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Cornhusker Economics

The Role of Farm Size in Crop Insurance

Market Report	Year Ago	4 Wks Ago	9-13-19
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	*	*	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	173.87	173.82	159.99
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	159.04	156.48	147.14
Choice Boxed Beef, 600-750 lb. Carcass.	205.09	216.04	222.61
Western Corn Belt Base Hog Price Carcass, Negotiated	51.69	*	NA
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	71.19	87.97	69.55
Slaughter Lambs, wooled and shorn, 135-165 lb. National.	150.61	159.96	152.51
National Carcass Lamb Cutout FOB.	380.85	395.17	399.44
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	4.45	3.45	3.57
Corn, No. 2, Yellow **Columbus**, bu.	3.09	3.87	3.74
Soybeans, No. 1, Yellow **Columbus,** bu.	7.04	7.77	7.96
Grain Sorghum, No.2, Yellow Dorchester, cwt.	496	5.98	5.63
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.82	3.01	3.06
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	*	*	*
Alfalfa, Large Rounds, Good Platte Valley, ton.	102.50	115.00	105.00
Grass Hay, Large Rounds, Good Nebraska, ton.	102.50	100.00	105.00
Dried Distillers Grains, 10% Moisture Nebraska Average.	133.50	136.50	137.50
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	44.50	40.50	42.50

*** No Market**

The role of farm size in crop insurance has been a reoccurring U.S. political issue with multiple attempts at legislation proposing to limit premium subsidies to large producers. For instance, in 2015 bill S.2244, amongst other items, proposed to cap crop insurance premium subsidies at $40,000 per year[1]. The most recent attempt was made by the current administration in mid-2017, where they introduced the same premium subsidy cap of $40,000 per year. The first mention of the $40,000 figure emerged from a report sanctioned by the Government Accountability Office in 2012 (GAO-14-700, 2014)[2]. Eventually no premium subsidy caps were included in the 2018 Farm Bill due to push back from farm and insurance groups[3]. However, premium subsidy restrictions have continually remained at the forefront of crop insurance policy debate since 2012.

If excess crop insurance returns by large producers exist, then they would have a competitive advantage over their smaller counterparts, as the latter would not have the financial ability to compete for resources. For example, additional financial resources may be used in the land rental and/or purchase market. A relation between farm size and crop insurance returns would provide evidence that crop insurance inefficiently reallocates resources. However, if larger producers are not garnering excess returns from crop insurance, then any government policy limiting their participation (for ex-

[1] https://www.shaheen.senate.gov/news/press/shaheen-flake-introduce-crop-insurance-reform-bill-with-24-billion-in-savings

[2] https://www.nytimes.com/2012/04/12/us/cap-on-farm-insurance-subsidy-could-save-billions-report-says.html

[3] https://www.farmprogress.com/insurance/caps-crop-insurance-subsidy-would-hit-family-farms

ample a reduction in premium subsidies via some type of cap on total premium subsidies) could change the pool of insured in a way that would not be advantageous to the health of the federal crop insurance program. Changing the pool of insured could result in increased premiums for participating producers. Increasing premiums also results in higher government costs since both premium subsidies and Administrative and Operating (A&O) subsidies are applied as a percentage of total premium. Higher premiums with higher subsidies also imply fewer acres needed to hit a total premium subsidy cap. Evaluating whether larger producers receive more in crop insurance than smaller producers represents an important contribution to the literature given the reoccurring political pressure proposing the limitation of premium subsidies.

Historical county loss cost (indemnity/liability) represents the primary calculation driving crop insurance premium rating (Coble et al. 2010)[4]. Loss costs are calculated for specific county production characteristics, for example, the crop grown and farming practice such as irrigated or rain fed, or summer fallow or continuous crop. While this tailoring of premiums is aimed at improving actuarial performance, it is possible that other farm specific characteristics influence indemnity payments. For the producer, this could mean the opportunity for excess returns beyond what the government intends since those characteristics are not found in the premium rating method. For the government, excess producer returns imply an inefficient program due to a misallocation of resources and increase in taxpayer cost. In this article, we empirically examine the impact of farm size on returns from crop insurance participation. Specifically, we evaluate whether larger producers are riskier than smaller producers. Our analysis is based on the principle that since this characteristic is not part of the premium generating process, they should be neutral to the return from insurance. Investigating the role of farm size gives insights into how much influence farm structure heterogeneity has on the return from crop insurance participation.

In our evaluation of the impact of farm size on the return from crop insurance, we base our definition of farm size on the total number of insured acres by each producer. Since we only observe insured acreage in our data set, we likely underestimate farm size due to acreage on uninsurable crops or crops that were not insured. Since we are interested in the impact of larger farms versus the average impact of an additional acre, we break our farm size data into six size categories: producers (1) greater than 2000 acres , (2) between 1000 and 1999 acres, (3) between 500 and 999 acres, (4) between 200 and 499, (5) between 100 and 199 and (6) less than 100. This approach of six distinct categories allows for a better comparison between very large and small farms than offered by the USDA farm size categories and better than inspecting the marginal value of an additional acre. We are interested in the outcomes from the tails of the acreage distribution.

To evaluate the relevance of farm and producer characteristics, we focus on the return from crop insurance as a function of crop insurance contract choices, farm characteristics and unobserved temporal and spatial effects.

We use a highly detailed unit-level crop insurance dataset obtained from USDA's Risk Management Agency for our analysis. The analysis is conducted in four regions and five crops for the period 1996 to 2009, allowing us to evaluate differences between regions, leading to improved understanding of region-specific crop insurance impacts. The four regions analyzed are Nebraska, Iowa, Montana and Oklahoma. We have data for canola, corn and soybean producers in Iowa. Corn, soybeans and wheat data for Nebraska. Montana consists of Barley and Wheat (both winter and spring), and in Oklahoma we have cotton and wheat

Results

Marginal effects to evaluate our hypothesis that farm size is neutral to crop insurance are presented in Table 1. Significant and positive marginal effects on farm size and/or insured type provide evidence of excess returns. For farm size, we do not find any evidence of excess returns by larger farms in any of the four regions. This runs counter to the results provided by Coble and Williams (2018) and may be explained by the fact that we account for the net return from crop insurance across fourteen years while they focus on only indemnities for one year. We do find support for the alternate hypothesis that larger farms receive less return than their smaller counterparts. Support for the converse hypothesis was found in both Iowa and Nebraska in three of the six size categories in Iowa and two of six size categories in Nebraska.

Conclusions

This paper examined the relation of farm size on the return from crop insurance participation in four regions and five crops. Our approach is empirical, spanning 14 years (1996 to 2009) across 4 regions and 5 crops at the per acre level. Our goal was to evaluate whether larger producers are riskier than smaller producers. We approach our problem by analyzing the per acre net return from crop insurance participation

[4] Premiums are also loaded from state, miscellaneous (prevented planting, replant, quality adjustment) and disaster reserve factor loads.

Table 1: Results – Farm Size Marginal Effects, $ per acre.

Variables	Iowa	Montana	Nebraska	Oklahoma
Size (Base = 0 to 99 acres)				
100 to 199	-1.43	-0.02	NA	0.18
200 to 499	-1.30**	0.02	0.53	0.07
500 to 999	-0.94***	0.00	-1.22***	0.27
1000 to 1999	0.75***	0.06	-0.66**	0.20
>2000	-0.57**	0.20	-0.32	0.39

Notes: ***, **, * represent 1%, 5%, and 10% significance level, respectively.

rather than relying on totals. Comparing per acre net returns allows us to more accurately examine insurance outcome differences between farm sizes. Our empirical findings contribute to the debate on whether large farms receive more back from insurance participation than their smaller counterparts.

Our findings fail to find support for the hypothesis that larger producers obtain more in returns from insurance than their smaller counterparts in any of the analyzed crops and regions. Finding evidence that larger producers are not receiving significantly more from insurance over their smaller counterparts suggests that any policy limiting participation of larger producers could negatively impact the insurance pool. Insurance rates would likely go up for the remaining participants, resulting in higher producer premiums and higher premium subsidy expenses, thereby also negatively impacting taxpayers. Recall that premium subsidy is applied as a percentage of premium so increasing the premium results in more premium subsidy dollars per acre. In fact, we find support of the converse hypothesis that larger producers in Iowa get less back than their smaller counterparts in one of the four regions. However, estimated parameters are small, indicating a small economic effect. A result indicating the RMA is doing a good job at estimating crop insurance premiums.

For a complete copy of the working paper please contact Cory Walters at cwalters7@unl.edu

References:

Coble K. H., T. O. Knight., B.K. Goodwin, M.F. Miller., R. M. Rejesus., and G.A. Duffield. (2010). Comprehensive review of the RMA APH and combo rating methodology: Final report. Prepared by Sumaria systems for the risk Management agency.

Coble K. and B. Williams. (2018). Are Large Farms Less Risky to Insure? Working paper, Department of Agr. Econ., Mississippi State University.

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