

Sensitivity Analysis: Understand Your Borrower's Risk Exposure

by Dr. Paul Ellinger

The recent decline in commodity prices and diminished expectations of future prices have increased the financial stress of farmers and ranchers. Recent forecasts indicate the farm economy will have to weather another economically difficult year. USDA's latest forecasts of net farm income for 1999 at \$44.6 billion are significantly lower than the estimate of \$48.0 billion for 1998.

Do you understand your borrowers' risk exposure to changes in commodity prices, input costs and production? Do you have the tools and data necessary to assess your borrowers' repayment capacity under alternative economic scenarios?

Alternate Scenarios

Evaluating repayment capacity and loan performance necessitates evaluating the farm or ranch under alternative scenarios. Considerable uncertainty exists about the impacts of future economic and weather conditions on the financial performance of a farm or ranch. Lenders need to evaluate the conditions that permit loan repayment as well as the adverse conditions that may hinder loan performance.

Understanding the sensitivity of an operation to adverse conditions is essential in assessing repayment capacity. Since farmers and ranchers have adopted and employed risk management techniques at different levels, it is difficult to make general judgments regarding borrowers' exposure to decreases in prices or yields. Each borrower's management situation should be evaluated individually.

Table 1 shows the components of projected capital replacement and term debt repayment capacity. The

information comes from a pro-forma income statement and a projected cash flow budget.

Table 1.

Projected Capital Replacement and Term Debt Repayment Margin for Joe and Elise Farmall

1.	Crops and feed revenue	\$221,500
2.	Livestock and livestock product revenue	+ 136,300
3.	Other revenue and adjustments	+ 30,000
4.	Value of farm production	387,800
5.	Operating expenses	- 271,460
6.	Interest expenses	- 49,760
7.	Net farm income from operations	66,580
8.	+ Total non-farm income	17,320
9.	+ Depreciation expense	35,800
10.	- Income tax expense	25,170
11.	- Withdrawals for family living	38,050
12.	= Capital Replacement and Term Debt Repayment Capacity	56,480
13.	- Principal payments on unpaid operating debts	- 0
14.	- Principal payments on current portions of term debt and capital leases	39,340
15.	= Capital Replacement and Term Debt Repayment Margin (CRDRM)	17,140

Sensitivity Analysis

Percent crop revenue can decline and still maintain positive CRDRM (Line 15/Line1)	8%
Percent livestock revenue can decline and still maintain positive CRDRM (Line 15/Line2)	13%
Percent farm operating expenses can increase and still maintain positive CRDRM (Line 15/Line 5).....	6%
Percent interest expenses can increase and still maintain positive CRDRM (Line 15/Line 6)	34%
Total non-farm income as a percent of CRDRM (Line 8/Line 15)	101%

The capital replacement and term debt margin is a measure that can be used to evaluate the ability of a borrower to generate funds to repay term debt, to service additional debt or to replace capital assets. The measure can also be viewed as the safety margin that could be used for capital replacement and debt service.

In making projections, assumptions have to be made regarding commodity prices, production levels, interest rates and input costs. Due to the uncertainty of these measures, it is often helpful to evaluate the sensitivity of capital replacement and term debt margin to changes in these assumptions. The lower portion of Table 1 relates the borrowers' vulnerability to adverse events.

Identify Risk

A crop revenue decline of 8 percent or a livestock revenue decrease of 13 percent would eliminate the entire safety margin. Furthermore, an increase in operating expenses of 6 percent or an increase of 34 percent in interest expenses would also negate the repayment cushion.

Combinations of these adverse events would also reduce the ability of Joe and Elise to repay debt. This operation is very sensitive to revenue and cost changes. Strategies to reduce these risks on this farm should be explored.

A negative value for capital debt and term debt repayment margin indicates that loan repayment would have to come from alternative sources such as savings accounts, marketable securities and/or other asset liquidations.

Non-farm income for the Farmalls exceeds the capital replacement and term debt margin, indicating a high reliance on non-farm income. The stability and risks of the sources of non-farm income should be evaluated in these situations.

Computer software has enhanced the ability of lenders to evaluate alternative scenarios. Commercial software is available that will allow lenders to evaluate the historical and pro-forma financial analysis for farms and ranches.

Input values can be changed to evaluate sensitivity of various financial measures to changes in the input values. Spreadsheet tools can also be designed to evaluate alternative scenarios. However, a significant challenge that remains is obtaining adequate information from your borrowers to perform these analyses.

The changing conditions in agriculture and the recent economic downturn are requiring lenders to refine their credit evaluation toolkits. You need to understand the sources of risk for your borrowers and the potential effects of alternative situations on your borrowers' ability to repay. Sensitivity analysis is a valuable tool to help you understand the sources and magnitude of borrower risks.

For additional information on farm financial analysis software, downloadable tools and other relevant lender information, go to Farm Decision Outreach Central (FARM.DOC) on the Internet (<http://web.aces.uiuc.edu/farmdoc/>). It is a family of services designed to provide comprehensive risk management information and analysis for agricultural producers, lenders and agribusinesses.

Paul Ellinger is an associate professor at the University of Illinois. He can be reached at 217/333-5503
pellinge@uiuc.edu

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Subscription inquiries: 314-569-2700
AgLender@doane.com