Agricultural ECONOMICS

EC-609

Purdue University

Cooperative Extension Service

West Lafayette, IN 47907

The Power of Leverage: It Can Hurt As Well As Help

Freddie L. Barnard, Assistant Professor of Agricultural Economics

The number of farmers experiencing financial difficulties increased tremendously in the early 1980s. High real interest rates increasing production costs, depressed commodity prices, and low crop yields caused cash flow problems for many farmers. In some cases those problems eventually led to either bankruptcy or foreclosure. In addition, other farmers are enduring decreases in net worth because of real estate devaluation and operating losses. The purpose for this publication is to explain why the impact of borrowing in different economic environments is not the same for all farmers.

Background

From the outset it should be recognized that not all farmers experienced financial difficulties in the early 1980s. Those who experienced severe difficulties generally were young farmers and/or highly leveraged (indebted) farmers.

The first category is that of younger farmers trying to get started in farming. In most cases, they borrowed heavily to gain control of assets needed in their farming operations. This heavy borrowing was combined with a small amount of equity capital. During the early 1980s they experienced operating losses and were unable to service their debt.

Highly leveraged farmers utilized the strategies that were most successful during the 1970s; get as big as you can as fast as you can, and do it on borrowed funds. That strategy worked well during the 1970s when the real cost of borrowing (interest rate minus inflation rate) was low relative to historical and current levels. In addition, real estate values climbed throughout the 1970s. So, most operations were left with a higher net worth at year-end than at the beginning of the year, regardless whether there was an operating profit during the year.

However, the financial climate changed; the real rate of borrowing is much higher in the 1980s than in the 1970s. Real estate values are no longer rapidly climbing but instead are falling or at best leveling out. Highly leveraged and young farmers did not have the strong equity positions needed to absorb operating losses. Furthermore, declines in real estate values diluted an already weak equity position and prevented additional borrowing needed to supplement the cash flow needs of the business. The result was bankruptcy, foreclosure, or severe cash flow problems.

One measure of financial indebtedness is the ownership equity ratio, which is calculated as follows:

```
  Net worth
------------  x  100  Ownership equity ratio
Total assets
```

Multiplying by 100 presents the results as the percentage of equity an operator has in the operation. In other words, it tells what percentage of the farm business is equity capital of the farmer. Consequently, the remainder is borrowed capital. This ratio will be used in the discussion that follows.

A Case Example

A simple example illustrates the impact that interest rates and 20% and 5% returns on assets have on the net worth of two operations when there are different levels of borrowing. This example discusses a $5,000 operation. Most farmers are dealing with businesses 20 to 200 times larger than this. To fully appreciate this problem, multiply the results here by a factor to approach the size of your business.

Assume that in the first operation $1,000 of equity capital is combined with $4,000 of borrowed capital to make a $5,000 investment. The balance sheet for the operation would be as follows:

```
Total assets     Total liabilities       Net worth
------------  =  -----------------  +   -------------
  $5,000             $4,000                $1,000
```

The ownership equity ratio would be 20 percent [($1,000 divided by $5,000) x 100 = 20%]. For convenience, this operation will be the low-equity or highly leveraged operation.

In the second operation, $4,000 of equity capital is combined with $1,000 of borrowed capital for an

investment of equal value ($5,000). The balance sheet for the second operation would be as follows:

```
Total assets    Total liabilities     Net worth
------------ =  ----------------  +  ------------
  $5,000             $1,000            $4,000
```

For this operation, the ownership equity ratio would be 80 percent [($4,000 divided by $5,000) x 100 = 80%], and it is the high-equity or low leverage operation.

For both operations the interest rate on borrowed capital is assumed to be 15%, but the amount of interest paid varies from $600 ($4,000 x .15 = $600) for the low-equity operation to only $150 ($1,000 x .15 = $150) for the high-equity operation. Living expenses are paid from an off-farm job and are not deducted from net income. Net income is assumed to be used to retire debt. The two assumed rates of return on assets, after all expenses except interest, are 20 and 5 percent. The 20 percent rate of return (.20 x $5,000 = $1,000 in earnings) represents a high-profit situation. The 5 percent rate of return (.05 x $5,000 = $250 in earnings) represents a low-profit situation.

High-Profit Situation

Low-Equity Operation

When the rate of return on total assets is assumed to be 20% (high-profit situation), net worth or equity capital for the low-equity business increases by $400 during the first year of operation from the original $1,000 to $1,400 (Table 1). Assuming the $400 is used to retire a corresponding amount of the outstanding debt, the end-of-year balance sheet would be as follows:

```
Total assets      Total liabilities        Net worth
------------- =  ---------------------  + ------------
  $5,000               $3,600                $1,400
```

The $400 would result in a 40 percent rate of return on the original $1,000 of equity capital [($400 divided by $1,000) x 100 = 40%]. The ownership equity ratio for the low-equity operation in a high-profit situation would increase from 20% to 28% [$1,400 divided by $5,000) x 100 = 28%] during the year.

High-Equity Operation

The same 20% rate of return on total assets for the high-equity operation would result in net income of $1,000, and after the $150 interest cost an $850 increase in net worth from $4,000 to $4,850 (Table 1). The end-of-year balance sheet would be as follows, assuming the $850 is used to retire a corresponding amount of existing debt:

```
Total assets     Total liabilities       Net worth
------------- = ------------------- + ------------
 $5,000                $150              $4,850
```

Table 1. Rate Earned on Total Assets of 20 Percent

	Low-equity Operation	High-equity Operation
Investment	$5,000	$5,000
Earnings	1,000	1,000

```
Interest cost at 15%       600          150
                         -------------------
Net income               $ 400        $ 850
Rate earned on equity       40%          21%
Ending capital          $1,400       $4,550
-------------------------------------------------
```

Although the $850 would result in only a 21% return on the original $4,000 of equity capital [($850 divided by $4,000) x 100 = 21%], the ownership equity ratio for the high-equity operation in a high-profit situation would increase from 80% to 97% [$4,850 divided by $5,000) x 100 = 97%].

Summary

Therefore, during high-profit situations (20% rate of return on total assets), the low-equity or highly leveraged operation had a higher rate of return on equity capital (40%) than the high-equity or low leverage operation (21%). This was because four times the amount of equity capital was used in the high-equity operation ($4,000) than in the low-equity operation ($1,000). Note that the rate of return on total assets was equal regardless of how they were financed. This makes borrowing large amounts attractive during high-profit times such as the 1970s.

High-Profit and Asset Appreciation

This attraction is enhanced even further when the value of the asset is increased by inflation. To illustrate this, the value of the $5,000 in total assets is increased 10% or $500, i.e., to $5,500. Since total liabilities are not affected, the increase is added to net worth. The end-of-year balance sheet for the low-equity operation would look as follows:

```
Total assets      Total liabilities     Net worth
-------------  = ------------------ + ------------
  $5,500              $3,600             $1,900
```

The rate of return on equity capital, although not all realized, is now 90% [($900 divided by $1,000) x 100 = 90%]; 40 percent of the gain is realized and 50 percent is unrealized, since the asset would have to be sold to reap the cash benefits of the asset appreciation. The ownership equity ratio for the low-equity operation is now 35% [$1,900 divided by $5,500) x 100 = 35%].

For the high-equity operation, an increase in the value of the assets of 10% results in the following balance sheet:

```
Total assets      Total liabilities     Net worth
------------- = -------------------- + ------------
  $5,500              $150              $5,350
```

The rate of return on equity capital, although not all realized, is now 34% [($1,350 divided by $4,000) x 100 = 34%]; 21 percent is realized and 13 percent is unrealized. The ownership equity ratio for the high-equity operation is now 97.3% [($5,350 divided by $5,500) x 100 = 97.3%].

Thus, borrowing during high-profit times in conjunction with periods of high inflation results in rates of return as high as 90% on equity capital for low-equity operations. Those conditions also help high-equity operations, but at 34% the rate of return on equity capital is much less. Thus, borrowing large amounts of money grew in popularity during the 1970s.

Low-Profit Situation

Low-Equity Operation

However, when we examine a low-profit situation and assume the rate of return on total assets is only 5%, the effects of leverage are quite different. With earnings of $250 (.05 x $5,000 = $250) and an interest payment of $600 net worth or equity capital for the low-equity operation decreases by $350, from the original $1,000 to $650 (Table 2). Assuming the $350 loss was financed by additional borrowing, the balance sheet would be as follows:

```
  Total assets     Total liabilities      Net worth
  ------------ = -------------------- + ------------
    $5,000               $4,350            $650
```

Table 2. Rate Earned on Total Assets of 5 Percent

	Low-equity Operation	High-equity Operation
Investment	$5000	$5,000
Earnings	250	250
Interest cost at 15%	600	150
Net income	$-350	$100
Rate earned on equity	-35%	2.5%
Ending capital	$ 650	$4,100

The $350 loss in net income results in a -35% rate of return on the original $1,000 of equity capital [$-350 divided by $1,000) x 100 = -35%]. the ownership equity ratio declines from 20% to 13% [($650 divided by $5,000) x 100 = 13%].

High-Equity Operation

When the same 5% rate of return on total assets is assumed for the high-equity operation, the result is $100 in net income (Table 2). Assuming the $100 is used to retire a corresponding amount of the $1,000 in outstanding debt, the balance sheet would be as follows:

```
  Total assets     Total liabilities       Net worth
 -------------- = -------------------- + -------------
    $5,000                $900               $4,100
```

The rate of return on equity capital would be 2.5% [($100 divided by $4,000) x 100 = 2.5%]. The ownership equity ratio would increase from 80% to 82% [($4,100 divided by $5,000) x 100 = 82%].

Summary

Thus, during a low-profit period (5% return on total assets) the low-equity or highly leveraged operation lost a considerable amount of money ($350), whereas the high-equity or low leverage operation actually made $100. Being highly leveraged results in pain and anguish during low-profit times, such as the early 1980s.

Low-Profit and Asset Value Decline

To better represent the impact of the recent economic environment, an additional assumption needs to be

made; a decline in the value of the assets. If there is also a decline in asset values in conjunction with the low-profit situation (for example real estate and farm machinery) the low-equity operator gets into severe financial difficulty. If a 10% decline in asset values is experienced, the value of the total assets decreases from $5,000 to $4,500. Then the balance sheet is as follows:

```
Total assets     Total liabilities      Net worth
------------- = -------------------- + -------------
  $4,500              $4,350              $150
```

The rate of return on the $1,000 of equity capital would be -85% [($-850 divided by $1,000) x 100 = -85%]; a negative 35 percent realized and a negative 50 percent unrealized. The ownership equity ratio decreases from the original 20% to just 3% [($150 divided by $4,500) x 100 = 3%], which is enough to make many lenders very concerned about the survival of the farm business and the security of the loan.

However, the impact on net worth for the high-equity operation with a 5% rate of return on total assets and a 10% decline in the asset value is not as severe as for the low-equity operation. The balance sheet in this instance would be as follows:

```
Total assets      Total liabilities       Net worth
-------------- = --------------------- + -------------
    $4,500                $900                $3,600
```

The rate of return on the $4,000 of equity capital would be -10% [($-400 divided by $4,000) x 100 = -10%]; a plus 2.5 percent realized and a -12.5 percent unrealized. The ownership equity ratio would remain at the original level of 80% [($3,600 divided by $4,500) x 100 = 80%].

Summary

This simple example illustrates how the net worths of farming operations are impacted differently by various earnings situations depending upon the amount of debt used in the operation. During high-profit situations highly leveraged operations experience a higher rate of return on equity than do low leveraged operations. However, during low-profit situations, high leverage operations often experience financial stress and greater losses than low leverage operations.

The author greatly appreciates the helpful comments by J.H. Atkinson, David H. Bache, Robert W. Taylor, and George F. Patrick on an earlier draft.

RR 2/85

Cooperative Extension work in Agriculture and Home Economics, state of Indiana, Purdue University, and U.S. Department of Agriculture cooperating; H. A. Wadsworth, Director, West Lafayette, IN. Issued in furtherance of the acts of May 8 and June 30, 1914. The Cooperative Extension Service of Purdue University is an affirmative action/equal opportunity institution.