Financial Well-Being of North Dakota Farm Families

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For many North Dakota farmers, the 1980s have been a period of substantial economic stress. Low commodity prices, high interest rates, and declining land values have combined to create major problems for both farmers and their creditors. Some farm and ranch operators have been forced to liquidate and seek other types of work (Leistritz et al., 1987a), and some agricultural creditors report substantial loan losses (Saxowsky et al., 1987).

This article examines several aspects of the financial well-being of farm families, including their equity, income, cash flow, and returns to assets and owner equity. Data were drawn from a two-year study of farm operators that was initiated in 1985. Data collected in 1985 and 1986 reflected income and equity in 1984 and 1985, respectively. Comparisons drawn between the two years reflect the answers of 759 respondents who provided pertinent data for **both** years. (For additional discussion of data collection procedures, see Leistritz et al., 1987b.)

EQUITY CHARACTERISTICS

The relative equity (net worth) position of farm families has been under close scrutiny in recent years. The debt-to-asset ratio is an important indicator of the financial health of a farm business, particularly during a period when interest rates are generally higher than the rate of return to farm assets (as has been the case for the last several years). The larger the debt-to-asset ratio, the greater the probability that an operator will experience cash flow problems.

At current prices, input costs, and asset values, most commercial farms begin to experience difficulty meeting principal repayment commitments at debt-to-asset ratios of about 40 percent (Johnson, Baum, and Prescott, 1985; Leistritz et al., 1985). A more critical point is reached when the debt-to-asset ratio exceeds 70 percent. Above this point, most farms have difficulty meeting interest payments and other current expenses.

On average, producers' equity positions worsened in 1985. The average debt-to-asset ratio rose from 32.6 percent as of December 31, 1984, to 34.2 percent as of December 31, 1985. Declining asset values were the primary cause of operators' deteriorating equity positions. The average value of assets reported by survey respondents declined 3.7 percent during this period, while total debt increased by 0.9 percent.

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When debt-to-asset ratios of operators providing financial information for both 1984 and 1985 are compared (Table 1), the percentage with ratios in excess of .70 increased from 13.8 to 17.3 percent, and the proportion with ratios between .40 and .70 remained relatively constant at about 24 percent. Thus, at the end of 1985, about 41 percent of North Dakota farm families had debt-to-asset ratios in the ranges often associated with moderate to severe financial stress.

Table 1. Level of Debt of Operators Providing Financial Data for Both 1984 and 1985.

Debt-to-Asset Ratio	1984	1985
	----------percent----------	
No debt	16.26	17.55
.01 to .40	46.22	41.23
.41 to .70	23.68	23.97
.71 or more	13.84	17.26

INCOME CHARACTERISTICS

The sources of income of North Dakota farm families were divided into four categories: (1) net cash farm income, (2) earnings from off-farm employment, (3) mineral lease income, and (4) other off-farm income. **Net cash farm income** for a given calendar year is the gross farm income (including government payments) less all cash expenses of farming and depreciation of farm assets. In the short run, a farm operator may be able to use income normally designated for machinery replacement to pay other obligations. From an economic perspective, however, the cost of maintaining an adequate line of machinery must be accounted for through a depreciation allowance. **Earnings from off-farm employment** include wage and salary income of the farm operator and/or his spouse. **Mineral lease income** is the proceeds of an oil or coal lease. **Other off-farm income** consists primarily of interest and other revenues associated with off-farm investments.

The relative importance of each income source for 1984 and 1985 is illustrated in Figure 1. North Dakota farm families are heavily dependent on farm revenues as their primary source of income. According to survey data, net cash farm income averaged $15,958 in 1985 and comprised about 63 percent of total farm family income; nationally, only 39 percent of total farm family income originated from the farm in 1984 (Ahearn 1986).

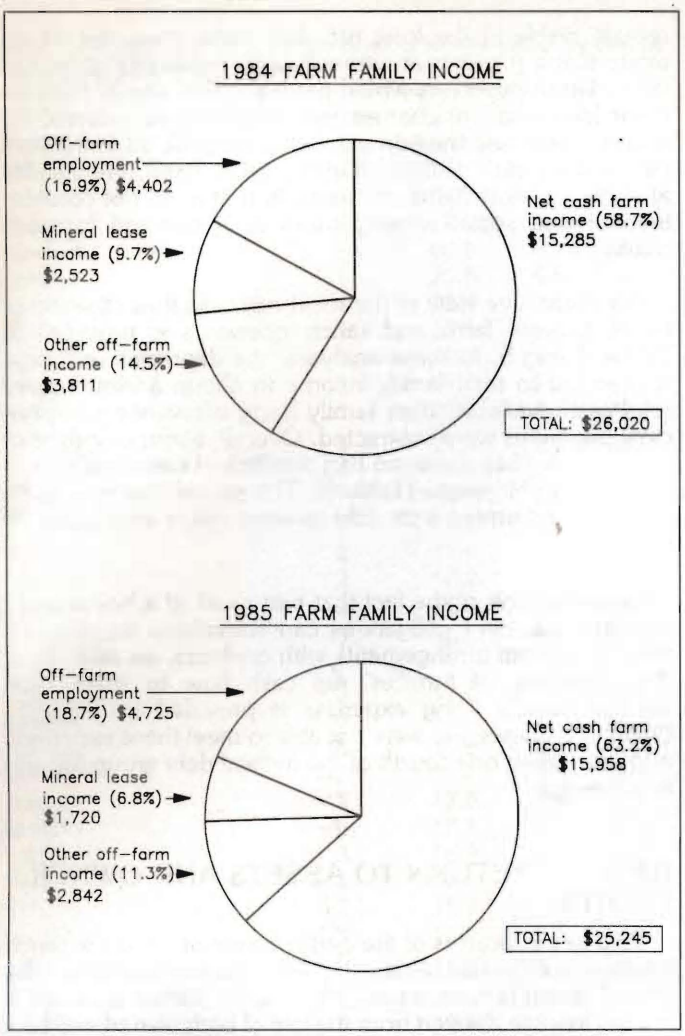

Figure 1. Farm Family Income, 1984 and 1985.

It should be noted that a few extreme values on either side of the mean (average) can have a substantial influence on the average figure reported. In some instances the median (or midpoint) may be a more appropriate descriptor than the mean of the financial attributes of a typical North Dakota farm or ranch. The means (averages) and medians (midpoints) for key financial characteristics are listed in Table 2.

To be "viable," a farm family must generate net cash income (gross income less cash operating expenses) sufficient to meet financial obligations of four types (Salant, Smale, and Saupe, 1986). First, it must provide for basic family needs, i.e., food, clothing, shelter, and education. Second, all federal and state income taxes and social security taxes on earned income (farm and nonfarm) must be paid. Third, to maintain a line of farm credit and prevent foreclosure of the business, the family must meet principal payments on debt as scheduled. Fourth, to continue operating the farm business at an efficient level, capital assets (machinery, equipment, and breeding stock) that are no longer performing effectively must be replaced.

The following analysis incorporates three of the four criteria to measure the ability of the farm family to meet immediate financial obligations. First, an allowance for family living expenses (FLE)[1] was subtracted from total family income (TFI) in 1984 and 1985. Principal payments (P) on intermediate-term and long-term debt were also deducted, but income and social security taxes were not included as a cash withdrawal. Total family income (TFI) minus family living expenses (FLE) and principal (P) was calculated for each operation, which was then placed in one of four categories:

1. **Stressed:** Total family income (TFI) minus family living expenses (FLE) and principal (P) was negative in both 1984 and 1985.
2. **Slipping:** The family was able to pay family living expenses and meet principal payments in 1984 but not in 1985.
3. **Improving:** They were income short in 1984 but not in 1985.
4. **Strong:** They had an income surplus in both 1984 and 1985.

The percentage distribution statistics in Figure 2 show what proportion of farm operators in the sample fell into each viability group. The largest proportion of sampled operators, 42.1 percent, was in the stressed category. The slipping category contained 11.7 percent of survey respondents, the improving category 10.0 percent, and the strong category 36.2 percent. A closer examination of these results revealed that almost one-third of sampled operators (31.8 percent) were at least $5,000 short of meeting basic family expenses and principal payments in both 1984 and 1985.

Selected characteristics of farm operators for the four viability groups are reported in Table 3. The following observations can be made:

- As expected, farmers with income problems tended to be younger and have more dependents than those in a strong viability position.
- There are relatively small differences in the value of owned assets across viability groups. Farmers in group 1 controlled $374,169 worth of assets. Farmers in group 4 controlled only 20 percent more assets ($467,874).

Table 2. Alternative Measurements of the Financial Characteristics of North Dakota Farm and Ranch Operators, 1985.

Item	Mean[a]	Median[b]
	dollars	
Net cash farm income	15,958	10,000
Gross farm income	110,266	78,000
Mineral lease income	1,720	450
Other nonfarm income	2,842	1,500
Total assets	413,396	300,000
Total debts	141,409	76,000
Net worth	289,166	200,000
Farm-related interest paid	15,320	9,000
Depreciation expense	16,909	12,000

[a]The average of all farmers reporting.
[b]The midpoint of the responses.

[1]*The poverty income level threshold was used as a conservative estimate of family living expenses based on size of household and is determined by the Bureau of Labor Statistics, U.S. Department of Labor (Weinberg 1985).*

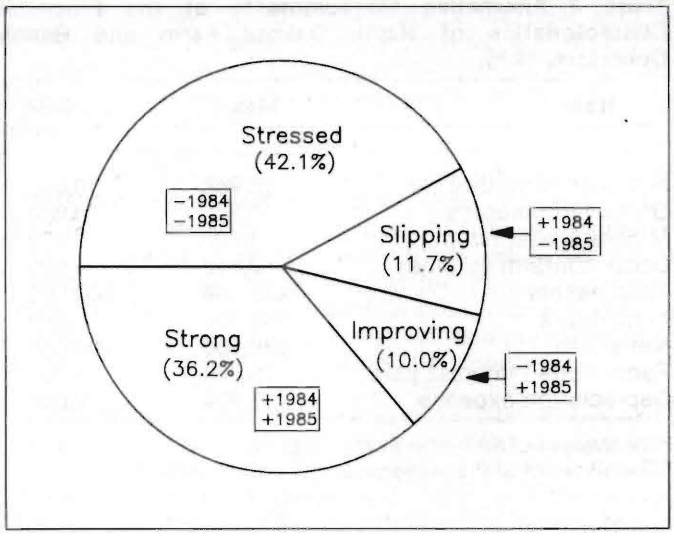

Figure 2. Viability Groups.

- Farmers in group 1 had an average total debt of $207,020. This is more than three times the $68,579 average debt owed by farmers in group 4.
- There was a significant difference in the ownership equity (net worth) situation among the four groups. Group 1 farmers' average net worth was $167,149. Group 4 farmers had a net worth two and one-half times greater ($399,295).
- The solvency position (debt-to-asset ratio) also varied a great deal according to viability group. Farmers in a stressed position owed 55.3 cents for each dollar of assets. Farmers in a strong viability position owed only 14.6 cents for each dollar of assets.
- A major difference among viability groups was the net cash farm income reported. Group 1 farmers' average net cash farm income (gross farm income less cash farm expenses and depreciation) was only $1,337 in 1985. Conversely, group 4 farmers reported net cash farm income averaging $32,915 in 1985.

SHORT-RUN CASH FLOW ANALYSIS

The foregoing analysis reflects the adequacy of farm households' income to meet financial obligations required to remain viable in the long run, but some observers would argue that it presents an unnecessarily pessimistic short-run view. These observers would point out that capital replacement (depreciation) charges can sometimes be deferred for several years and thus do not always impose an immediate demand for cash outlays. (On the other hand, the viability analysis was somewhat optimistic in that it did not consider income and social security taxes as a demand for cash outlays.)

An alternative view of the short-run cash flow situation of North Dakota farm and ranch operators is provided in Tables 4 and 5. In these analyses, the depreciation charge was added to total family income to obtain an estimate of total cash available, then family living allowance and principal payments were subtracted. Overall, about one-third of the farm families surveyed had insufficient cash available to meet these obligations (Table 4). This percentage rose to 80 percent for farmers with debt-to-asset ratios exceeding 70 percent.

In recognition of the fact that part or all of a household's principal payment obligations can sometimes be deferred through special arrangements with creditors, an analysis of the adequacy of families' net cash flow to meet even minimal family living expenses is provided in Table 5. Overall, 13.5 percent were not able to meet these expenses, and more than one-fourth of the highest debt group fell into this category.

RATE OF RETURN TO ASSETS AND OWNER EQUITY

Two key indicators of the performance of a farm or ranch business are the rate of return to farm assets (capital) and the rate of return to farm equity (net worth). Return to assets is the net income derived from the use of both owned and borrowed assets. It is computed by adding interest paid to net cash farm income and subtracting an allowance for unpaid family labor and management.[2] By dividing this dollar amount by the total capital invested in the business at the beginning of the year, the rate of return is determined. Because the cost of borrowed capital (interest) is added to net cash farm income to calculate return to capital, this ratio is an acceptable indicator of business efficiency but is not a good indicator of financial stress. Return-to-asset values are listed in Table 6 according to debt-to-asset ratio, region, and type of production.

[2]*The poverty income level threshold was used as a proxy for the value of unpaid operator and family labor and management.*

Table 3. Average Operator Characteristics of North Dakota Farmers by Viability Groups, 1985.

	Viability Group			
Operator Characteristics	#1 Stressed	#2 Slipping	#3 Improving	#4 Strong
Age	42.7	45.1	44.4	48.7
Persons in household	3.8	3.4	3.6	3.0
Total assets	$374,169	$377,974	$358,627	$467,874
Total debt	$207,020	$139,921	$128,762	$ 68,579
Net worth	$167,149	$238,053	$229,865	$399,295
Debt-to-asset ratio	55.3%	37.0%	35.9%	14.6%
Net cash farm income	$ 1,337	$ 4,868	$ 25,902	$ 32,915

Table 4. Net Cash Available Less Family Living Allowance and Principal Payments, North Dakota Farm Operators, 1985.

Item	Less than $0	$0 to $4,999	$5,000 to $19,999	$20,000 or More
Debt-to-asset ratio:				
No debt	10.7	9.7	21.4	58.3
.01 to .40	18.1	8.9	30.1	42.9
.41 to .70	49.3	10.5	18.4	21.7
.71 and greater	80.2	5.7	9.4	4.7
Total	35.2	8.9	22.3	33.7
Region:				
1 (Williston)	34.3	5.7	28.6	31.4
2 (Minot)	35.1	15.6	18.2	31.2
3 (Devils Lake)	23.5	8.8	35.3	32.4
4 (Grand Forks)	21.1	12.3	21.1	45.6
5 (Fargo)	22.2	8.9	20.0	48.9
6 (Jamestown)	41.0	6.8	19.7	32.5
7 (Bismarck)	49.1	8.8	21.9	20.2
8 (Dickinson)	42.9	2.9	18.6	35.7
Farm type:[a]				
Crop	28.7	9.2	23.3	38.8
Beef	48.7	7.9	18.4	25.0
Dairy	53.7	9.8	14.6	22.0
Other	52.1	6.2	23.1	18.5

[a]Farms were categorized into types if over 50 percent of gross receipts were derived from a particular enterprise.

Table 5. Net Cash Available Less Family Living Allowance, North Dakota Farm Operators, 1985.

Item	Less than $0	$0 to $4,999	$5,000 to $19,999	$20,000 or More
Debt-to-asset ratio:				
No debt	10.7	9.7	21.4	58.3
.01 to .40	8.5	8.1	32.1	51.4
.41 to .70	15.0	11.1	32.0	41.8
.71 and greater	26.4	20.8	27.4	25.5
Total	13.5	11.3	29.5	45.7
Region:				
1 (Williston)	17.1	8.6	40.0	34.3
2 (Minot)	13.0	16.9	35.1	35.1
3 (Devils Lake)	8.8	5.9	38.2	47.1
4 (Grand Forks)	8.8	12.3	17.5	61.4
5 (Fargo)	5.6	6.7	21.1	66.7
6 (Jamestown)	11.9	14.4	27.1	46.6
7 (Bismarck)	23.7	13.2	30.7	32.5
8 (Dickinson)	18.6	7.1	28.6	45.7
Farm type:[a]				
Crop	11.0	9.4	27.6	52.0
Beef	22.4	11.8	31.6	34.2
Dairy	7.3	19.5	36.6	36.6
Other	25.8	16.7	31.8	25.8

[a]Farms were categorized into types if over 50 percent of gross receipts were derived from a particular enterprise.

Return to assets of North Dakota farms was not significantly associated with debt load. Restated, those in high leverage positions were not demonstrably more or less efficient than their counterparts who had relatively little debt according to survey data. Returns to assets were highest in the Red River Valley regions (Regions 4 and 5), reflecting relatively favorable crop yeilds in these regions in 1985 and the presence of specialty crops, which tended to be more profitable than wheat, small grains, and sunflower that dominated cropping patterns across the remainder of the state. Cash grain farms generally experienced higher returns than livestock and diversified operations.

Rate of return to equity is used to evaluate the return operators receive on their own capital and is a relative measure of financial stress. The absolute size of the ratio roughly measures the rate at which a farm business is adding to or consuming its own capital stock. It is computed by subtracting a family living allowance (a proxy for unpaid family labor and management) from net cash farm income and dividing for owner equity (assets minus liabilities). About one-half of the operators surveyed experienced a negative return to equity in 1985, one-fourth received a return to equity of between 1 and 5 percent, and another one-fourth experienced a return to equity of more than 5 percent.

Return to equity was highly associated with the level of debt carried by the operator (Table 7). Those with no debt received an average return to equity of 4.4 percent in 1985, whereas those with 70 percent or more debt experienced a negative 25 percent return to equity.

CONCLUSIONS AND IMPLICATIONS

The economic forces affecting agriculture continued to be quite challenging for many North Dakota farmers and ran-

Table 6. Average Rate of Return to Total Assets by Debt-to-Asset Ratio, Region, and Type of Production, North Dakota Farm Operators, 1985.

Item	Return to Total Assets[a]
	----------percent----------
Debt-to-asset ratio:	
No debt	5.1
.01 - .40	3.6
.41 - .70	5.4
.71 and greater	8.8
Total	4.9
Region:	
1 (Williston)	0.3
2 (Minot)	4.1
3 (Devils Lake)	5.6
4 (Grand Forks)	6.5
5 (Fargo)	12.3
6 (Jamestown)	5.3
7 (Bismarck)	1.7
8 (Dickinson)	3.0
Type of production:[b]	
Cash grain	6.4
Beef	2.0
Dairy	0.3
Other	3.1

[a](Net cash farm income + interest paid – family labor allowance) divided by total farm assets.

[b]Farms were categorized into types if over 50 percent of gross receipts were derived from a particular enterprise.

Table 7. Distribution of North Dakota Farm Operators' Return to Equity by Debt-to-Asset Ratio, 1985.

Debt-to-Asset Ratio	Return to Owner Equity[a]				Average Return to Equity
	Negative	1% - 5%	6% - 10%	>10%	
	percent				
No debt	29	39	19	13	4.4
.01 - .40	43	29	17	11	0.3
.41 - .70	58	17	10	15	– 2.9
.71 - 1.0	73	11	2	14	– 25.0
Total	48	26	14	13	– 1.3

[a](Net cash farm income minus family labor allowance) divided by owner equity.

chers in 1985. Survey results indicated that, on average, producers' equity positions worsened in 1985 and that declining asset values, rather than increased debt levels, were primarily responsible. The average total income of farm families decreased slightly from 1984 to 1985 as a modest increase in net cash farm income was offset by decreases in mineral lease income and income from off-farm investments. More than half (54 percent) of the farm families surveyed had 1985 incomes that were inadequate to meet family living expenses and principal payment obligations, and more than 78 percent of this group had been in the same position in 1984. Even when depreciation expenses were excluded as a current demand for funds, about 35 percent of the farm operators did not have an adequate cash flow to cover current expenses, a family living allowance, and principal payments, while about 13.5 percent could not meet even current expenses and family living costs.

The rate of return to total farm assets (an indicator of farm operating efficiency) was not signficantly associated with the operator's debt load, indicating that highly leveraged operators were not substantially more or less efficient than their counterparts with little or no debt. However, the rate of return to equity was strongly (and inversely) related to the degree of leverage because the rate of return to assets was generally less than the cost of borrowed funds.

At the same time, however, the survey results indicate the diversity of financial circumstances in which North Dakota producers find themselves. While about 17 percent of the respondents had debt-to-asset ratios exceeding .7 at the end of 1985, a similar percentage had no debt. Similarly, while about 35 percent had insufficient cash flow in 1985 to meet current expenses, family living costs, and principal payments, about 34 percent were able to cover these costs with $20,000 or more to spare.

LITERATURE CITED

Ahearn, Mary. 1986. **Financial Well-Being of Farm Operators and Their Households.** Agr. Econ. Rpt. No. 563. Washington, D.C.: USDA, Economic Research Service.

Johnson, Jim, Kenneth Baum, and Richard Prescott. 1985. **Financial Characteristics of U.S. Farms, 1985.** Agr. Info. Bull. No. 495. Washington, D.C.: USDA, Economic Research Service.

Leistritz, F. Larry, Brenda L. Ekstrom, Arlen G. Leholm, and Janet Wanzek. 1987a. **Families Displaced From Farming in North Dakota: Characteristics and Adjustment Experiences.** Agr. Econ. Rpt. No. 220. Fargo: North Dakota State University, Dept. of Agr. Econ.

Leistritz, F. Larry, Wallace C. Hardie, Brenda L. Ekstrom, Arlen G. Leholm, and Harvey G. Vreugdenhil. 1987b. **Financial, Managerial, and Attitudinal Characteristics of North Dakota Farm Families: Results of the 1986 Survey.** Agr. Econ. Rpt. No. 222. Fargo: North Dakota State University, Dept. of Agr. Econ.

Leistritz, F. Larry, Harvey G. Vreugdenhil, Brenda L. Ekstrom, and Arlen G. Leholm. 1985. **Off-Farm Income and Employment of North Dakota Farm Families.** Agr. Econ. Misc. Rpt. No. 88. Fargo: North Dakota State University, Dept. of Agr. Econ.

Salant, Priscilla, Melinda Smale, and William Saupe. 1986. **Farm Viability: Results of the USDA Family Farm Surveys.** Rural Development Res. Rpt. No. 60. Washington, D.C.: USDA, Economic Research Service.

Saxowsky, David M., Cole R. Gustafson, Mir B. Ali, Joan M. Braaten, and Jeff Rotering. 1987. **Economic Impact of North Dakota Laws that Permit Delayed or Partial Repayment of Agricultural Debt - July 1, 1986.** Agr. Econ. Rpt. No. 216. Fargo: North Dakota State University, Dept. of Agr. Econ.

Weinberg, Daniel H. 1985. "Measuring Poverty." **Family Economics Review** 1985(2):9-13.