THE FINANCIAL SITUATION OF U. S. FARMS BY CLASS AND TYPE

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ABSTRACT

This is a study of the financial profile and situation of U.S. farm operators in 1986. Difficult conditons in the farm sector have placed a number of farmers under financial stress. While some farms of all sizes have been experiencing financial stress, these problems have been most pronounced for small family-sized commercial farms. The degree of financial stress is based on the farm's debt/asset ratio and its cash flow. Analysis of the accounting statements of the farming sector for 1986 shows that assets and debts were lower causing a reduction in owner equity. This drop in equity indicates a decline in the wealth position of farmers. For analytical purposes, family-size commercial farms were those that sell between $40,000 and $500,000 of farm products per year. Such farms account for nearly a third of all farms and half of all sales of farms products.

INTRODUCTION AND REVIEW OF LITERATURE

Agriculture is not a homogeneous industry. It is composed of small family farms, large corporate organizations, credit firms, credit and processing firms, wholesalers, transportation networks and food and fiber retailers (Lee et al., 1980).

Farms can be classified according to economic classes (Edwards et al., 1985). Because of changes in these numbers through time, we can refer to them as the expanding, declining, and noncommercial sectors. The expanding sector included 350,000 farms in 1960, increasing to 1,012,000 by 1986. These farms accounted for 43 percent of all farms, produced over 93 percent of the value of agricultural output, and received 83 percent of the government support payments. Off farm income was $10,078 per farm. Average total income per farm, including off farm income and government payments amounted to $33,000.

The declining sector of agriculture includes those farms with annual product sales between and $2,500 and $20,000. Those farms decreased in numbers from 1.8 million in 1960 to 766,000 in 1986 (USDA, Agricultural Statistics 1986). This group of farms produced 6 percent of the agricultural output, 10 percent of the net income in agriculture, and received 15 percent of the government payments. Total income for these farms was $20,151 per farm in 1986.

Another distribution can be made according to the sources of income (Brooks, 1985). In 1984 of the 2.3 million farms, 1.6 million were small with less than $40,000 in annual sales. Operators of these farms are not often considered "farmers" because they rely on off-farm income as a principal source of income. The commercial farm sector is of extreme importance because it accounts for most of the agricultural production and is composed of almost 700,000 farms (Agrcultural Outlook, 1987).

Still another classification of farms can be made on the basis of commodities produced and sold (Remund, 1985). For a farm to be classified as a particular type, more than 50 percent of its gross sales must come from one commodity.

Financial conditions can also be measured in terms of asset/debt ratios (the amount of debt owed relative to the value of assets owed) and net cash flow (the amount of net cash income from all sources that can be used to meet family living expenses and debt payment needs),(Devino, 1981).

Cash flow by farm sales class in 1985 shows that the percentage of farms with negative cash flow values actually declined since 1981. The same analysis by farm type shows that livestock farms had the highest percentage of operators with negative cash flow because these farms had the lowest average gross farm income of any farm type. Greenhouse and dairy farms had the lowest percentage of farms with negative cash flow (Johnson, 1986).

Most of the publications concerning the Agricultural sector, like the Census of Agriculture, Agricultural Statistics, and periodic surveys conducted by the U.S. Department of Agriculture (USDA), provide only aggregate data. Items analyzed include the number of farms, land in farms, value of land and buildings, values of machinery and equipment, characteristics of operators, inventories, prices paid and received by farmers, etc. But, different farm types use different production practices and make unique decisions on financing, marketing, purchasing, and government program participation. Yet, the economic data base for agriculture gives the false idea of a homogeneous farming sector. Therefore, information about the financial situation and well being of different farm classes may not be reliable when obtained from aggregate statistics.

The objectives of the study will be a) to analyze the financial aspects of different farm classes, according to their annual product enterprise sales, b) to examine the economic situation of the major farm crop types in the U.S.

MATERIALS AND METHODS

Farm classes were classified in two categories, noncommercial farms, those with annual sales below $40,000, and commercial farms, with annual sales above $40,000. The latter were divided into a) small farms, with $40,000 to $100,000 annual sales, b) midsize farms, with $100,000 to $500,000 annual sales, and c)large farms, with $500,000 and more in annual sales.

Each farm was also assigned into an enterprise category which was determined to be the major source of sales for that farm. Enterprise categories utilized for this study were as follows: cash grain,tobacco/cotton, vegetable/fruits, nursery/greenhouse, beef/hog/sheep, dairy, and poultry.

A balance sheet and an income statement were constructed for each farm class and for the whole agricultural sector. The ratios obtained from the financial statements were statistically compared to determine which farm class was in a better economic and financial situation. Financial statements, a balance sheet and income statement, were constructed and ratios developed to establish and compare financial positions for each of the major farm enterprise types in the U.S. Data assembled came from various U.S. government publications (see literature cited).

Statistical and financial analysis were used to determine whether economic differences existed between sales classes and farm crop types. The statistical analysis used was the paired t-test. The financial analysis included assets to debts and debt to equity ratios.

A farm has favorable income status when it has positive net cash income; a favorable solvency status occurs when its debt to asset ratio is less than 0.40. A debt to asset ratio of 0.40 indicates that debts represent 40 percent of the assets. An equity to value ratio of less than 40-50% would be scruitinized with extreme care by lenders (Lee etal., 1988).

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RESULTS AND DISCUSSION

Non-commercial farms have been experiencing financial problems. According to this study they represent 70.7 percent of all farms, share 10.0 percent of cash receipts and receive 11.3 percent of government payments (Table 1). These farms usually have off-farm income sources and are ordinarily part-time operations. Most of them qualify for loans and can repay them on the basis of the off-farm income. Thus, they don't depend on their agricultural production as much as commercial farms do (Brooks, 1985).

Table 1. Distribution of farms by sales class.

Value of Sales Class	1986 Number (1,000)	Share of cash receipts	Share of government payments
			Percent
less than $40,000	1,569 (70.7 pct.)	10.0	11.3
$40,000 - 99,999	293 (13.1 pct.)	15.6	22.2
$100,000 499,999	338 (15.1 pct.)	41.7	54.1
$500,000 - and over	40 (1.8 pct.)	32.7	12.4
U.S.	2,241 (100 pct.)	100.0	100.0

Source: USDA, Agricultural Chartbook, June 1987.

Commercial farms presented a varied financial picture. In 1986, there were approximately 672,500 farms accounting for almost 30 percent of all farms and 81 percent of all sales of agricultural products. Table 2 shows that 41,697 farms were technically insolvent, meaning that they owed more than their assets were worth. An additional 48,422 farms had debt/asset ratios between 70 and 100 percent; 137,870 farms had debt/asset ratios between 40 and 70 percent. Most of these farms had problems meeting principal payments because the debt asset ratios are generally above 40 percent which indicates a weak financial positon.

Table 2. Number of farms with financial problems and portion of debt, January 1, 1987.

Debt/asset ratio	Number of farms	Portion of all farm debt
Over 100 pct. (technically insolv.)	41,697 (6.2 pct.)	9.3%
70-100 pct (extreme financial problems)	48,422 (7.2 pct.)	11.1%
40-70 pct. (serious financial problems)	137,870 (20.5 pct.)	25.9%
Under 40 pct. (no financial problems)	443,875 (66.0 pct.)	17.9%
All commercial farms	672,538 (100.0 pct)	64.2%
Non-commercial farms	1,569,000	35.8%

The net worth of farm operators average $640,375 on January 1, 1987, but ranged from a low of $162,000 for farms with less than $40,000 in annual sales to nearly $1.7 million for farms with sales in excess of $500,000 (Table 3).

Table 3 also suggests that for all farms , land and buildings were about 70 percent of total assets. Land and buildings decreased as a portion of total assets as farm size increased. Also, for farms with sales of less than $40,000, land, equipment, and livestock accounted for 98 percent of total assets.

Table 3. Farm balance sheet by sales class. January 1, 1987

Item	SALES CLASS $500,000 and over	$100,000 to $499,000	$40,000 to $99,000	$40,000 or less
	Thousands			
Farm assets	2,335	665	320	182
Land, build.	1,526	427	217	146
Farm equip.	296	119	56	22
Livest. inv.	281	63	27	11
Crop invent.	135	46	17	2.6
Purch. inputs	14	2	0.5	0.2
Other assets	80	9	2	0.7
Farm debt	650	204	67	20
PCA	62	15	4	1.3
FmHA	67	27	13	4.3
Banks	179	55	19	0.7
FLB	153	51	13	4.6
Merchants & dealers	11	3	1	0.4
Other farmers	10	2	0.5	0.2
Other indiv.	58	23	7	3
CCC	50	17	4	0.7
Any other	56	11	3	1.2
Net worth	1,685	461	253	162
Selected ratios				
Debt/equity	0.38	0.44	0.26	0.12
Debt/asset	0.27	0.30	0.20	0.10

Source: Agricultural Statistics

Sources of debt also varied by class of farm. Farms with sales of $40,000 or less obtained a larger share of debt from FmHA, FLB and individual lenders. More than half of debt on farms with sales over $500,000 was owed to banks and FLB's (Table 3).

While the average debt/asset ratio for all farm operators was 0.22, they ranged from 0.10 for the smallest farmers to 0.30 farms with sales of $100,000 to $499,000, the highest ratio.

As Table 4 shows, the net cash margin after interest and principal increased (item 9) with the size of farm. Average non-farm income is relatively stable across farm size except for class $100,000-499,999 which increased; cash balance, (item 12), decreased for the most part in direct proportion to the size of farm.

Table 4. Income statement by sales class, January 1, 1987

Item	Sales Class			
	$500,000 and over	$100,000 to $499,999	$40,000 to $99,999	$40,000 or less
	Thousands			
1.Crop, livestock sales	1,021	395	53	37
2.Other farm inc.	166	70	12	7.5
3.Gross farm inc.	1,188	470	65	45
4.Operating exp.	872	318	46	45
5.Net cash before interests	315	150	20	2
6.Total int. exp.	77	47	7	7
7.Net cash after interests	237	10	12	2
8.Principal payment	43	27	4	2.5
9.net cash margin after interests and principal	194	72	7	-9
10.Non-farm income	21	26	19	20
11.Family living				

Source: Agricultural Statistics

According to Table 5, vegetable/fruit, and dairy farms had the largest levels of assets per farm. Vegetable/fruit farms had the largest net worth of any farm type. Cash grain producers, followed by dairy producers, had the highest debt/asset and debt/equity ratios. Nursery/greenhouse and beef/hog/sheep farms had the lowest debt/asset and debt/equity ratios.

Table 5. Balance Sheet by type of farm, January 1, 1987.

Item	Cash Grain	Tobacco Cotton	Vegs. Fruits	Nursery Green ho.	Beef Hog Sheep	Dairy	Poult.
	Thousands						
Farm asst.	340	213	451	294	304	392	223
Land, build.	218	158	355	179	228	227	175
Equipment	75	39	60	33	30	67	25
Livestock	10	7	2	1	34	72	16
Crop invest.	33	6	13	36	7	17	2
Inputs	1	0.4	0.6	1	0.6	1	0.7
Other asst.	3	2	18	43	19	59	34
Farm Debt	106	52	92	48	49	107	54
PCA	7	4	7	8	4	12	6
FmHA	15	10	9	3	7	19	10
Banks	25	13	25	15	16	28	15
FLB	24	10	22	7	10	14	13
Merch. Deal.	2	1	0.7	1	7	2	1
Other farm.	2	0.4	2	2	0.5	1	1
Other ind.	10	2	13	7	6	14	5
CCC	14	3	2	1	2	3	2
Any other	6	6	9	3	4	2	2
Net worth	234	161	359	246	255	285	169
Ratios							
Debt/asset	0.31	0.24	0.20	0.16	0.16	0.27	0.24
Debt/equity	0.45	0.32	0.25	0.19	0.19	0.37	0.31

Source: Agricultural Statistics

Table 6. Cash income statement by type of farm, January 1, 1987

Item	Cash grain	Tobacco cotton	Vegs. fruits	Nursery green ho.	Beef Hogs sheep	Dairy	Poult
	Thousands						
1.Crop,livest. sales	66	50	124	194	46	116	208
2.Other farm income	26	12	7	6	9	5	3
3.Gross farm income	92	63	131	200	55	127	211
4.Oper. exp. less int.	47	45	100	116	47	87	162
5.Net cash before int.	35	17	31	83	8	34	50
6.Tot. int.	11	6	10	5	5	12	5
7.Net cash after int.	26	11	21	78	2	22	44
8.Princ. pay	6	3	5	3	3	7	3
9.Net cash after int. and prin.	17	8	15	75	1	16	40
10.Non farm income	18	16	29	36	27	9	14
11.Family liv. expense	15	15	15	15	15	15	15
12.Cash balance	20	9	28	97	11	9	40

Source: Agricultural Statistics

Beef/hog/sheep farms had the lowest net cash margin after interest (Table 6, item 7),because these farms had the lowest gross farm income ($55,000) (item 3) of any type. Nursery/greenhouse followed by poultry farms had the highest net cash margin (item 7) and the highest cash balance (item 12).

This study divided the agricultural sector by farm sales classes and by crop types; a statistical analysis was run to examine which of the changes between 1985 and 1986 could be statistically significant. A paired t-test was conducted to establish where significant changes occurred in the distribution of farms across sales classes (Table 7) and crop types (Table 8). Using the two-tailed, 1-percent alpha level, significant changes were found for all sales classes and crop types between those two years. This formal test of statistical significance agrees with the more casual observation of absolute changes in farm numbers. Overall, the test indicated that the change in total number of farms was significant at the 1-percent level.

Table 7. Distribution of number of farms by sales class, 1985 and 1986

Sales class	Mean	Std error	T-statistic
$500,000 and over	10083	2.89	3492.85 **
$100,000 - 499,999	33500	1.67	20100.40 **
$40,000 - 99,999	57882	5.36	10789.96 **
less than $40,000	67511	8.82	7655.07 **

**** Represents significance at the 1 percent level, for two tailed test.**

Table 8. Distribution of number of farms by type, 1985 and 1986

Farm type	Mean	Std Error	T-statistic
Cash grain	80092	34.80	2301 **
Field crops	38006	16.51	2302 **
Vegs & fruits	11136	4.67	2386 **
Nursery	8538	5.36	1591 **
Beef, hog & sheep	181983	38.98	4668 **
Dairy	14692	22.19	662 **
Poultry	11805	23.97	492 **

**** Represents significance at the 1 percent level, for two tailed test.**

The inventory turnover of farm products for 1985 and 1986 of 3.99 and 3.29 (Table 9), fell below the industry norm of 6.4. The return on equity in 1985 was 3 percent and 2 percent in 1986(Table 9). These were below the industry standard of 5.0 for return on equity. Likewise, proprietors' equity declined in 1986 to 534 billion (Table 10), a decrease of 8 percent with respect to 1985. However, net farm income increased from 30.5 to 33 billion dollars or about a 10 percent increase (Table 11). This incongruity occurred because from 1985-86 although farm receipts declined by approximately 6.4 percent , total farm expenses declined 8 percent and direct government payments went up by nearly 43 percent. This demonstrates the importance of government subsidies to enhance the farm net income for this period in time. Also, because some non-real estate debt is held against durable assets, which were stabilized in 1986, U.S. net farm income is understated.

Table 9. Financial Ratios of the farming sector, 1985-1986.

Item	1985	1986	Industry
	Percentage		
Current ratio	.50	.50	2.0
Inventory turnover	3.99	3.29	6.4
Return on sales	2.54	2.43	4.4
Return on assets	2.00	2.00	4.7
Debt to equity	26.00	23.00	30.90
Return on equity	3.00	2.00	5.00

Source of industry ratios: Dun & Bradstreet Inc., 1986

Table 10. Balance Sheet of the U.S. Farming Sector. Figures are in billions.

	Calendar year			
	1983	1984	1985	1986
Assets				
Real estate	736.1	639.6	559.6	515
Non-real estate	220.4	216.5	211.9	196
Livestock & poultry	49.7	49.6	45.9	44
Machinery & motor vehicles	100.9	95.0	92.2	88
Crop stored	33.2	33.7	37.1	29
Financial assets	36.5	38.1	36.7	35
Total farm assets	956.5	856.1	771.4	711
Liabilities				
Real estate	103.5	102.9	97.3	90
Non-real estate	98.7	95.8	94.8	87
CCC loans	10.8	8.6	16.9	19
Other non-real estate	87.9	87.1	77.9	68
Tot. farm liability	202.4	198.7	192.7	177
Total farm equity	754.0	657.3	579.3	534
	Percent			
Selected ratios				
Debt to assets	21.2	23.2	24.9	24.9
Debt to equity	26.8	30.2	33.2	33.1

Source: Agriculture Outlook, June 1987

Table 11. Farm Income Statistics. Figures are in billions.

Item	Calendar years			
	1983	1984	1985	1986
1. Farm receipts	140.9	146.4	148.5	139
Crops	67.0	69.2	72.7	63
Livestock	69.5	72.9	69.4	71
Farm related	4.4	4.3	6.4	5
2. Direct Gov. Payments	9.3	8.4	7.7	12
Cash payments	4.1	4.0	7.6	8
Value of PIK Commod.	5.2	4.5	0.1	4
3. Total gross farm inc.	152.4	174.4	166.6	158
4. Gross cash income	150.2	154.9	156.2	151
5. Nonmoney income	13.2	13.3	11.5	10
6. Value of inv. change	-10.9	6.3	-1.1	-3
7. Cash expense	113.0	115.6	112.1	102
8. Total expenses	139.5	141.7	136.1	125
9. Net cash income	37.1	30.3	44.0	49
10. Net farm income	13.0	32.7	30.5	33
11. Off-farm income	37.0	37.9	40.8	43
12. Loan changes				
Real estate	2.5	-0.8	-5.6	-8
13. Non real estate	1.0	-0.8	-9.2	-10
14. Rental income	5.7	7.8	8.0	7
15. Capital expenditures	13.0	12.5	10.1	8
16. Net cash flow	33.3	33.0	27.1	30

Source: Agricultural Outlook. June 1987

A comparison of the financial ratios of the farm sector with those of the industry (Table 12) indicates that there was a significant difference, at the 1-percent level, in the current and inventory turnover ratios. Also, there was a significant difference on return on equity ratio at the 5 percent level.

The degree of operating leverage is the increase or decrease in earnings from the use of borrowed funds. It exists as long as it is greater than 1. Even though the farming sector in 1985-1986 had operating leverage of 1.42 (Table 13), the effect of changes in sales on earnings was nearly balanced. The t-test analysis of the leverage ratios (Table 14), indicates that there was no significant difference between those leverage ratios.

Table 12. Financial ratios of the farming sector, 1985-1986, attest.

Item	Mean	Std error	T-statistic
Current ratio	1.8	2.75	2345 **
Invent. turnover	2.2	1.56	1345 **
Return on sales	1.2	2.56	2356
Return on asset	2.0	1.34	1467
Debt to equity	24.0	3.67	2345
Return on equity	2.5	2.45	1987 *

**** Represents Significance at the 1 percent level, for two tailed test.**
*** Represents significance at the 3 percent level, for two tailed test.**

Table 13. Leverage ratios of the farming sector, 1985-1986

Item	1985	1986
Degree of operating leverage	1.42	1.42
Degree of financial leverage	1.48	1.50
Degree of total leverage	2.10	2.13

Table 14. Leverage ratios of the farming sector, a t-test.

Item	Mean	Std Error	T-statistic
Degree of operator leverage	30054	1.78	3592
Degree of financial leverage	76893	3.25	5784
Degree of total leverage	13478	1.47	4873

SUMMARY

During 1986 U.S. farmers were affected by several adverse factors: lower product prices, farm exports and land values, among others. Despite those negative conditions most of the farms were financially sound. However, approximately 228,000 farmers, or 10 percent of the total, experienced financial stress. This financial stress is caused by a high debt load (a debt/asset ratio of 40 percent or more) and insufficient cash to pay their bills.

The degree of financial stress, which is based on two measures (the farm's debt/asset ratio and its cash flow), varied with size and the type of the farm. The debt/asset ratio was 0.10 for the smallest farmers to .30 for farms with annual sales of $100,000 to $499,000. It went from 0.16 for nursery/greenhouse, and beef/hog/sheep farms to 0.31 for cash grain farms.

Farmers' cash flow improved in 1986 by 10 percent with respect to 1985, due to an increase in direct government payments and in Commodity Credit Corporation loans. Net farm income also increased in 1986, by 10 percent over the 1985 value, while net cash income rose from 44 to 49 billion during the same period.

Analysis of the farm balance sheet of 1986 shows that assets and debts were lower causing a reduction in owner equity. The drop in equity by 8 percent indicates a decline in the wealth position of farmers.

Also, the return on investment of the farming sector in 1985-1986 was below the industry standard and most of the financial ratios calculated for that period were short of the industry norm.

Although there was an increase in the amount of sales, crop inventories also increased. This was the result of a greater production in 1986, compared to 1985. As a consequence, the operating leverage did not contribute to net farm income.

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