Using Solvency Ratios to Predict Future Profitability

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Executive Summary

Solvency ratios are normally used as an indicator of the long-term viability of the farm business. Farms with high leverage have a greater likelihood of going bankrupt. Bankruptcy occurs because a farm loses its equity. However, for a farm to lose equity, it must generate negative profits, which might imply that highly leveraged farms are earning less profit than those farms without debt. Thus it might be possible to predict future profitability based on solvency ratios. This paper tests that hypothesis but finds a naïve model of looking at past profit to predict future profits works the better than using solvency ratios.

Introduction

The Farm Financial Standards Council currently lists 21 ratios that can be used to evaluate a farm business. Three of these ratios are solvency ratios. Solvency ratios assess the amount of debt capital used by a farm business and help determine whether the business can meet long-term obligations. Any business that uses debt capital incurs an obligation to make principle and interest payments. If a business has too much debt, periods of low profitability can lead to insufficient cash flow to cover the principle and interest. Thus, the use of debt increases the financial risk of a farm business and the likelihood the farm business might become insolvent.

While solvency ratios are designed to measure a company's financial health, can they also be used to predict future profitability? Because debt capital introduces interest expense to a farm business, net farm income will be lower compared to a farm with just equity capital (everything else being equal). Going forward though, future net farm income might not always be lower for higher leveraged farms as these farms may have taken on more debt in order to fund profitable segments of their business.

Another potential complication of using solvency ratios to predict future farm profitability is farmland control. As land is the most valuable asset class on most crop farms, controlling that land is an important decision. Few farms have enough of their own equity to supply all the land they need without either purchasing land with debt capital or renting land. Farms that have taken on more debt to purchase land will need to rent less land than a similar farm with lower debt levels and farming the same acreage base. The interest rate and the cash rental rate, determine

whether renting or purchasing land is the most profitable option. However, even if purchasing land is more profitable than renting, purchased land will not cash flow (Oltmans).

A third potential issue with accessing profitability using solvency ratios is the payment of loan principle. While this does not affect profitability, the loan principle payment does take cash away from other areas where the cash could be employed. Thus the loan principle could indirectly lower farm profitability.

As the preceding discussion indicates, it is not clear if solvency ratios can reliably predict future net farm income. Given the easy with which the solvency ratios (particularly the debt-to-asset ratio) can be calculated, this paper tests the ability of two solvency ratios to future net farm income. A positive result might indicate that a solvency ratio could be used as a quick way to screen farms for future profitability.

Data and Methods

Data for this study comes from the Kansas Farm Management Association (KFMA) where farm information has been collected since 1973. The KFMA program employs a set of field economists who typically assists 100 farmers each to make management and tax decisions. As part of this process, farm-level financial and production data are collected and recorded. In this study, a panel data set of farms with 20 consecutive years of records was used (1995 to 2014).

For this study, three sets of comparisons were conducted. The first comparison divided farms into two groups based on an initial debt-to-asset ratio. This initial debt-to-asset ratio grouping was based on the average debt-to-asset ratio from 1995 through 1997. Each farm was then assigned to either the high-risk group (i.e., the individual farm debt-to-asset ratio was above the median) or the low risk group (i.e., the individual farm debt-to-asset ratio was below the median). For each group the median net farm income per acre was computed for each year. The net farm income per acre was used as a profitability measure to eliminate any size differences that net farm income might cause.

The second comparison divided farms into two groups based on an initial solvency ratio. The solvency ratio is not one of the 21 recommended FFSC ratios but it is a ratio commonly used with non-agricultural businesses. The solvency ratio is computed from net farm income plus depreciation and then divided by total debt capital. The comparisons based on solvency were computed in a similar fashion to the debt-to-asset ratio comparison.

The final comparison was a baseline check to examine what would happen when dividing the farms into two groups based just on the net farm income per acre. This constitutes the naïve model test. The comparison with groups based on dividing by net farm income per acre was conducted similarly to the other two comparisons.

Results

Results of the naïve model when dividing farms into two groups based on an initial three-year average of net farm income per acre are shown in Figure 1. As expected, there is a large difference between these two groups in the first three years. Since the groups were determined based on the net farm income per acre for the first three years, by definition there should be a large gap in the net farm income number. Over the next 17 years, the net farm income gap did not shrink and actually increased. The trend lines show this increasing difference in net farm income. Thus, the naïve model of predicting future net farm income based on past net farm income is effective (at least for ranking farms).

Results of the comparison when dividing farms into two groups based on an initial three-year average of debt-to-asset ratio are shown in Figure 2. As in the naïve model, there is an initial gap in the net farm income per acre between the two groups and this gap increases over time. The low risk group was at least slightly more profitably than the high-risk group.

Results of the comparison when dividing farms into two groups based on an initial three-year average of the solvency ratio are shown in Figure 3. As with the other comparisons, the initial gap in the net farm income per acre grows over time. The difference in net farm income per acre between the groups is larger in the solvency ratio comparison than in the debt-to-asset ratio comparison.

Conclusions

Both of the solvency ratios (i.e., debt-to-asset ratio and the solvency ratio) show at least some ability to predict future net farm income. Those farms that were lower risk had a greater net farm income per acre than those farms that were higher risk. This gap was consistent over the entire time horizon and actually increased over the time horizon.

The solvency ratio tended to do a better job of predicting future profitability than did the debt-to-asset ratio. The net income cap between high and low risk farms for the debt-to-asset ratio was about $10 per acre at the start of the time horizon. The net income gap for the solvency ratio was $20 per acre at the start of the time horizon.

However, the naïve model of just using past profitability to predict future profitability did the best of all. Here the income gap between the high and low profit farms was $25 at the start and grew from there. Given this is the easiest measure of all to examine and gave the best results, this is the most appropriate tool to use of the three measures examined. It would appear that past performance is a good guide to future performance, at least when ranking farms.

Because net farm income was so effective, it probably explains why the solvency ratio was better than the debt-to-asset ratio. The solvency ratio uses net farm income in the calculation while the debt-to-asset ratio is just based on the balance sheet. Other financial ratios might give good results too at predicting future net farm income but they were not examined in this paper. In particular, ROA and ROE might be good ratios to test.

References

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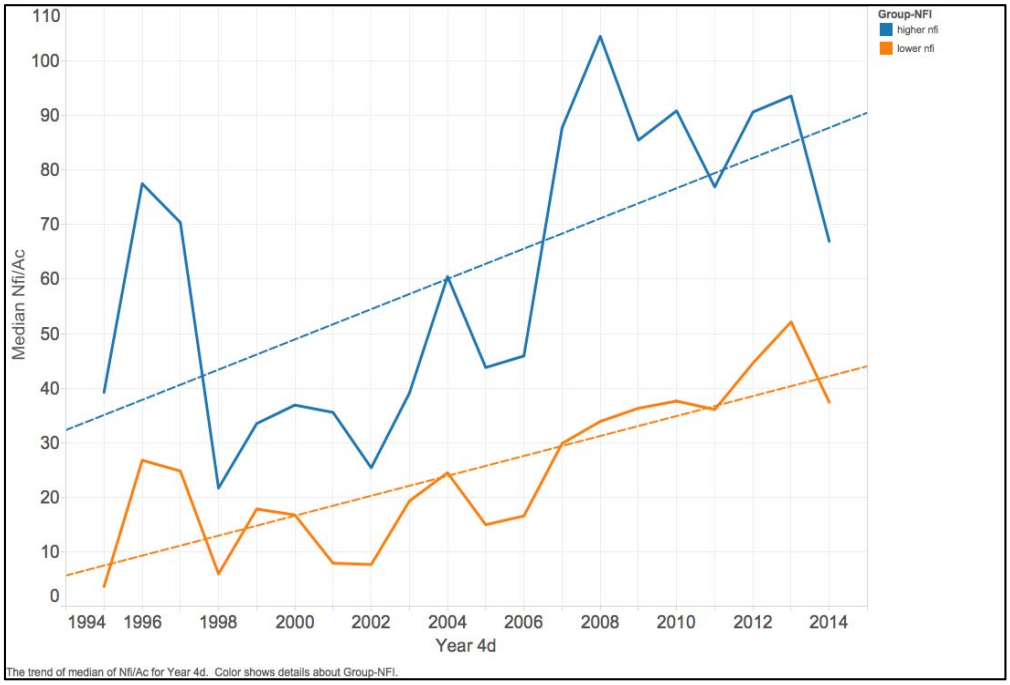

Figure 1. Net Farm Income per Year for High and Low Income Groups
Note: Income group based on 1995-97 NFI

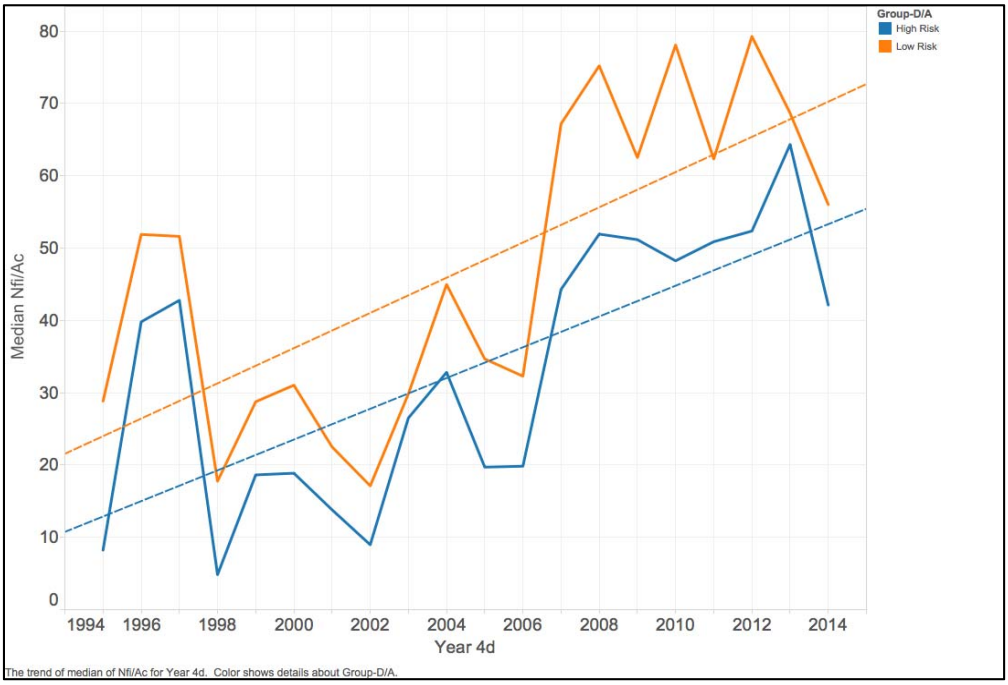

Figure 2. Net Farm Income per Acre per Year for High and Low Risk Groups
Note: Risk group based on 1995-97 Debt to Asset Ratio

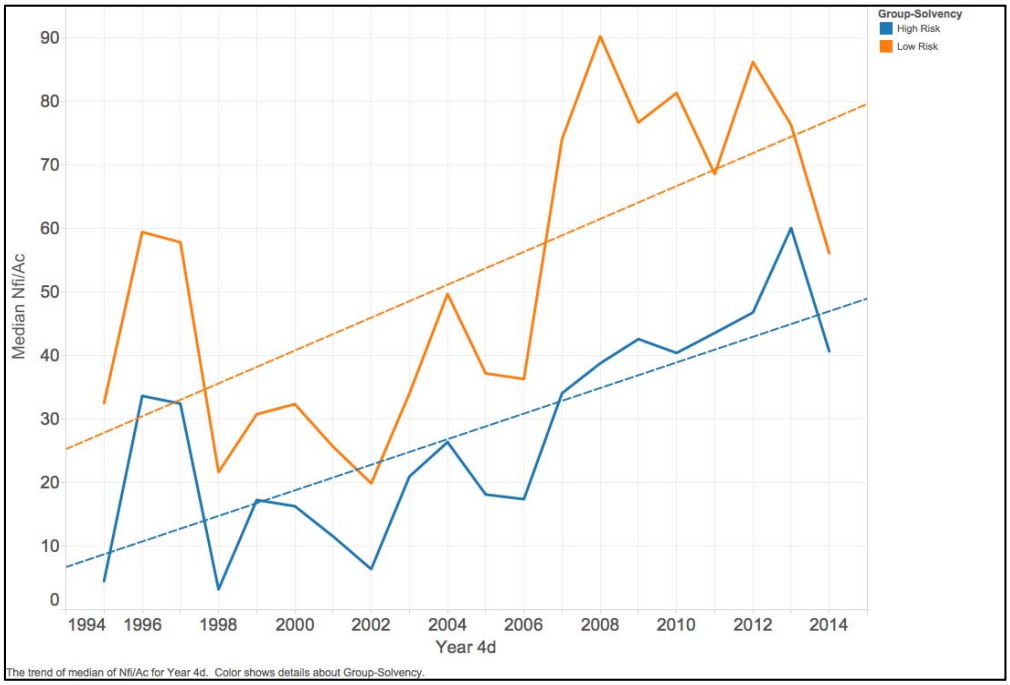

Figure 3. Net Farm Income per Acre per Year for High and Low Risk Groups
Note: Risk group based on 1995-97 Solvency Ratio

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