



## Measuring Financial Stress

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Financial stress is typically measured using a profitability measure and a solvency measure. For example, profitability could be measured using the operating profit margin ratio and solvency could be measured using the debt to asset ratio. As noted in Langemeier (2016) and Langemeier and Yeager (2018), the operating profit margin is a useful benchmark when comparing financial performance among farms. The operating profit margin ratio is computed by adding interest expense and subtracting unpaid family and operator labor from net farm income and dividing the result by either value of farm production or gross revenue. A long-run benchmark for the operating profit margin ratio is 20 percent. The average profit margin has been relatively lower than this benchmark during the last few years, particularly for farms with below average long-run performance (e.g., bottom quartile). For the operating profit margin to be positive, net farm income plus interest expense has to be large enough to cover unpaid family and operator labor. The debt to asset ratio is computed by dividing total farm debt by total farm assets. Given the importance of land to total farm assets, land values are an extremely critical determinant of a farm's debt to asset ratio. Farms with little to no owned land tend to have relatively higher debt to asset ratios.

Farms are said to be financially stressed if the operating margin is relatively low and the debt to asset ratio is relatively high. Specifically, a farm is said to be financially stressed if the operating profit margin is negative and the debt to asset ratio is above 0.70. Measuring financial stress is not the same thing as measuring credit quality or the probability of default. Measures involving credit quality and probability of default typically include the percentage of assets owned, repayment capacity, and working capital (Featherstone and Langemeier, 2017). Comparing the two concepts, financial stress provides a warning signal whereas credit quality reflects the risk that a farm may not be able to repay short-term and long-term debt.

### Operating Profit Margin Ratio

During the 2007 to 2013 period, real U.S. net farm income ranged from \$68.5 billion in 2009 to \$132.0 billion in 2013, and averaged \$97.6 billion. Since 2014, U.S. net farm income has averaged \$82.0 billion, which is 16 percent lower than the average for the 2007 to 2013 period (USDA-ERS, 2019). The operating profit margin ratio for the U.S. farm sector averaged 14.3 percent from 2007 to 2013, and 9.8 percent from 2014 to 2018. In terms of net cash farm income, 56 percent of all farms and 42 percent of farms with a gross cash farm income greater than \$350,000 reported negative income during the 2007 to

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2016 period (Key et al., 2018). Because net cash farm income does not include family and operator labor, the percentage of farms with a negative operating profit margin ratio was likely higher than these percentages.

Using FINBIN data summarized by the Center for Farm Financial Management at the University of Minnesota, the average operating profit margin ratio was 21.3 percent from 2007 to 2013, and 7.0 percent from 2014 to 2018. The operating profit margin varies widely among farms. In 2018, the median operating profit margin ratio for the farms summarized in FINBIN was 6.1 percent. Over 20 percent of the farms had a ratio above 20 percent, a commonly used benchmark. In contrast, approximately 40 percent of the farms had a negative operating profit margin ratio.

### **Debt to Asset Ratio**

Due to its inclusion of both part-time and full-time farm operators, the farms included in U.S. farm balance sheet typically exhibit an average debt to asset ratio that is considerably lower than that exhibited by farms included in databases, such as FINBIN, that focus on full-time farms. The average debt to asset ratio for all U.S. farms averaged 0.124 from 2007 to 2013, and 0.127 from 2014 to 2018. Since 2012, the debt to asset ratio has steadily increased, moving from 0.113 in 2012 to 0.133 in 2018. The percentage of farms with a gross cash farm income greater than \$500,000 that had a debt to asset ratio greater than 55 percent increased from 7.6 percent in 2012 to 13.5 percent in 2017 (Key et al., 2019).

The average debt to asset ratio for the farms summarized in the FINBIN database, averaged 0.383 from 2007 to 2013, and 0.388 from 2014 to 2018. The median debt to asset ratio in 2018 was 0.45. The 20 percent of farms with the lowest debt to asset ratio had ratios below 30 percent. Approximately 20 percent of the farms had a debt to asset ratio above 0.70.

The median debt to asset ratio for Illinois FBFM farms was 0.204 in 2017 and 0.214 in 2018 (Zwilling and Raab, 2019). However, debt to asset ratios vary widely among farms. In an analysis of Illinois grain farms in 2017, Schnitkey and Swanson (2018) indicated that approximately 39 percent of the farms had a debt to asset ratio of 30 percent or below, and approximately 10.3 percent and 2.4 percent of the farms had debt to asset ratios above 50 and 75 percent, respectively.

### **Financial Stress**

As indicated above, financial stress can be measured by examining farms with both a negative operating profit margin ratio and a debt to asset ratio above 0.70. Information from the data sources mentioned in the previous two sections pertaining to financial stress is limited. Using U.S. data for farms with a gross cash farm income greater than \$500,000, and a total debt coverage ratio below 1 and a debt to asset ratio above 0.55 as a measure of financial stress, Key et al. (2019) indicated that 3.7 percent of large farms were financially stressed in 2017, representing a 2.4 percent increase compared to financial stress in 2012. Using Illinois FBFM and University of Minnesota FINBIN data and assuming that less than one-half of the farms had a negative operating profit margin, financial stress as measured in this article would be less than 10 percent. An upcoming article will estimate financial stress for a sample of farms in the Great Plains.

### **Concluding Comments**

Farms with low profitability and high solvency are typically financially stressed. This article used the operating profit margin ratio and the debt to asset ratio to create a measure of financial stress. Specifically, farms with a negative profit margin ratio and a debt to asset ratio above 0.70 were defined as being financially stressed.

The operating profit margin ratio has been relatively low since 2013. After increasing dramatically from 2006 to 2013, land values have dropped. However, for many farms the drop in net farm income has been larger than the decline in land values. As a result, even with relatively low profit levels, farm solvency has remained strong for most farms, mitigating financial stress.

This article focused on measuring financial stress. An upcoming article will illustrate trends in the operating profit margin ratio, the debt to asset ratio, and financial stress for a sample of farms in the Great Plains.

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