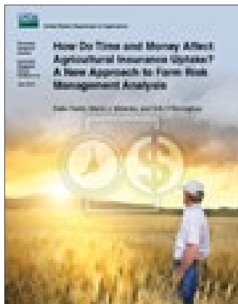
United States Department of Agriculture

A report summary from the Economic Research Service August 2016



Find the full report at *www.ers.usda.gov/publications/err-economic-research-report/err212*

How Do Time and Money Affect Agricultural Insurance Uptake? A New Approach to Farm Risk Management Analysis

Katie Farrin, Mario J. Miranda, and Erik O'Donoghue

What Is the Issue?

Farmers use crop insurance to protect themselves against risk—primarily against crop failure and low output prices. In the United States, the Federal crop insurance program has grown steadily since the mid-1990s and has become the single largest individual program providing support to producers under the 2014 Farm Act. The growth in crop insurance programs—both in the United States and in developing countries—appears to be driven in part by premium subsidies from governments.

This report uses a new approach to examine a farmer's risk management choices, and to look at how changes in the farmer's financial environment—particularly in savings and insurance markets—may change insurance demand. Unlike previous research on the topic, which emphasizes a farmer's attitude toward risk as the primary driver of insurance uptake, this report analyzes the relationship between wealth, savings, and insurance over time to identify alternative approaches to managing farm risk.

What Did the Study Find?

When farm households consider multiple growing seasons, insurance and savings are substitutes. Demand for insurance will fall as the interest rate on savings rises; similarly, farmers will save more and insure less as insurance premium rates increase. The exception is among farm households who are less wealthy; when wealth is low to start, additional savings complements insurance, allowing households to be able to afford to pay an insurance premium when they do not yet have enough savings to completely self-insure.

Farmer attitudes toward risk matter less when examining crop insurance demand over multiple years. Demand for crop insurance, when examined over multiple years, is

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment,and rural America.

primarily driven by the farmer’s financial wealth rather than the farmer's attitude toward risk. Both uptake of insurance and choice of coverage levels are heavily determined by the producer’s income and savings. Crop insurance is in low demand at both lower and higher levels of farm wealth—although the reasons for low purchase or coverage rates differ depending on what side of the spectrum a farm household falls. High-wealth farmers may not purchase insurance at all and may instead use savings to self-insure. By comparison, farm households with low wealth (i.e., with low incomes and little or no savings) may not purchase crop insurance because they cannot afford it.

The demand for crop insurance drops the longer the time horizon explored. Farmers do not make production decisions based solely on what would be best in the current season. Instead, they choose to manage their farms in a way that helps them earn the most value over the lifetime of the farm; this longer time period farmers consider when making their choices can span generations. An example of such behavior is crop rotation, where alternative crops are planted to maintain soil quality—even when the production value of the crop rotated in (or of fallow land) may be lower. Because farm risk management is included in farm-level production choices, planning for risk is also conducted while considering multiple seasons. Our approach takes into account a farmer’s forward-thinking process. It shows that when households can save over many years, their insurance decision depends on time and is inherently dynamic; the choice is based off of a household’s wealth and its history of farm income—including shocks to that income. Even among farm households with the same level of wealth, predictions about their insurance decisions will differ depending on whether the approach in the analysis considers two crop seasons or many.

Demand for crop insurance among U.S. farmers is significantly responsive to their savings and accumulated wealth. An analysis of USDA Economic Research Service and National Agricultural Statistics Service's Agricultural Resource Management Survey (ARMS) data shows that insurance and savings are substitutes, unless a household’s annual farm income is relatively low. On average, savings lowers insurance demand among crop farmers in the United States. While low-income farmers are less likely to purchase insurance than those with higher gross farm income, savings among these limited-resource farmers can mitigate low insurance uptake. The study also finds that that operators with more farm debt are more likely to purchase insurance, perhaps to avoid falling farther into debt should a weather shock affect production in a given season.

How Was the Study Conducted?

The report presents a new approach to examining risk management at the farm level. The underlying analysis uses reasonable values to represent a farmer’s financial and risk environment, as well as his or her risk preferences. These values can be varied to examine how farmer behavior changes under different assumptions about the environment in which the farmer lives. Thus, the new approach is valuable in that it can be used to forecast farm-level risk management behavior in a variety of settings—both in the United States and in developing countries—as it can be adapted to represent specific counties, States, growing regions, or other geographical or livelihood areas given available data. The fully dynamic approach is complex and cannot be solved by hand; a method for solving this approach on a computer is further detailed in the Appendix.

To test the empirical validity of the insights from the new approach, ARMS data are used to estimate how farm wealth changes the likelihood that a farm household will buy crop insurance.