Understanding ARC-CO as a Shallow Loss Program

Carl Zulauf

Department of Agricultural, Environmental and Development Economics
Ohio State University

Gary Schnitkey

Department of Agricultural and Consumer Economics
University of Illinois

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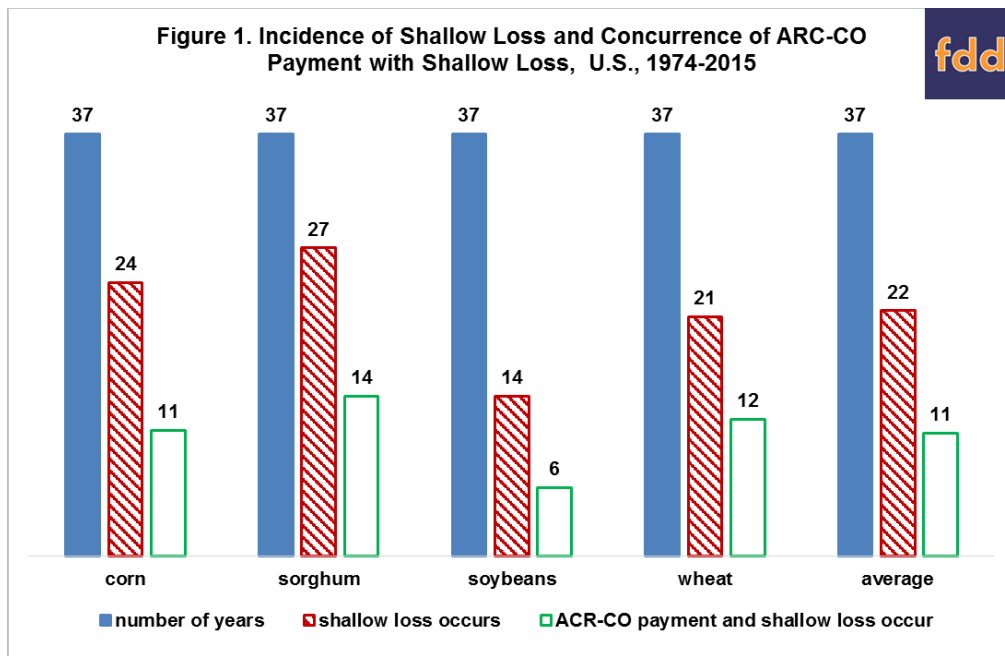This article continues the discussion of ARC-CO. Previous articles in this series were posted on November 25, 2015 and December 9, 2015. They respectively addressed ARC-CO as transition assistance and as a multiple year loss program. This article examines ARC-CO as a shallow loss program. In contrast to multiple year loss for which no standard definition exists, a shallow loss is commonly defined as a loss that is less than the deductible on individual farm insurance. For example, if individual farm insurance has a 25% deductible, a shallow loss occurs if insurance revenue at harvest is 10% less than the revenue expected prior to planting. To facilitate the flow of this article, the methods and data used in the analysis are discussed in an appendix at the end of the article.

Shallow Losses

Of the 37 crop years in the analysis period, a shallow loss occurred an average of 22 crop years across the 4 crops examined: corn, sorghum, soybeans, and wheat (see Figure 1). The range was 14 to 27 crop years for soybeans and sorghum, respectively. Except for soybeans, a shallow loss occurred over half the time. The shallow loss per acre as a share of revenue per acre ranged from 4% for soybeans to 10% for sorghum, with an average of 7% for the 4 crops (see Figure 2). The shallow loss for each crop is calculated using the average coverage level purchased by farmers for individual farm insurance for the crop for the 2015 crop year.
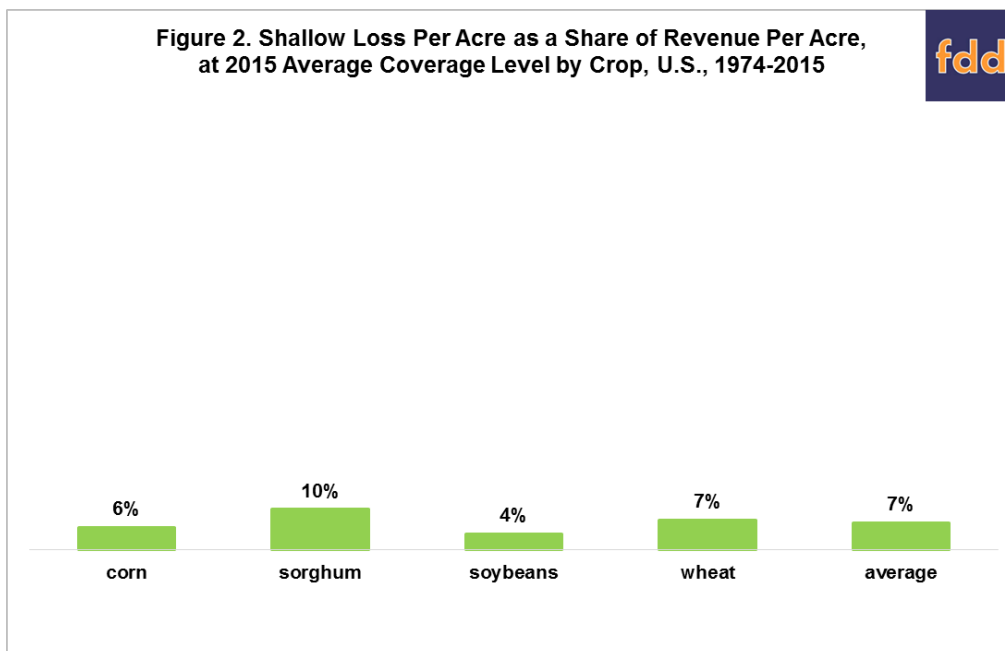

Figure 1. Incidence of Shallow Loss and Concurrence of ARC-CO Payment with Shallow Loss, U.S., 1974-2015

	corn	sorghum	soybeans	wheat	average
number of years	37	37	37	37	37
shallow loss occurs	24	27	14	21	22
ACR-CO payment and shallow loss occur	11	14	6	12	11

■ number of years ▨ shallow loss occurs ▢ ACR-CO payment and shallow loss occur

ARC-CO and Shallow Loss

By crop, ARC-CO made an indicated payment in 40% to 60% of the crop years in which a shallow loss occurred (see Figure 1). The average for the 4 crops was 50% (ARC-CO payment an average of 11 years divided by a shallow loss an average of 22 years). For years with a shallow loss, ARC-CO indicated payments averaged 29% of the total per acre shallow loss (see Figure 3). The range was 23% for soybeans to 34% for sorghum and wheat.

Figure 2. Shallow Loss Per Acre as a Share of Revenue Per Acre, at 2015 Average Coverage Level by Crop, U.S., 1974-2015

corn	sorghum	soybeans	wheat	average
6%	10%	4%	7%	7%

Figure 3. Percent of Insurance Shallow Loss Covered by ARC-CO Payments, at Average 2015 Coverage Level by Crop, U.S., 1974-2015
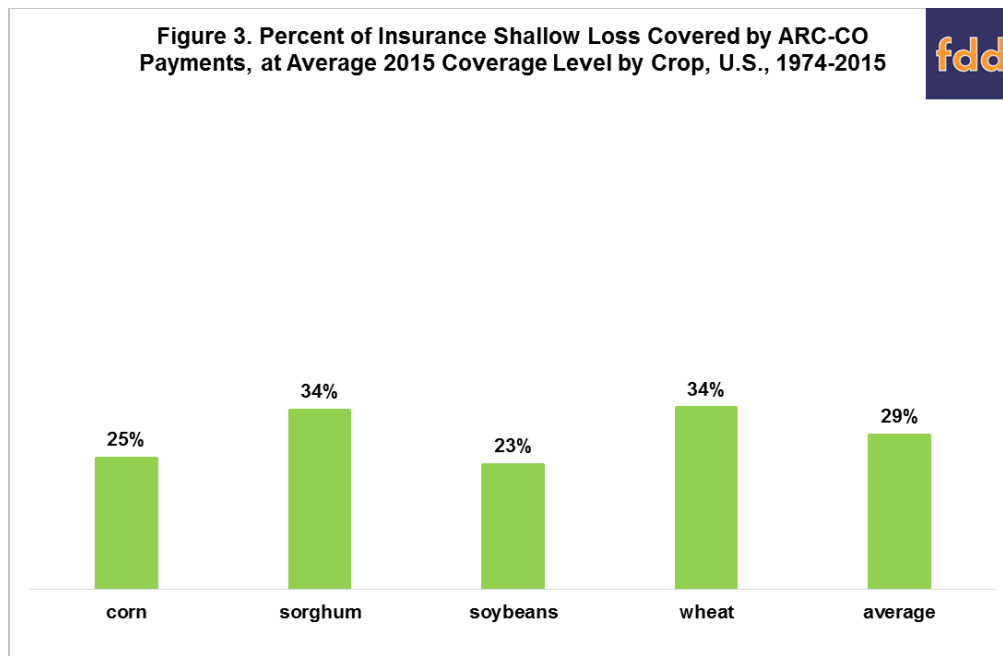
Summary Observations

- Shallow loss occurred in over hall of the years for the 4 crops, excluding soybeans, analyzed in this article.

- Shallow loss per acre averaged 7% of crop revenue when shallow loss is defined relative to the average individual farm coverage level purchased for the 2015 crop.

- The two previous findings likely underscore why farmers and their advocates made shallow loss an issue during the debate over the last two farm bills.

- Consistent differences existed among the 4 crops examined, with shallow loss more of an issue for sorghum and less of an issue for soybeans.

- ARC-CO covered between one fifth and one third of the shallow loss that occurred.

- CAVEAT: While ARC-CO's estimated coverage share of shallow loss is non-trivial, it is highly likely to be an upper bound. This analysis used the same yield for insurance and ARC-CO, a situation highly unlikely in the real world as insurance and ARC use different methods to determine program yield. Moreover, ARC-CO uses county yield while insurance uses farm yield. These important differences in program yield determination almost certainly reduce the effectiveness of ARC-CO in covering shallow loss.

References

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Appendix — Analysis Methods

The analysis is conducted for corn, sorghum, soybeans, and wheat. U.S. cash price and yield are collected for the 1974-2015 crop years from the U.S. Department of Agriculture (USDA), 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 of 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 December 2015 *World Agriculture Supply and Demand Estimates*. This simple procedure normalizes the analysis on current U.S. prices and yields while utilizing variations historically observed for a crop year in U.S. price, U.S. yield, and the relationship between them,. This data are used to calculate estimated ARC-CO payments (in other words, ARC-CO assistance) for the crop year. The estimated assistance is referred to as indicated assistance because U.S., not county, yield is used. Yield across counties usually varies widely in a crop year.

Shallow loss is commonly defined as a loss less than the deductible on individual insurance. The shallow loss in any crop year is calculated as the difference, if positive, equal to the insurance revenue prior to planting minus the insurance revenue at harvest, with a maximum amount equal to the plant revenue times the average coverage level purchased by farmers for individual farm coverage of the crop during the 2015 crop year. These average coverage levels were 76% for corn, 68% for sorghum, 75% for soybeans, and 71% for wheat. Expected yield at planting is measured as the Olympic yield for the five previous crop years, which is the same method used by ARC-CO. Plant and harvest insurance prices are for Illinois corn, wheat, and soybeans and Kansas sorghum. This data are from the USDA, Risk Management Agency website and a data file complied by Art Barnaby of Kansas State University. Chicago wheat is used for the wheat analysis because Chicago historically has higher trading volume on wheat contracts than Kansas City or Minneapolis. The plant and harvest insurance are adjusted to the level of the 2015 crop year price so the ratio between plant insurance, harvest insurance, and U.S. crop year average price remains the same as that which occurred for a given crop year. The data set begins with the 1974 crop year, but 5 crop years are needed to calculate the ARC-CO 5-year Olympic average yield. Thus, calculation of shallow loss begins with the 1979 crop year.