FEATURE

Managing Risk With Revenue Insurance

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FEATURE

- Crop revenue insurance offers farmers a way to manage revenue variability that results from yield and price risks.
- Commodity-level revenue insurance, particularly for corn, soybeans, and wheat, has become a major part of the subsidized Federal crop insurance program.
- Whole-farm revenue insurance, based on combined revenue from all commodities produced on a farm, is a more broad-based approach, but is difficult to administer.

Farming is an inherently risky business. Uncertain weather conditions, market shifts, and other events beyond a farmer's control affect farm yields and commodity prices, creating variability in farm revenue. Since the early 1980s the Federal Government has promoted insurance as a tool for managing crop losses. In its simplest form, insurance reduces risk by making payments to insured farmers when yields or revenues fall below a guaranteed level. Farmers can choose from a variety of insurance plans in the subsidized Federal crop insurance program, including yield insurance plans, which have been part of the program from the outset, and revenue insurance plans, which were added in the mid-1990s.

As a tool based on revenue shortfalls rather than on yield or price shortfalls, revenue insurance can be more effective at stabilizing income than insurance plans or farm programs that protect against yield and price risks separately or that provide fixed-income transfers. A revenue-based program may also offer a simple way of assisting a wider variety of farms than programs linked to current or historical production of particular commodities, a practice that focuses risk management support only on certain segments of the farm sector. Finally, revenue insurance plans are designed to match costs of risk protection with benefits and to base coverage on the market value of the item insured.

What Causes Revenue Variability?

Revenue depends on production, prices, and interactions between the two. Prices received by farmers depend largely on world market conditions, while yields depend on localized factors, such as weather. Thus, revenue variability across farms is largely the result of yield variability and differences in the relationship between prices and individual farm-level yields.

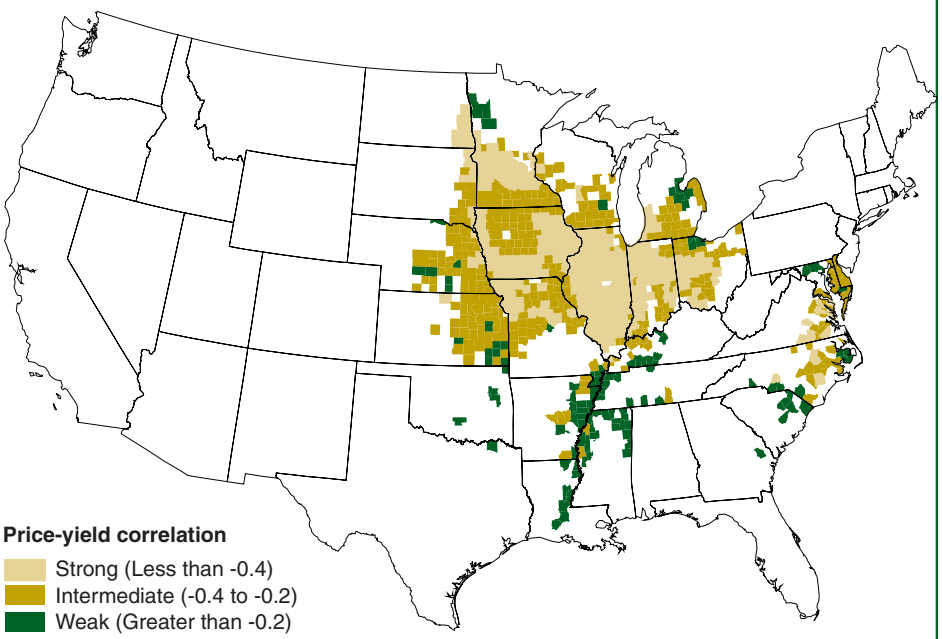
The relationship between prices and yields is "negative" when changes in yield and aggregate production result in offsetting changes in prices. In other words, when yield and aggregate production of a commodity increase, price decreases; when yield falls, price rises. The price-yield relationship, measured by the price-yield correlation, tends to be strongest in areas where most farm-level yields are closely related to areawide production and where the area's production normally accounts for a significant share of world production. Corn and soybeans, for example, show the strongest negative price-yield correlation in the Midwest. Negative price-yield correlations moderate revenue variability, thus they are often referred to as a "natural hedge."

Not surprisingly, many areas with large amounts of corn and soybean production tend to be areas of low yield variability. Yield variability for corn, for example, is low in Illinois and Iowa, which together account for about a third of the U.S. corn crop. The U.S. crop typically accounts for about 40 percent of world production. Because of the low yield variability and the strong price-yield correlations, revenue insurance costs are relatively low in these areas and producers tend to see a correspondence between revenue variability on their farms and the protection offered by revenue insurance. In contrast, for crops in areas with high yield variability and weak price-yield correlation, such as cotton in Texas, revenue insurance costs are higher.

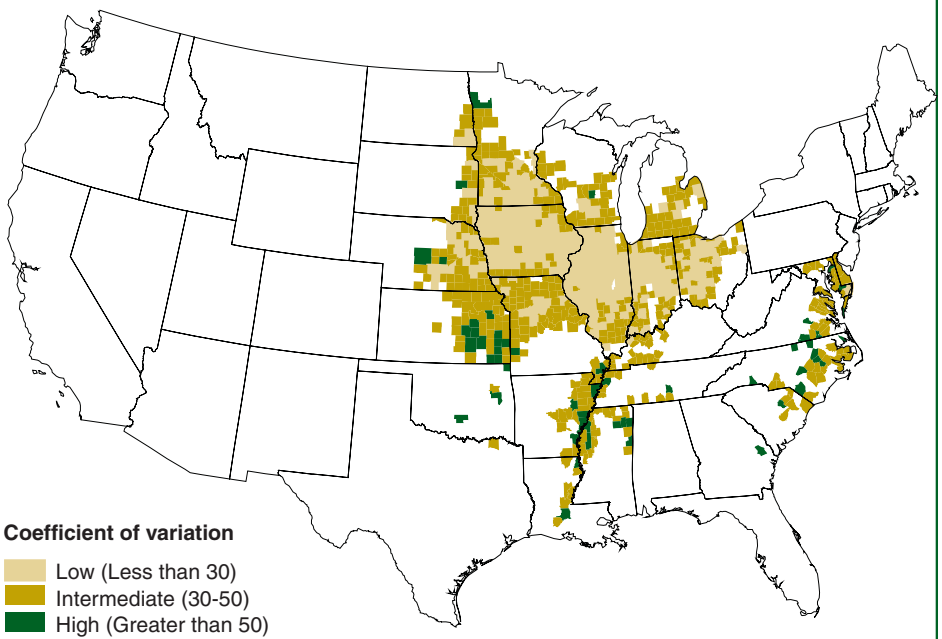
The benefits from revenue insurance depend on the type of program and the type of subsidy offered with revenue insurance. The Federal crop insurance program pays premium subsidies that encourage producers to buy revenue insurance and pays administrative subsidies to private insurance companies that sell and service revenue insurance. These subsidies are based on a share of the premium value of the revenue insurance policies sold.

While the subsidization of revenue insurance helps producers reduce risk, the subsidies also transfer income, although this income is realized only when an insurable loss occurs and results in an indemnity payment. A subsidy structure based on uniform proportions of a premium across areas and crops transfers greater amounts of income per dollar of insured value to riskier crops and areas where premium rates are higher. However, producers of risky crops in risky areas face higher premiums due to greater revenue variability, and may see little relationship between their yields and market price; thus, they still may be reluctant to buy revenue insurance.

For soybeans grown in the Midwest, offsetting price-yield variability is strong . . .



. . . and revenue variability is low



Source: Analysis by USDA, Economic Research Service of yield data from USDA's Risk Management Agency and price data from USDA's National Agricultural Statistics Service.

Revenue Insurance Participation Grows With Subsidies

Revenue insurance was first available under the Federal crop insurance program in 1996. Initially, it was available for corn, soybeans, wheat, and cotton in a limited number of counties. In the late 1990s, availability of revenue insurance for these crops increased and revenue insurance plans for grain sorghum, canola, barley, rice, and sunflower were added. In 2006, revenue insurance accounted for 57 percent of all acreage insured under the Federal crop insurance program, including about three-quarters of the insured acreage of corn, soybeans, and wheat, the top three crops in the program.

When buying revenue insurance, a farmer chooses, before planting, an insurance plan and a coverage level (a share of expected revenue) and pays a portion of the insurance premium that is based on the risk covered. If actual revenue at the end of the season falls below the coverage level multiplied by the amount of expected revenue, the insurance pays an indemnity equal to the difference.

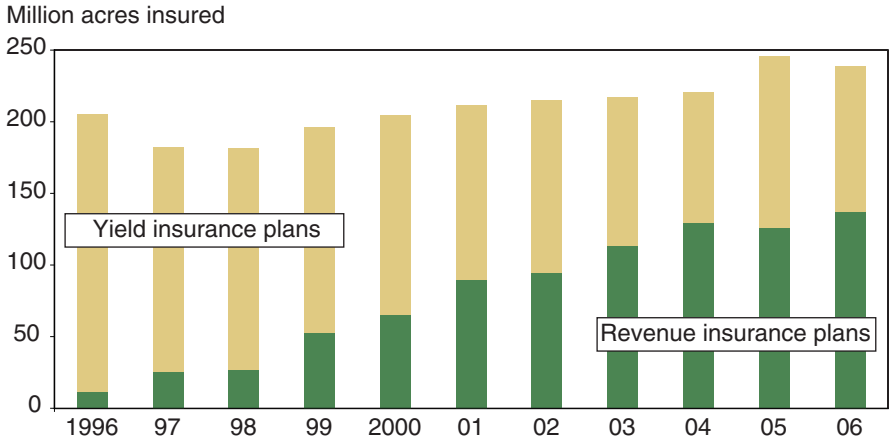
Premium subsidies have been key to inducing farmers to increase their crop insurance coverage. Subsidies for crop insurance, especially for revenue insurance, have been rising since the 1990s. Between 1996 and 2006, the share of subsidized revenue insurance premiums grew from less than 30 percent to 56 percent. In 2006, the Government paid $1.8 billion in revenue insurance premiums, and producers paid $1.4 billion.

The overall increase in premium subsidy has included increases in the subsidy rates for higher coverage levels. In response to the increased subsidies and reduced premium costs, producers have insured higher proportions of their expected revenues. In 1999, for instance, about half of the acres insured under revenue insurance were covered at the 70-

percent level or higher. By 2002, about three-quarters of the revenue-insured acres were at coverage levels of 70 percent or higher. The most popular coverage levels have been 70 and 75 percent of expected revenue.

The variety of options under the Federal crop insurance program gives producers several choices for determining their revenue coverage. Two have been especially popular: coverage that increases if the harvest-time price of the crop is higher than the pre-planting-time price and coverage that is based on separate insured units on the farm. The increasing price feature, called "replacement cost" or "harvest-price option," is attractive to producers because an increase in commodity price can be associated with a drop in yield. The higher coverage would allow a producer to replace lost production at the higher price. Subdividing insured acreage is attractive because if units are insured separately, losses on one unit are not offset by production on another.

Revenue insurance acreage surpasses yield insurance acreage in Federal crop insurance program



Source: Tabulations by USDA, Economic Research Service of Summary of Business Data from USDA's Risk Management Agency.

Revenue Insurance Guarantees Fluctuate With Markets

Crop revenue insurance covers variation in market revenue only over a growing season. Revenue is determined from market prices at the beginning and end of the season. Revenue insurance does not cover interyear revenue variation. The dollar amount of revenue coverage can rise or fall from year to year to reflect different market conditions.

Allowing insurance coverage to vary with market conditions reduces interference with market signals. If prices used to calculate revenue for insurance purposes exceeded expected market prices, producers would have an incentive to alter production merely to collect on the insurance. If prices were below expected market prices, the risk protection provided by the insurance might be insignificant and producers would have little interest in the protection offered. Such "overinsurance" or "underinsurance" would also undermine an insurance program's balance between premiums and indemnities and could make the program unsustainable.

Canada's experience in the 1990s with the Gross Revenue Insurance Plan (GRIP) illustrates the problem of overinsurance. In 1991, the Canadian Government offered farmers a commodity-level revenue insurance that used historical prices rather than current prices to set guarantees. Specifically, GRIP used average prices over the previous 15 years, which included the relatively high prices of the late 1970s and early 1980s. Because indemnities (insurance payments) were based on the difference between high historical prices and prices in the insured years, indemnities greatly exceeded premiums. By 1998, GRIP was largely discontinued due to financial pressure on the government.

The revenue insurance plans in the U.S. Federal crop insurance program use prices that reflect market conditions in the insurance period and that are observ-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able by both producers and insurers. In particular, the plans use prices of futures market contracts to determine the value of the insured commodity at the beginning and end of the season, which simplifies calculation of revenue guarantees and losses and ensures that coverage is consistent with current market prices. The availability of data on market expectations is critical to operation of the revenue insurance policies of the crop insurance program.

Whole-Farm Revenue Insurance: Simple Idea, Difficult To Administer

A more broad-based form of revenue insurance—whole-farm revenue insurance—covers all farm enterprises and thus may have wider appeal than commodity-based insurance. Like single-commodity insurance, whole-farm insurance charges risk-based premiums and makes payments (indemnities) when revenue drops below expectations. But, instead of covering revenue for each crop on the farm separately, whole-farm revenue insurance covers combined revenue.

USDA's Risk Management Agency operates two small programs of whole-farm revenue insurance: Adjusted Gross Revenue (AGR) and Adjusted Gross Revenue-Lite (AGR-Lite). Intended for producers of commodities for which single-commodity crop yield and revenue insurance are available, AGR and AGR-Lite have limits that keep them from being full-fledged whole-farm insurance programs. Although simple in concept, developing and operating a whole-farm revenue insurance program that would be available to all farmers is not likely to be simple.

A major issue would be determining and measuring the risks covered. Developing premium rates for whole-farm insurance is complex because coverage includes all prices and yields and their interrelationships on a particular farm. Expanding the limited AGR and AGR-Lite insurance plans into a program for all farms would likely mean covering risks from more farm enterprises, particularly more specialty crop and livestock enterprises, which would make such a program even more complex. Moreover, if the insurance were to cover net, rather than gross, revenue, input cost variability would have to be considered in determining coverage and measuring risk.

Determining the level of income and the farming activities covered by a whole-farm insurance policy would challenge both producers and insurers. AGR and AGR-Lite rely heavily on tax records but often have to make adjustments to account for changes in inventory to make insured income levels correspond to production in a calendar year. Most farmers report income on their tax schedules when the money is received or paid, which may not reflect the underlying annual revenue risk.

How well a farm's historical income indicates expected income in the insurance year is also critical. Farm operations often change size and commodities from year to year. For example, expanding a farm by renting additional land or switching land from corn to soybeans can dramatically change overall expected gross revenue. These changes result in variability in income that is not simply the result of risk or unexpected variability. Unless income data are adjusted, a process that is likely to be complex, farms can be significantly overinsured or underinsured.

Verifying insurance losses and paying claims pose an additional problem. Existing revenue insurance payments at the commodity level are triggered by readily observable prices and crop losses. Whole-farm revenue insurance, in contrast, incorporates prices and production of many farming activities that are hard to verify. Complex rules have been developed for measuring and validating insured losses under AGR and AGR-Lite policies. In addition, because tax filings are used for documenting income, several months can elapse between the event that caused a drop in income and the filing of the documentation for a claim (see box, "Canadian Agricultural Income Stabilization: A Whole-Farm Revenue Program").

Can Revenue Insurance Provide Adequate Risk Management?

Although revenue insurance has several characteristics that make it a valuable risk-management tool, it may not provide farmers with what policymakers and the farmers themselves regard as adequate coverage. Because both single-commodity and whole-farm revenue insurance combine risks, they can mean less frequent, lower payments to farmers when the risks offset each other. Single-commodity revenue insurance combines price and yield coverage. Whole-farm revenue insurance combines coverage of individual commodities on a farm. Experience suggests that farmers prefer to separate insurance protection. For example, most participants in the Federal crop insurance program subdivide their farm acreage for insurance purposes, even though doing so requires that they forgo a premium discount.

Canadian Agricultural Income Stabilization: A Whole-Farm Revenue Program

Since 2003, the Canadian Federal and provincial governments have operated the Canadian Agricultural Income Stabilization (CAIS) program for Canadian farmers. Although not truly insurance, CAIS has several characteristics of a fully subsidized whole-farm income insurance program. CAIS allows participants to shift the risk of income declines to an insurer, the government in this case. Participants establish insured amounts of income based on recent history. Like insurance, the program makes immediate and ongoing protection available to all participants. Unlike insurance, participants are not charged a risk-based premium. Instead, they pay a flat fee per amount covered.

Under CAIS, the amount of income to be covered is based on a producer's margin. The margin is defined as income minus expenses directly related to the primary production of agricultural commodities on the farm. In particular, income is the sale of agricultural commodities and proceeds from production (crop) insurance but excluding other government payments; expenses are costs, such as feed, fertilizer, and pesticides. CAIS payments are made when a farmer's claim-year margin falls below his or her reference margin, which is an Olympic average of the producer's margin for the previous 5 years. (An Olympic average is a 5-year average that "drops" the highest and lowest values.)

The CAIS participant annually selects a level of protection, a proportion of his or her historical margin. Substantial government benefits are paid if the participant's margin falls. As the producer's loss deepens, government assistance increases. The first 15 percent of a producer's loss (the part between 100 percent and 85 percent of the margin) would be shared 50-50 with the government. For the next 15 percent of loss, the government's share is 70 percent of the drop in margin. For the portion of the decline less than 70 percent of the reference margin, the producer would receive 80 percent from the government.

CAIS provides for situations in which the margin is negative, that is, when expenses exceed income. If the producer satisfies certain criteria, the producer is eligible to receive 60 percent of the program-year margin decline that falls within the negative margin. However, the maximum total government contributions that a farmer can receive under CAIS in a given year is capped at the lesser of C$3 million, or 70 percent of the margin decline of the program-year margin relative to the reference margin. Any negative portion of the program-year margin is included in the calculation of the 70-percent cap.

CAIS has undergone two major changes since it was introduced. One reduced the participation cost to producers. In the first years of the program, 2003-05, a participant was required to maintain a deposit of 22 percent of the reference margin in a CAIS account. In 2006, the deposit was replaced by an annual "participation fee" of C$4.50 per C$1,000 of margin covered. The other change was to include a "market loss" in payments to producers. In 2006, the method of calculating inventory changes was amended so that losses in inventory values caused by declining commodity prices are reflected in a producer's payment. This method is applied to market commodities but not to productive assets such as breeding livestock. Additional payments, based on the new method, were made to producers for 2003-05.

Because insurance design requires that insured producers pay the first portion of any loss (the deductible), it may seem that insurance cannot provide adequate protection because coverage will always be less than the full value of the item insured. While reducing deductibles can make insurance more attractive, it also increases costs as well as loss claims, and tends to lead to overinsuring, thus interfering with market signals.

Neither single-commodity nor whole-farm revenue insurance provides coverage against multiple-year income declines. These policies base coverage on historical yields and expected market prices, in the case of single-commodity insurance, and on historical income, in the case of whole-farm insurance. If these measures indicate a revenue decline, revenue insurance coverage will decline. One way to counteract this is to use fixed target prices or target revenues instead. This modification, however, would make the protection less of an insurance tool and more of an income-support program.

This article is drawn from . . .

Whole-Farm Approaches to a Safety Net, by Robert Dismukes and Ron Durst, EIB-15, USDA, Economic Research Service, June 2006, available at: www.ers.usda.gov/publications/eib15/

You may also be interested in . . .

The ERS Briefing Room on Farm Risk Management, www.ers.usda.gov/briefing/riskmanagement/