level of sediment load is much higher in the Iowa River Watershed than in the Des Moines River Watershed. Thus, the total sediment load reduction is about twice as high by targeting the Iowa River Watershed. This is consistent with column 4, which reports the average sediment load reduction per acre of land converted to conservation tillage.

However, the costs of adoption can vary significantly with targeting and need to be considered in assessing the consequences of targeting. The median cost of adopting conservation tillage in the two watersheds is about 20 percent higher in the Iowa River Watershed (we estimate the median costs of adoption to be $11/acre in the Des Moines River Watershed). While the total cost of sediment reduction is higher in the Iowa River Watershed, the per ton cost of sediment reduction is significantly lower (see columns 5 and 6). Targeting the Iowa River Watershed results in a higher overall reduction in sediment at a lower average cost per ton than does targeting the Des Moines River Watershed.

This particular example is only indicative of the different outcomes that could occur under various targeting mechanisms. However, the results of this simple simulation suggest that by targeting different watersheds, as proposed in the CSP, the Natural Resources Conservation Service will significantly affect the location, degree, and cost effectiveness of water quality improvements. Details of this research and other studies focusing on the consequences of targeting and conservation programs can be found at www.card.iastate.edu/environment/.

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