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Assessing Risk and Variation in 2018 Farm Revenue and Expenses

Bradley Zwilling and **Dwight Raab**

Illinois FBFM Association and Department of Agricultural and Consumer Economics
University of Illinois

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There is a great deal of risk associated with production agriculture. Much of the management of the farm enterprise is oriented to mitigating or minimizing the various forms of risk present. Risk in production agriculture is associated with the uncertainty of the possible outcome of any decision made in the farm operation combined with things like commodity markets and weather which are out of the control of the farm operator. Today's article looks to quantify risk numerically for farm revenue and expenses for a group of farms in the Illinois FBFM dataset. Once quantified, those metrics are evaluated and compared.

The data in this instance is a group of 1,478 participating Illinois FBFM farms. This group of farms are categorized as pure grain farms in that there is an absence of livestock enterprises on these farms. Those farms are then separated into four groups; 341 of them are located in northern Illinois, 346 of them are located in central Illinois and have lower productivity soils, 606 of the farms are located in central Illinois and have higher productivity soils and the final group are located in southern Illinois.

The three metrics considered are from the 'per acre' variables from the Illinois FBFM Economic Management Analysis report. This report has a focus on farm operator returns to management ability. Thus, an allowance for the unpaid operator labor and an allowance for an opportunity cost for operator capital are made.

In this work, we calculate the average, the standard deviation and the coefficient of variation for the various cost and returns shown in Table 1.

Table 1. Illinois FBFM Pure Grain Farms-2018

	North (341 Farms)			Central-Low (346 Farms)			Central-High (606 Farms)			South (185 Farms)		
	Average	Stdev	CV	Average	Stdev	CV	Average	Stdev	CV	Average	Stdev	CV
Gross Farm Returns	$ 804.99	116.15	0.14	$ 771.22	97.40	0.13	$ 863.28	89.24	0.10	$ 723.68	119.65	0.17
Crop Cost	$ 241.97	49.79	0.21	$ 236.91	48.07	0.20	$ 245.09	42.89	0.17	$ 232.06	48.47	0.21
Power & Equipment	$ 153.59	54.89	0.36	$ 131.94	43.22	0.33	$ 134.52	48.47	0.36	$ 154.83	46.69	0.30
Building Cost	$ 33.81	24.10	0.71	$ 33.58	20.20	0.60	$ 35.31	22.04	0.62	$ 23.49	16.01	0.68
Paid & Opr Labor	$ 54.42	23.16	0.43	$ 58.53	23.76	0.41	$ 56.33	24.84	0.44	$ 64.63	26.43	0.41
Miscellaneous	$ 86.54	27.44	0.32	$ 85.01	23.80	0.28	$ 88.57	25.20	0.28	$ 86.82	22.84	0.26
Land Cost	$ 239.65	55.82	0.23	$ 214.12	57.55	0.27	$ 242.83	53.52	0.22	$ 162.18	38.43	0.24
Total Cost	$ 809.98	129.58	0.16	$ 760.10	125.13	0.16	$ 802.65	123.92	0.15	$ 723.99	109.81	0.15
Mgmt Returns	$ 14.66	121.35	8.28	$ 29.19	118.69	4.07	$ 89.31	121.18	1.36	$ 18.77	115.21	6.14

Averages in the data tell us much about this single years' data. The standard deviations are also are very revealing. The coefficient of variation (CV) is calculated by dividing the standard deviation by the average. So, a CV measures the standard deviation (or variability) relative to the average. Lower CVs typically tell of lesser amount of risk, variability and uncertainty. The data at hand show the CVs of gross farm returns to be much the same across the four groups, and are highest for the southern Illinois farm and are lowest for the central Illinois higher soil productivity farms.

One might assume that CVs would be higher for gross farm returns as they are subject to things beyond the control of the farm operator – weather (temperature, rain, etc), and price. Expenses might be thought to be less variable as they seem to be generally similar from year to year with a general upward trend in most of the expenses incurred. This would tend to lead one to believe the CVs of the expense measures would tell of lesser amount of variability or uncertainty. Table 1 tells that this in not the case for this group of 2018 grain farms in Illinois as the CVs of gross farm returns are generally in the same range as the CVs of total cost.

The apparent differences in variability or uncertainty as measured by the CVs is much more apparent in management returns. The central Illinois higher productivity farms tell of lower levels of variability or uncertainty. The other three groups reveal much higher levels of variability or uncertainty in returns to management.

Summary

While one might assume that gross farm returns would exhibit more signs of variability when compared to total expenses. This is not the care for this group of 2018 grain farms. Further work in this area could answer the question of does this variability change over time.

The authors would like to acknowledge that data used in this study comes from the Illinois Farm Business Farm Management (FBFM) Association. Without Illinois FBFM, information as comprehensive and accurate as this would not be available for educational purposes. FBFM, which consists of 5,500+ farmers and 68 professional field staff, is a not-for-profit organization available to all farm operators in Illinois. FBFM field staff provide on-farm counsel along with recordkeeping, farm financial management, business entity planning and income tax management. For more information, please contact our office located on the campus of the University of Illinois in Mumford Hall at 217-333-5511 or visit the FBFM website at www.fbfm.org.