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Growing Season Crop Losses since 1978 on the Same Illinois and Kansas Farms

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Introduction

The potential for loss over the growing season is a key risk for crop farmers, and is the primary risk covered by U.S. crop insurance. Growing season loss is commonly examined across farms in a single year. This article takes a different approach. It examines growing season loss for the same farm over 35 years. Specifically, each farm in this study has reported complete data including yield for the same crop in all or all but one year from 1973 through 2012 to farm management programs in Illinois and Kansas. Both the magnitude and composition of growing season losses differ between the two states. In particular, the share
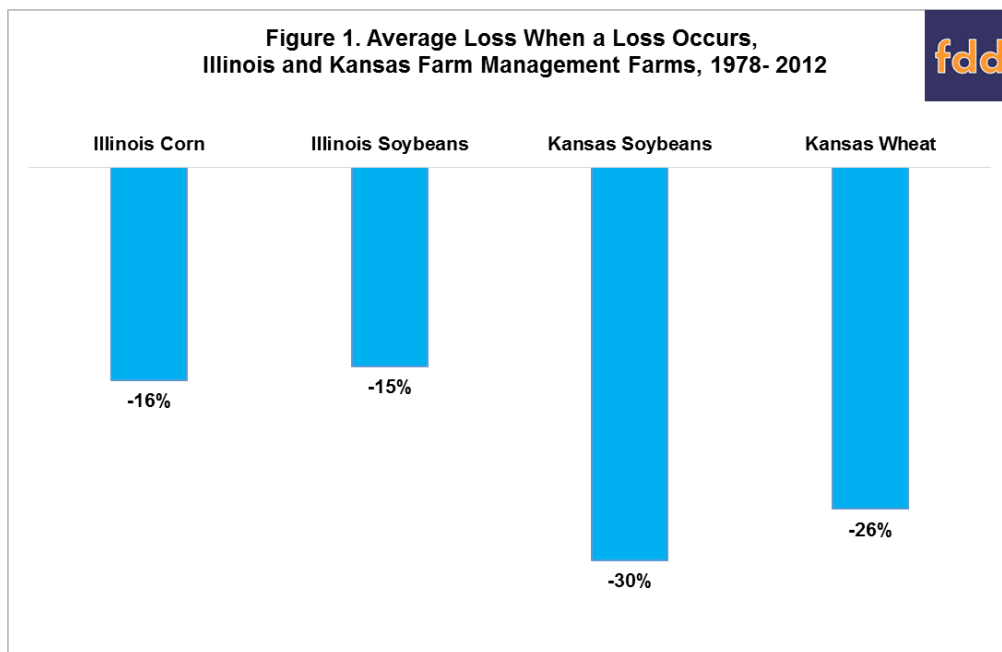
of losses that occur in years when loss exceeds 30% is much higher for the Kansas crops. This difference has important policy implications.

Data and Procedures

Data are available for 185 farm observations as follows: corn in Illinois, 61 farms; soybeans in Illinois, 61 farms; soybeans in Kansas, 28 farms; and wheat in Kansas, 35 farms. Other state-crop combinations have fewer than 20 farm observations, which is questionable for statistical inferences. Revenue per acre at harvest is calculated as the price during the insurance harvest price discovery period times the farm's yield per planted acre during the same crop year (see data note 1). Revenue per acre expected prior to planting for the crop year equals the insurance price during the pre-plant price discovery period times the Olympic average of the farm's planted yield for the 5 prior crop years (see data notes 2, 3, and 4). The percent change in revenue is then calculated as {(harvest revenue minus pre-plant expected revenue) divided by pre-planted expected revenue]. The insurance prices are from the U.S. Department of Agriculture, Risk Management Agency and a data set compiled by Art Barnaby of Kansas State University.

Farm Loss Profile

Average loss between the pre-plant and harvest periods for years when a loss occurs is approximately twice as large for the Kansas crops (see Figure 1). The range is from -15% for soybeans on Illinois farms to -30% for soybeans on Kansas farms. Larger growing season losses are expected for Kansas crops because the crop production environment is more variable in Kansas.

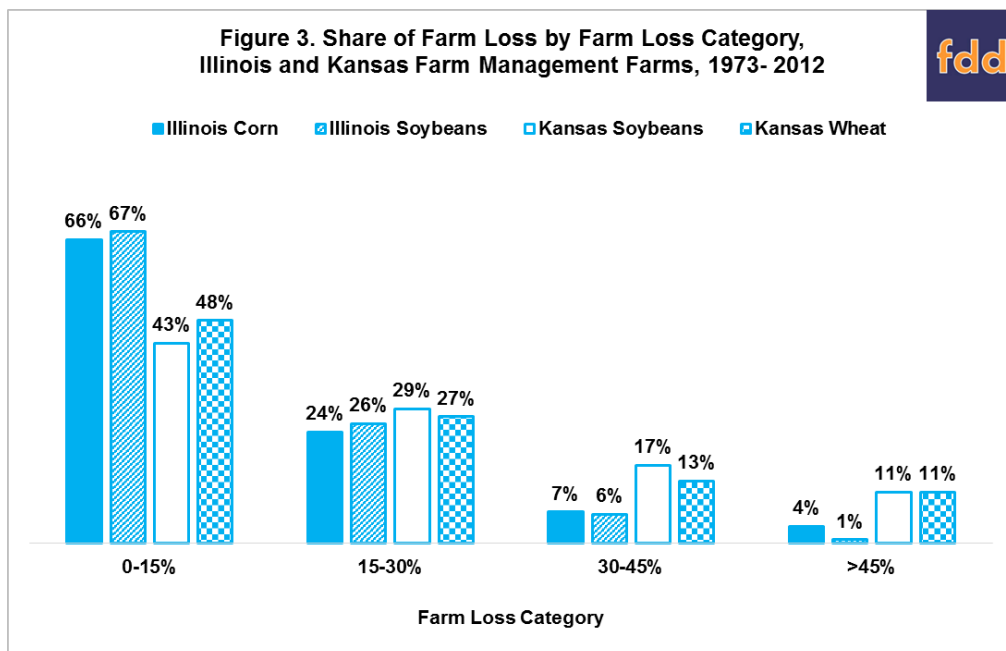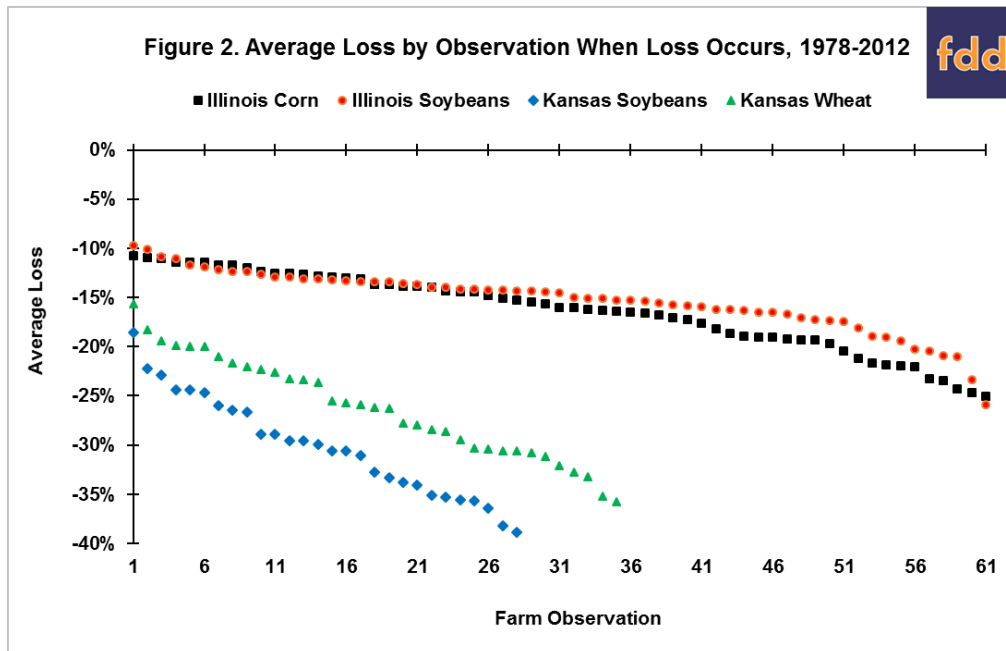Figure 1. Average Loss When a Loss Occurs, Illinois and Kansas Farm Management Farms, 1978- 2012

Perhaps a better illustration of the difference across states is the distribution of average loss by farm observation (see Figure 2). In particular, only 6 Illinois soybean farm observations had an average loss that exceeded the smallest average loss for a Kansas soybean farm observation (-18.6%).

Despite their larger average loss, losses did not occur more often for the Kansas crops. A loss occurred in 50% and 51% of the years for Kansas wheat and soybeans vs. 52% and 60% for Illinois soybeans and corn. The higher share for Illinois corn is in part due to a 2.4% lower average insurance price during the harvest than pre-plant price discovery period (see data note 5). In contrast, the difference in average pre-plant and harvest price for the other 3 state-crop combinations is no more than 0.3%.

Average loss is higher for the Kansas crops primarily because around one quarter of their losses occur in years when loss exceeds 30% (see Figure 3). For the Illinois crops, losses are more concentrated in years when loss is less than 15%: around two-thirds of losses for the Illinois crops vs. less than half of losses for

the Kansas crops. The latter finding is important because 15% is the smallest deductible for individual farm insurance. (See data note 6.)

Figure 2. Average Loss by Observation When Loss Occurs, 1978-2012

Figure 3. Share of Farm Loss by Farm Loss Category, Illinois and Kansas Farm Management Farms, 1973- 2012

Summary Observations

- Before discussing the summary observations, it is important to note that growing season losses are likely to be smaller for the farms in this study since they have survived as farms since 1973. It is difficult if not impossible to know the magnitude of this bias. Its importance is somewhat reduced in this analysis because the focus is on comparing crops farms in Illinois and Kansas. It seems reasonable that many of the impacts associated with long term survival are likely to be similar for Illinois and Kansas crop farms. Nevertheless, this data issue should be kept in mind.

- As expected, average farm loss over the growing season is higher for Kansas soybeans and wheat than for Illinois corn and soybeans.

- A larger share of growing season losses for the Illinois crops occurs during years when the loss is less than 15%. In contrast, a larger share of growing season losses for the Kansas crops occurs during years in which the loss exceeds 30%.

- These findings explains why in the last 2 farm bills Illinois farmers, more broadly Midwest farmers, have focused on "shallow losses," or losses that are less than the crop insurance deductible.

- A farm loss that exceeds 30% is often called a "deep loss." A key policy issue is whether publically-subsidized insurance should focus on deep losses? Moreover, the World Trade Organization classifies insurance that only covers farm losses greater than 30% as non-trade distorting green box. If losses less than 30% are covered, insurance is considered trade distorting amber box.

- The findings of this study imply that focusing farm risk policy on deep losses would likely alter the geographical distribution of program payments and thus the politics and economic impacts of farm risk assistance, including insurance.

- In short, this study underscores the importance of understanding the growing season loss profile, particularly over long periods of time, when assessing farm risk policy.

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References and Data Sources

Art Barnaby, Kansas State University, Personal Communication.

U.S. Department of Agriculture, Risk Management Agency. *Summary of Business*. June 2016. http://www.rma.usda.gov/.

Data Notes

1. Crop insurance prices were collected for the state-crop combination.

2. An Olympic average removes the low and high values before calculating the average.

3. Because a 5 year Olympic average is used to measure projected yield, a loss cannot be calculated for the first 5 observation years, 1973-1977. Hence, the number of observations is 35, not 40.

4. Findings are similar when projected yield is measured as a trend yield for the crop year based on a linear regression of planted yields between 1973 and 2012.

5. While relatively large numerically, the difference in the average pre-plant and harvest price of corn is not statistically significant even at the smallest conventional test level of 90% confidence.

6. The profile for yield loss over the growing season is similar to the profile of revenue loss over the growing season discussed in this article.