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The Financial Condition of Agriculture: An Income Analysis

by  
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U.S. agriculture experienced significant variability in net farm income during the early 1980's. This variability along with adverse market conditions; such as, rising exchange rates and high real interest rates; caused expectations of the future income of U.S. agriculture to be reduced. The combination of events resulted in a significant decline in the market value of agricultural assets.

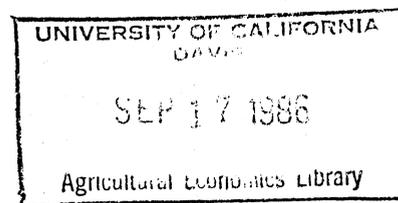
Although aggregate cash income and net farm income to the sector were at record highs in 1984, some farming operations and other agri-businesses encountered difficult problems and went out of business. These events have been widely publicized and many have called the adjustment a "financial crisis". The problems encountered by agricultural lenders and borrowers have been called "financial stress" (Melichar; Harrington and Stam; and Johnson, Baum and Prescott).

Some agricultural producers continue to experience financial difficulties and possibly will go out of business. Thus, the number of farms facing financial failure, and the impact these failures will have on agricultural output and the U.S. economy is at issue.

RESEARCH OBJECTIVES

The purpose of this research is to extend the literature, which examines U.S. agriculture's financial characteristics, by assessing farm financial health directly from income and balance sheet measures. In doing so, measures of

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net operating margin, net cash income to the farm family unit, and equity are employed as indicators of a farm operators financial strength. In addition, the effects of interest expenses on cash income are examined.

Because farm operators are usually involved in both farm and non farm income generating activities, a distinction is made between the farm business or enterprise and the farm family unit. 1/

#### RELATED STUDIES

In 1984, Melichar used debt/asset ratio criteria to assess the financial condition of U.S. agricultural producers. Melichar used data from the 1979 Farm Finance Survey, conducted by the Bureau of the Census, to classify farms into four size categories (large, medium, small and very small) according to their annual value of farm sales. These farms were further classified, by debt/asset ratio, into one of the four ranges: less than or equal to 10 percent, 11 to 40 percent, 41 to 70 percent and 71 percent and over. Underlying Melichar's research was the assumption that financial problems depend largely on relative indebtedness and that the ratio of debt to assets provided an indication of a farm operation's financial difficulty. Melichar inferred that farms with debt/asset ratios over 40 percent might be experiencing financial stress. He stated "If, ... , it can be concluded that farms with a debt-asset ratio greater than 40 percent are experiencing financial stress, then about one-fifth of all farmers are in this predicament" (Melichar 1984, p. 9). Tweeten extended Melichar's debt/asset criterion to a cash flow analysis by using value of sales classifications. He calculated "tolerable debt ratios" for each sales class based on average interest rates, average debt and average cash flow.

Several other studies utilized debt/asset ratio criteria to identify farms

experiencing financial difficulties. Johnson, Jolly, Meyers and Womack suggested that debt/asset ratios measured relative indebtedness and provided a simple indicator of financial stress. They also stated that farms with ratios less than 40 percent were not experiencing severe financial stress. They did not extend this argument to imply that farms with debt/asset ratios greater than 40 percent were having financial difficulties. (Johnson et al, p. 12)

Alternatively, Harrington and Stam, in a 1984 USDA report, stated that: "The best single measure of the seriousness of farmers' current financial difficulties is given by their debt/asset ratios", but that "financial distress is not perfectly reflected by debt/asset ratios". (Harrington and Stam, p. 7) Using 1983 Farm Cost and Returns Survey (FCRS) data and Melichar's debt/asset methodology they examined the financial condition of farmers and the extent of "farm financial stress". Furthermore, they redefined Melichar's debt/asset classification ranges as: less than 40 percent, 40 to 70 percent and greater than 70 percent. The 40 to 70 percent debt/asset range was interpreted as serious stress, while greater than 70 percent represented extreme stress. The term "technically insolvent" was used by Harrington and Stam to describe farms with debt/asset ratios greater than 100 percent. (Harrington and Stam, P. viii)

Johnson, Baum and Prescott later adopted the methodology developed by Harrington and Stam, and used 1984 FCRS data to study the financial characteristics of U.S. farms. The authors used previous debt/asset ratio classifications as primary "stress" criteria but noted that large debt/asset ratios did not always imply financial distress, since certain farm types (i.e., poultry and egg) operated with relatively higher debt/asset ratios. Thus, select cash flow measures, not available in the 1983 FCRS data, were

also incorporated in their analysis. Johnson, Baum and Prescott identified an operation as having a cash flow surplus or shortfall, depending upon whether the value of cash, income after subtracting a fixed family living expense and an estimate of principal repayments, was positive or negative, respectively.

Melichar, using the 1984 FCRS data, classified farm operations with sales of \$40,000 or more (according to him commercial farms) into one of four financial positions: good, fair, stressed and vulnerable. In assessing the financial position of the farm operation, Melichar jointly considered four indicators: the debt/asset ratio, return on assets, return on equity and amount of equity. Using debt/asset ratio as the primary measure of stress, Melichar stated that the higher the operators debt/asset ratio, the less likely the operator was considered to be in good financial shape. (Melichar 1985, P. 8) However, he noted that many highly leveraged farm operators were not in financial trouble because they were operating profitably. (Melichar 1985, P. 2)

More recently, Melichar (1985), in a commentary on farm financial stress, states that farming operations must possess similar relative profitability, interest rates and debt repayment schedules for debt/asset ratios to provide a useful indication of financial stress (Melichar 1985, p. 116). Melichar also suggests that if income data is available, financial difficulty can be measured directly, and that other variables, including debt/asset ratios, can be used to explain the degree of financial strength or distress.

Similarly, Johnson, Baum and Prescott suggested that a more complete analysis include income measures.

Finance literature suggests that a firm is "bankrupt" whenever it cannot generate sufficient cash to pay financial obligations as they become due, even though the firm may be profitable and have a favorable equity or net worth. (Barry, p. 62) Given the recent availability of income data, it would appear that initially a farm's financial success or distress may best be determined by some measure of net cash income. However, because current assets can be liquidated to help finance current liabilities as they become due, without disrupting normal business operations, measures of net worth and/or the relative debt/asset position can be used help to assess the farms ability to withstand any negative income shocks. In the following sections, select income and balance sheet measures are developed to further identify how many farm businesses and their corresponding farm family units may be experiencing financial trouble.

This analysis is based on 1984 calendar year data from the Farm Cost and Return Survey (FCRS). The survey is a multiframe stratified probability based survey with farmers chosen from both a list and area frame. Responses for approximately 13,000 farm operations are included in the sample which can be expanded to represent 1.7 million farms. A more complete description of the FCRS data is provided in the Johnson, Baum and Prescott analysis.

#### NET OPERATING MARGIN

For this analysis, net operating margin or net cash income to the operation before family living expenses and principal repayments (i.e., receipts from farming minus the associated expenses), is used as an indicator in assessing the income generating performance of a farm business. Net operating margin includes returns from production and other farm related sources (i.e., income from government payments, farm rental property, custom work, etc.), the direct costs associated with this production, and all interest expenses.

It does not include off-farm income, family living expenses and/or principal repayment. Furthermore, no allowances have been made for depreciation or returns to operator labor and capital. 2/

To examine the relationship between a farms debt/asset ratio and net operating margin, debt/asset ratio and net operating margin categories were constructed and the distribution of farms within these categories computed.

3/ The data show little correlation across debt/asset ratio and operating margin classes (Table 1). A large proportion of farm businesses reporting negative operating margins had low debt/asset ratios. That is, of the

Table 1 -- Number of Farms by Debt/Asset Ratio and Operating Margin Categories, for all U.S. Farms, 1984.

| Operating Margin Class (\$000) | Debt as a Percentage of Assets |          |          |          |          |          |          |          |          |          |        | U.S. Total |
|--------------------------------|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------|------------|
|                                | 100 and over                   | 99 to 90 | 89 to 80 | 79 to 70 | 69 to 60 | 59 to 50 | 49 to 40 | 39 to 30 | 29 to 20 | 19 to 10 | 9 to 0 |            |
|                                | (thousand farms)               |          |          |          |          |          |          |          |          |          |        |            |
| 100 or more                    | 2                              | 0        | 1        | 1        | 3        | 4        | 3        | 5        | 6        | 6        | 18     | 49         |
| 40-99                          | 6                              | 1        | 3        | 3        | 4        | 7        | 10       | 14       | 15       | 16       | 50     | 129        |
| 10-39                          | 6                              | 2        | 4        | 5        | 10       | 14       | 15       | 25       | 25       | 37       | 141    | 285        |
| 0-9                            | 9                              | 2        | 4        | 5        | 7        | 8        | 8        | 13       | 16       | 30       | 254    | 357        |
| Zero or more                   | 23                             | 5        | 12       | 14       | 24       | 33       | 36       | 57       | 62       | 89       | 463    | 820        |
| (1)-(10)                       | 11                             | 3        | 6        | 6        | 10       | 17       | 22       | 28       | 49       | 54       | 381    | 585        |
| (11)-(40)                      | 12                             | 2        | 4        | 9        | 12       | 13       | 15       | 24       | 21       | 26       | 69     | 208        |
| (41)-(100)                     | 4                              | 1        | 2        | 3        | 3        | 5        | 4        | 6        | 4        | 5        | 12     | 50         |
| Less than (100)                | 3                              | 1        | 1        | 1        | 2        | 2        | 2        | 4        | 2        | 2        | 8      | 27         |
| Less than 0                    | 30                             | 8        | 12       | 19       | 26       | 37       | 43       | 61       | 76       | 87       | 470    | 871        |
| U.S. Total                     | 53                             | 13       | 24       | 34       | 50       | 71       | 81       | 118      | 139      | 176      | 933    | 1,691      |

approximately 871,000 farms businesses reporting net operating losses in 1984, 676,000 or 78 percent had debt/asset ratios less than 40 percent. The data also show that not all farm enterprises with debt/asset ratios equal to or greater than 100 percent were in serious financial difficulty. In fact,

43 percent of these operations had positive margins. However they are likely to have very large principal obligations.

The total number of farms with operating losses exceeded the number with positive margins and about 280,000 farms reported operating losses of at least \$10,000. Furthermore, of the 933,000 farms with debt asset ratios less than .09, approximately 50 percent reported operating losses and 10 percent (89,000 farms) lost more than \$10,000.

At the other extreme, approximately 463,000 farm businesses earned margins greater than \$10,000, and 178,000 of these reported operating margins greater than \$40,000. Approximately 104,000 of these farms with margins over \$10,000 had debt/asset ratios over 40 percent.

The data show that debt/asset ratios are not closely correlated with operating margin and that the two variables measure different aspects of the financial condition of producers. In addition, the data confirm heterogeneity within the U.S. farming sector. So, while a large number of producers were evidently in serious financial trouble, a large number were making significant income from farming.

The data suggest that, because of heterogeneity, a single measure will likely prove insufficient in identifying farm businesses which are experiencing problems.

To derive homogeneous farm groupings, the value of agricultural products sold by the farm enterprise was assumed to measure size, and used to construct farm size categories. The data in Table 2 show the distribution of farm enterprises by net operating margin and value of sales categories. Although there appears to be a negative relationship between farm size and

degree of financial difficulty, as measured by sales and net operating margin, there is still considerable diversity.

In 1984, 1.8 percent of all farm businesses reported agricultural sales of at least \$500,000. Approximately 30 percent of this group reported net losses, while over 60 percent had operating margins greater than \$40,000.

The data also show that slightly over one fourth of all farm businesses had

Table 2 -- Percentage of Farms by Sales Class and Operating Margin Categories, all U.S. Farms, 1984.

| OPERATING MARGIN CLASS (\$000) | Sales Class Categories (\$000) |            |            |          |          |          |        |             | Percent of U.S. Total |
|--------------------------------|--------------------------------|------------|------------|----------|----------|----------|--------|-------------|-----------------------|
|                                | 500 and over                   | 499 to 250 | 249 to 100 | 99 to 40 | 39 to 20 | 19 to 10 | 9 to 5 | Less than 5 |                       |
|                                | (percent of column)            |            |            |          |          |          |        |             |                       |
| 100 or more                    | 50.6                           | 29.9       | 5.1        | 0.3      | 0        | 0        | 0      | 0           | 2.8                   |
| 40-99                          | 12.2                           | 27.4       | 34.8       | 8.3      | 0.5      | 0.1      | 0.1    | 0.1         | 7.6                   |
| 10-39                          | 5.8                            | 15.2       | 27.2       | 45.6     | 27.4     | 6.7      | 0.9    | 0.1         | 16.9                  |
| 0-9                            | 1.6                            | 3.9        | 8.1        | 15.0     | 31.9     | 41.2     | 38.4   | 14.9        | 21.2                  |
| Zero or more                   | 70.2                           | 76.4       | 75.2       | 69.2     | 59.8     | 48.2     | 39.4   | 15.1        | 48.5                  |
| (1)-(10)                       | 6.3                            | 1.9        | 5.4        | 11.4     | 21.4     | 33.2     | 48.5   | 71.5        | 34.6                  |
| (11)-(40)                      | 3.1                            | 6.7        | 9.3        | 13.1     | 14.2     | 16.9     | 10.6   | 12.7        | 12.3                  |
| (41)-(100)                     | 3.0                            | 7.0        | 6.8        | 5.2      | 3.5      | 1.4      | 0.9    | 0.3         | 3.0                   |
| Less than (100)                | 17.4                           | 8.0        | 3.3        | 1.2      | 1.1      | 0.3      | 0.6    | 0.4         | 1.6                   |
| Less than 0                    | 29.8                           | 23.6       | 24.8       | 30.8     | 40.2     | 51.8     | 60.6   | 84.9        | 51.5                  |
| Class Total                    | 100.0                          | 100.0      | 100.0      | 100.0    | 100.0    | 100.0    | 100.0  | 100.0       | 100.0                 |
| Percent of U.S.                | 1.8                            | 4.0        | 13.5       | 18.1     | 11.7     | 11.5     | 12.1   | 27.1        | 100.0                 |

net operating margins greater than \$10,000 dollars. However, given the need to make debt repayment and provide for family living, it would appear that farm enterprises reporting less than this level of margin might be experiencing financial problems, unless they received considerable non farm income.

The information in Table 2 has presented a picture of the concentration of farm enterprises experiencing cash flow difficulties by size of farming operation. However, even within homogeneous size categories there are significant differences which may affect an operator's ability to acquire and use debt, and generate income. These differences also affect a business' tolerance for low or negative operating margins.

Examining the number of farm enterprises by net operating margin and sales (size) classes provides much of the information necessary in assessing the financial condition of U.S. farms. However, other income and balance sheet measures should be jointly considered in assessing the financial position (Melichar 1985, P. 6). Fortunately, the 1984 FCRS provides a wealth of information

The data in Table 3 show that approximately 35 percent of all farms had sales of \$40,000 or more, in 1984; the remaining 65 percent had sales of less than \$40,000.

For the most part, large farms either earn more or lose more than small farms, and have a larger level of assets and debt for each operating margin classification. However, average debt/asset ratios tend to be similar for both large and small farms for each operating margin group. While average debt/asset ratios are slightly higher for farms with losses, these ratios would not, according to the previously discussed debt/asset ratio criteria, imply severe stress.

The data also suggest that farms which lost more than \$40,000 and are classified as small on the basis of gross sales, may be misclassified. If an asset criterion were used along with value of sales, these would indeed be large farms. A similar conclusion could be reached for those small farms

which reported operating margins greater than \$40,000. This anomaly appears to be due to the fact that some farms had low sales but received high government payments and/or CCC loans.

Table 3 -- Selected Financial Data and The Percentage of Farms, by Operating Margin Class for Large and Small Farms, 1984

| ITEM/<br>OPERATING<br>MARGIN<br>(\$000) | :Per- :<br>:cent :<br>: of :Debt/<br>:Size :Asset Interest |       | Mean Values                  |                            |                         |         |       |                        |
|---|--|-------|------------------------------|----------------------------|-------------------------|---------|-------|------------------------|
|   | :Class:  | Ratio | Expenses                     | Net<br>Operating<br>Margin | Gross<br>Farm<br>Income | Equity  | Debt  | Off-<br>Farm<br>Income |
|   | : pct.   |       | ----- Thousand Dollars ----- |                            |                         |         |       |                        |
| LARGE FARMS                             | :  |       |                              |                            |                         |         |       |                        |
| 100 or more                             | : 8.3  | 0.31  | 35.9                         | 240.4                      | 615.2                   | 961.9   | 315.0 | 10.5                   |
| 40-99                                   | : 21.5   | 0.31  | 14.7                         | 61.7                       | 186.0                   | 449.1   | 140.2 | 8.9                    |
| 10-39                                   | : 34.2   | 0.27  | 10.4                         | 23.9                       | 110.6                   | 318.2   | 91.5  | 7.2                    |
| 0-9                                     | : 10.5   | 0.38  | 13.9                         | 5.2                        | 101.4                   | 316.7   | 124.1 | 9.4                    |
| (1)-(10)                                | : 7.2  | 0.40  | 14.7                         | (4.9)                      | 106.2                   | 286.7   | 129.1 | 10.5                   |
| (11)-(40)                               | : 9.6  | 0.46  | 23.3                         | (22.1)                     | 127.3                   | 359.4   | 202.3 | 10.3                   |
| (41)-(100)                              | : 5.5  | 0.43  | 31.8                         | (62.5)                     | 149.7                   | 515.9   | 268.5 | 32.2                   |
| Less Than (100)                         | : 3.3  | 0.58  | 72.9                         | (295.9)                    | 345.9                   | 1,097.3 | 593.0 | 14.3                   |
| Class Total                             | :100.0   | 0.27  | 18.6                         | 26.2                       | 178.9                   | 437.9   | 163.5 | 10.2                   |
| % of U.S.                               | : 35.0   |       |                              |                            |                         |         |       |                        |
| SMALL FARMS                             | :  |       |                              |                            |                         |         |       |                        |
| 100 or more                             | : 0  | 0.17  | 31.5                         | 198.4                      | 705.7                   | 628.0   | 231.9 | 2.9                    |
| 40-99                                   | : 0.3  | 0.24  | 3.1                          | 55.3                       | 78.1                    | 468.7   | 30.6  | 10.0                   |
| 10-39                                   | : 7.7  | 0.11  | 1.8                          | 16.6                       | 33.6                    | 239.5   | 17.4  | 10.2                   |
| 0-9                                     | : 26.8   | 0.09  | .9                           | 3.6                        | 13.9                    | 136.8   | 10.0  | 14.5                   |
| (1)-(9)                                 | : 49.2   | 0.13  | 1.4                          | (3.9)                      | 6.4                     | 123.3   | 13.9  | 18.4                   |
| (11)-(40)                               | : 13.8   | 0.30  | 6.1                          | (18.2)                     | 12.0                    | 200.8   | 51.9  | 24.4                   |
| (41)-(100)                              | : 1.6  | 0.49  | 15.3                         | (61.1)                     | 20.7                    | 340.5   | 132.7 | 105.5                  |
| Less Than (100)                         | : 0.7  | 0.35  | 23.9                         | (195.1)                    | 35.4                    | 384.3   | 204.4 | 48.2                   |
| Class Total                             | :100.0   | 0.12  | 2.4                          | (4.3)                      | 12.0                    | 152.9   | 21.7  | 19.1                   |
| % of U.S.                               | : 65.0   |       |                              |                            |                         |         |       |                        |

Because of its significance, off-farm income is considered in examining the financial condition of farm operations. Off-farm income is, by definition, income earned from sources other than farming, available to the farm enterprise for payment of operating and interest expenses, as well as principal on debt, family living expenses, and other investments.

## FAMILY CASH INCOME

In general, small farm enterprises have larger off-farm income for each operating margin class than do large ones. Also, off-farm income of small farms tends to exceed operating losses, with the exception of those losing more than \$100,000. Because off-farm income generally increases the farm business' total earnings or reduces its net losses, the inclusion of off-farm income is essential in understanding the susceptibility of the farm enterprise to adverse economic conditions. For instance, small farms which reported operating losses between \$10,000 and \$40,000 had an average margin of minus \$18,235. By itself, this measure suggests these farms may be facing substantial hardship. When average off-farm income is considered, their financial position changes. But, heterogeneity, in the way economic units are organized, may result in net operating margin and off-farm income being uncorrelated. If so, the averages presented in Table 3 will poorly represent individual members of the group.

To test whether the groups presented in Table 3 can be represented by these averages, correlation coefficients of net operating margin with off-farm income were calculated for net operating margin and similar family income classifications (Table 4). Family income measures cash available for family living and principal repayment, and is defined as the sum of net operating margin and off-farm income for each farm operation. Although the signs on the coefficients are, as expected, negative, there appears to be little correlation between net operating margin and off-farm income. In addition, the few cases where the correlation coefficients rise above .7, correspond to a small number of observations. Thus, any implications drawn from adding operating margin and off-farm income averages are questionable.

Table 4 --- Correlation Coefficients For Operating Margin and Non Farm Income by Operating Margin and Family Income Classes, 1984

| Operating Margin Class (\$000) | Family Cash Income Class (\$000) |               |              |            |        |          |          |             |       |
|--------------------------------|----------------------------------|---------------|--------------|------------|--------|----------|----------|-------------|-------|
|                                | Less than (100)                  | (41) to (100) | (11) to (40) | (1) to (9) | 0 to 9 | 10 to 39 | 40 to 99 | 100 or more | All   |
| 100 or more                    |                                  |               |              |            |        |          |          | -0.01       | -0.01 |
| 40-99                          |                                  |               |              |            |        |          | -0.16    | -0.54       | -0.05 |
| 10-39                          |                                  |               |              |            | -0.40  | -0.34    | -0.22    | -0.33       | -0.08 |
| 0-9                            |                                  |               |              | -0.51      | -0.68  | -0.37    | -0.14    | -0.18       | -0.15 |
| (1)-(10)                       |                                  |               | -0.36        | -0.92      | -0.91  | -0.38    | -0.52    | -0.39       | 0.07  |
| (11)-(40)                      |                                  | -0.32         | -0.86        | -0.97      | -0.98  | -1.00    | -0.64    | -0.71       | -0.19 |
| (41)-(100)                     | -0.03                            | -0.96         | -0.92        |            |        |          | -0.98    | -0.65       | 0.01  |
| Less Than (100)                |                                  |               |              |            |        |          |          |             |       |

To understand how the financial viability of farm businesses was affected by non farm income, the change in distribution of large and small farms from the net operating margin classes to the family income classes, were computed, and are presented in Table 5 and figures 1, 2, and 3. The results shows that 346,000 operations continue to have negative income. That is, their combined income from farm and non farm sources was not enough to cover operating expenses. Such operations can remain in business only if they have sufficient savings to cover losses and provide for family living, or if they have sufficient equity such that a lender is willing to advance them funds on the prospect that next year's income will be better.

Half of the 320,000 farm operations with family cash income between zero and \$10,000 lost money farming but had sufficient off-farm income to bring total income to the positive side of the ledger. Although this group had a positive income, they would be living near poverty levels considering that their income must cover debt repayment and family living expenses. Of the 872,000 farm businesses that lost money, about 525,000 had sufficient non farm income to bring them to the positive side of the ledger.

Figure 1 Distribution of all farms by net operating margin and family cash income, 1984

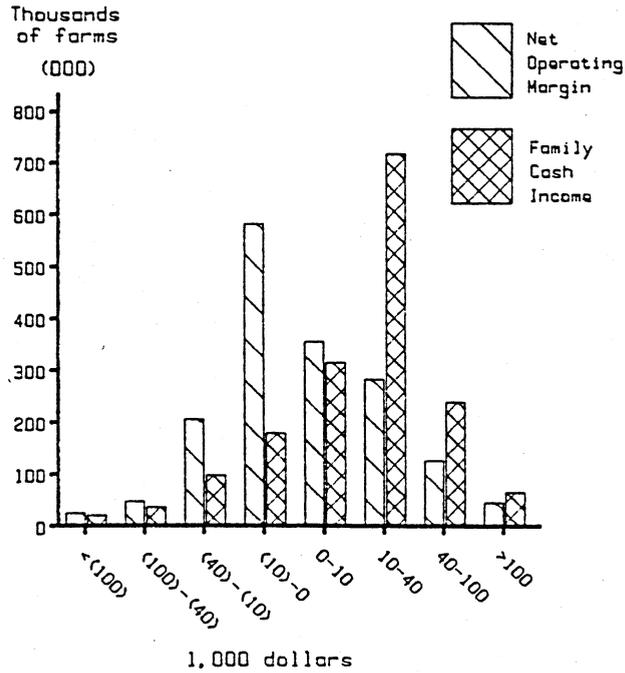


Figure 2 Distribution of small farms by net operating margin and family cash income, 1984

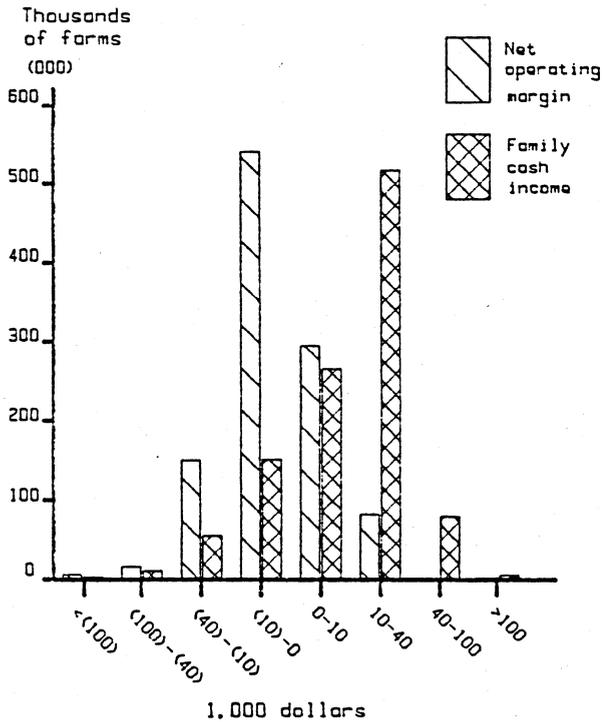


Figure 3 Distribution of large farms by net operating margin and family cash income, 1984

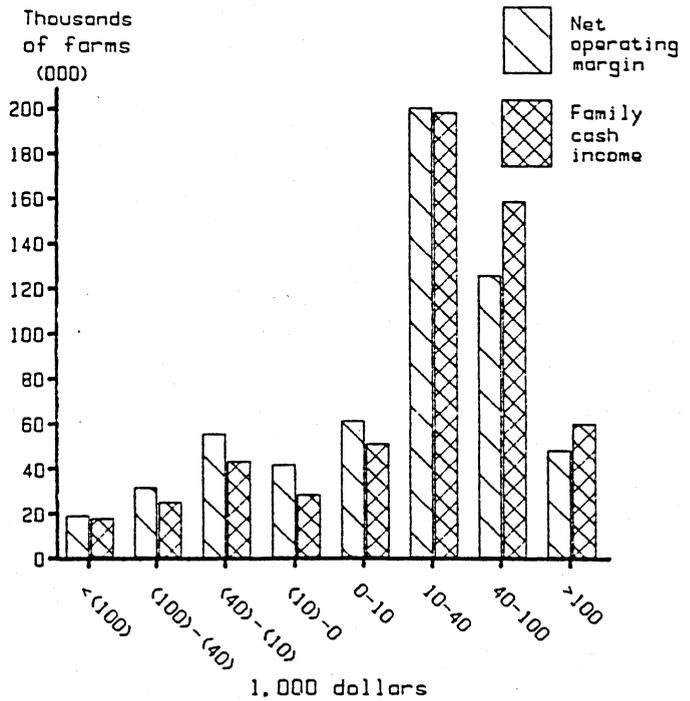


Table 5 -- Number of Large and Small Farm Operations by Net Operating Margin and Family Cash Income Class, 1984.

| Operating Margin Class (\$000) | Family Cash Income Class (\$000) |        |      |       |       |       |       |       |      |
|--------------------------------|----------------------------------|--------|------|-------|-------|-------|-------|-------|------|
|                                | Total                            | <(100) | (40) | (10)  | 0     | 10    | 40    | 100   | >100 |
| ----- (thousand farms) -----   |                                  |        |      |       |       |       |       |       |      |
| <b>SMALL FARMS</b>             |                                  |        |      |       |       |       |       |       |      |
| 100 or more                    | 0.2                              |        |      |       |       |       |       |       | 0.2  |
| 40-99                          | 2.9                              |        |      |       |       |       |       | 2.9   | 0    |
| 10-39                          | 85.0                             |        |      |       |       | 69.6  | 15.3  | 0.1   |      |
| 0-9                            | 296.8                            |        |      |       | 128.3 | 147.4 | 18.9  | 2.1   |      |
| (1)-(9)                        | 543.5                            |        |      | 132.2 | 119.6 | 254.3 | 35.0  | 2.3   |      |
| (11)-(40)                      | 152.4                            |        | 52.9 | 21.6  | 19.2  | 48.2  | 8.3   | 2.3   |      |
| (41)-(100)                     | 18.2                             | 11.8   | 4.2  | 0     | 0.5   | 0.1   | 1.0   | 0.7   |      |
| Less than (100)                | 7.9                              | 5.0    | 1.3  | 0.4   | 0     | 0     | 0     | 0.9   | 0.2  |
| Total                          | 1,106.8                          | 5.0    | 13.1 | 57.5  | 153.8 | 267.6 | 519.7 | 82.2  | 7.8  |
| <b>LARGE FARMS</b>             |                                  |        |      |       |       |       |       |       |      |
| 100 or more                    | 48.5                             |        |      |       |       |       |       |       | 48.5 |
| 40-99                          | 126.3                            |        |      |       |       |       | 117.1 | 9.2   |      |
| 10-39                          | 200.9                            |        |      | 0.2   | 0.3   | 164.2 | 35.0  | 1.1   |      |
| 0-9                            | 61.7                             |        |      |       | 37.8  | 19.6  | 3.8   | 0.5   |      |
| (1)-(10)                       | 42.1                             |        |      | 21.7  | 8.0   | 10.3  | 2.0   | 0     |      |
| (11)-(40)                      | 56.0                             |        | 38.9 | 6.4   | 5.3   | 4.4   | 0.7   | 0.3   |      |
| (41)-(100)                     | 32.1                             | 24.7   | 4.9  | 0.4   | 0.1   | 0.4   | 0.9   | 0.7   |      |
| Less than (100)                | 19.6                             | 18.3   | 0.9  | 0     | 0.1   | 0     | 0     | 0     | 0.1  |
| Total                          | 587.2                            | 18.3   | 25.6 | 43.8  | 29.0  | 51.6  | 199.0 | 159.5 | 60.4 |
| <b>ALL FARMS</b>               |                                  |        |      |       |       |       |       |       |      |
| 100 or more                    | 48.7                             |        |      |       |       |       |       |       | 48.7 |
| 40-99                          | 129.2                            |        |      |       |       |       | 120.1 | 9.2   |      |
| 10-39                          | 285.9                            |        |      | 0.2   | 0.3   | 233.8 | 50.3  | 1.2   |      |
| 0-9                            | 358.4                            |        |      |       | 166.1 | 167.0 | 22.7  | 2.6   |      |
| (1)-(10)                       | 585.5                            |        |      | 154.0 | 127.6 | 264.6 | 37.0  | 2.3   |      |
| (11)-(40)                      | 208.4                            |        | 91.8 | 28.0  | 24.5  | 52.6  | 8.9   | 2.6   |      |
| (41)-(100)                     | 50.3                             | 36.6   | 9.0  | 0.5   | 0.6   | 0.5   | 1.8   | 1.3   |      |
| Less than (100)                | 27.4                             | 23.3   | 2.2  | 0.5   | 0.1   | 0     | 0.1   | 0.9   | 0.3  |
| Total                          | 1,693.9                          | 23.3   | 38.7 | 101.3 | 182.8 | 319.2 | 718.7 | 241.7 | 68.2 |

### INTEREST

The effect of interest on income and the financial position of farmers has become a significant issue as farmers with large interest payments relative to income may be more vulnerable to income shocks and declining equity. The 1984 data show that about 1.4 million of the 1.7 million producers covered

by the survey had a positive family cash income before interest payments (table 6). On the other hand, approximately 265,000 producers reported negative family income before interest payments, leaving no residual for debt servicing or family living. The survey shows that, after interest, an additional 81,000 producers were placed in rather severe financial difficulty because they had no income for family living or debt repayment. In total, the 1984 survey results show that about 670,000 farm operations had family cash income of less than \$10,000. On the other hand, approximately 401,000 farms had family cash income of more than \$40,000.

Table 6 -- Distribution of All Farms by Family Income Before Interest and After Interest, 1984

| Family Cash Income Before Interest | Family Cash Income after Interest |                  |          |          |        |             |              |               |                 |
|------------------------------------|-----------------------------------|------------------|----------|----------|--------|-------------|--------------|---------------|-----------------|
|                                    | Total                             | 100 or more      | 40 to 99 | 10 to 39 | 0 to 9 | (1) to (10) | (11) to (40) | (41) to (100) | Less Than (100) |
|                                    |                                   |                  |          |          |        |             |              |               |                 |
| (\$000)                            |                                   | (thousand farms) |          |          |        |             |              |               |                 |
| 100 or more                        | : 91                              | 68               | 20       | 1        | 0      | 0           | 0            | 0             | 0               |
| 40-99                              | : 310                             |                  | 221      | 77       | 6      | 2           | 3            | 1             | 0               |
| 10-39                              | : 732                             |                  |          | 641      | 62     | 15          | 10           | 2             | 1               |
| 0-9                                | : 296                             |                  |          |          | 251    | 36          | 8            | 2             | 0               |
| Zero or more                       | :1429                             | 68               | 241      | 719      | 324    | 53          | 21           | 5             | 1               |
| (1)-(10)                           | : 157                             |                  |          |          |        | 129         | 26           | 1             | 0               |
| (11)-(40)                          | : 68                              |                  |          |          |        |             | 54           | 14            | 1               |
| (41)-(100)                         | : 24                              |                  |          |          |        |             |              | 19            | 5               |
| Less than (100):                   | 16                                |                  |          |          |        |             |              |               | 16              |
| Less Than Zero                     | : 265                             |                  |          |          |        | 129         | 80           | 34            | 22              |
| Total                              | :1694                             | 68               | 241      | 719      | 324    | 182         | 101          | 39            | 23              |

#### EQUITY

Considering the joint effects of income and wealth is important in understanding the financial position of farmers, since the farm operations wealth may provide a buffer against negative income shocks. If a farm operation is faced with negative income and does not have sufficient equity

to guard against this shock, it is possible that this producer may be out of business in the following year. Table 7 presents the distribution of farms by family cash income categories and select equity classes. The data shows about 20,000 producers with both negative income and negative equity in 1984. An additional 28,000 operators had levels of equity which were about equal to their losses, these too are likely farm failures. An additional 278,000 operators had negative family cash income, but had equity reserves that could have been drawn on to provide funds for living assuming these reserves were not already committed towards securing debt.

Table 7 -- Number of Farms by Family Cash Income And Equity Classes

| Family Cash Income | Equity (\$000)   |          |         |        |          |          |          |            |            |            | Total |               |
|--------------------|------------------|----------|---------|--------|----------|----------|----------|------------|------------|------------|-------|---------------|
|                    | :Less than (100) | (41-100) | (11-40) | (1-10) | : 0 to 9 | 10 to 39 | 40 to 99 | 100 to 249 | 250 to 499 | 500 to 999 |       | 1,000 or more |
| (\$000)            | (thousand farms) |          |         |        |          |          |          |            |            |            |       |               |
| Less than (100)    | 2                | 0        | 0       | 0      | 0        | 1        | 1        | 4          | 5          | 5          | 5     | 23            |
| (41-100)           | 1                | 2        | 1       | 0      | 0        | 1        | 4        | 11         | 9          | 6          | 3     | 39            |
| (11)-(40)          | 1                | 2        | 3       | 2      | 2        | 9        | 12       | 37         | 17         | 13         | 4     | 101           |
| (1)-(10)           | 0                | 1        | 3       | 2      | 6        | 21       | 48       | 62         | 30         | 7          | 3     | 183           |
| Less than 0        | 4                | 5        | 7       | 4      | 8        | 32       | 66       | 113        | 61         | 31         | 15    | 346           |
| 0-9                | 0                | 2        | 2       | 3      | 10       | 54       | 97       | 103        | 34         | 9          | 4     | 319           |
| 10-39              | 2                | 4        | 4       | 4      | 21       | 80       | 192      | 263        | 110        | 31         | 7     | 719           |
| 40-99              | 1                | 2        | 2       | 2      | 2        | 10       | 31       | 80         | 60         | 41         | 10    | 242           |
| 100 or more        | 1                | 0        | 0       | 0      | 0        | 1        | 4        | 12         | 13         | 17         | 19    | 68            |
| Zero or more       | 4                | 9        | 9       | 9      | 33       | 145      | 324      | 458        | 217        | 98         | 40    | 1348          |
| Total              | 8                | 14       | 16      | 13     | 41       | 177      | 390      | 571        | 278        | 129        | 55    | 1694          |

The survey results also show about 32,000 producers with positive family cash income but with negative equity (their liabilities exceeded their assets). Because these operators had positive income after interest payments their lenders may be tolerant of their poor security position and exercise forbearance. Furthermore, over 1,000,000 producers had both

positive equity, and family cash income greater than \$10,000.

A shortcoming in using the absolute equity position of producers to measure of wealth, is that it tells nothing about the liabilities of the firm.

Similarly, debt/asset ratios measure relative indebtedness but say nothing about the absolute level of equity. In Table 8 a crosstabulation of debt/asset ratio and family cash income classes show about 111,000 producers with negative family cash income between -1,000 and -10,000 dollars, and a debt/asset ratio less than 10 percent. Of the 346,000 producers with negative family cash income, about 43,000 had debt/asset ratios greater than 70 percent. For the 1.0 million producers with over \$10,000 in family cash income, approximately 46,000 had debt/asset ratios greater than 70 percent. Thus while there is correlation between relatively higher debt and negative net cash income to the family, the relationship is not strong.

Table 8 -- Number of Farms by Debt/Asset Ratio  
By Family Cash Income Class, 1984

| Family Cash Income | Debt as a Percent of Assets |       |       |       |       |       |       |       |       |       | Total |       |
|--------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                    | 100 or More                 | 90-99 | 80-89 | 70-79 | 60-69 | 50-59 | 40-49 | 30-39 | 20-29 | 10-19 |       | 0-9   |
| (\$000)            | (thousand farms)            |       |       |       |       |       |       |       |       |       |       |       |
| 100 or more        | 2                           | 0     | 1     | 1     | 3     | 5     | 4     | 7     | 8     | 8     | 29    | 68    |
| 40-99              | 7                           | 1     | 4     | 3     | 6     | 9     | 15    | 22    | 23    | 33    | 119   | 241   |
| 10-39              | 14                          | 5     | 7     | 11    | 17    | 29    | 31    | 49    | 63    | 78    | 412   | 718   |
| 0-9                | 9                           | 3     | 4     | 6     | 8     | 7     | 9     | 12    | 17    | 24    | 218   | 318   |
| Zero or more       | 33                          | 9     | 16    | 22    | 35    | 50    | 59    | 89    | 112   | 143   | 778   | 1,345 |
| (1)-(10)           | 7                           | 1     | 3     | 3     | 4     | 7     | 10    | 9     | 13    | 16    | 111   | 183   |
| (11)-(40)          | 7                           | 1     | 3     | 5     | 7     | 7     | 6     | 13    | 9     | 13    | 30    | 101   |
| (41)-(100)         | 4                           | 1     | 2     | 3     | 2     | 4     | 3     | 4     | 3     | 4     | 10    | 39    |
| Less than (100)    | 3                           | 1     | 1     | 1     | 1     | 2     | 2     | 3     | 2     | 1     | 7     | 23    |
| Less Than Zero     | 20                          | 4     | 8     | 11    | 15    | 19    | 22    | 29    | 28    | 34    | 157   | 346   |
| U.S. Total         | 53                          | 13    | 23    | 33    | 50    | 69    | 81    | 118   | 139   | 177   | 935   | 1,691 |

## CONCLUSIONS

A major problem confounding farm policy and policy analysis, that is, farms are heterogeneous. Farm operations produce a variety of commodities under a diverse set of organizational configurations and costs. Depending on the commodities produced, location, size of operation, management, natural phenomena, etc. returns from production may, and do, vary widely.

Furthermore, sources of variation may be dissimilar among farm operations. Generalizations about farms or farmers and about their financial condition are hazardous at best. The analysis shows that net operating margin (cash income) conditions for farm operators in 1984 are not closely correlated with debt/asset ratios. This suggests that multiple criteria are required to identify those operations who may be experiencing financial trouble.

It is difficult to establish a demarcation point between those who are in considerable financial difficulty and those who are not. Certainly all producers who lost money from operating are under some financial pressure because of the need to cover their losses and meet family living expenses. In light of this, it would seem that those operations with margins less than \$10,000 would be living near the poverty threshold if they did not have a source of income other than farming.

When off-farm income is considered, the family income picture generally improves. However, 346,000 producers continued to show a negative income, before family living expenses, debt repayment or depreciation of assets are considered. Of these about 265,000 had negative income before interest payments. In addition, about 420,000 operators had a combined operating margin and off-farm income between zero and \$10,000.

At the other end of the distribution, 178,000 farm operators earned more

than \$40,000 from combined farm and off-farm sources, in 1984.

Considering both wealth and income, slightly over 1.0 million producers had family cash income over \$10,000 and positive equity. However, about 20,000 producers had both negative income and negative equity.

#### FOOTNOTES

2/ The farm business or enterprise includes all operation activities directly related to farming. The farm family unit includes both farm enterprise and non farm income generating activities. The term "family" does not preclude non farm income from other economic units, e.g. individual, partnership and/or corporations, and corresponds with ERS's definition of cash available for family living expenses and principle repayment.

3/ It is assumed that net operating margin serves as a reasonable proxy of the net return to the variable factors of production.

4/ Operating margin categories were chosen because they coincided with other definitions, maintained reasonable sample counts and seemed to fit the distributions. However, the classifications are arbitrary in the sense that there is no theoretical basis for them.

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