SDSU Extension

iGrow Corn

BEST MANAGEMENT PRACTICES

Chapter: 54

Using Vertical Financial Analysis to Assess Corn Production Costs

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Understanding corn production costs is an important step in the optimization of the corn management system. The interactive tool "2015 Crop Budgets" is available online from South Dakota State University (sdstate.edu), https://www.sdstate.edu/econ/extension/index.cfm, and can be used for this purpose. This chapter is focused on the analysis of corn production costs in the northern Great Plains and heartland region.

Corn Enterprise Vertical Analysis

Is too much money spent on land rent, seed, fertilizers, and pest management? Vertical analysis may have the answers. Vertical financial analysis helps pinpoint where the money is spent and it provides a mechanism to compare production costs. Vertical analysis is done by converting the dollar amounts on a financial statement to percentages. It compares major expenses to gross revenue.

Example 54.1 If your revenue is $1100/acre, your costs of production are $962/acre and your seed and fertilizer costs are $110/acre and $170/acre, respectively, what percentage of your total revenue was spent on seed and how much was spent on fertilizer?

Seed

$$\% \text{ revenue} = \frac{\$110/a}{\$1100/a} \times 100\% = 10.0\%$$

Fertilizer

$$\% \text{ revenue} = \frac{\$170/a}{\$1100/a} \times 100\% = 15.5\%$$

Knowing that direct expenses per acre are $456 is important, but knowing this represents 64% of gross revenue provides more information. You can track the percentage over time and compare it to industry benchmarks. Parameters can be set that will serve as an early warning sign of expenses moving out of proportion with revenues. Key expenses such as seed, fertilizer, rent, machinery costs, and labor/management can be watched, and modification plans can be made and implemented, if necessary. As gross sales per acre increased from 2006 to 2012, it was assumed that crop expenses would also go up. But what happens when expenses outpace revenue? Vertical analysis can help identify this change.

Vertical analysis is conducted by dividing a line item on an income statement by gross revenue[1]. As an example, if gross revenue is $1,100 per acre and seed is $110 per acre, divide $110 by $1,100 and multiply by 100 to get the percentage (see Example 54.1).

[1] Gross revenue in this analysis includes: hedging gains (losses), crop insurance, and other crop income that is tracked directly to the crop and is not included in bu/acre and $/bu (yield * price).

Guidelines to Using Vertical Analysis

Vertical analysis is essential to understand how the enterprise is doing financially, reveals inconsistencies, and aids in making astute business decisions. For example, from 2007 through 2012, the costs for seed, fertilizer, and land rent totaled 43.4% of gross revenue for all farms in the data set. Historical analysis suggests that it is difficult to be profitable if these key costs increase to > 50% of the gross revenues. Comparing different expense ratios allows individuals to help target expense reductions where they may have the most impact. If an expense makes up 16% of gross revenue and another expense makes up 4%, which solution is better: cutting the lower expense by 50% or cutting (without giving up yield) the higher expense by 20%? Focusing management efforts on the higher expense components may increase the return on investment.

Corn Production Costs

Source of Information

The cost, yields and selling price information provided in Table 54.1 is obtained from FINBIN Farm Financial Database, Center for Farm Financial Management, University of Minnesota. The Farm Financial Management Database is available at http://www.finbin.umn.edu/. Benchmarks can be obtained for individual states or products. The database summarizes actual farm data from thousands of agricultural producers who use FINPACK for farm business analysis. Data in FINBIN is contributed by farm management associations that use FINPACK as their farm business analysis and summary program. The analyses can be specified for specific groups. For example, in 2014 total direct expenses for South Dakota corn producers farming owned land producing 169 bu/acre was $316/acre with a net return of $73.48/acre. However, for rented land producing 170 bu/acre, the total direct expenses were $408/acre with a net return of $68.07/acre.

Data reported in this report were obtained for cash rented corn enterprise systems located in South Dakota, North Dakota, Minnesota, and Nebraska. Over 2,000 farms were included in the analysis. The analysis covers the years 2000 through 2014 and is split into 3 time frames, 2000 through 2006, 2007 through 2012, and 2013 through 2014. The focus is on key expenses in proportion to gross revenue from the corn enterprise. The information is presented for all farms in the data set and further broken down

Table 54.1 The average cost of production, average grain yield, and selling prices for the top 40% of all producers compared with all producers.

Top 40%	2000-2006		2007-2012		2013-2014	
	$/a	% revenue	$/a	% revenue	$/a	% revenue
Seed	40	9.8	85	10.6	114	13.1
Fertilizer	49	11.9	122	14.9	148	17.0
Machinery	58	14.1	113	14.1	126	14.5
Other	68	16.5	109	13.9	127	14.5
Rent	84	20.5	137	17.1	195	22.5
Corn yield	166		169		165	
Selling price	2.25		4.73		4.33	
All producers	**2000-2006**		**2007-2012**		**2013-2014**	
	$/a	% revenue	$/a	% revenue	$/a	% revenue
Seed	42	12.3	85	11.1	115	15.8
Fertilizer	53	15.7	126	14.4	162	22.2
Machinery	69	20.5	119	15.6	151	20.7
Other	75	22.6	106	14.3	130	17.8
Rent	93	27.8	137	17.9	197	27
Corn yield	155		163		152	
Selling price	2.12		4.66		4.07	

into the group of farms in the top 40 percent of net profit (High). These numbers and percentages may be used to further compare to an individual's corn enterprise cost.

Cash Rent Corn Production Systems

Direct expenses for the corn enterprise include seed, fertilizer, chemicals, crop insurance, repairs, drying, marketing, labor, miscellaneous, operating interest, and land rent. Land rent has been deducted from direct expenses in this analysis (Table 54.2). Direct expenses without rent ranged from $165to $232 and averaged $193 during 2000 to 2006 for all farms. In high net profit farms, direct expenses, without rent, ranged from $138 to $226 from 2000 to 2006, with an average of $174 per acre. For the time period from 2007 to 2012 direct expenses without rent ranged from a low of $238 in 2010 to high of $444 in 2012, with an average of $364 for all farms. High net profit farms ranged from a low of $249 in 2007 to a high of $443 in 2012 with an average of $354. The average direct expenses without rent for 2013 and 2014 for all farms is $461 and for high-profit farms is $428. Direct expenses without rent as a percentage of gross revenue peaked in 2001 at 73% for all farms and reached a low of 40.5% for high-profit farms in 2010.

High-profit farms maintained the direct expense ratio at 40% to 45% of gross revenue for 11 of the 15 years from 2000 to 2014, with only 2009 being above 50%. High-profit corn producers have been able to remain profitable by keeping direct expenses in the range of 40% to 45% of gross revenues. From 2000 to 2006, land rents averaged $84/acre.

For all farms, rent doubled from 2007 to 2013. However, the high-profit farms maintained the land rent in a range of 16% to 20% of gross revenue. On the high-profit farms, land rent ranged from 16% to 30% of total revenues, whereas the expenses for seed, fertilizer, machinery costs (variable and fixed), labor, and management increased from $140 in 2000 to $478 in 2012. From 2012 through 2014, these costs decreased slightly to $460.

Historically, seed costs ranged from 10% to 11% of gross revenues. However in 2013 and 2014, seed costs increased to 13% of gross revenues (Table 54.1). For the high-profit group, fertilizers generally range from 13% to 15% of gross revenue. However, in 2013 and 2014, the percentage of gross revenues increased slightly (16.5% to 17%). High-profit farms have maintained machinery costs in a range of 13% to 15% of gross revenue.

Table 54.2 Direct expenses without rent and rent for the top 40% of all producers and all producers.

Top 40%	2000-2006		2007-2012		2013-2014	
	$/a	% revenue	$/a	% revenue	$/a	% revenue
Direct Expenses w/o Rent	174	42.3	354	44.0	428	49.2
Rent	84	20.5	137	17.1	195	22.5
All producers	**2000-2006**		**2007-2012**		**2013-2014**	
	$/a	**% revenue**	**$/a**	**% revenue**	**$/a**	**% revenue**
Direct Expenses w/o Rent	193	57.3	364	48.0	461	63.3
range	$165-232		$238-444			
Rent	93	27.8	137	17.9	197	27.0

References and Additional Information

South Dakota State University, SDSU Extension. https://www.sdstate.edu/econ/extension/index.cfm (accessed 5 November 2015)

Center for Farm Financial Management, University of Minnesota http://www.finbin.umn.edu/ (accessed 5 November 2015)

Data Sources. South Dakota Center for Farm/Ranch Management

Nebraska Farm Business Association and Nebraskaland Farm & Ranch Management Education Program, All North Dakota Groups, MnSCU Farm Business Management, Southwest Minnesota Farm Business Management Association, Southeast Minnesota Farm Business Management Association

U.S. Department of Agriculture, National Agricultural Statistics Services. http://www.nass.usda.gov/Statistics_by_State/South_Dakota/ (accessed 5 November 2015)

USDA, Economic Research Service, Cost and Returns. http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx (accessed 5 November 2015).

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