

Abstract

Recent US Department of Agriculture (USDA) outlook concludes the nation's farm sector is in a healthy condition based largely on the low debt-to-asset ratio. The sector's debt outstanding continues to grow despite five consecutive years of declining real net farm income.

We argue the validity of using national financial indicators such as the debt-to-asset ratio to assess financial stress in agriculture is highly problematic. While those farms with little or no debt on their balance sheets can withstand rising interest rates, declining commodity prices and stronger dollar, highly leveraged producers may not be as fortunate, causing increasing credit risk for agricultural lenders.

Dynamic stochastic simulation of selected representative farms is used to assess the probability of loan default associated with different leverage positions. Our results reveal a more pessimistic view, suggesting farms with heavy or even median debt loads may face severe financial stress, particularly if interest rates continue to rise. Agricultural lenders may face higher loan loss reserves and increased writing offs. Understanding the depth of the problem as opposed relying on national financial indicators can benefit all stakeholders in agriculture.

Introduction

The nation's farm sector experienced a severe financial crisis in the 1980s when high interest rates and strong dollar contributed to real net farm incomes approaching depression era levels. Farmland values nationally fell in almost in half, agricultural bank failures rose sharply, and several major farm equipment manufacturers closed their doors for good. The current economic situation shares some similarity with 1980s. Commodity prices have declined sharply from 2013 highs while a stronger dollar and tariffs are cutting exports. The sector's debt-to-asset ratio, one of several financial indicators published by the US Department of Agriculture (USDA), peaked at 22 percent in 1985. Many draw comfort in the fact that the sector level debt-to-asset ratio is 14 percent today.

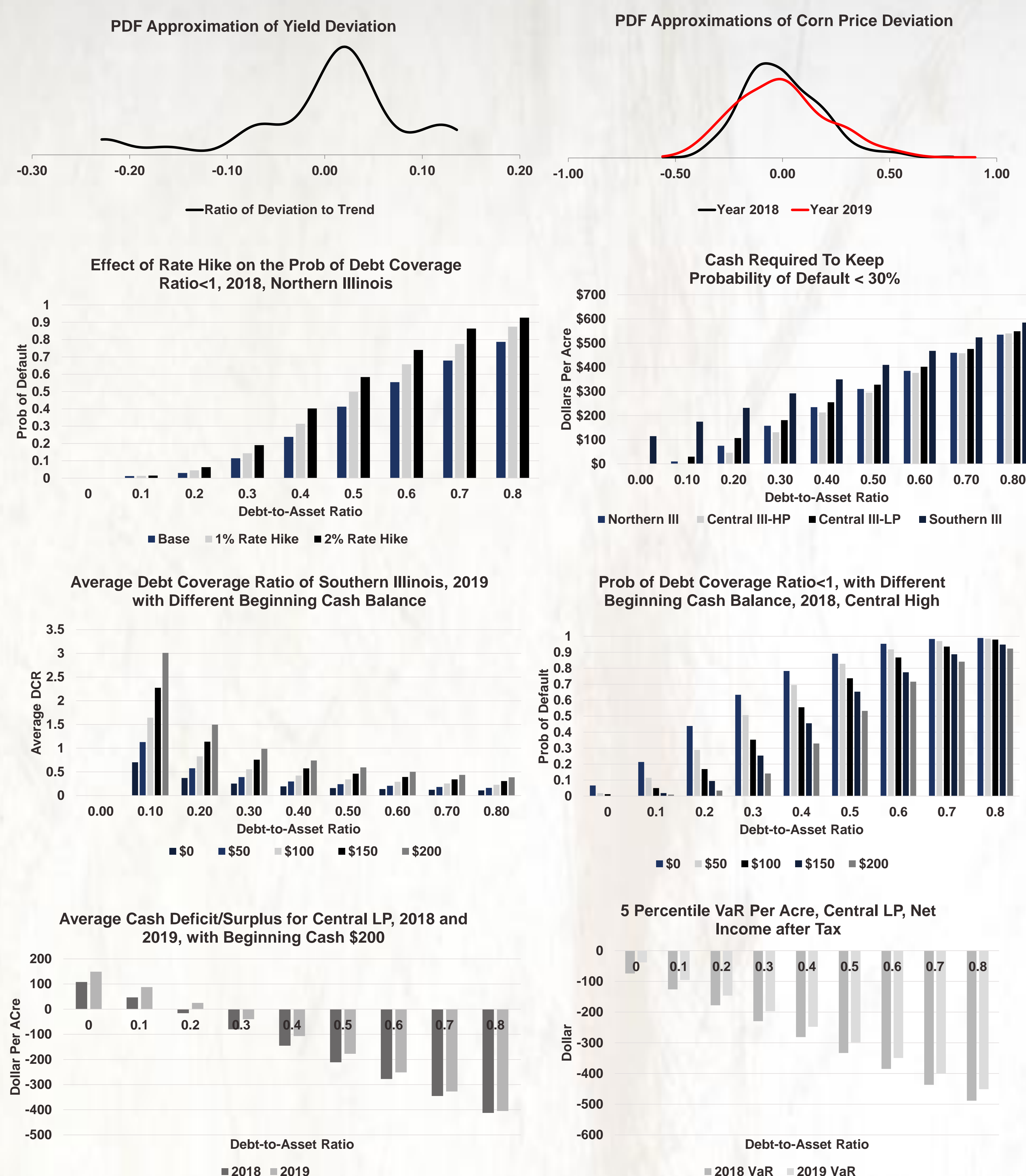
Farm debt continues to expand despite declining net farm income the last five years. Much of this growth in debt outstanding is likely highly concentrated in the hands of large highly-leveraged operations. 2016 data shows 10% farm operators carried more than 50% of the debt in farm sector, either expanding or modernizing operations based on risk/reward expectations formed earlier in the decade and today's low interest rates. The argument in this research is that those financial indicators used by USDA are highly aggregated and thus do not fully represent what is really going on in Agriculture. Given the increasing debt outstanding and shrinking net income, those with heavy debt concentrated farmers could be in financial stress and their failure could cause a systematic problem for agricultural lenders.

To predict the financial performance of highly leveraged producers, we propose a simple simulation method to stress test representative farm performance.

Methods and Materials

- For this study the performance of representative corn producers are generated from four Illinois regions (Northern Illinois region, Central Illinois High Productivity region, Central Low Productivity region and Southern Illinois region).
- The representative farm models are constructed first based on projected data.
- The empirical distribution of corn yield is estimated with linear regression based on historical data. The joint empirical prices distribution is obtained from Food and Agricultural Policy Research Institute-University of Missouri (FAPRI-MU). The conditional distribution of corn prices are used for simulation.
- The corn yield and price are then simulated for 500 iterations for each economic scenarios and each year (2018 and 2019). For each iteration the financial performance of the representative farm is recorded.
- The predicted probability of default and other indicators are then calculated from the simulation results. These indicators include the debt coverage ratio, the times interest earned ratio, the cash flow deficit, the beginning cash balance, and the VaR.
- To guarantee we have enough flexibility, we relaxed some assumptions for linear regressions. Most data comes from USDA production and cost projections.

Selected Results



Discussion

- Our simulations allow a number of financial indicators can be calculated. The figures above are some selected results from our simulation analysis.
- In general our models predict some level of financial stress for producers with mild debt while those who have heavy debt face more severe financial stress, even with the allowance of re-financing and with crop insurance payments for significant drops in yields or prices.
- The ongoing interest rate hike could worsen the probability of default measured by debt coverage ratio and times interest earned ratio.
- To minimize the probability of potential default, producers have to maintain some level of liquidity. The liquidity needed increases dramatically with the level of debt outstanding.
- At relatively low debt-to-asset ratios, the financial performance is sensitive to the beginning liquidity at the start of the two year forecast period. At higher level of debt outstanding,, beginning liquidity becomes less important.
- Allowing for re-financing, farm performance could be improved over time given a reversal of current commodity price trends

Conclusions

The relatively small portion of producers with heavy concentrated debt are the focus of this study. Our simulation results show they are expected to face significant financial stress in the near future. Producers with more moderate debt loads may have sufficient liquidity to avoid loan default or ability to acquire re-financing.

Our study offers a simple approach to stress testing the financial position of producers in the farm sector and an early warning indicator for agricultural lenders. We recommend stress testing key segments of loan portfolios using a representative farm or benchmark approach periodically, especially for those producers who are highly leveraged.