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Understanding ARC-CO as a Multiple Year Loss Assistance Program

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This article continues the discussion of ARC-CO (Agriculture Risk Coverage – County farm program) begun with the November 25 *farmdoc daily* article, "Understanding ARC-CO: Transition Assistance vs. Support Assistance." This article examines ARC-CO's assistance for multiple year loss, including two policy innovations: (1) a 10% cap on per acre payment and (2) using the Price Loss Coverage (PLC) program's reference price as a minimum price in calculating ARC-CO's benchmark revenue.

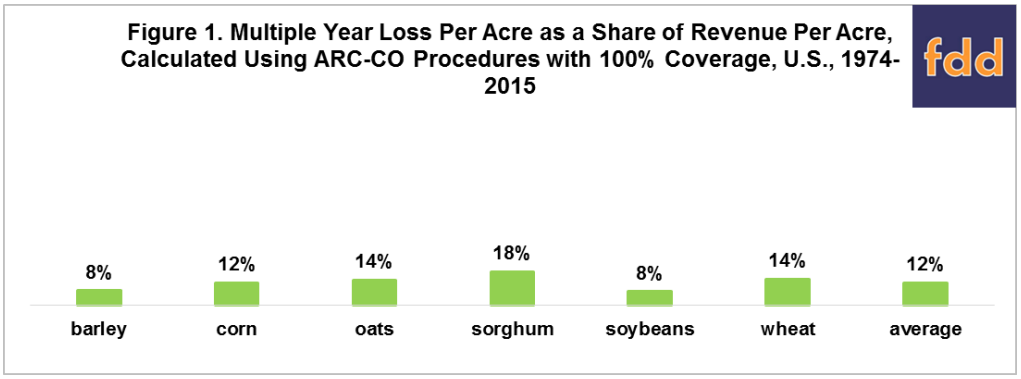
Analysis

ARC-CO assistance (alternatively, ARC-CO payment) is analyzed for barley, corn, oats, sorghum, soybeans, and wheat. U.S. price and yield are collected for the 1974-2015 crop years from the U.S. Department of Agriculture, National Agricultural Statistics Service *QuickStats* database. A trendline yield is computed for each crop year using linear regression. For each crop year, percent deviation of its yield from its linear trendline value is computed. Also computed is the percent deviation of price from the average price either for 1974-2006 or for 2007-2015, depending on which of these periods the crop year falls. The first period is a period of stationary prices prior to the price run up that occurred in the second period. The pairs of percent deviations in price and yield for each crop year are then applied to the 2015 crop year U.S. price and yield forecasts reported in the November 2015 *World Agriculture Supply and Demand Estimates*. This simple procedure normalizes the analysis on current U.S. prices and yields while utilizing variations in U.S. price and yield, as well as the relationship between them, historically observed for a crop year. The focus is on per acre payment because payment per acre is a key determinate of the potential for a policy to impact which crop a farmer decides to plant. Because U.S., not county, yield is used, the estimated assistance is referred to as indicated assistance. Yield usually varies widely across counties in a crop year.

Magnitude of Multiple Year Loss

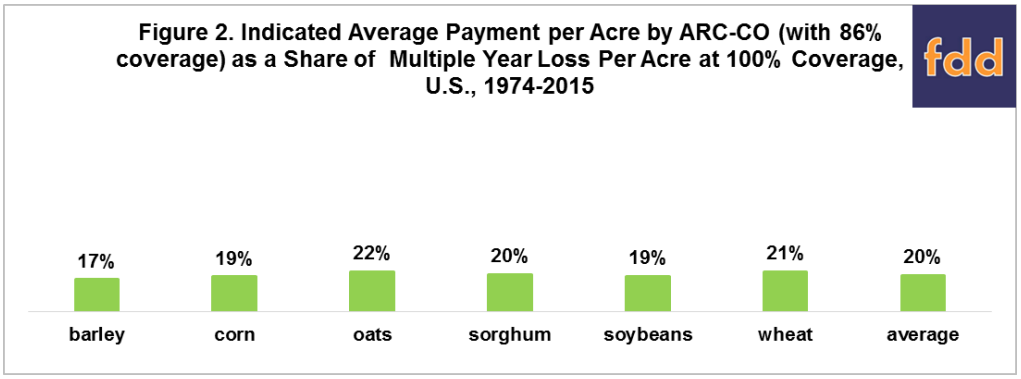
A key policy question for any risk management program is how much risk exists? Because no commonly-accepted definition of multiple year loss exists, it has to be defined by a program. ARC-CO

defines multiple year loss via its payment formula. Payment is made when crop year revenue is less than [benchmark revenue times 86% coverage]. Benchmark revenue is the product of a [5-year Olympic moving average of U.S. crop year price times a 5-year Olympic moving average of county yield per planted acre] (in this analysis, U.S. yield is used). But, a crop year's price used to compute benchmark revenue cannot be less than the crop's reference price in the PLC program. Given ARC-CO's formula, a common sense measure of how much risk exists is the loss that occurs when coverage is set at 100% of benchmark revenue. The level of indicated loss per acre using this measurement of multiple year loss expressed as a share of average revenue per acre ranges from 8% for barley and soybeans to 18% for sorghum (see Figure 1). The average for the 6 crops is 12%. These share suggest multiple year loss is a non-trivial risk for farmers.



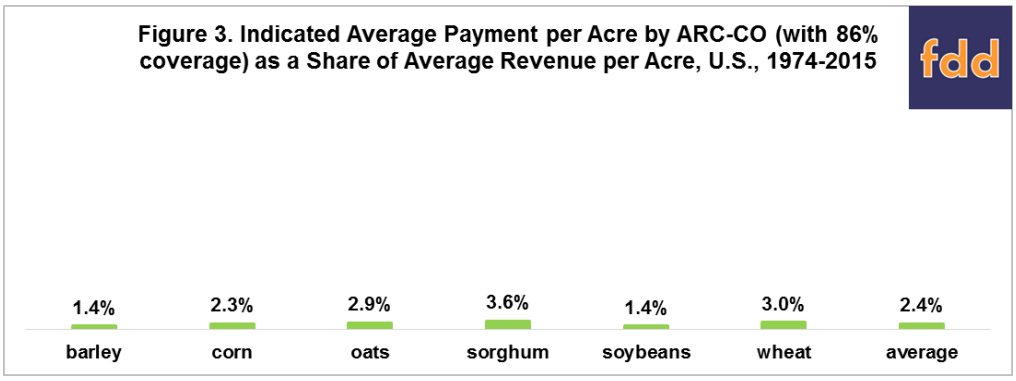
ARC-CO's Assistance with Multiple Year Loss

Another key question for any risk assistance program is how much of the risk does it cover? When expressed as a share of the multiple year loss calculated for Figure 1, ARC-CO's indicated per acre payment at its legislated coverage rate of 86%, 10% payment cap, and 85% acreage payment factor ranges from 17% for barley to 22% for oats, with an average of 20% for the 6 crops (see Figure 2). Thus, ARC-CO provides assistance for between one-sixth and one-fourth of multiple year loss given ARC-CO's definition of multiple year loss.



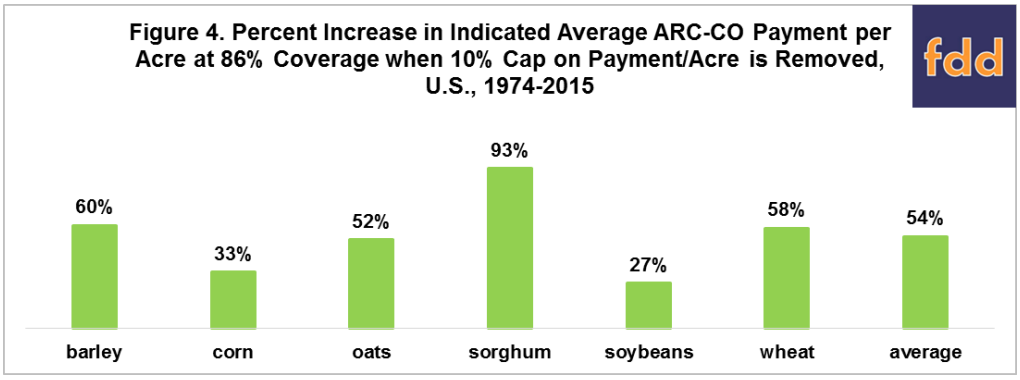
ARC-CO's Assistance Relative to Crop Revenue

A key question when assessing any public policy is what share of business revenue can come from the policy? Indicated average per acre payment by ARC-CO expressed as a share of average revenue per acre ranges from 1.4% for barley and soybeans to 3.6% for sorghum (see Figure 3). The small shares and relatively narrow range across the 6 crops suggest that ARC-CO payments are unlikely to notably alter the distribution of revenue over time across the 6 crops.



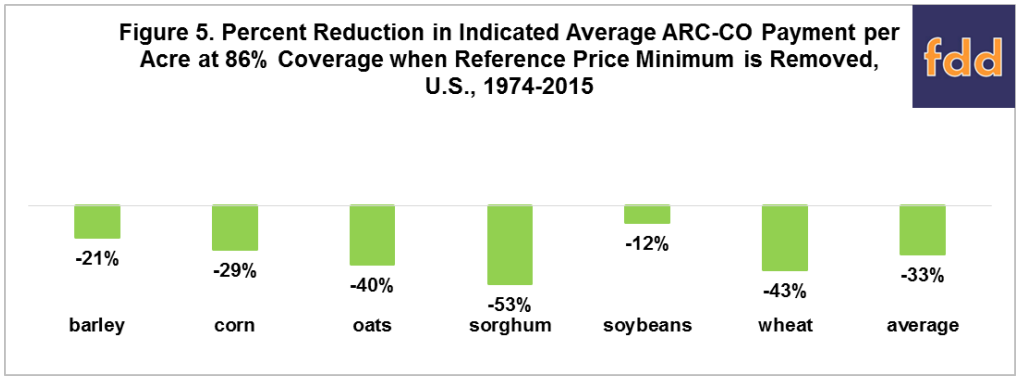
ARC-CO's 10% per Acre Payment Cap

This policy design innovation in ARC-CO is in essence a payment limit applied to land instead of a person or business entity. Removing the cap increases indicated ARC-CO payments per acre by an average of 54% across the 6 crops. The increase ranges from 27% for soybeans to 93% for sorghum (see Figure 4). The large increase for sorghum reflects in part its higher yield variability. Over the 1974-2015 analysis period, standard deviation of percent deviation of yield from its linear trendline was 16% for sorghum, compared with 10% for corn and barley, and 8% for the other crops. For all 6 crops, the per acre payment cap has a greater impact on total payments does the 15% reduction in payment acres.



ARC-CO's Reference Price Minimum

Another important policy design innovation by ARC-CO is making the PLC reference price a floor for the price used to calculate the ARC-CO benchmark revenue. Removing the reference price minimum means the lower market price is used to calculate benchmark revenue and thus reduces ARC-CO payments. The reduction ranges from 12% for soybeans to 53% for sorghum, with an average reduction of 33% for the 6 crops (see Figure 5).



Summary Observations

- No commonly-accepted definition of multiple year loss exists. Thus, a program has to define it. ARC-CO defines it via a formula for calculating benchmark revenue that involves 5-year moving averages of county yields and U.S. crop year price, with the crop's reference price as a minimum price for any of the 5 crop years. As discussed extensively in the November 25, 2015 farmdoc daily article, this formula means ARC-CO is a hybrid program that can provide both transition assistance that will disappear over a 3 to 5 year period and support assistance that can continue for longer periods.

- Using historical price and yield data for the 1974-2015 crop years, average multiple year loss per acre as defined by ARC-CO averages over 10% of revenue per planted acre across the 6 crops examined. It is not a trivial risk. ARC-CO payments cover between one-sixth and one-fourth of these multiple year losses. The payments average between 1.4% and 3.6% of a crop's per acre revenue. While a meaningful level of assistance, average ARC-CO payments are not large as a relative share of revenue and varies within a relatively narrow range across the crops.

- Both the 10% payment cap and reference price minimum have important impacts upon ARC-CO program payments and thus upon program cost.

- The 10% cap on per acre payment is found to have a somewhat greater impact than the reference price minimum on program payments/cost.

- Relative importance of these two ARC-CO features likely varies by crop, which could raise fairness issues across crops.

- As noted in the November 25, 2015 article, the interplay between the 10% per acre payment cap and the traditional limit on payments to a payment entity could become an interesting feature of the next farm bill debate. Because farming is about both land and operators, it seems reasonable that policy would consider putting payment limits on both attributes.

- CAVEAT: This analysis is simple and uses U.S., not county yield. Its findings need to be confirmed using county yield and other methods. The analysis assumes ARC-CO's definition of multiple year risk is the preferred definition. This assumption may not prove correct in the future. Nevertheless, the analysis suggests insights into ARC-CO as a multiple year risk assistance program.

References

Zulauf, C., and G. Schnitkey. "Understanding ARC-CO: Transition Assistance vs. Support Assistance." *farmdoc daily* (5):220, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, November 25, 2015.

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