



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**THE ABILITY OF LIVESTOCK PRODUCERS  
TO INVEST IN THE 1980'S**

**John E. Jenkins**

**Proceedings of  
Regional Research Committee NC-161**

**FINANCING AGRICULTURE IN A CHANGING  
ENVIRONMENT: MACRO, MARKET,  
POLICY AND MANAGEMENT ISSUES**

**Kansas City, Missouri  
September 24-25  
1990**

Department of Agricultural Economics and Rural Sociology  
The Pennsylvania State University  
University Park, Pennsylvania 16802  
May 1991

*Copyright 1990 by author. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

## THE ABILITY OF LIVESTOCK PRODUCERS TO INVEST IN THE 1980'S

John E. Jenkins\*

The viability of using borrowed funds to finance acquisition of land and buildings for livestock production affects livestock producers that want to expand their operations, potential livestock producers, and lending institutions. The capability of livestock producers to successfully use debt financing has generally improved as the economic condition of the agricultural sector changed from severe financial stress during the mid 1980's to recovery and stability at the start of the 1990's.

This research uses a cash flow model to compare percentages of cattle, dairy, and swine producers in each year from 1984 to 1988 who have generated enough income to finance their operations with debt. The model is also used to make short term forecasts of the ability of livestock producers to use debt financing. Effects on farmland prices of the ability to make payments on farmland with income earned from agriculture are also explored.

### THE FARM COSTS AND RETURNS SURVEY

The principal data source used for this study was the Farm Costs and Returns Survey (FCRS), conducted by the National Agricultural Statistical Service. The FCRS is the most comprehensive national data source available on the costs and returns associated with the production of crops and livestock. Farm Costs and Returns Survey data were available for the years 1984 to 1988 when this research was conducted.

Operations included in the survey are selected from two types of lists: (1) a list of operators grouped by size and (2) a list of geographic areas grouped by type of use. Each operation included in the Farm Costs and Returns Survey represents a statistically determined number of other similar operations. The FCRS sample represented 89 percent of the official USDA number of farms with sales greater than \$40,000 in 1988.

### SELECTION OF LIVESTOCK PRODUCERS FROM FCRS DATA

Farmers and ranchers included in the FCRS often have complex operations where a variety of crops and livestock are produced. Several selection criteria were developed so that homogeneous groups of dairy, beef, and hog producers could be chosen for this study. Limiting observations to leading dairy, hog, and beef states further enhanced the homogeneity of producers included in each category.

Dairy producers were selected from Michigan, Minnesota, and Wisconsin. An observation was included in the Dairy category if it had at least \$40,000 in milk sales and derived at least 65 percent of its total sales from milk and dairy cows. These criteria ensured that dairy was the major enterprise of any

---

\*John E. Jenkins is an agricultural economist with the USDA's Economic Research Service.

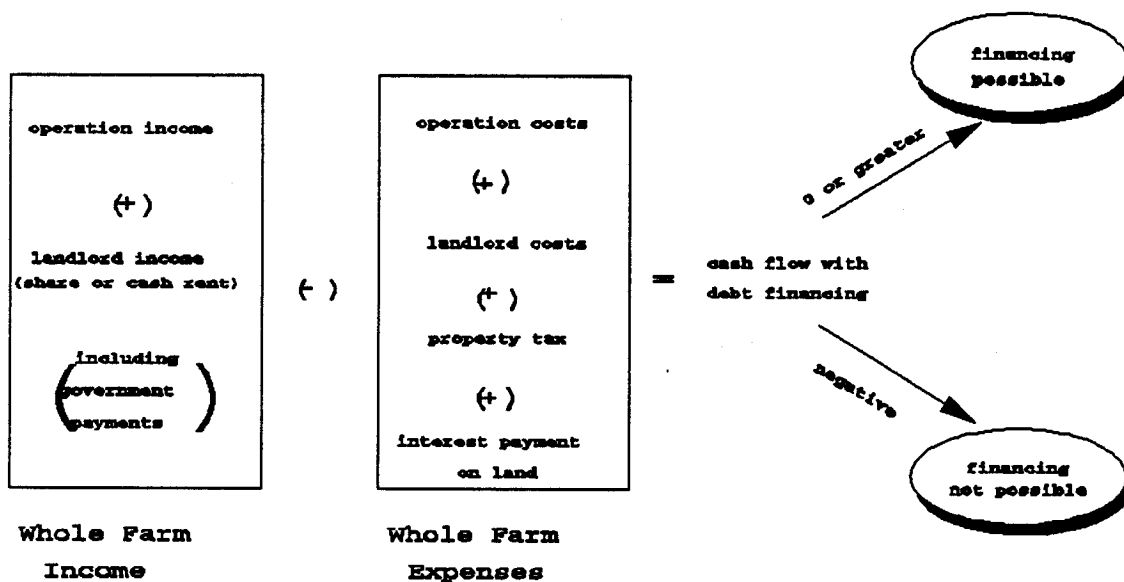
observation included in the dairy category and that the observation represented a commercial sized operation. Hog producers in this study came from Illinois, Indiana, Iowa, Missouri, Ohio, Minnesota, and Nebraska. Observations selected as hog producers had at least \$40,000 of sales of hogs and pigs. Sales of hogs and pigs were required to account for at least 65 percent of the total sales of observations categorized as hog producers.

Beef producers were selected from Texas, Oklahoma, Kansas, South Dakota, and Nebraska. Beef producers had at least \$40,000 of sales of cattle and calves. Two additional requirements eliminated feedlots from the beef category: (1) cattle purchases made up no more than 15 percent of livestock related expense and (2) the ratio of the value of cattle purchases to cattle sales was less than 40 percent.

#### THE MODEL OF ABILITY TO USE DEBT FINANCING

Figure 1 is a representation of the model to determine the ability of livestock producers to finance the purchase of land and buildings. This model determines the cash flow of each livestock operation selected from the Farm Costs and Returns survey under the assumption that all the land and buildings in the operation are being purchased and that a 25 percent down payment has been made. The 25 percent down payment is increasingly viewed as a minimum by commercial bankers. This assumption ensures a modest study bias in the direction of conservative financing. Each year is modeled independently, allowing comparisons of cash flow ability among years.

Figure 1. Model of Land Purchase Ability



Income from the farming operation is calculated in the first section of the model, represented in Figure 1 by the "Whole Farm Income" rectangle. Under the model scenario all land in the operation is owned or being obtained through debt financing. Share rents that previously went to a landlord are thus added to the income of the operation. The income of the operation includes operator and landlord government payments. Off farm income earnings were excluded from the model scenario.

The right-most rectangle in Figure 1., labeled "Whole Farm Expenses", represents the expenses of the operation if 75 percent of the land and buildings in the operation are being purchased with debt financing. Costs that were previously paid by the landlord are now part of the expenses of the combined operation. The operator will also have to assume the burden of making interest payments on the purchased acreage and installations. First quarter interest rates for Federal Land Bank (FLB) real estate loans were used for calculating interest payments.<sup>1</sup> Interest expense was calculated by multiplying the value of land and installations being financed by the first quarter interest rate for the year being examined. Principal payments increase net worth and are thus not considered to be an expense in this model.

Subtracting the costs in the second rectangle from income gives "cash flow with debt financing". The two arrows coming from "cash flow with debt financing" show, based on net cash flow, the categories into which producers were grouped. A cash flow of zero or greater will mean that the producer is considered to have the ability to use debt financing. Producers with negative cash flows had inadequate net farm income for using debt financing.

#### FORECASTS

Combining Farms Costs and Returns Survey data with price projections from the Situation and Outlook program of the Economic Research Service provides a unique opportunity for making short term forecasts. FCRS data from 1988 were used as a base for making projections for 1989 and 1990. Enterprise mixes, amounts of inputs used, and levels of non real estate debt from the 1988 questionnaire were held constant for the years for which projections were made.

Forecasts were constructed by updating the input costs, commodity prices, land prices, and government income of each questionnaire observation to reflect their projected 1989 and 1990 levels. This methodology allowed distinctions among producers who were more dependent on a particular input or commodity. The forecast scenarios were used to reestimate the ability of each livestock producer to use debt financing for 1989 and 1990.

Drought affected the financial situation of many farm operations in 1988. Yield levels were adjusted to reflect more normal conditions when making the 1989 and 1990 forecasts. This adjustment was made by multiplying 1988 yields with a ratio of 1987 to 1988 state average yields based on production data compiled by the National Agricultural Statistical Service. This ratio was applied to each

---

<sup>1</sup> First quarter Federal Land Bank interest rates for real estate loans were: 1984 - 11.5%, 1985 - 12.24%, 1986 - 11.9%, 1987 - 11.4%, and 1988 - 9.88%.

individual survey response from the area affected by drought.

#### DAIRY PRODUCERS HAVE THE MOST ABILITY TO USE DEBT

Figure 2 is a historical comparison of the ability of dairy, hog, and beef farmers to use debt financing. The results shown for 1989 and 1990 are forecasts based on 1988 FCRS data. Dairy producers have consistently had more ability to use debt financing than hog or beef producers. In 1987, for example, 73 percent of dairy producers could cash flow the interest on 75 percent of the real estate and installations in their operation. In that same year 41 percent of hog producers and 13 percent of beef producers had sufficient cash flows to make debt financing feasible.

The agricultural sector experienced a wide variety of economic conditions during the years for which results are presented in Figure 2. Land prices in all the regions included in this study declined from 1984 through 1986 and then began to increase. A drought in 1988 caused feed prices to rise. Dairy producers have had the greatest ability to use debt financing under a wide range of conditions (Figure 2). The percentages of hog producers able to obtain land through debt financing was fairly stable from 1984 to 1988. Projected increases in prices will lead to an increased ability of hog producers to use credit at the beginning of the 1990's. Most beef producers included in this study have not had enough profitability to justify financing large portions of their operations with debt.

#### DEBT FINANCING ABILITY AND LAND PRICES

The percentage of producers that have the capability to purchase land can be used as a leading indicator of farmland prices in the same manner housing affordability indices signal changes in residential real estate markets. This approach recognizes the importance of current income in the process of generating changes in land prices, as has been shown by Emanuel Melichar of the Federal Reserve Bank. The use of cash flow ability as an indicator of the direction farmland prices may take assumes the purchase decision is heavily weighted by current cost and return relationships.

Figure 2. Percentage of Livestock Producers That Can Use Debt Financing

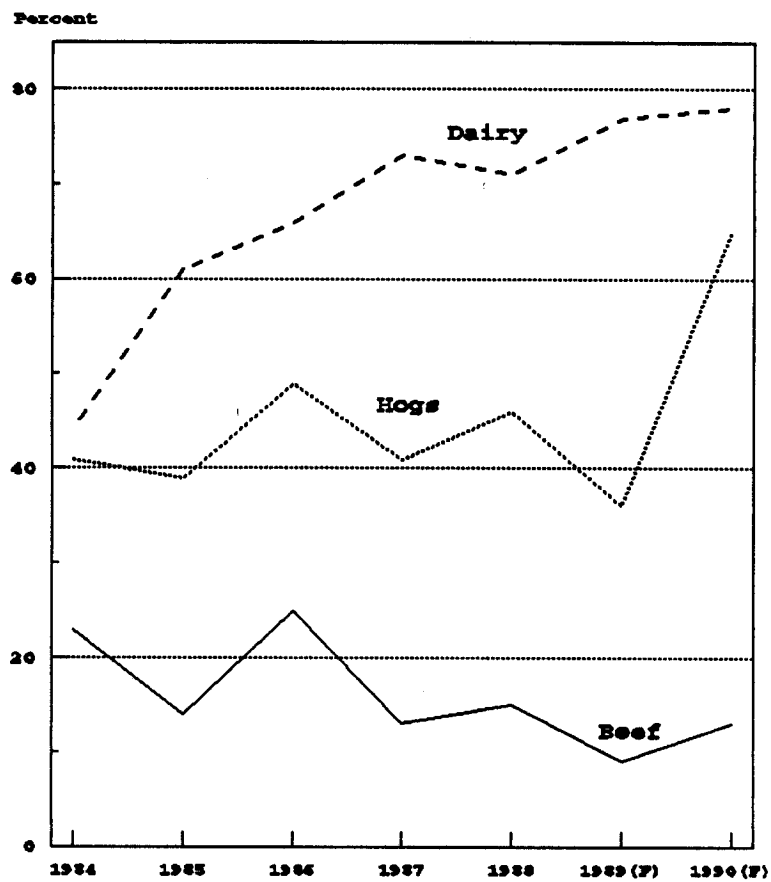
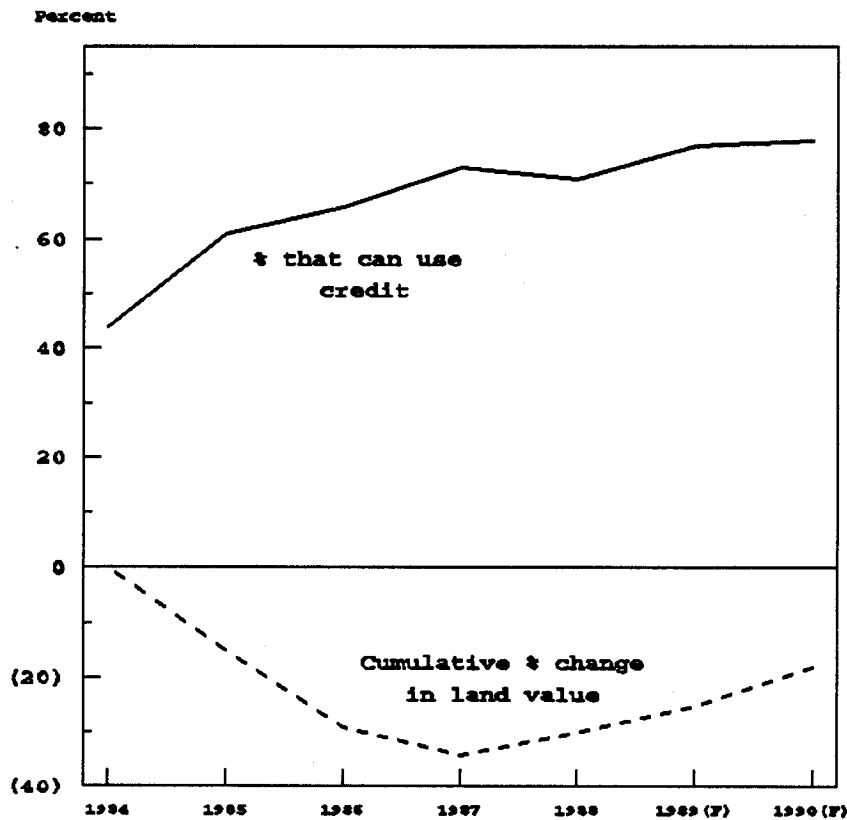


Figure 3 uses dairy producers to illustrate how ability to finance land with proceeds from the operation may be related to farmland prices. Dairy products account for more cash receipts than any other commodity in Minnesota, Michigan, and Wisconsin. Thus ability of dairy producers to purchase land can be expected to have an important influence on farmland prices in that three state area.

Figure 3. The Ability of Dairy Producers to Use Debt Financing Influences Land Values



The bottom line in Figure 3 is the cumulative percentage change in farmland values for Minnesota, Michigan, and Wisconsin. Farmland prices in the three states fell 39 percent from the beginning of 1984 to the beginning of 1987. The

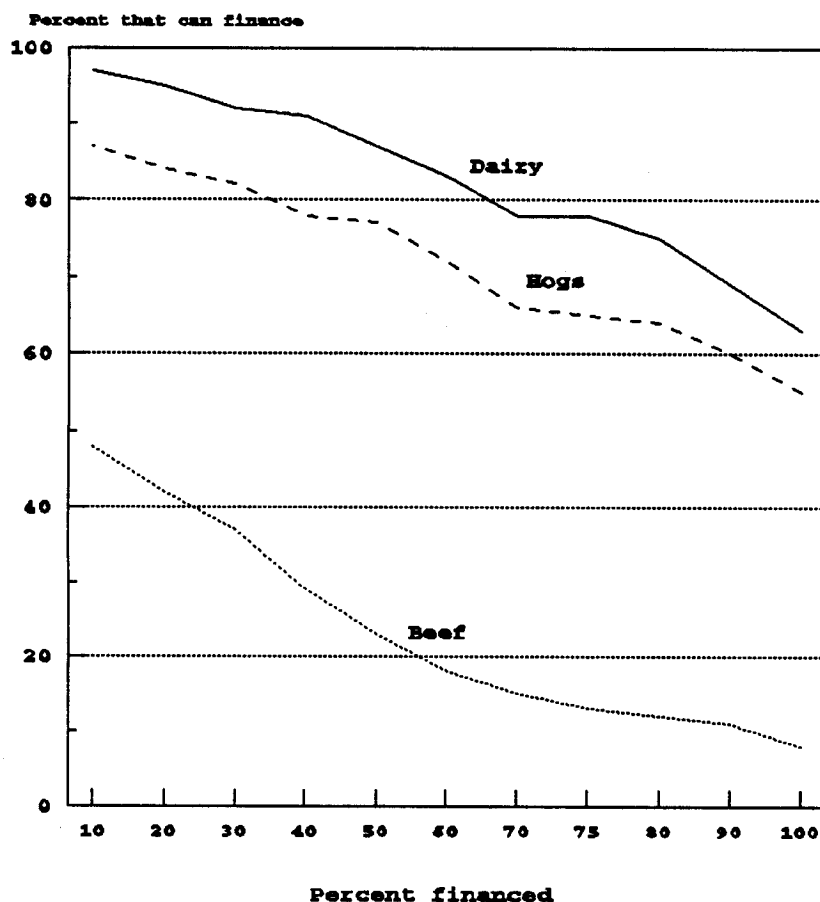


top line in Figure 3, reproduced from Figure 2, is the percentage of dairy farmers with the capability to finance 75 percent of the land and installations in their operations. The steady increase in the percentage of dairy producers able to use debt financing between 1984 and the start of 1987 provided a leading indicator of the farmland price turn around during 1987.

#### AMOUNT OF DEBT THAT CAN BE FINANCED

The assumption that all the land and buildings in the operation are being financed and that a 25 percent down payment has been made results in a conservative estimation of the percentage of producers that can assume debt. Figure 4 shows how the forecast of the percentage of livestock producers able to finance their operation with debt in 1990 changes as the percent of the operation being financed varies. When only 10 percent of the operation is being financed, almost all dairy operations and close to 90 percent of hog operations are projected to be able to meet interest payments on real estate in 1990. Less than half the beef producers included in the study are projected to be able to finance 10 percent of their real estate in 1990.

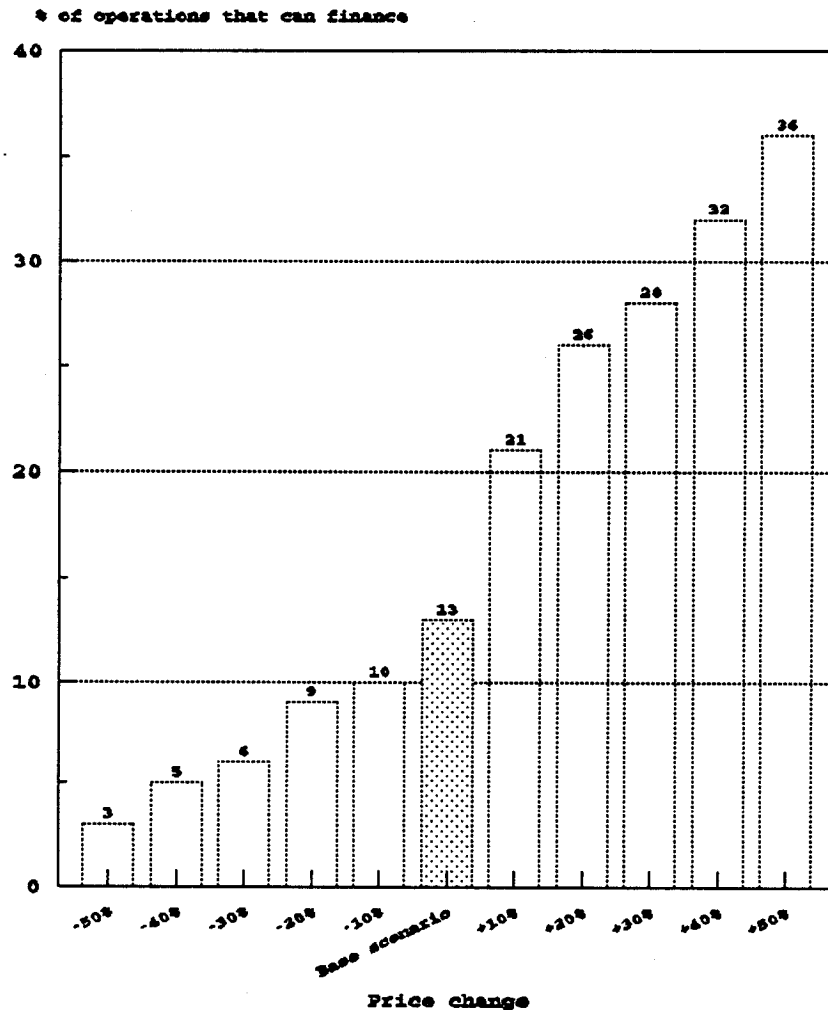
Figure 4. Forecast Percentage of Livestock Producers Able to Use Debt Financing in 1990



### PRICE SENSITIVITY

Figure 5 demonstrates the sensitivity of the 1990 forecast of the ability of beef producers to use debt financing to changes in the forecasted prices that will be received by cattle producers. The bar labeled "base scenario" is the result obtained by using projected input and commodity prices from the Economic Research Service situation and outlook program. The other results in this sensitivity analysis were obtained by varying the forecasted price. The bar labeled "+10%", for example, is the result obtained by raising projected 1990 cattle prices 10 percent.

Figure 5. Forecast of Ability of Beef Producers to Use Debt Financing Under Different 1990 Price Scenarios



Under the base scenario only 13 percent of cattle producers had sufficient cash flow to finance 75 percent of the land and buildings in their operations. A price reduction of 50 percent would mean that 10 percent fewer cattle operations could successfully use debt in 1990. An increase in the projected price of 50 percent would give 23 percent more of the cattle operations included in this research the capability to use debt financing.

### CONCLUSIONS

This paper explored the ability of dairy, hog, and beef producers to finance the purchase of land and installations with proceeds from their operations. Results obtained from applying a cash flow model to Farm Costs and Returns survey data indicate that a higher percentage of dairy operations have been able to successfully use debt financing than either hog or beef operations. Projections based on 1988 FCRS data predict no change in this relationship.

The methodology used in this research could be easily employed by university researchers with access to time series financial data from farm management associations. The probable course of land values in their areas could be explored via the cash flow concept, especially if local agriculture was somewhat specialized. The potential also exists to determine statistical relationships between ability to cash flow land purchases and trends in land prices. Even useful indicator of the direction of farmland values.

### REFERENCES

- Melichar, Emanuel, 1979. "Capital Gains Versus Current Income in the Farming Sector." *American Journal of Agricultural Economics*, 61 (December): 1085-1092.