

**AN EVALUATION OF POSSIBLE ABATEMENTS TO
FINANCIAL STRESS FOR A NORTH
CENTRAL OKLAHOMA WHEAT
AND LIVESTOCK
FARM**

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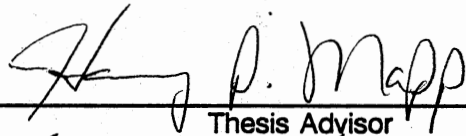
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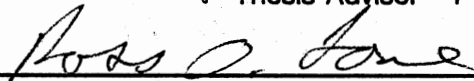
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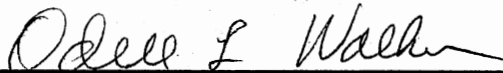
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CHAPTER I

INTRODUCTION

Historical Overview

The financial experience of the agricultural sector has historically been characterized first by the advent, and then by the aftereffects, of a farm "boom" of major proportions. Such episodes have been relatively rare. Two occurred earlier in this century during and immediately following both World Wars, and two in the nineteenth century, also triggered by the commodity demands of U.S. and European wars (Melichar, 1984). The down side of the cycle presented the problem of adjusting to new world market situations and working out as painlessly as possible from the inflation and speculative excesses that marked the post boom years and the need to restore quickly and with less hardship a more suitable balance between amounts produced and the effective market for them (Benedict, 1953).

The expansionary effects of what Benedict characterized as speculative excesses extended over several decades shaping the fortunes of entire generations of farmers, farm lenders, and suppliers. Initially, farmers responded to increased demand by investing heavily in land and technological improvements with the expectation of capitalizing on their good fortunes. Ultimately, however, the excess demand would disappear leaving farmers with investments that required the continuation of boom time prices to service the newly acquired debt. Depending on how dependent farmers had become on higher prices to cover expenses, many farmers would face prolonged financial stress or bankruptcy.

In a like manner, throughout the decade of the 1970's, farmers and ranchers, prompted by rapidly expanding exports, accelerating inflation, and low to negative real interest rates, borrowed heavily to invest in new capital equipment, new production technologies and rapidly inflating farmland (USDA, March, 1985).

Although public attention has focused on farmers under financial distress, such cases have not represented the norm of farm conditions. On balance, real profits from farm assets and real farm wealth have remained above preboom levels (Melichar, 1984). These observations on overall farm financial conditions, however, mask highly diverse experiences among various groups of farmers. Ever since interest rates rose far above the average rate of return to assets, a sizeable group of heavily indebted farmers have faced financial stress.

The first part of this introductory chapter discusses the origins and impacts of the current episode of financial stress. In this section data are presented depicting changes in asset values, agricultural debt, farm equity, net farm income, interest rates, and cash flow. The second section illustrates the severity and breakdown of financial stress following the USDA's classifications of farm type, sales class and farming region. In each of these classifications data are presented to demonstrate the current state of financial performance with respect to profitability, liquidity and solvency. The third section gives special emphasis to the current state of financial stress and its effects on financial performance in Oklahoma. In the fourth and final section the problem statement and research objectives are stated.

The Making of a Financial Crisis

Ironically, the decade of the 70's actually is a boom decade only in comparison to the 1980's. Except for 1972-74, Net Farm Income (NFI) in real terms declined although cash receipts from farming grew annually (Table I). The irony of agriculture's financial woes began in the mid-70's as farmers were forced to expend more in production

expenses bringing about serious cash flow shortfalls. For example, farmers responded to their increased financial stress by attempting to call a nationwide farmer's strike. In the winter of 1977-78 farmers drove their tractors 100,000 strong from at least 30 states to protest at the nations capital (Braun, 1978). Their complaint was a familiar one of insufficient incomes to cover their costs of production.

Asset Values and Rents

Over the course of the decade, the effects on cash flow brought about by lower farm prices and incomes were offset by the tremendous increases in asset values. Farmers found financial institutions eager to refinance debts using appreciated land values as collateral. Through leveraged financing farmers were able to acquire their much needed operating capital.

From 1970 to 1981, agricultural land values, which typically comprise three-fourths of total assets in the United States, grew without exception (Table I). From 1973-1981, land values throughout the U.S. increased an average of 198 percent, or at an annual compound rate in excess of 10 percent per year. Increases in individual states ranged from 97 percent in Oregon to 359 percent in Minnesota. Generally, increases were greatest in the Midwest and smallest in the South, West, and Northwest (USDA, August, 1985).

From 1981 to 1986, land values declined over 49 percent in Illinois, Indiana, Ohio, Nebraska, Minnesota and Iowa while the average decline nationwide was 29 percent (USDA, June, 1986). The average value per acre of U.S. farmland was \$596 in 1986, below that of 1979. Over the same time period, the real value of farmland declined even more. In 1986 indexed farm real estate values were equal to those of the mid 1960's. In inflation adjusted terms, all of the huge real increase in wealth brought about by the boom period of the 1970's have been lost. During the period, 1980-84, real capital losses on farm real estate have totaled about \$149 billion (in 1983 dollars), mostly occurring in

TABLE I
FACTORS WHICH SHAPED THE FINANCIAL
CONDITIONS OF U.S. FARMS

Year	Net Farm Nominal	Income Real	Nominal Interest Rate	% Charge IPD** Index	Real Interest Rate	Total Asset	Total Debt	Farm Equity
1970	14.4	34.2	7.91	5.50	2.41	280.2	50.5	229.7
1971	15.0	33.8	5.70	5.70	0.00	303.0	55.3	247.7
1972	19.5	41.8	5.25	4.70	0.55	341.4	60.2	281.2
1973	34.4	69.4	8.02	6.50	1.52	418.9	68.1	350.8
1974	27.3	50.5	10.80	9.10	1.70	442.2	76.0	366.3
1975	25.5	43.1	7.86	9.80	-1.94	510.1	85.2	424.9
1976	20.2	32.0	6.84	6.40	0.44	590.4	97.0	493.4
1977	19.9	29.5	6.82	6.70	0.12	656.6	114.9	541.7
1978	25.2	34.9	9.06	7.30	1.76	783.7	131.9	651.8
1979	27.4	34.9	12.67	8.90	3.77	918.1	155.2	762.9
1980	16.1	18.8	15.27	9.00	6.27	1003.2	170.4	832.9
1981	26.9	28.6	18.87	9.70	9.17	1005.2	189.0	816.3
1982	23.4	23.4	14.86	6.40	8.46	977.8	203.7	774.2
1983	12.7	12.2	10.79	3.90	6.89	956.5	202.5	754.0
1984	32.3	29.8	12.04	3.70	8.34	847.7	190.7	657.0
1985	32.1	28.8	9.03	3.20	6.73	754.4	175.5	578.9
1986	38.2	33.4	10.30	2.95	7.35	695.8	157.4	538.4
1987*	43.2	36.3	10.75	2.90	7.85	712.0	141.0	571.0

Source: USDA, Financial Condition of U.S. Farms, January 1, 1987.

*Preliminary USDA estimates

**IPD Implicit Price Deflator

1981 and 1982 (Melichar, January, 1984). The Midwest experienced the greatest increases in land values and subsequently suffered the greatest decline.

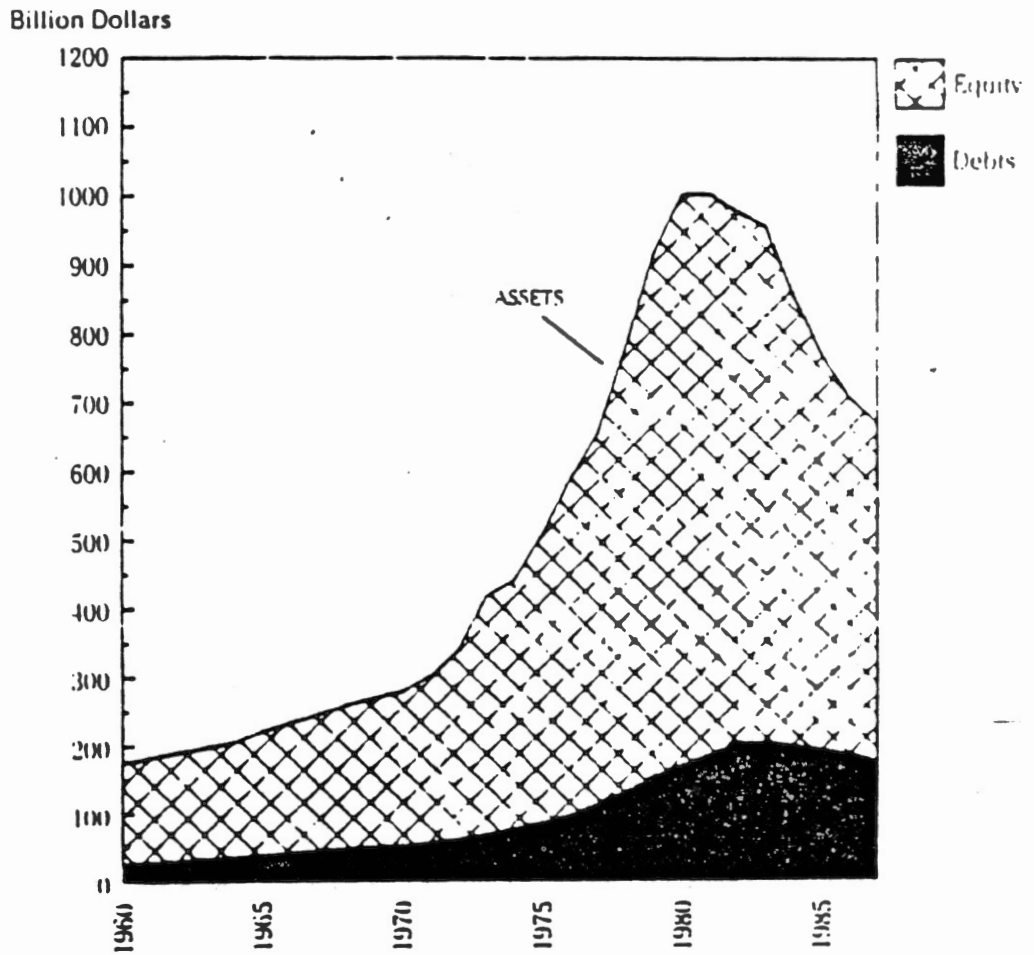
Net investment in machinery, equipment, and buildings tripled during the 1970's but fell by 25 percent from 1981 to 1985 (USDA, March, 1986). Net worth, in nominal terms, for the entire sector fell from \$833 billion in 1980 to \$538 billion in 1986, a level approximately equal to 1977 and indicating a loss of 25 percent of peak values.

Rents declined in most states reporting estimates in 1985 and 1986 (USDA, August, 1985 and June, 1986). Land values declined more than rents causing rent-to-value ratios to rise substantially in the Corn Belt, Lake States and Northern Plains. The largest decline in rents occurred in Nebraska and Iowa where they fell 20 percent and 12 percent respectively in 1985. Melichar believes that lower land prices represent a major long-term adjustment to a revised farm outlook of lower returns than those experienced in the early 1970's rather than a temporary phenomena caused by financial stress (Melichar, April, 1986).

Agricultural Debt

Nationally, farm debt rose an estimated 10 percent per year during the 1970's. However, land values appreciated at a more rapid rate than did debt this caused debt/asset (D/A) ratios for the agricultural sector to actually decline (Figure 1). The decline in D/A ratios supported increased investment and borrowing through highly leveraged financing. Farmers willing to borrow more freely made faster financial progress. Soon both farmers and farm lenders learned this new lesson and as a result neither considered the principle of increasing risk associated with higher D/A ratios.

During the 1970's farm debt expanded very rapidly, from \$49 billion to \$154 billion, or by 228 percent (Bullock, 1985). During the same period, net farm income or repayment capacity increased by only 52 percent. Farm asset values increased at a rate higher than debt thus causing the overall D/A ratio of the agricultural sector to actually



Source: Agricultural Finance Review, Vol. 47, 1987.

Figure 1. Farm Sector Assets, Debt, and Equity Excluding Dwellings, 1960-87

decline (USDA, March, 1985). Since 1982, the level of farm debt has declined absolutely, by 0.6 percent from its peak of \$203 billion in 1982-83, and down another 1.8 percent to \$199 billion in 1983-84. Farm debt fell by \$18 billion in 1986 and continued its decline through 1987 as lenders tightened their credit policies (USDA, August 1987 and FRB Chicago, January, 1988).

Total real estate debt for 1985 was estimated at \$99 billion, down from \$102.9 billion in 1984. This was the second consecutive yearly decline and the largest one year decline in real estate debt since 1944.

In 1984, 81.1 percent of all U.S. farms had D/A ratios less than 0.4 and held 38.1 percent of total farm debt (Table II). Conversely, 15.9 percent of all farms had D/A ratios from 0.4 to 1.0 and held 48.8 percent of the \$120.2 billion in operator debt in 1984. The remaining 3 percent of all farms were technically insolvent and held 13.1 percent of all debt. Part time farmers (those with annual sales below \$40,000) with D/A ratios less than 0.4 comprised 54.8 percent of all farms and held 8.1 percent of all farm debt. Forty-three percent of family farms, defined as those farms with \$40,000 to \$500,000 of sales each year, accounted for 7 percent of all farms and held 31 percent of all farm debt.

Commercial farms with D/A ratios less than 0.4 comprised 26.3 percent of all farms and held 30 percent of all farm debt.

Overall, part-time farms accounted for 62.2 percent of all farms and held 16.8 percent of all farm debt. Family farms accounted for 35.9 percent of all farms and held 66.2 percent of all farm debt. Large farms, those with more than \$500,000 in annual sales, accounted for 1.9 percent of all farms and held 17 percent of all operator debt.

In 1950, the agricultural sector debt to net farm income ratio was less than one (USDA, January, 1986). By 1960 the ratio had risen to two and by 1970, to three. By 1982 the ratio was in excess of ten to one. In other words, the sector as a whole held \$10 of debt for every \$1 of net farm income. This ratio showed some improvement in 1986 with the tremendous increase in government commodity program payments and

TABLE II

U.S. FARMS AND FARM OPERATOR DEBT BY DEBT/ASSET RATIO,
CASH-FLOW STATUS AND SALES, JANUARY, 1985

Cash-Flow Status and Farm Size	D/A Ratio			Total All Farms
	≤0.4	0.4 to 1.0	≥1.0	
Farms with Positive Cash Flows				
Percent of Farms				
All	43.3	5.5	.8	49.6
>\$500,000	.8	.2	.1	
\$40,000 TO \$499,999	16.7	3.3	.5	
<\$40,000	25.8	2.0	.2	
Percent of Debt				
All	19.7	14.1	2.4	36.2
>\$500,000	3.1	3.4	.7	
\$40,000 TO \$499,999	13.2	9.2	1.3	
<\$40,000	3.4	1.5	.4	

Farms with Negative Cash Flows				
Percent of Farms				
All	37.8	10.4	2.2	50.4
>\$500,000	.4	.3	.1	
\$40,000 TO \$499,999	8.4	6.0	1.0	
<\$40,000	29.0	4.1	1.1	
Percent of Debt				
All	18.4	34.7	10.7	63.8
>\$500,000	2.2	4.6	3.0	
\$40,000 TO \$499,999	11.5	25.1	5.9	
<\$40,000	4.7	5.0	1.8	

Total All Farms				
Percent of Farms	81.1	15.9	3.0	100.0
Percent of Debt	38.1	48.8	13.1	100.0

*Based on the 1984 Farm Costs and Returns Survey estimate of 1.694 million farms. Farm operator debt for farm purposes based on the survey estimate of \$120.2 billion (USDA, 1985).

substantial declines in farm debt.

Interest Rates

Interest payments on the farm debt in 1984 were slightly over \$20 billion compared with \$3.2 billion in 1970 and \$1.2 billion in 1960 (USDA, January, 1986). In 1960, interest was 4.4 percent of total operating expenses and by 1984 had grown to 15.1 percent of operating expenses. Interest expense was the fastest growing expense in the 1970's and has now begun to decline (USDA, March, 1986). Fifty-three percent of the increase in interest expense since the early 1970's arose from expanded use of debt financing.

The October 1979 decision by the Federal Reserve System to allow interest rates to fluctuate greatly increased the financial risk exposure of the agricultural sector. Because of this policy change, the liquidity position of many farms was subjected to increased interest expense.

From 1970 until 1980, when agricultural debt more than tripled, real interest rates varied from two percent to a negative 1.5 percent (USDA, March, 1985). In 1981, real interest rates jumped to over 8 percent and basically remained at that level through 1985. The prime rate increased from around 7 percent in 1977 to over 18 percent in 1981 (Federal Reserve, August, 1980; December, 1981; February, 1983; February, 1986; March, 1987). The prime rate fell below 11 percent in 1983 and rose to 13 percent in 1984. During 1985 the prime rate fell to 9.5 percent and fell further to 7.5 percent by December of 1986, and rose to 8.5 percent in early 1988.

The average interest rate on agricultural loans from 1910 until 1974 held steady between 4.5 percent and 6.5 percent (Ag Finance Databook, July, 1985). After 1975 the interest rate on all agricultural loans increased to a peak of 18.5 percent in 1981. The average rate decreased to 13.6 percent in 1983 and rose to 14.2 percent in 1984. The average rate decreased to 13.1 percent by mid-1985 and USDA projections indicated

further declines in 1986 and 1987. The rapid rise in interest rates in the late 1970's and early 1980's created serious liquidity problems for many heavily indebted farmers. As both real and nominal interest rates have grown more of the farm's cash receipts have been consumed in paying interest expenses leaving fewer dollars to cover other expenses. Even though interest rates have improved since 1984, interest rates still exceed the average rate of return to assets on many farms resulting in the continued erosion of the farm's equity base.

Net Cash Flow

Table II shows that 49.6 percent of all farms had positive total net cash flows in 1984 and held 36.2 percent of all operator debt (USDA, March, 1986). Conversely, 50.4 percent of all farms had negative cash flows and held 63.8 percent of all operator debt.

Eighty percent of all farm firms had D/A ratios less than 0.4 and 46.6 percent of these farms also had negative cash flows. Two-thirds of farms with D/A ratios greater than 0.4 experienced negative cash flows. Forty-three percent of family farms, which comprised seven percent of all farms, had negative cash flows in 1984. Commodity prices would need to increase an average of 32 percent to restore positive cash flows to family farms (USDA, March, 1985). Three percent of farms were technically insolvent but 25 percent of these had positive cash flows (USDA, March, 1986).

Crop and livestock farms basically showed financial stress in equal proportions in 1984 of 10-15 percent. Twenty-five percent of dairy farms showed financial stress. Crop production expenses decreased by 3 to 5 percent in 1985 from their peak of 1984 and declined again in 1986. However, receipts declined 1 to 3 percent in 1985 and another 3 to 7 percent in 1986. The decline in receipts offset lower production costs.

In 1984 net farm income reached a record \$34.5 billion. In 1985 farm income fell by 20 percent and in 1986 fell to \$25 billion. Estimates suggested that net farm income would rise by eight percent in 1987 (USDA, March, 1987).

Performance Under the Present

State of Financial Stress

Farm sector income and cash flow showed substantial improvement in 1986 due largely to lower costs of production and higher Government support program payments. Preliminary estimates put 1986 net farm income in the \$38 billion dollar range, up from \$32 billion earned in 1985. Farm debt declined in 1986, but farm asset values, particularly land values, continued to fall, but at a slower pace than in previous years (USDA, January, 1987).

The material in this section relies heavily on the 1986 Farm Costs and Returns Survey administered by the USDA (USDA, January, 1987). Indications are that 39 percent of all farms entered 1987 debt free, and another 39 percent had debt asset ratios less than 40 percent. At the beginning of 1987, as was the case in 1986, 21 percent of farms reported debt/asset ratios greater than 40 percent. The percentage of debt held by these highly leverage farmers remained steady at about 66 percent of all debt. The percentage of debt owed by farms with D/A ratios greater than 1 declined from 16 percent in 1985 to 14 percent in 1986. The highest D/A ratios were among farms with sales greater than \$250,000, cash grain farms, and farms in the Lake States and Northern Plains.

As the data indicate, some degree of financial stress continues to exist for many farmers and that even with massive Government program outlays other solutions to the problems of certain high risk farm groups are needed.

Information required to analyze the financial performance of farm businesses can be derived from the farm's income and cash flow statements and its balance sheet. These tools provide the basis for evaluating the profit, liquidity, and solvency positions of the farm business.

Assessing Farm Financial Performance

Financial performance of individual farm operations can be assessed by evaluating the relationship between measures of income and relative debt positions (USDA, January, 1987). The liquidity or cash flow of an operation can be assessed from a cash-based measure of income. This measure should reveal the operations ability to meet current debt commitments and pay family living expenses. The USDA farm cost and returns data are used to calculate cash operating income which in turn is used to represent the liquidity position of farms represented in the survey. Profitability is assessed through net cash household income and net farm income which give a longer term assessment of the operations ability to generate profits. Solvency as measured through the D/A ratio reflects owner equity and indicates the degree of financial risk associated with the operation. Solvency can also be measured by owners equity and the leverage ratio (D/E) provides an alternative measure of financial risk. Under certain business conditions farm businesses with very large D/A ratios generate enough cash flow to service all commitments while some operations with low D/A ratios may have either low or negative earnings. The farm's ability to make debt work for it is often dependent on factors such as obtaining economies of size or scale.

Income Measures

The following section is a comparison of USDA income measures. Income generated by farm businesses and households during calendar year 1986, is examined with two measures (USDA, January, 1987). The first income measure is net cash household income (NCHI). NCHI is derived by adding family nonfarm income to net cash farm income and deducting an estimate of principal repayments and a family living allowance. NCHI is an estimate of the farm business's net cash flow.

The second income measure is net farm income (NFI). Net farm income provides a calendar year measure of the net value of agricultural production regardless of

disposition and indicates the profit or loss associated with current production. NFI is constructed by adjusting gross cash income to reflect changes in inventory values while incorporating nonmoney income components and subtracting total operating expenses which include both interest and depreciation of capital stock.

Solvency Measures

Debt/asset ratios are constructed from survey data to determine the solvency position of the farm business (USDA, January, 1987). This measure reflects the risk of the farm operator's financial structure or equity of the farm business. It is calculated by taking the total operator debt outstanding as of January 1, 1987, divided by the operator's estimate of current market value of all owned assets of the farm business.

Income and Solvency Classifications

The farm's relative financial health classification is based on its combined liquidity and solvency status. Income and solvency measures provide the basis for classifying farm businesses and households into one of four categories of financial health (USDA, January, 1987).

Favorable -- Positive income, D/A ratio < 0.40. These farms, which demonstrate both low to moderate levels of debt and positive returns, are in good short-term financial positions and are considered financially stable. These farms are poised to take advantage of possible investment and expansion opportunities.

Marginal income -- Negative income, D/A ratio < 0.40. These farms/households generally face an earnings problem. Any financial difficulties are more likely related to current business decisions and results rather than to the financial riskiness of past decisions. Current earnings deficiencies can be alleviated with increased borrowing or sales of assets, both of which convert equity to cash. The resulting additional debt

service burden of decreased equity base could accelerate cash flow problems and increase financial risk.

Marginal solvency -- Positive income, D/A ratio > 0.40. Farms/households in this category are generating positive returns despite higher debt service requirements. While not experiencing short-term cash income difficulties, they are susceptible to economic changes that would prevent them from meeting existing cash commitments. At current asset values, their equity is insufficient to serve as security for additional borrowing to meet shortrun cash needs. Many of these operations may be relying on participation in Government programs to generate current earnings.

Vulnerable -- Negative income, D/A ratios > 0.40. These farms are both highly leveraged and demonstrate income deficiencies which greatly increase their vulnerability as viable business operations. These operations do not generate sufficient income either to meet current expenses or to reduce existing indebtedness. The highly leveraged positions of these units may be due to declining asset values, increased indebtedness to meet past expansion needs or cash operating shortfalls, or a combination of these factors. Regardless of the evolution of financial circumstances leading to their current highly leverage position, these farmers may be forced to rely on debt restructuring/forgiveness to continue operating. Even then, cash earnings may not service additional debt.

Farms that are in a favorable position by one income measure will not necessarily be in a favorable position by the other measures. Some measures may understate the financial difficulties of highly leveraged operations to the extent that debt repayment is excluded. The favorable position of one income measure relative to another will depend on the importance of farm production in total family income, and the magnitude of nonmonetary adjustments to income.

Overview of Net Cash Household Income
and Solvency Positions

Net cash household income and solvency figures can be used to describe the liquidity performance of the agricultural sector by sales, region and farm type. Over 47.4 percent of farm households were in a "favorable" income/solvency position in 1986 compared with 44 percent in 1985 (Table III). Of these farms, 62 percent had sales of less than \$40,000. Forty-eight percent of all farms with sales above \$500,000 were in this income/solvency position in 1986.

Forty-two percent of farms were in a "marginal" financial position. Of this group, 43 percent had no debt and negative NCHI and were predominately small farm operations. Only 27 percent of marginal farm households indicated having solvency problems, while the remaining 73 percent could not meet family living, debt service and operating expenses out of current farm and nonfarm income. Because of increased investment which resulted in economies of size, farms with high debt loads tended to be economically larger than farms with cash flow problems. Because of higher turn-over ratios-farms with high debt loads did not automatically experience cash flow problems. Marginal farm households (farms with both marginal income and marginal solvency positions) accounted for 42 percent of total operator debt outstanding as of January 1, 1987 (USDA, January, 1987).

In 1986, 10.5 percent of farm households were in a vulnerable position compared with 11.2 percent in 1985 (USDA, January, 1987). Twenty-one percent of these vulnerable farm households were technically insolvent in 1986. The percentage of operator debt held by farms in the vulnerable classification declined to 35 percent and about 40 percent of the vulnerable farm households had sales of less than \$40,000.

TABLE III

FARM HOUSEHOLDS: NET CASH INCOME POSITION AND DEBT
SITUATION BY LIQUIDITY/SOLVENCY CLASS
AND DEBT/ASSET RATIO

Farms with positive net household income	Debt/Asset Ratio						All Farms
	-----Favorable----- No debt	0.01 to 0.10	0.11 to 0.40	-----Marginal Solvency----- 0.41 to 0.70	0.71 to 1.0	Over 1.0	
Number of Farms	316	159	239	<u>1,000 Farms</u> 110	36	21	881
Percentage of all Farms (by sales):				<u>Percent</u>			
\$500,000 or more	.22	.21	.46	.31	.12	.09	1.42
\$40,000 to \$499,999	4.93	4.35	7.80	3.73	1.50	.91	12.21
Less than \$40,000	15.81	6.02	7.61	3.28	.80	.38	33.90
All Sizes	20.96	10.58	15.87	7.32	2.41	1.39	58.52
Percentage of all Debt (by sales):				<u>Percent</u>			
\$500,000 or more	0	.54	2.99	3.33	2.95	1.27	11.08
\$40,000 to \$499,999	0	1.80	12.70	10.64	5.73	3.17	34.04
Less than \$40,000	0	.80	3.82	3.33	1.19	.45	9.59
All Sizes	0	3.15	19.51	17.30	9.87	4.89	54.71
Total Debt	0	3,099	19,216	<u>Billion Dollars</u> 17,043	9,721	4,815	53,895

TABLE III (CONTINUED)

Farms with negative net household income	Debt/Asset Ratio						All Farms
	-----Marginal Income-----			-----Vulnerable-----			
	No debt	0.01 to 0.10	0.11 to 0.40	0.41 to 0.70	0.71 to 1.0	Over 1.0	
Number of Farms	270	77	119	<u>1,000 Farms</u> 85	39	34	625
				<u>Percent</u>			
Percentage of all Farms (by sales):							
\$500,000 or more	.02	.04	.14	.14	.07	.02	.43
\$40,000 to \$499,999	1.45	1.00	3.09	2.97	1.64	1.13	12.29
Less than \$40,000	16.48	4.07	4.67	2.55	.87	1.12	29.77
All Sizes	17.95	5.12	7.89	5.66	2.58	2.27	41.48
Percentage of all Debt (by sales):				<u>Percent</u>			
\$500,000 or more	0	.16	1.18	2.78	1.24	.96	6.32
\$40,000 to \$499,999	0	.43	5.51	10.56	7.02	5.92	29.45
Less than \$40,000	0	.55	2.43	3.33	1.08	2.10	9.52
All Sizes	0	1.14	9.13	16.70	9.34	8.98	45.29
Total Debt	0	1,120	8,992	<u>Billion Dollars</u> 16,454	9,199	8,846	44,611

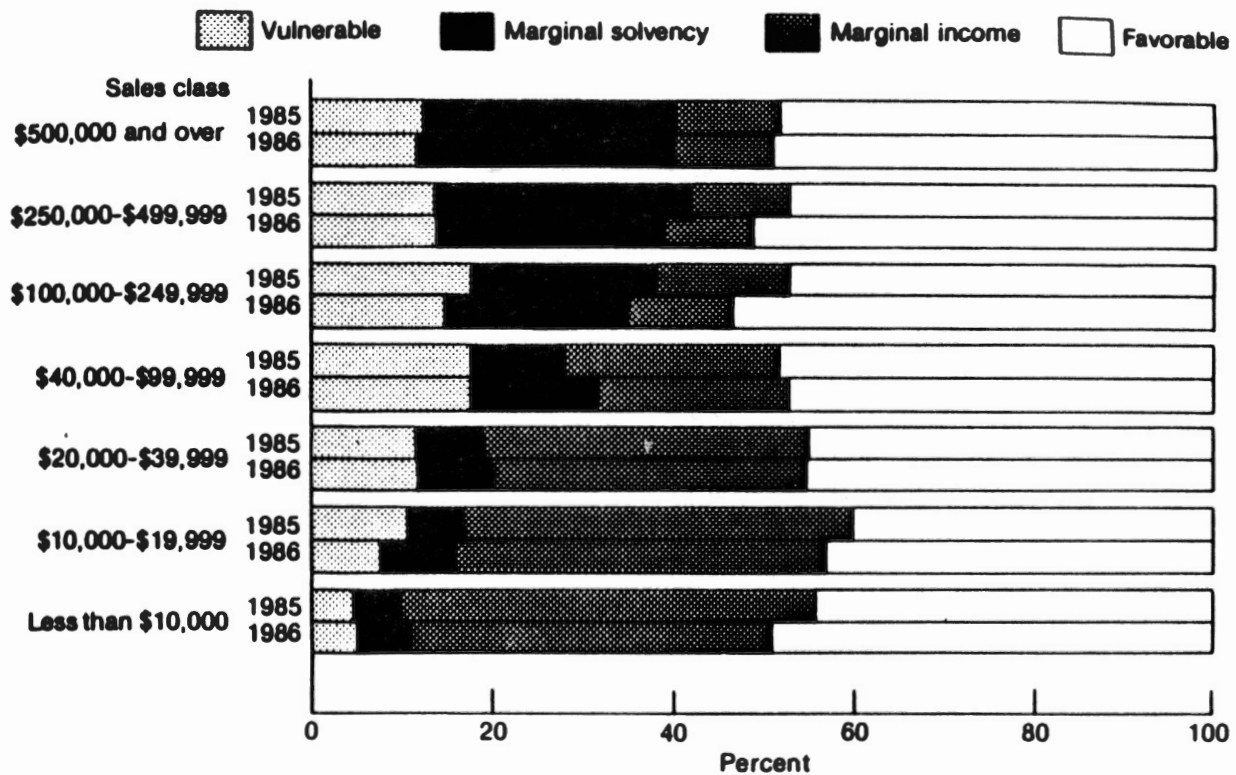
1986 Farm Costs and Returns Survey

Liquidity/Solvency Analysis by Sales Class

The percentage of farm households in a vulnerable position declined between 1985 and 1986 for farms in the \$500,000 and over, 100,000 to \$249,999, and \$10,000 to \$19,999 sales classes, and was unchanged for the remaining sales categories (Figure 2). Still according to FCRS data, one in six farm households associated with farms in the \$40,000 to \$499,999 sales range were in a vulnerable position. The distribution of marginal farm households indicates that larger farms (sales above \$40,000) had more debt related problems while smaller households had trouble generating cash flow.

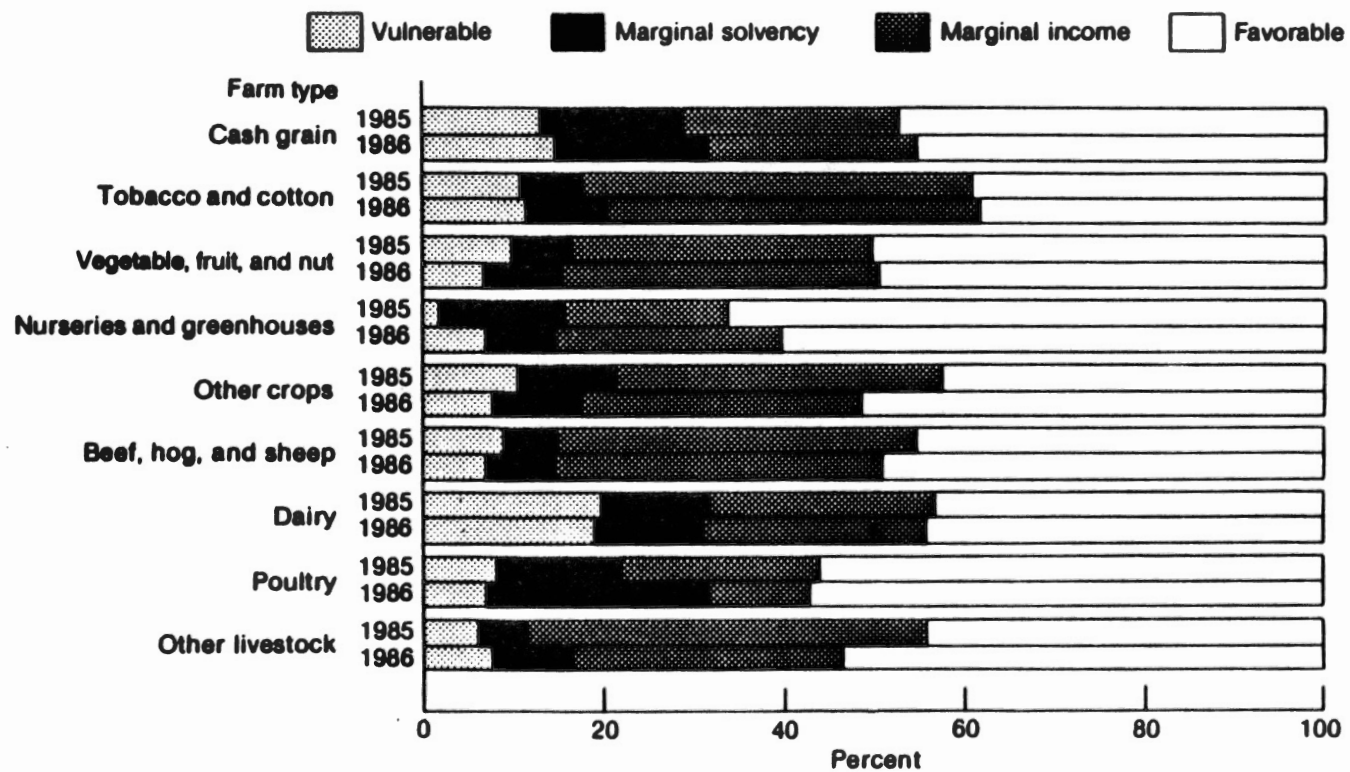
Liquidity/Solvency Analysis by Farm Type

Cash grain, tobacco and cotton, and dairy were the only farm types with more than 10 percent of households in a vulnerable position (Figure 3). The percentage of farm households in a vulnerable income/solvency position rose between 1985 and 1986 for cash grain, tobacco and cotton, and nursery and greenhouse operations, but declined for all types of livestock operations (USDA, January, 1987). It is of special importance to this research that the number of cash grain farms in the vulnerable classification was approximately 18 percent with an additional 20 percent in the Marginal solvency classification. Research indicates that cash grain farms will continue to suffer both liquidity and solvency problems in the near future (USDA, August, 1987). All farm types, other than poultry, in a marginal household income and solvency position in 1986 tended to have more cash flow difficulties than solvency problems. Many of these farm types receive sizeable government program subsidies making them even more vulnerable to policy decisions originating in Washington.



Source: USDA, 1986 Farm Costs and Returns Survey.

Figure 2. Distribution of Farms Within Sales Classes by Net Cash Household Income and Solvency Position



Source: USDA, 1986 Farm Costs and Returns Survey.

Figure 3. Distribution of Farms Within Farm Types by Net Cash Household Income and Solvency Position

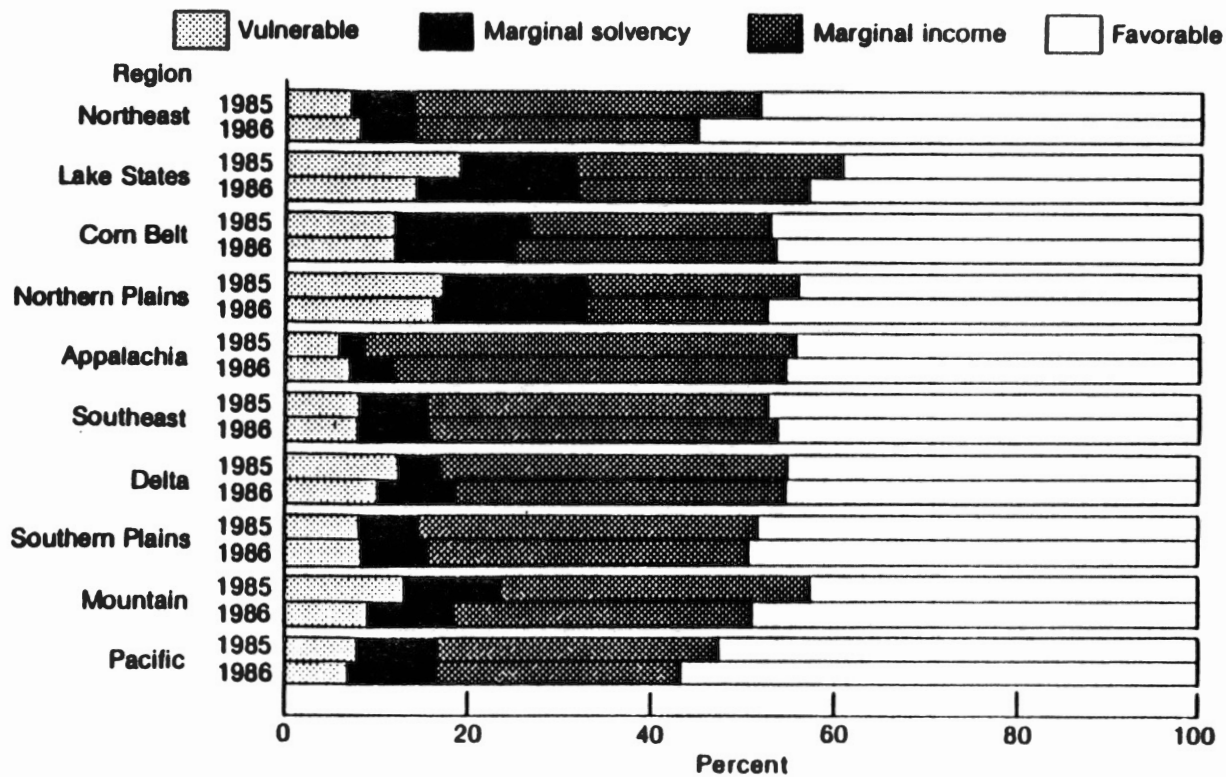
Liquidity/Solvency Analysis by Region

The regional distribution of farm households by income/solvency position is given in Figure 4. In both 1985 and 1986, the Northern Plains and Lake States had the largest portion of farms in a vulnerable position. This reflects the relatively large debt commitment of farms in this region and smaller amounts of off-farm income. Farm households located in the Northeast and Pacific regions had the highest percentage of farms in a favorable income/solvency position.

In the Southern Plains region, which includes Oklahoma, the percentage of farms in a vulnerable income/solvency position increased slightly in 1986 to approximately 10 percent as did the percentage of farms in the marginal solvency position. The percentage of farms in the marginal income position improved as did the percentage of farms in the favorable income/solvency position. These improvements were due largely to increased government outlays during 1986 for grains and cotton. While those income/solvency positions which continued to worsen (approximately 20 percent of all farms in the region) indicate the need for solutions to financial stress other than increased government payments.

Overview of Net Farm Income and Solvency

Evaluation of farm business earnings based on net farm income reveals that 68 percent of farms were profitable in 1986 (Table IV). The remaining 32 percent of farm businesses operated at a net loss when earnings were adjusted for depreciation, changes in inventories, and nonmoney income. Thirty-three percent of farms with sales less than \$40,000 had negative net farm incomes, while only 28 percent of farms with sales above \$40,000 were in this position. FCRS data indicate that changes in inventory and other nonmoney income items more than offset the charges for depreciation of machinery, equipment, and other farm capital, leaving a higher percentage of farms in a positive income situation (USDA, January, 1987). The most improvement in the percentage of



Source: USDA, 1986 Farm Costs and Returns Survey.

Figure 4. Distribution of Farms Within Regions by Net Cash Household Income and Solvency Position

TABLE IV
 FARM HOUSEHOLDS: NET FARM INCOME POSITION AND DEBT
 SITUATION BY LIQUIDITY/SOLVENCY CLASS
 AND DEBT/ASSET RATIO

Farms with positive net household income	Debt/Asset Ratio						All Farms
	-----Favorable----- No debt	0.01 to 0.10	0.11 to 0.40	-----Marginal Solvency----- 0.41 to 0.70	0.71 to 1.0	Over 1.0	
Number of Farms	451	171	234	<u>1,000 Farms</u> 108	39	27	1,031
Percentage of all Farms (by sales):				<u>Percent</u>			
\$500,000 or more	.20	.20	.40	.34	.13	.08	1.34
\$40,000 to \$499,999	5.12	4.16	8.07	4.27	1.92	1.20	24.73
Less than \$40,000	24.66	6.96	7.06	2.65	.55	.52	42.40
All Sizes	20.97	11.32	15.53	7.25	2.60	1.80	68.47
Percentage of all Debt (by sales):				<u>Percent</u>			
\$500,000 or more	0	.48	2.62	4.14	1.68	1.14	10.07
\$40,000 to \$499,999	0	1.68	12.52	11.79	7.58	4.79	38.36
Less than \$40,000	0	.79	3.40	2.29	.53	1.14	8.15
All Sizes	0	2.96	18.54	18.23	9.79	7.07	56.58
Total Debt	0	2,913	18,259	<u>Billion Dollars</u> 17,960	9,639	6,961	55,732

TABLE IV (CONTINUED)

Farms with negative net household income	Debt/Asset Ratio						All Farms
	-----Marginal Income-----			-----Vulnerable-----			
	No debt	0.01 to 0.10	0.11 to 0.40	0.41 to 0.70	0.71 to 1.0	Over 1.0	
Number of Farms	135	66	124	<u>1,000 Farms</u> 86	36	28	475
Percentage of all Farms (by sales):				<u>Percent</u>			
\$500,000 or more	.05	.05	.20	.12	.06	.03	.50
\$40,000 to \$499,999	1.26	1.19	2.81	2.43	1.22	.84	9.76
Less than \$40,000	7.64	3.14	5.21	3.18	1.11	.98	21.27
All Sizes	8.94	4.38	8.23	5.73	2.39	1.86	31.53
Percentage of all Debt (by sales):				<u>Percent</u>			
\$500,000 or more	0	.22	1.55	1.96	2.51	1.09	7.33
\$40,000 to \$499,999	0	.55	5.70	9.41	5.17	4.30	25.13
Less than \$40,000	0	.56	2.85	4.39	1.74	1.41	10.96
All Sizes	0	1.33	10.10	15.77	9.42	6.80	43.42
Total Debt	0	1,306	9,950	<u>Billion Dollars</u> 15,537	9,280	6,701	42,774

1986 Farm Costs and Returns Survey

farms with positive income was for small farms with sales below \$40,000. These farms have both relatively small amounts of depreciation and a large share of total farm earnings from adjustments for noncash sources. Commercial farms, like the one being analyzed in this study, increased their share of farms with negative net farm incomes. These farms likely had large depreciation charges and perhaps sales from inventory.

FCRS data analysis examined the relationship between net cash farm income and net farm income and found that 31 percent of farm businesses with positive NFI did not cover cash operating expenses (including interest) out of current sales. Over 48 percent of farms with sales less than \$40,000 were in this position demonstrating the dependence of small farm operators on non-farm income as a source of business earnings.

Using net farm income to measure earnings showed that 57 percent of farms were in the most favorable long-term income/solvency position (Table IV). These farms were holding about 22 percent of total debt owed by operators in 1986.

Using NFI to measure earnings indicates that 33 percent of farms were in a marginal income/solvency position. Approximately 46 percent of farms with sales above \$500,000 were in this marginal financial situation, about the same as in a favorable situation. Within this group of marginal farms, 35 percent had solvency problems (USDA, January, 1987).

Ten percent of farms were in the most vulnerable income/solvency position in 1986. Large farms accounted for 47.7 percent of farms in this situation. This probably occurs because charges for depreciation on larger commercial farms is larger than adjustments for inventories and home consumption of products.

Analysis by Sales Class

Sales classes with the largest percentage of farms in a vulnerable financial position, using the net farm income/solvency criteria, were those between \$40,000 and \$499,000 (Table V). Both larger and smaller sales classes had a smaller percentage of

TABLE V

DISTRIBUTION OF FARM OPERATORS WITHIN SALES CLASSES BY
NET FARM INCOME AND SOLVENCY POSITION

Sales Class	-----Income/Solvency Position-----				All Farms
	Favorable	Marginal Income	Marginal Solvency	Vulnerable	
-----Percent-----					
\$500,000 or over	43.32	16.04	29.54	11.10	100.00
\$250,000 to \$499,000	46.47	14.75	25.79	12.99	100.00
\$100,000 to \$249,999	50.03	14.36	22.72	12.88	100.00
\$40,000 to \$99,000	51.30	16.09	19.42	13.19	100.00
\$20,000 to \$39,999	61.10	19.07	10.12	9.71	100.00
\$10,000 to \$19,999	59.05	24.79	6.16	10.00	100.00
\$9,999 or less	61.18	26.96	4.51	7.36	100.00

Source: 1986 Farm Costs and Returns Survey

farms in a vulnerable position. Farms with sales over \$40,000 still appear to have more problems with their debt position than their income capability. Moreover, nearly 60 percent of farm businesses with sales below \$40,000 had positive net farm incomes and low debt levels in 1986; 50 percent of farms with sales between \$40,000 and \$250,000 also fell into this position (USDA, January, 1987).

Analysis by Farm Type

When earnings are measured by net farm incomes, only other livestock operations had fewer than 50 percent of farm businesses in the most favorable financial position (Table VI). In addition, one in six cash grain farms was classified as vulnerable under this criteria, the highest of any farm type. Two reasons are given for this poor showing. First, cash grain farms have a large depreciation charge due to their large machinery investment. Second, they also drew down inventories in 1986 to reduce debt (USDA, January, 1987). Once again this information points to the need for other solutions to financial stress for cash grain (wheat) farms such as those frequently found in Oklahoma.

Analysis by Region

The distribution of farms with negative net farm income and D/A ratios above 0.40 ranged from 5 percent in Appalachia to 14 percent in the Lake States (Table VII). The Lake States, Northern Plains, and Corn Belt had the largest shares of farms both in a vulnerable position and with positive net farm income but high debt loads in 1986. Over 50 percent of farms were in a favorable net farm income and solvency position in all regions except for the Southern Plains and the Mountain region.

Specifically in the Southern Plains 49 percent of farms were in the favorable income/solvency position and 10 percent were in the vulnerable classification.

TABLE VI
 DISTRIBUTION OF FARM OPERATORS WITHIN FARM TYPES BY
 NET FARM INCOME AND SOLVENCY POSITION

Sales Class	-----Income/Solvency Position-----				All Farms
	Favorable	Marginal Income	Marginal Solvency	Vulnerable	
-----Percent-----					
Cash Grain	49.85	18.21	16.15	15.79	100.00
Tobacco and Cotton	65.54	13.93	10.81	9.72	100.00
Vegetable, Fruit & Nut	58.47	24.97	7.40	9.16	100.00
Nursery & Greenhouse	77.13	8.68	11.64	2.56	100.00
Other Crop	52.81	28.83	9.47	8.88	100.00
Beef, Hog & Sheep	59.31	25.95	7.82	6.92	100.00
Dairy	58.27	10.69	19.92	11.12	100.00
Poultry	59.52	8.34	23.55	8.59	100.00
Other Livestock	47.88	34.59	5.54	11.98	100.00

Source: 1986 Farm Costs and Returns Survey

TABLE VII
 DISTRIBUTION OF FARM OPERATORS WITHIN REGIONS BY
 NET FARM INCOME AND SOLVENCY POSITION

Sales Class	-----Income/Solvency Position-----				All Farms
	Favorable	Marginal Income	Marginal Solvency	Vulnerable	
	-----Percent-----				
Northeast	64.00	21.58	8.15	6.27	100.00
Lake States	50.85	17.56	17.89	13.70	100.00
Corn Belt	56.81	17.96	13.55	11.68	100.00
Northern Plains	51.95	15.20	19.97	12.89	100.00
Appalachia	72.62	15.49	6.50	5.39	100.00
Southeast	59.71	23.47	9.19	7.63	100.00
Delta	53.93	26.73	9.13	10.20	100.00
Southern Plains	49.08	34.74	6.04	10.14	100.00
Mountain	49.53	31.29	10.59	8.60	100.00
Pacific	57.77	25.22	8.74	8.27	100.00

Source: 1986 Farm Costs and Returns Survey

Current Financial Condition in Oklahoma

A Farm Finance Survey of farmers and ranchers in Oklahoma concluded there is serious financial stress in Oklahoma (Plaxico and Tilley, 1986). However it is believed that the degree of financial stress in Oklahoma is less than that of other areas in the U.S. agricultural sector. The suggested reason is that land values in Oklahoma rose less during the 1970's than in other areas and thus the subsequent decline in asset values has been less severe.

Table VIII contains data classified by type of farm/ranch, primary location within the state and by D/A ratio. Farms are classified as primarily wheat or cattle if more than 70 percent of gross receipts resulted from the sale of wheat or cattle respectively. Farm/ranch location is classified as being located primarily in western, central, or eastern Oklahoma. The D/A ratio simply measures the financial position of the farm/ranch in terms of percentage of assets pledged as collateral on existing debt.

Table IX summarizes the average financial position of all survey respondents as of January 1, 1987. The average age of the nondebt respondent is 63, compared with 56 for the lightly leveraged group and 50 for the highly leveraged group. On average the respondents own 536 acres and operate a total of 1,003 acres. Operators with no debt report an average of 834 acres operated compared with 1478 acres for operators with D/A ratios greater than 0.7 percent.

Average total asset value for all respondents is \$420,698. Average real estate assets account for approximately 69 percent of average total assets. Real estate constitutes a larger portion of asset value for wheat farms at 78 percent. The units with no debt reported the smallest value of assets owned, but asset values vary little between other D/A categories. Outstanding debt on December 31, 1985 averaged \$78,046, with a range of zero to \$337,116. Thus, the difference by D/A ratio is in the mode of finance (Debt vs. Equity), not the total value of resources owned. The average net worth for

TABLE VIII
 AVERAGE FARM FINANCIAL POSITION BY CROP REPORTING DISTRICT,
 TYPE OF FARM, AND GROSS SALES, BASED ON 995 RESPONDENTS,
 OKLAHOMA, JANUARY 1987

Item	North Central Counties of Oklahoma	Type of Farm > 50% Cattle	Type of Farm >50% Wheat	Gross Sales \$100,000 to \$250,000 \$249,999 to \$499,999	
Number of Farms	131	221	543	145	63
Age of Operator	57	57	59	53	51
Years Operated a Farm	31	31	32	30	20
Acres Operated	1,134	986	1,374	1,913	3,170
Total Assets	\$382,611	\$350,949	\$440,762	\$673,435	\$994,410
Total Debts	123,512	80,536	91,787	172,022	286,188
Equity	259,099	270,413	348,975	501,403	708,223
Debt/Asset Ratio	.32	.23	.21	.26	.29
Gross Sales		\$ 54,764	\$ 84,635	\$158,972	\$337,380
Total Cash Farm Inc.	\$111,680	84,234	95,250	92,464	386,315
cash Expenses	69,928	52,670	61,019	22,233	253,654
Net cash Farm Inc.	41,752	31,564	34,231	70,232	132,662
Total Wages	10,824	11,604	12,970	8,677	7,565
Off-Farm Inc.	22,597				
Total Off-Farm Inc.		22,759	26,216	21,698	20,347
Total Cash Inc.	64,349				
Return on Assets	10.9	9.0	7.8	10.4	13.3
Return on Equity	16.1	11.7	9.8	14.0	18.7

TABLE VIII (CONTINUED)

Item	North Central Counties of Oklahoma	Type of Farm		Gross Sales	
		> 50% Cattle	>50% Wheat	\$100,000 to \$250,000	\$249,999 to \$499,999
% of Farms	13.2	22.2	54.6	14.6	6.3
% of Acres Oper.	12.2	18.0	61.5	22.9	16.5
% of Assets	12.0	18.5	57.2	23.3	15.0
% of Debts	17.6	19.3	54.1	27.1	19.6
% of Gross Sales	13.3	14.4	54.6	27.4	25.3
% of Net Farm Inc.	15.3	19.5	52.1	28.5	23.4
% of Off-Farm Inc.	12.7	21.6	61.0	13.5	5.5

Source: Oklahoma Farm Financial Survey, 1987

TABLE IX
 AVERAGE FARM FINANCIAL POSITION BY DEBT/ASSET RATIO,
 BASED ON 995 RESPONDENTS, OKLAHOMA,
 JANUARY 1987

Item	-----Debt/Asset Ratio-----				
	None	<.4	.4-.7	>.7	All
Number of Farms	413	364	144	74	995
Age of Operator	63	56	50	39	58
Years Operated a Farm	35	31	25	31	
Acres Operated	834	1,549	1,355	1,478	1,219
Total Assets	\$322,188	\$535,177	\$438,528	\$372,681	\$420,698
Total Debts	0	92,618	232,838	337,116	92,651
Equity	322,188	422,559	205,690	35,565	328,046
Debt/Asset Ratio	0	.17	.53	.90	.22
Gross Sales	\$ 43,062	\$103,693	\$130,126	\$133,641	\$ 84,579
Government Payments	5,669	14,480	17,664	22,630	11,890
Government Loans	1,195	8,559	10,982	9,434	5,922
Total Cash Farm Inc.	49,926	126,732	158,772	165,755	102,391
Net Cash Farm Inc.	19,276	46,737	50,951	45,640	35,867
Total Wages	88,087	13,037	17,529	15,847	11,841
Mineral & Invest Inc.	5,299	4,781	6,500	3,893	5,179
Off-Farm Inc.	23,143	22,435	27,905	21,419	23,445
Return on Assets	6.0	0.7	11.6	12.2	8.5
Return on Equity	6.0	10.6	24.8	128.3	10.9

TABLE IX (CONTINUED)

Item	-----Debt/Asset Ratio-----				
	None	<.4	.4-.7	>.7	All
% of Farms	41.5	36.6	14.5	7.4	100.0
% of Acres Oper.	28.4	46.5	16.1	9.0	100.0
% of Assets	31.8	46.5	16.1	9.0	100.0
% of Debts	0.0	46.5	15.1	15.1	100.0
% of Gross Sales	21.1	44.9	22.3	11.8	100.0
% of Net Farm Inc.	22.3	47.7	20.6	9.5	100.0
% of Off-Farm Inc.	41.0	35.0	17.2	6.8	100.0

Source: Oklahoma Farm Financial Survey, 1987

respondents is \$328,046, ranging from a low of \$35,565 for the highly leverage group to \$322,188 for the lightly leveraged group.

Net cash farm income, defined as the difference between gross cash farm receipts and cash farm expenses, averages \$35,867 and ranges from a low of \$19,276 for the no-debt group to \$45,640 for the highly leverage group. The fact that the more highly leveraged farmers had higher average net cash incomes indicates that many of them may be receiving adequate cash flow to handle their high debt loads.

Off-farm income is important in all D/A categories with respondents reporting an average of \$23,445. Average earned income is \$13,655. There is no difference in the off-farm income reported by the less than 0.7 D/A groups, but the most highly leveraged group reports somewhat higher off-farm income. Due to large oil and gas incomes, producers in western Oklahoma reported significantly higher off-farm incomes than any other group.

In percentage terms, the zero debt group constitutes 41.5 percent of the respondents, accounts for 28 percent of the acres operated and receives 22.3 percent of the net cash income. In contrast, the highly leveraged group constitutes 7.4 percent of the farms, operates 9 percent of the land, owns 6.6 percent of the assets, owes 27.1 percent of the debt, and receives 9.5 percent of the net cash farm income of the entire group.

Forty-five percent of respondents report no farm debt as of December 31, 1986. As for the others, 35 percent report D/A ratios between zero and 0.4; 11 percent report D/A ratios in the 0.4-0.7 range; and 9 percent report D/A ratios greater than 0.7. Analysis indicates that a significant number of the highly leverage respondents are insolvent. That is, liquidation of the assets would not retire the debt.

Consideration of the ratio of net income to debt indicates to some extent the relative debt repayment capacity of various operations. In effect, two sources of income are available to meet cash flow requirements: farm income and off-farm income. When

farm income is considered alone, average annual net farm income equals 26 percent of the average debt. If both farm and non-farm income are considered, average income equals 60 percent of the average debt. If \$15,000 annual living expenses are assumed, the ratio of total income to debt drops to 40 percent and the ratio of net farm income to debt drops to 7 percent.

Summary

In summary, the economic condition of agriculture has declined in absolute terms and relative to most other sectors since 1981 (USDA, March, 1986). The real value of farm assets has declined by nearly one-half since 1981, causing a loss of approximately \$250 billion in equity by April of 1985. During 1985, net farm income declined 20 percent from its record peak the year before and is projected to drop another 8 percent in 1987 (USDA, March, 1987). Real net cash incomes of the sector are projected to decline as they have since 1979. In the third quarter of 1987, the Seventh Federal Reserve District reported farmland values increased 3.3 percent indicating a possible turn around (FRB Chicago, November, 1987).

By 1986 the farm sector financial profile reflects mostly improved liquidity, profitability and solvency. These improvements signal that the farm economy may be recovering after several years of relatively low commodity prices, declining farm exports, plunging farmland values, and high debt loads. In 1986, most farmers earned enough to meet principal and interest payments, reduce debt outstanding and meet other financial commitments. However data varied widely by farm size type and region as continued foreclosures and debt restructuring by lenders indicate that not all farmers are sharing equally in the recovery. Results indicated that highly leveraged farmers still held roughly 66 percent of all debt indicating the continued need for research into the area of alleviating financial stress.

According to the 1986 Farm Financial Survey, Oklahoma producers are faring better than their national counterparts. This is mainly a result of smaller increases in real estate values and subsequently smaller declines. Forty-one percent of farmers reported no debt as of December 31, 1985. For the others, 35 percent reported D/A ratios between zero and 0.4; 11 percent reported D/A ratios between 0.4 and 0.7; and 9 percent reported D/A ratios greater than 0.7. After a moderate rate of increase during the 1960's, followed by a rapid rate increase during the 1970's and early 1980's, farm debt in Oklahoma appears to be declining (Plaxico, June, 1986). The decline likely reflects a diligent effort of both lenders and borrowers to reduce D/A ratios as well as equity infusions associated with property transfers.

Problem Statement

Stated succinctly, the short run concern of financially stressed operators is that their debt servicing requirements exceed their current repayment capacity. The 1970's brought together a unique combination of events that made borrowing in agriculture extremely attractive. From a financial investment standpoint returns on assets grew to over 17 percent per year when capital gains were included. Debt loads were assumed under the premise that such growth in the value of assets would continue. Because of the annual increases in land values, little attention was given to whether or not the farm plan could cash flow. Borrowers and lenders alike followed the philosophy of "spend now - pay later".

Significant changes have occurred in the financial environment of agriculture during the last few years. Farm incomes have undergone substantial declines since the late 1970's while debt use continued to grow. Up until 1982, the result was historically high debt loads as measured by the debt to income ratio of approximately ten to one (USDA 1982). Along with this higher debt load, interest rates rose dramatically in real terms: the relative importance of interest as a percentage of all cash expenses almost

doubled from the mid-1970's up through 1984 (USDA 1984).

Farmers also restructured their balance sheets during the 1960's and 1970's, which reduced their liquidity and consequently their ability to service debt (USDA 1980). Finally, the downside risk in agriculture increased. Although farm incomes were volatile in the 1970's, government assistance such as ASCS disaster and FHA Emergency Loan programs and the opportunity to refinance on appreciating land values provided protection from volatile incomes (Boehjle and Eidman). The "safety valve" of monetizing capital gains to cover debt servicing problems is no longer available because interest rates are higher and what had been capital gains have been turned into sizeable capital losses that only recently began to level off (1986-87).

An American Bankers Association survey conducted in 1982 indicates that approximately 20 percent more farmers than normal discontinued their operations between June 1981 and June 1982 (Herr, 1982). The changes in the financial environment of agriculture and their impact on farm viability suggest the need to focus farm finance research efforts toward insuring farm survival.

Assuming that insuring farm survival is the primary objective of any suggested abatement to financial stress then a target farm needs to be specified and performance criteria developed to evaluate the effectiveness of suggested abatements to financial stress. Research is needed to determine the effects of these abatements on the profitability, liquidity and solvency positions of the agricultural firm.

Objectives

The main objective of this study is to evaluate the improvement in financial performance of the suggested abatements to financial stress for a typical wheat and stocker operation in Northcentral Oklahoma. Specific objectives are:

1. Summarize the current financial conditions of farmers in America and Oklahoma specifically.

2. Develop financial performance criteria to evaluate proposed financial stress abatements.
3. Develop a whole-farm scenario for the Northcentral area of Oklahoma and construct a spreadsheet simulation of the farm scenario over a five year analysis period.
4. Investigate the impact of probable abatements to financial stress on the financial performance of the farm.
5. Investigate the success of Chapter 12 bankruptcy as an alternative to farm liquidation.

In Chapter II an overview of completed research is conducted to investigate the current incidence of financial stress.

CHAPTER II

LITERATURE REVIEW

Because the current episode of farm financial stress is a relatively recent phenomena, little comprehensive research has been completed. The research that has been completed is primarily of three types. The first type provides a financial perspective on agriculture and discusses the severity of farm financial stress in addition to suggesting possible abatements to the financial stress phenomena. The second group of studies employs various statistical grouping techniques to further classify the extent of farm financial stress by location, size, and type of farming enterprise. The third group of studies investigate the merits of proposed abatements to farm financial stress at the farm level using farm simulation modeling techniques.

Problem Discussion Studies

These studies are general in nature as they attempt to correlate the various causes of the farm financial crisis. These studies also contribute a considerable amount of understanding about the impacts of financial stress on each of the respective areas of the agricultural economy (Chicoine, 1987; Ginder, 1987; Stone, 1987; Melichar, 1987; Harshbarger and Chite, 1987). In this study focus is given to those contributions relating directly to the farm business portion of agriculture. All of the USDA reports and many other of these studies have already been cited in Chapter I as evidence of the farm financial crisis. Therefore, this section is devoted to those studies which either gave important insights into the nature of the problem or which proposed testable solutions to the problem of farm financial stress.

According to Harl, the central problem of agriculture since 1980 has been high real interest rates (Proposal for Interim Land Ownership). If agricultural producers are to be stabilized he feels real interest rates must be reduced by 4 to 5 percentage points. He states that federal intervention should not just include the Farm Credit System. Intervention should be targeted to stabilize borrowers which will result in stabilization of lenders. Careful targeting and flexibility should be built into a program to allow market forces to respond efficiently.

Harl's proposal has two major components. Mechanism A would insulate farm assets from current depressed markets mainly by acquiring land. Mechanism B would provide supplemental financing for "buying down" interest rates on farms which will eventually be able to repay the subsidy. The expected cost of the program during the first four years of its operation is \$6.8 billion.

According to Raup the primary cause of the current financial crisis is overproduction. Guither et al., Knutson and Klinefelter also point to overproduction as the major cause of current financial difficulties. Direct confrontation of this problem through policy measures is recommended to give long term relief to agriculture.

Knutson and Klinefelter argue that credit subsidies, including interest and principal buydowns and expanded government credit to producers only treat symptoms of current problems. They place foreclosure moratoria, subsidies to lenders and price and income supports into the category of treating symptoms also. They argue that treating symptoms will aggravate current problems and serve to lengthen the current agricultural adjustment. Use of private sector initiatives (lender forbearance, liquidation, foreclosure and bankruptcy), reduced tax benefits, balanced macroeconomic policy, increased regulation of lenders, farmer retraining and relocation programs and development of secondary farm credit markets are suggested as means of treating root causes of the problem.

Bullock (1985) claims the basic cause of the farm financial crisis was the expansion of debt far beyond the repayment capacity of farm assets. Bullock estimates that a 60

percent buydown of interest rates would improve the financial performance of 52 percent of financially stressed farms grossing greater than \$50,000 annually. This amounts to 25 percent of all financially stressed farms and would cost approximately \$2 billion annually. The average subsidy would be \$21,000 per farm. He also estimates that farm prices would need to be increased 15 to 560 percent to correct financial problems of all farms with severe financial stress.

Boehlje argues that targeting public assistance to moderate sized farms, temporarily in financial difficulty, may be consistent with long term agricultural policy goals. If normally healthy, but temporarily in trouble, farms are consolidated into other moderate sized units, public assistance may need to be targeted so that credit is available to ease this consolidation. This would be consistent with goals of efficiency, preserving a pluralistic agriculture, flexibility and economic opportunity.

If the farms which are larger than necessary to capture efficiencies of size are able to take advantage of assistance there may be no social advantage to public assistance. Additionally, Boehlje states economic reasoning does not support assistance to preserve farms which are submarginal even under normal conditions. Such a subsidy would promote inefficiencies in resource use.

Many analyst and researchers have attributed the current episode of financial stress to farm incomes that were bolstered by expanding export markets, accelerating inflation which increased land values, and low to negative real interest rates which made it profitable to invest in new capital (Boehlje; Bullock; Melichar; Bains and Paulson; and Barry).

Perhaps the most comprehensive discussion of the causes of financial stress is presented by Melichar (Melichar, 1984). Using updated USDA income and balance sheet statistics, Melichar (1984) took an in depth look at the relationship between farm income and asset pricing. Central to his discussion are four theses:

1. In the 1960s, moderate additional farm wealth was created through capitalization of earnings growth that was, in part, induced by government programs.

2. During the 1970s, huge additional wealth was created when a boom level of earnings was capitalized at a relatively high multiple of those earnings, indicating that farmers expected further earnings growth.
3. Preservation of the new wealth requires continued earnings growth, which owners of farms will press to secure through greater sales, higher prices, or government assistance.
4. If farm supply-demand relationships are such that the required earnings growth is not produced, it is not in the public interest to help to preserve the huge additional wealth through government programs that make up the shortfall in earnings.

Melichar described the creation of wealth in agriculture as following the growth model of asset pricing (Vanhorn, 1983). Over the last three decades, aggregate earnings attributable to farm assets rose by the same percentage as the average price of farm real estate. But for much of this time, analysts were unaware of this relationship. Instead, they had been using "operators' net farm income" (a USDA measure) to measure earnings, they were looking at the sum of income from operators' labor, management, and equity, which was stagnant, rather than at income from assets, which had risen. In effect, they overlooked the impact of the ongoing reduction in labor requirements-- often called the "substitution of capital for labor." As labor was reduced, more of the "operators' net farm income" was being earned by capital. Concentrating on income from assets, profit margins were maintained because the decline in labor and management requirements offset increases in other operating expenses.

During the 1960s the government was operating programs intended to improve farm income. But it appeared that these programs were relatively ineffective, because "operators' net farm income" was stagnant and the rate of income return to equity remained relatively low. However, because real income from assets and real land prices were rising gradually, real income and wealth were both improving. In addition, farm productivity was rising sharply, reducing unit costs of production. Thus unit sale prices of farm products would also have tended to fall, but such declines were slowed or prevented by government price

support programs. The combination of falling unit costs and steadier unit sales prices resulted in rising income from assets, and hence in rising land prices. Because the asset market recognized that income was growing, the rising total return consisted of real capital gains as well as the rising current income.

During the 1970s the market forces alluded to earlier propelled enormous gains in earnings. If the greater earnings that triggered farm wealth creation in the 1970s arose mainly from a permanently tighter worldwide supply-demand relationship then the annual earnings required to sustain the increased wealth would continue to be provided by consumers through the routine operation of commodity markets. However, if the gains in earnings and wealth resulted in large part from events that turned out to be temporary then those gains would also be in large part temporary. In this case pleas for public programs to restore earnings nearer to their boom levels should be resisted.

During the 1980s farmers' new wealth has been threatened by lower earnings. As wealth declines farmers search for various ways to preserve their gains. Many possible means of government intervention to alleviate farm financial stress have been suggested (Swoboda; Sesker; Harl; Raup; Knutson and Klinefelter; Boehlje; Paarlberg; and Bullock), but more research is needed to determine if the recent adjustments in agriculture (particularly asset values) are permanent or are a temporary phenomena. Because as Melichar (1979) has pointed out the policy actions that increase the growth rate of income will tend to depress the rate of current return to assets, and thus the problems they seek to address are eventually aggravated. Furthermore, the transition to a smaller U.S. farm sector is almost inevitable if the agricultural economy does not change (D.G. Johnson, O'Brien, S.R. Johnson, et al.; American Bankers Association). Preventing adjustment to a long-run equilibrium would be extremely expensive to taxpayers and consumers. Thus, such a policy is unlikely to sustain needed political support.

Moreover, government programs designed to isolate the sector may be removed suddenly, possibly causing more damage than they are originally designed to prevent. With

the expectation of the indefinite continuation of current conditions, government responses should probably be constrained to those that ease transition of resources out of the sector (Hughes, Penson, Richardson, and Chen 1987). Government responses could be quite different if conditions can be expected to improve. Based on historic perspective, current conditions are extremely unusual. The average profitability of the farm sector for 1980 through 1984 was lower than any time since the mid-1920s (Hughes and Osborn, 1986). In addition, fluctuations in real farm income have increased dramatically since 1970 (Gabriel, 1986). Thus, it is quite possible that current conditions are worse than should be expected for farmers in the long run. If so, slowing the current rapid disinvestment in the farm sector may well reduce the need for rapid investment in the future (Hughes, Penson, Richardson, and Chen, 1987).

Two macroeconomic studies which have been completed indicate that there may be serious impacts on the economy yet to be realized (FAPRI 1985 and Schink 1985). According to the FAPRI report, approximately one-half of outstanding farm debt as of 1984 could not be fully serviced at 1984 incomes and interest rates. This translates into the eventual liquidation of 10 to 15 percent of farm assets. FAPRI analysis also indicates that increases in farm income have little effect on the extent of financial stress. Reduction in incomes, however, significantly increases the incidence of financial stress.

Schink forecasts two direct impacts on the economy of doing nothing to ease the current incidence of financial stress: (1) higher short term interest rates of 75 to 125 basis points due to increase public perception of financial risk; (2) Higher interest rate premiums of 40 to 50 basis points in agricultural credit markets. Longer term effects include slowed investment spending leading to lower productivity and output which lead to a decrease in jobs and personal income. These are forecasted to combine to push up the federal deficit by \$14 to \$22 billion by 1993.

The next group of studies further explore the financial health of U.S. farms and point to the diversity of conclusions concerning the farm financial crisis. There is disagreement

among researchers concerning which methodologies are appropriate to evaluate financial stress and which indicators best measure the degree of financial stress.

Farm Financial Stress Classification Studies

During recent years, numerous studies have enhanced the understanding of the farm financial crisis from state, regional and national perspectives (USDA, July 1985; Lines Zulauf; Dobson, et. al; Lines and Pelly; FAPRI(b)). These studies examined the degree of financial stress relative to size, type, region, and other demographic characteristics by focusing on the immediacy of farm family financial stress using D/A ratios and/or cash balances for indicators. In this section the difficulty of being able to pinpoint the nature and extent of financial stress is discussed in the context of the different approaches taken to measuring financial stress and the accompanying differences in conclusions.

Lines and Morehart (1986) attempt to change the focus from short run cash flow difficulties to the intermediate and longer run and stress profitability of the business with cash flow being a secondary consideration. Using LOGIT procedures (Harrel, 1983 and 1985) on data from the 1984 Farm Costs and Returns Survey Lines and Morehart concluded farm businesses, for the most part, exhibited either quite good or quite poor financial health. However, their analysis excluded off-farm earnings, but unlike the previous studies of this type did include estimates for inventory changes, depreciation allowances, and charges for family labor.

Lines and Morehart conclude that when examined from their position of business financial health, the "farm crisis" is more severe than the previous literature would suggest. Using the same data as this analysis but only addressing the near-term cash crisis (cash flow measures of stress) USDA concluded that 12 percent of all farms were financially stressed (USDA, July 1985). The Federal Reserve, again using the same data base, suggested that 17 percent of the commercial farms were financially stressed (Melichar, October 1985). Lines and Morehart concluded that nearly 70 percent of all U.S. farm

businesses and 40 percent of commercial farms were in serious financial difficulty, when inventory changes, depreciation, and unpaid family labor were taken into account.

The study conducted by Lines and Morehart represents the difficulty in identifying the true severity of current financial stress. Different results are concluded depending upon the statistical techniques used to classify the data. Additional problems arise from the way survey questions may be interpreted (Brubaker and Frey). Further disagreement exist over what financial indicators best reflect the true nature of financial stress. Commonly used measures have been the D/A ratio, returns to assets and to equity and some measure of cash flow.

Researchers have argued for the use of the D/A ratio on the basis that financial problems depend largely on the relative indebtedness of the business and that the ratio of debt to assets provides an indication of a farm operation's financial difficulty (Melichar 1984; Harrington and Stam 1985; Johnson, Baum and Prescott 1985). On the other hand it has been suggested that one of the inherent problems of the D/A ratio as a measure of financial stress is that it requires accurate and comprehensive estimates of both assets and liabilities (Lins, Ellinger and Lattz 1987; Penson 1987). Penson states that when the D/A ratio is used in the context of evaluating insolvency it is entirely appropriate to do so. Penson points out that financial stress occurs before insolvency. Consequently, the D/A ratio may not be an adequate measure of financial stress. Brake (1986) argues however that when used by itself, the D/A ratio is a poor indicator of farm cash flow problems before they become insolvency problems. Penson (1987) suggests three new measures of financial stress to be used especially on aggregate data. They are the times interest earned ratio, the financial leverage index (Frazer 1985) and the debt burden ratio (Foster 1986).

Choat and Plaxico (1987) conclude that the D/A ratio is not an adequate indicator of financial stress or survivability. Consequently they developed a variable designated as Total Residual Income (TRI) to classify farms into viability categories. TRI is defined as net cash income from farming plus other sources. Choat (1987) contends that a distinction needs to

be made between financial stress and financial viability. He defines financial stress to be the loss of equity arising from declines in asset values. He defines viability as the ability of a farmer to operate over the long run. His point is that financial stress impacts viability in that farmers with high D/A ratios may be forced to restructure assets and in doing so may negatively impact their productive capacity and efficiency.

Choat and Plaxico (August 1987), using results from a survey of 2610 Oklahoma farmers and ranchers (Plaxico, Tilly and Bellinghausen 1987), analyze the incidence and magnitude of financial stress in Oklahoma and project the impacts and costs of alternative public programs as applied to the Oklahoma situation.

Based on the survey data, 5.48 percent of Oklahoma operators were in the less than zero TRI category, 22.76 percent were in the zero to less than \$15000 group, and 71.76 percent were in the \$15,000 and greater category. Of the operators in the less than \$15,000 TRI category, 12.3 percent had debt and these operators hold 10.8 percent of the assets and owe 19.1 percent of the Oklahoma farm debt. If these farms were forced to liquidate, a loss of \$299 million or 5.3 percent of the state farm debt might occur.

Choat and Plaxico's analysis indicates that interest rate reductions would be relatively ineffective in moving farms into an improved financial performance category as classified by their measure of total residual income. However, a major limitation of the analysis is that it is a one-year "snap shot" of the financial condition of Oklahoma farmers and ranchers.

Brake (1983), in a discussion of the financial crisis in agriculture pointed out that although Boehlje and Eidman (1983) had presented many useful views of financial stress, but they had not given an adequate definition of financial stress. Brake goes on to define financial stress as a cash flow concept that does not directly coincide with either net income or profitability, though obviously related.

Jolly et al., indicate that financial stress can be determined directly by examining four long run characteristics of a farm business: profitability, liquidity, solvency and risk bearing ability (December, 1985). Guidelines or rules of thumb for these indicators are not given.

Net cash flow used in their analysis is defined as income over cash farm expenses plus off-farm income less withdrawals for family living, taxes and debt service. D/A ratio and cash flow are used to indicate financial stress and indicate vulnerability to both liquidity and solvency problems.

Joseph and Reinsel perform analysis on FCRS data sorted by both D/A ratio and operating margin. Of 872,000 farm businesses which lost money in 1984, 525,000 had sufficient off-farm income to put them in a positive overall income position. They suggest that due to heterogeneity of farm businesses that a single measure will prove insufficient in identifying farms facing financial problems. Their analysis showed that net operating margin for farm operators in 1984 was not closely correlated with D/A ratio.

The discussion surrounding proper criteria to measure financial stress suggests that the research into the cause and effects of financial stress is still in its early stages.

Studies Which Evaluate Proposed Abatements

Although there has been much discussion about public sector responses to financial stress (Pederson and Eidman 1987), most of the adjustments are being absorbed in the private sector by farm families, their relatives, and their creditors. This section reviews those studies which have examined the family adjustments, the farm business reorganization changes, and the restructuring of farm assets and liabilities which have been made and are being made in response to financial stress.

The first objective before implementing any wide scale abatement program is to carefully analyze the effect of any adjustment being considered before it is made (Eidman, Boehlje, Olson, Hasbargen, and Pederson 1987). These authors have pointed out that farmer's in response to financial stress have "tightened their belts" and increased off-farm income in recent years (Findeis 1985) and also demonstrate how adjustments to the farm's production and marketing plan can help increase income and/or decrease expenses. Moreover, the changes, which have occurred, in the financial environment of agriculture and

their impact on firm viability suggest a new focus in farm management and finance research; one of firm survival.

Overview of Theoretical Considerations

Surrounding Financial Stress

Boehlje and Eidman (1983) suggest that one aspect of this new focus is the recognition of different concepts of risk and uncertainty in analyzing the economic variability of agricultural firms. They argue that many analyses in agriculture have utilized a widely accepted concept of risk as variation in income that results from variable prices and yields (Walker and Helmers; and Baum and Harrington). They suggest the reemphasizing of a second concept of risk, the probability of firm survival as an entity. In addition to firm survival, they also emphasize the cash flow and liquidity of a firm and its asset base.

Boehlje and Eidman use a theoretical model which is built around a lexographic utility function. A recognized weakness of this model is the assumption of constant marginal utility of income above the disaster level. The model does, however, allow them to focus attention on the five financial characteristics of a farm business asset. These characteristics are classified as net income, net cash flow, capital gains, collateral value, and liquidity value. The first four have been commonly recognized, the fifth is suggested by Boehlje and Eidman as contributing an important variable in determining the survival of the farm.

Boehlje and Eidman go beyond the traditional approaches to risk reduction which include production or marketing strategies to reduce operating risk, and financial strategies to restructure debt or reduce leverage and financial risk. They investigate a broader spectrum of strategies including changes in asset composition, equity base, and the resource ownership pattern. They specifically investigate the effect on firm survival of asset liquidations, sale-leasebacks, liquidity management, equity infusion, and bankruptcy.

Boehlje and Eidman conclude from their model that collateral and liquidity characteristics play a significant role in firm survival. They argue that suggested policy

options impact these characteristics indirectly and propose that the effectiveness of policies to maintain collateral and liquidity value of assets should be analyzed. They believe that Chapter 11 of bankruptcy law appears to impact collateral and liquidity values directly by providing farmers with more options on the timing and method of liquidation, should partial or complete liquidation be required. At the time of their research Chapter 12 bankruptcy had not yet been proposed but following their reasoning should have an even greater impact on collateral and liquidity values than does Chapter 11.

Simulation Studies of Financial

Stress at the Farm Level

Perry, Rister, Richardson, and Leatham (1985) used the RICESIM model to evaluate the impact of beginning equity, minimum required equity, and land capital gain rates on survival of a representative Upper Gulf Coast Texas rice and soybean farm for the period 1984-1988. Several studies address the effects of initial equity position, credit policy, and capital gain rate for land (Patrick; Helmers and Held; Musser, White, and Smith; Skees and Reid; Skees, Reed, and Pederson). Perry (et al) contend that these studies are inconclusive because they evaluate only two or three beginning equity ratios and credit policies. They contend that the equity positions and credit policies studied did not represent the broad spectrum of possibilities in these variables. More important they attempt to make correlations between the beginning equity, credit policy, and value of land on farm survival.

The RICESIM model used by Perry (et al) is an updated and expanded version of FLIPSIM V (Richardson and Nixon). The RICESIM model is a firm level, Monte Carlo simulation model that simulates annual production, farm policy, marketing, management, and tax aspects of a farm over a chosen planning horizon. The model recursively simulates the farming operation by using the current year's ending financial position as a beginning for the next year. Pseudo-random prices and yields simulate the actual stochastic nature of these variables.

Perry (et al) conclude that both tenant and part-owner operations are more sensitive to changes in beginning equity than they are to changes in credit policy or capital gain rate for land. Credit policy is only important to farmers at intermediate beginning equity levels. At high beginning equity levels, both part-owners and tenants survive regardless of the credit policy. At low beginning equity, neither type of farm operation will likely survive no matter how liberal the credit policy.

Performance of the part-owner versus tenant operations are closely tied to the capital gain rate for land. A high rate causes the part-owner operations to perform better than tenant operations, even at low beginning equity levels. At negative capital gain rates, however, part-owners are much more dependent than are tenants on beginning equity for continued farm survival.

Results for the representative farm suggest a credit policy leverage ratio of 1.0 is too restrictive, because it forces farm operations into insolvency that would probably recover if given a chance. A credit policy of 4.0 on the other hand, is probably too lax because it allows farm operators in a high debt position to continue in farming, even though there is little chance the operators can achieve an acceptable equity position. The 2.0 leverage ratio appears to offer lenders a reasonable credit policy alternative, liquidating farm operations with little hope of recovery from financial trouble but permitting sufficient credit to allow recovery from bad years.

Using general financial information on the wheat industry from the 1985 Farm Costs and Returns Survey Ahearn, Dubman, and Hanson perform analysis on farms with at least 50 percent of their production coming from wheat and with wheat sales of at least \$40,000 annually (USDA, August, 1987). Almost one in three specialized wheat farms had negative net returns in 1985. Negative returns are most likely to be associated with small farms; over 66 percent of all farms with negative net returns had less than \$100,000 in production. Specialized wheat farms have low net returns from farming compared with other specialized crop farms.

Nonstressed specialized wheat farms had nearly \$500 million total farm cash flow after interest. However, this average of \$18,200 per wheat farm was less than half the \$39,000 farm cash flow of specialized corn farms. Seventy percent of the farms had low or no debt (D/A ratio less than 0.4). Nearly 50 percent of the farms fully serviced their debt obligations, and about 60 percent had return levels adequate for partial or complete debt service. Ten percent of the specialized wheat farms were technically insolvent in 1985. The average debt among these 3,000 farms was nearly \$275,000. Less than 5 percent of the wheat farms classified as not stressed were in a marginal financial position; debts equaled 40-70 percent of assets and the farm operators were only partially able to service their debt.

There is a large difference in the financial position of the financially stressed farms. The average debt of the group that is stressed and not able to service its debt is \$57,000 less than the group that is stressed and fully or partially able to service its debt. Although questionable, data indicate the average net worth of the latter group is negative (-\$83,000) and nearly \$200,000 less than the stressed group unable to service its debt. Stressed farms receive 40 percent less off-farm income. Stressed operations have about 90 percent of the sales of nonstressed wheat farms but 140-150 percent more debt. The consequent larger debt service of stressed farms is the primary reason farm cash flow is negative compared with the positive farm cash flow of nonstressed farms.

The low average net worth of stressed farms, \$10,500, is not primarily because they have expanded to a larger than average size or because their assets are concentrated in real estate. The problem is more related to the difficulties of younger operators beginning with moderate-sized commercial operations that are heavily dependent on debt during an extended period of high real interest rates.

Mapp and Walker simulate a hypothetical irrigated and dry land crop farm representative of many in Southwest Oklahoma (Mapp and Walker, December, 1986). Their financial analysis is done with aid of a computerized simulation model that projects the financial performance of a farm business. The model, was specifically designed for use in

the Southern Regional Research Project S-180 (Barry, 1986). The Farm Financial Simulation Model (FFSM) is designed for use as a Lotus 1-2-3 application program (Schnitkey, Barry, and Ellinger). The model's purpose is to simulate the financial structure and performance of a farm business over a transition period of four years with emphasis placed on the financial transactions of the firm. The FFSM model allows a comprehensive assessment of the profitability, liquidity and solvency positions of a farm business via a set of coordinated financial statements.

The farm unit is simulated over four years, 1986-89, with beginning debt to asset ratios of 20, 40 and 70 percent under base, optimistic and pessimistic assumptions regarding future economic conditions. The major criteria used to evaluate the impacts of alternative policies on survivability of the farm include profitability, liquidity, solvency and cash flow coverage. Projections are made under an original operating plan and six policy options, including debt reduction of 35 percent across all asset types, interest rate reduction on all outstanding debt to an average rate of 7.35 percent, a two year deferral of debt obligations, asset sale with lease back provisions, asset sale without leaseback provisions, and an infusion of equity (equal to 35 percent of the farm's indebtedness) to the farm. The importance of government debt payments to the viability of the farm unit is also studied.

The original plan is analyzed under base economic assumptions with beginning D/A ratios of 70 percent, 40 percent and 20 percent. With \$50,000 in government payments and \$10,000 in non-farm income, even the original plan with 70 percent beginning D/A ratio survives over the four year analysis under the base economic assumptions. The ending D/A ratio does increase to 80 percent and the change in net worth is substantially negative. For the other two D/A scenarios, average net income and change in net worth are both positive.

For comparison purposes, the original plan was also analyzed under base economic assumptions with \$10,000 in non-farm income but assuming no participation in government commodity programs. At the 70 percent beginning D/A ratio, the original plan with government payments does not survive over the four-year period of analysis. Average net

income is -\$42,000, the change in net worth is -\$224,000, and the ending D/A ratio exceeds 1.0. At the 40 percent and 20 percent D/A ratios, net worth is reduced over the four-year period but the farm does survive. The ending D/A ratio is 56 percent for the original plan with the beginning D/A ratio of 40 percent and is 27 percent for the beginning 20 percent D/A ratio situation.

Mapp and Walker (1986) conclude that the six financial policy options offer promise in assisting the farmer to improve liquidity, profitability, solvency and cash flow coverage. Under the base economic assumptions, all six of the alternatives permit the firm with beginning D/A ratio of 70 percent to improve the financial situation over the four years. Analysis indicates that the debt reduction option consistently results in the lowest net income because all debt forgiveness is taxable in year 1. This option also lead to the second largest increase in net worth in every case, but with low levels of fund availability. For the 70 percent beginning D/A ratio situation, the equity infusion option is perhaps the most attractive. It results in fairly high average net income and consistently results in the highest levels of liquidity and largest increases in net worth. Other favorable options are asset sale with lease back and debt deferral.

For the 40 percent beginning D/A ratio situation, the equity infusion option is promising based on several of the financial measures. It results in a fairly high average net income, the highest increase in net worth, highest level of liquidity and third highest average fund availability. For the 40 percent D/A ratio situation, the asset sale with lease back and debt deferral are also attractive.

When the beginning D/A ratio is 20 percent, the equity infusion option is again favorable based on liquidity and solvency measures. In addition, interest reduction and debt deferral are useful options for the 20 percent beginning D/A ratio situation.

Finally Mapp and Walker concluded that any substantial reductions in government commodity program payments would make financial survival considerably more difficult.

Al-Abdali (1987) model extended the study conducted by Mapp and Walker to project probabilities of farm survival given each of the above options. Al-Abdali used the FLIPSIM-V model (Richardson and Nixon) to account for the stochastic nature of the farm operation.

During the simulation period (1986-90), the farm situations are not allowed to grow through purchasing or leasing land, and the cash flow surplus is used for early retirement of debt. Furthermore, farms are not allowed to sell crop land to remain technically solvent. Cash flow deficits are covered by obtaining loans secured by crops in storage, intermediate asset or farmland. Once the debt of intermediate and/or long-term assets rise above 80 percent the farm is declared technically insolvent.

Al-Abdali (1987), using the FLIPSIM-V model, compares the financial policy options to the original farm plan and evaluates them in terms of their impact on farm profitability, risk, and solvency at the end of the five-year planning horizon. Four financial measures are used including:

1. probability of farm financial survival, measured as the probability that the farm remains solvent at the end of the simulation period,
2. present value of ending net worth, measured as the discounted (6.58 percent discount rate) net worth of the farm at the end of the planning horizon,
3. average annual net farm income, and
4. equity ratio at the last solvent year.

He also examines the variability associated with each measure, expressed as the coefficient of variation, between the policy options and strategies.

Al-Abdali, concluded that government commodity programs have a substantial impact in maintaining the survivability and economic viability of all farms and especially for the highly leveraged farm situation. Furthermore with government payments all policy options tested substantially improved over the five year analysis period. Government payments also

reduced the relative variability in the coefficient of variation compared to the original farm plan.

Using first and second degree stochastic dominance techniques, each of the six policy abatements are ranked according to their overall attractiveness over the original farm plan. Using this methodology, the equity infusion and asset sale-no lease back rank first for the 20 percent D/A ratio, debt reduction and asset sale no-lease back rank first for the 40 percent D/A ratio, and the equity infusion is first for the 70 percent D/A ratio situation. Debt deferral ranks last among all beginning D/A ratio situations.

Summary

As the above literature review indicates, the farm financial crisis has been approached in many different ways. Each of the studies reported above has made an important contribution to the body of knowledge in agricultural finance. Because of the financial crisis researchers have a deepened interest in the interrelationships of the farm business. It is the objective of this study to further develop an understanding of the impacts of given responses to financial stress.

This chapter began by reviewing those studies which contributed in a general way to a better understanding of farm financial stress. The next group of studies reflected some of the differences in opinion surrounding what criteria to use to measure stress and the different methodologies used to study the problem. The final section reviewed those studies that made interesting contributions to the application of agricultural finance theory as it applies to understanding the policy issues surrounding the farm financial crisis. Other studies reviewed in the final section demonstrated the use of simulation techniques to model the impact of proposed solutions to financial stress.

The purpose of this study is to evaluate selected proposed abatements to financial stress at the firm level and to report if, at least for this farm type, any real gains can be realized. Bullock (1985) and Boehlje (1984) highlighted several possible abatements to

financial stress of which three are selected in this study as being applicable to the farming situation in North-central Oklahoma. These are interest rate reductions, debt reductions and an equity infusion. Three additional abatements are considered to evaluate the impact on financial stress of altering the farm's production structure. More research needs to be conducted to investigate the affects of such programs for other farm types as well as affects beyond the farm level.

Although there is disagreement about the use of the D/A ratio to reflect financial stress, it is used in this study as a reflection of the solvency position of the farm operation. Also in this study net cash flows are used to measure the liquidity position of the farm. NCF best measures whether or not there are sufficient funds to meet debt repayment obligations and to meet family living needs. The profitability position of the farm is measured by net farm income which is calculated on an accrual basis. NFI is a residual return to the operator's unpaid labor, management and equity capital.

Many of the studies done to this point have addressed risk aspects of the farm financial crisis and the associated reductions in risk arising from the proposed solutions (Boehlje and Eidman; Barry; and Al-Abdali). In this study, risks are assumed to be implicit in the financial performance of the farm and any improvement in financial performance is by implication an improvement in the risk structure of the farm business.

The model used in this study is the Integrated Farm Financial Statements (IFFS) model, which is a series of integrated Lotus 1-2-3 spreadsheets. Unlike RICESIM and FLIPSIM V, IFFS is non-stochastic. However, one of the strengths of the IFFS model is that it allows annual adjustments to prices, yields and production enterprises via enterprise budgets or the cash flow. The IFFS model also provides a considerable amount of information regarding the financial position of the business. One of the key aspects of this model is the monthly cash flow that can be used to target periods in the year that the operator and his lender may be exposed to excessively high levels of risks. The IFFS model is described in greater detail in the next chapter.

The remainder of the thesis begins in Chapter III with a look at some of the important conceptual issues and the IFFS model. Chapter IV continues with the description of a typical North Central Oklahoma wheat and livestock farm and the initial financial position of the base case farm scenario. Chapter V presents an analysis of each of the proposed abatements effects on the farms profitability, liquidity and solvency positions. Finally, Chapter VI is a summary of the thesis and the conclusions of the study as well as suggestions for further research.

CHAPTER III

A CONCEPTUAL MODEL

Building a Financial Analysis Framework

In light of the problem situation described in Chapter I, the evaluation of proposed responses to financial stress should be based on a sound conceptual model. The model should provide adequate information to define the managerial process and allow for measuring the effectiveness of proposed solution outcomes. Studies indicate farmers', like other businessmen, place considerable emphasis on financial criteria for measuring business performance and evaluating their overall goal attainment (Barry, 1985). In addition, the criteria chosen should be measurable, manageable, accurate and reliable to reflect the farm's financial performance. A framework that meets these objectives can be constructed from the information provided in a properly prepared set of integrated farm financial statements.

Important Conceptual Linkages in the Firm's Financial Framework

For conceptual purposes, the factors which determine the financial performance of the farm may be expressed in a generalized performance function. The performance function provides a logical and concise means of illustrating the factors which determine the farms financial performance and the natural and human constraints which externally affect the nature of those relationships.

The financial performance function illustrates the three key financial performance criteria; profitability, liquidity and risk/solvency which are generally accepted as depicting the

overall financial performance of the farm (Barry, Hopkin and Baker, 1979). In addition to these financial criteria the performance function depicts through the production function how the firm's resources are combined and constrained in the production process. Furthermore the performance function conveys the idea of a total risk constraint which is a means of conveying how the individual operator's attitudes towards risk and uncertainty can influence the overall financial performance of the business through the decision process.

The financial performance of the farm is illustrated by the expression:

$$FP = f(P, L, S | Y=f(X_1..X_m | X_{m+1}...X_n) | \beta)$$

where financial performance (FP) is defined to be a function of the farm's profitability (P), liquidity (L) and solvency (S) subject to two constraints. The first constraint is a resource constraint defined by the firm's production function. The production function itself is constrained by fixed levels of resources and other unobservable phenomena. The second constraint denotes a risk preference constraint and in this case denotes the total amount of business and financial risk the farm operator is willing to take.

Financial Performance Constraints

The tasks of financial management are closely linked with those of production and marketing. Because of this relationship the nature of the operator's response to production and marketing phenomena has a profound impact on the financial performance of the farm business. Underlying the relationships between finance, production and marketing is a farm operator's attitude towards risks.

Production and Related Constraints

An abstract representation of the production process is given by the production function. A production function is a quantitative or mathematical description of the various technical production possibilities faced by a firm. The production function gives the maximum output(s) in physical terms for each level of the inputs in physical terms (Beattie

and Taylor p. 3).

In general production process constraints imposed on the financial performance of the firm are a result of resource limitations. These limitations may occur due to the quality of the resources used in production or result from an insufficient quantity of needed input resources. As an example, under the present state of financial stress, lower levels of capital are available due to the lenders perception of increased exposure to the possibility of financial loss. This impacts the production process through imposed changes in the capital constraint and results in adjusting the resource combinations used in the production process.

Without the ability or willingness to make adjustments in the production process the firm may suffer serious financial reversals. To a large extent the set of feasible solutions to an economic reversal depend on the stochastic nature of the inputs to the production process and the attitudes of the farm operator towards risk and uncertainty.

The Risk Tolerance Constraint

It is unrealistic to evaluate financial performance without recognizing the pervasive nature of uncertainty. Uncertainty occurs throughout the production process of the farm business in the form of unanticipated changes, and it is accepted that most individuals are averse to risk.

In the context of financial analysis, risks generally are divided into two broad categories: business and financial. Business risks are defined as the inherent uncertainty in the firm independent of how it is financed (Boehlje and Eidman p.442). Business risk generally occurs in the broad categories of price and production risk. Financial risk is defined to be the added variability of the net cash flows of the owners of equity that result from the fixed financial obligation associated with debt financing and cash leasing (Barges p.16). Financial risks also encompass the risk of cash insolvency (Van Arsdell p. 304 and Van Horn p. 252).

The effects of risk pervade the balance sheet. The traditional business risks are found on the asset side. They include:

- 1) production and yield risk,
- 2) market and price risk,
- 3) losses from severe casualties and disasters,
- 4) social and legal risk,
- 5) human risk on performance of labor and management, and
- 6) risk of technological change and obsolescence.

Business risk is distinguished from a farm's financial risk that arises on the liability side of the balance sheet. Financial risk can be summarized as follows:

- 1) the greater financial leverage becomes the greater the financial risk in meeting obligations to lenders and leasers,
- 2) borrowing risk arises from variation in interest rates and credit availability, and
- 3) leasing and/or rental risk comes from variations in rental rates and arrangements and from possible loss of access to leased lands (Barry, 1985).

Although these sources of risk take different forms they are correlated one to another and as such they cause adjustments in the firm's probability of experiencing financial loss or financial gain.

Equilibrium Concepts Associated

With the Risk Constraint

In order to construct a useful framework for financial analysis, it is helpful to think of each farm business as having an "equilibrium" position for the organization of its resources and income generating activities. The concept of equilibrium used here is independent of the concept of "optimal" resource allocation discussed in production theory and expressed

through the maximization of the production function. Rather, Barry (1985) argues that it is a position that is unique to each farm depending on the risk attitudes of the owner-operator and his expectations about key performance parameters. Of course, once a "firm equilibrium" is established the farmer tries to maintain that combination of resources and activities even though various shocks will disturb the position and call for corrective action.

Using the equilibrium concept and developing appropriate measures of financial performance is best accomplished through the use of such common financial statements as the balance sheet, income statement and cash flow. For example an equilibrium position as referred to above suggests a structure of assets and liabilities that is "optimal" in terms of a farmer's attitude towards profits, liquidity, solvency and subsequently over time the operator's attitude towards risk (Barry, 1985).

The equilibrium concept suggests that each farmer chooses an organization of assets and liabilities that is the product of their expectations of future events. This organization is an "equilibrium" in terms of the amounts of business and financial risks being carried, and the liquidity needed to respond to those risks. This "equilibrium" provides a framework by which one can evaluate how various changes in the farming environment might influence a farmer's equilibrium position, and the effectiveness of possible actions he may take to restore equilibrium (Barry, 1985).

The business environment in agriculture is such that changes in the farming environment may arise from many sources. These changes may occur in the form of increased business risk (crop disasters, swings in land values etc.) and financial risk (namely increased interest rates), or they may come in the form of new policy initiatives such as new federal farm Legislation. The point is that whatever the source, these changes alter the farm's equilibrium position providing the incentive for actions to restore equilibrium. The farm operator's risk equilibrium position is established through risk balancing. Risk balancing refers to the adjustment in the components of total risk (i.e. business risk and financial risk) that results from an exogenous shock to the existing equilibrium (Gabriel and

Baker, 1980).

As an illustration, consider the significant financial stresses affecting many farmers in the mid-1980's, that were described in Chapter I. The 1970's, with its successive periods of growth in farm incomes and appreciating land values, created for farmers a certain set of expectations of future business and financial events. These expectations prompted farmers to expand to gain economies of size and to use leverage as a means of financing their expansion. Thus, farmers put together for themselves a combination of assets and liabilities that represented an acceptable "equilibrium" up until the early 1980's. However, when business and financial risk showed up in the forms of lower farm income and land values and higher interest rates and higher debt loads respectively, the long run equilibrium of farmers established over the decade of the 70's was severely disturbed.

The shocks of the 1980's have prompted the search for effective managerial responses, policy responses or both to enable farmers to reestablish a more realistic position of equilibrium. This new equilibrium needs to occur at a revised level that more appropriately reflects the longer term outlook for financial performance in agriculture (Barry, 1985 and Melichar, 1984). Responses to disequilibrium could take many forms but basically they focus on reducing the level of business risk, and more importantly at the current time, reducing financial risk.

A Mathematical Representation of Risk Equilibriums

It is recognized that the introduction of risk into the production process affects the pattern of resource allocation and in turn the level of production (Dillon, pp. 102-48, Just, Wiens, and Wolgin). It has been shown that there is also a financial response to business risk modification. Furthermore, it has been demonstrated that business and financial risk may well be trade-offs in the risk behavior of farm operators (Gabriel and Baker, 1980). Thus, a decline in business risk would lead to the acceptance of greater financial risk, reducing the effects of the diminished business risk on total risk.

A lexicographic utility function (Anderson, 1972) may be used to express the risk behavior of the farm operator when the farm operator has identified both firm survival and profit maximization as goals, where firm survival is of primary importance. In order to attain both of these goals, the farm operator will maximize net returns subject to the constraint that total risk does not exceed a specified level (Encarnation; Halter and Dean p. 54-57).

It is possible to express the above concepts of risk in a simple one equation model (Barry, 1985). The model assumes a farmer who, based on his expectations for returns to assets and costs of borrowing along with his attitude towards risk, has achieved a desired structure of assets and liabilities. This "equilibrium position" is characterized by an acceptable level of risk relative to anticipated returns.

Risk is represented by the ratio of anticipated variability (V_e) of the return to equity to the expected rate of return to equity capital (R_e). The relationship between them is expressed as

$$\frac{V_e}{R_e} = \text{Equilibrium position} \quad (1)$$

It can be shown that this equilibrium position is jointly determined by the farm's business and financial risk (Gabriel and Baker, 1980).

Business risk is expressed by the ratio of the random variability (V_a) of the returns to the farm's assets and the expected level (R_a) of those returns.

$$\frac{V_a}{R_a} = \text{Business Risk} \quad (2)$$

That is, business risk increases as the variability in the returns to the farm's assets increases or as the rate of return to the farm's assets decreases.

Financial risk is represented by the farm's leverage position, expressed here as a flow measure of the expected returns to assets relative to the expected returns to equity.

$$\frac{R_a A/E}{R_a A/E - (i)D/E} = \text{Financial Risk} \quad (3)$$

Where A/E is the ratio of total assets to equity capital, D/E is the ratio of total debt to equity capital, and (i) is the expected cost of borrowing (assumed known with certainty). Or, put another way, financial risk is expressed as the weighted ratio of the return to assets and the return to equity. That is financial risk increases as the expected returns to equity decreases relative to the return to assets.

Thus the overall equilibrium relationship is given by the expression:

$$\frac{V_e}{R_e} = \frac{(V_a) (R_a A/E)}{(R_a) (R_a A/E - (i)D/E)} \quad (4)$$

A change in any of the variables results in the equilibrium position being disturbed. A series of counterbalancing management decisions may be initiated to establish a revised equilibrium position.

A total risk constraint, such as the one suggested in the financial performance function, can be formed if the maximum tolerable risk (β) can be identified by the farm operator. Hence, the total risk constraint could be written,

$$\frac{(V_a) (R_a A/E)}{(R_a) (R_a A/E - (i)D/E)} \leq \beta \quad (5)$$

Because the expression for financial risk involves that of business risk, its level is dependent upon the degree of business risk. Suppose there is an exogenously induced rise in (V_a) , and thus a rise in business risk. Assuming there is no slack in the risk constraint, financial risk also will rise, forcing a subsequent risk adjustment to comply with the constraint (Gabriel, 1979). This adjustment may involve a production or an investment decision, a financing decision or all three. For example, a strictly financial response would be to refinance some existing debt with either a debt of longer maturity (and thus lower periodic debt service requirement) or with a lender sponsored debt or interest write down program. Alternatively, a reorganization of farm assets and investments could take place, lowering business risk.

Conceptualizing Firm Level
Adjustments to Financial Stress

The financial performance function provides a concise way of describing the particular components which affect the financial performance of the firm. However a simple profitability model better describes the relationships between financial stress and financial structure. Even though the profitability model presented is simple it is important to keep in mind that the effects of productivity of assets and attitudes towards risk underlie the components of the growth model.

The risk equilibrium model presented above is closely associated with the profitability model presented here. Let a firm's rate of return on equity capital (R_e) be expressed as a weighted average of the difference between its rate of return on assets (R_a) and its cost of debt (i), where the weights are the ratios of assets to equity (A/E) and debt to equity (D/E), respectively, and the profit measure is net of withdrawals for taxation (t) and family living (c). Those relationships are expressed as

$$R_e = [(R_a) A/E - (i) D/E] (k) \quad (6)$$

where $k = (1-t)(1-c)$ (Barry, Ellinger, and Eidman, 1987).

The qualitative relationships expressed in (6), identify specific financial stress abatement options meriting further investigation. Through the discussion of the profitability model financial stress abatements are suggested that bring about the proper increase or decrease in these variables to increase the return to equity capital.

Many researchers have defined financial stress to be that combination of variable values which yields a zero rate of return to equity (Barry et al 1987, Melichar, 1984, and USDA, 1985). This assumption reduces expression (6) to the following:

$$D/E = -R_a / (R_a - i) \quad (7)$$

The expression holds as long as the rates of taxation and consumption are less than 100 percent and (R_a) is not equal to (i). Therefore a zero rate of return to equity can occur only

if (R_a) is less than (i) and the expression is logical only for cases where (R_a) is less than (i) .

The expression in (7) is derived using the identity $A/E = 1 - D/E$.

The model demonstrates intuitively that profitability will increase as the rate of return on assets (R_a) is higher, the rates of interest (i) , taxation (t) , and consumption (c) are lower, and those effects increase as financial leverage (D/E) increases. The effect of a 1 unit change in the rate of return on assets (R_a) on the rate of return on equity (R_e) in (6) is simply the derivative of R_e with respect to R_a . That is

$$f'(R_e)/R_a = (k) A/E \quad (8)$$

or, an increase in the rate of return on assets (R_a) by one unit will increase the rate of return on equity (R_e) by the product of net rate of savings (k) times the asset-to-equity ratio.

By taking the derivative of (R_e) with respect to (i) the effect on the rate of return to equity (R_e) of a one unit change in the cost of debt can be demonstrated.

$$f'(R_e)/(i) = -(k) D/E \quad (9)$$

That is, an increase in the cost of debt (i) by one unit will decrease the rate of return on equity (R_e) by the product of the net rate of savings and the debt-to-equity ratio (D/E) .

Finally, the effect of a change in leverage on profitability, with (R_a) and (i) held constant is

$$f'(R_e)/(D/E) = (k) (R_a - i) \quad (10)$$

That is, an increase in the leverage ratio (D/E) by one unit will increase the rate of return on equity (R_e) by the product of the net rate of savings and the rate of return on assets (R_a) minus the interest rate (i) . If (R_a) is less than (i) , then the profitability effect is a negative one, so that reductions in leverage will increase profitability by the difference between (R_a) and (i) multiplied by the net rate of savings. Or, if (R_a) is less than (i) , reducing the D/A ratio will also improve the profitability of the farm business.

The profitability model demonstrates the effect on the rate of return to equity of operating a farm under financial stress. The level of financial stress can be varied by changing the values of the variables which comprise the profitability model.

For example asset return and cost of debt figures from the 1986 Farm Cost and Returns Survey (USDA, 1987) indicate the average rate of return to assets is 2.8 percent and the average costs of debt is 9 percent for all farms. Then (R_e) will be zero for a leverage (D/E) ratio of 45 percent, or, equivalently, for debt to asset ratio of 37.4 percent. As expression (2) indicates, the level of leverage associated with financial stress ($R_e = 0$) will be lower as the rate of return on assets is lower and/or the rate of interest is higher.

If the interest rate increases to 11 percent the leverage ratio where financial stress begins decreases to 34 percent or a D/A ratio of 25.5 percent. Assuming a situation where the rate of return to assets equals 2.8 percent, an interest rate of 11 percent, and a leverage ratio of 1 would yield a rate of return to equity of negative 5.4 percent. The effect of leverage on the rate of return to equity can be demonstrated by holding the rate of return to assets at 2.8 percent, the interest rate at 11 percent and increasing the leverage ratio to 3 which corresponds to a D/A ratio of 75 percent. Increasing the leverage ratio decreases the rate of return to equity to a negative 21.8 percent. Likewise if the leverage ratio is decreased to 1/2 then the rate of return to equity will increase to a negative 1.3 percent. Table X is a summary of how adjusting the rate of return to assets, the interest rate, and the leverage ratio impacts the rate of return to equity.

If a farm continues operating at a level of leverage greater than the farm's repayment capacity it is clear that the farm's leverage ratio will increase as a result of increased borrowing to pay existing debts. As demonstrated above, this increase in leverage results in the rate of return on equity to decrease at an increasing rate over time. One solution to this situation is to do nothing and to allow those farm businesses to fail that are under financial stress. However, a more promising approach is to consider possible abatements to the financial stress problem which might either increase the rate of return to assets, decrease the interest rate on debt, or decrease the leverage ratio.

A number of possible abatements have been suggested and analyzed in other studies (Al-Abdali, 1987; Barry et. al, 1986; and Mapp and Walker, 1986). The abatements

TABLE X

THE EFFECT ON THE RATE OF RETURN TO EQUITY OF
CHANGING THE RATE OF RETURN TO ASSETS,
INTEREST RATE, OR LEVERAGE RATIO

Rate of Return on Assets	Interest Rate	Leverage Ratio	Rate of Return on Equity
2.00%	2.00%	33.33%	2.00%
2.50%	2.00%	33.33%	2.67%
3.00%	2.00%	33.33%	3.33%
2.00%	8.00%	33.33%	0.00%
2.50%	8.00%	33.33%	0.67%
3.00%	8.00%	33.33%	1.33%
2.00%	14.00%	33.33%	-2.00%
2.50%	14.00%	33.33%	-1.33%
3.00%	14.00%	33.33%	-0.67%
2.00%	2.00%	100.00%	2.00%
2.50%	2.00%	100.00%	3.00%
3.00%	2.00%	100.00%	4.00%
2.00%	8.00%	100.00%	-4.00%
2.50%	8.00%	100.00%	-3.00%
3.00%	8.00%	100.00%	-2.00%
2.00%	14.00%	100.00%	-10.00%
2.50%	14.00%	100.00%	-9.00%
3.00%	14.00%	100.00%	-8.00%
2.00%	2.00%	300.00%	2.00%
2.50%	2.00%	300.00%	4.00%
3.00%	2.00%	300.00%	6.00%
2.00%	8.00%	300.00%	-16.00%
2.50%	8.00%	300.00%	-14.00%
3.00%	8.00%	300.00%	-12.00%
2.00%	14.00%	300.00%	-34.00%
2.50%	14.00%	300.00%	-32.00%
3.00%	14.00%	300.00%	-30.00%

studied include interest rate reductions, debt set-aside programs, equity infusions, asset sale with lease back option, asset sale without lease back option, debt repayment deferrals, and, government price support programs. In this study the following abatement options are considered: interest rate reduction, debt reduction, equity infusion, asset sale no lease back option, interest rate reduction/equity infusion combination, and Chapter 12 Bankruptcy. In the next section each of these abatement strategies are discussed in light of the conceptual model to disclose their possible effects on the rate of return to equity and other financial performance criteria.

Suggested Abatements to Financial Stress

The Importance of Continued Government Subsidy Payments

The first component in expression (6) that affects R_e is the rate of return to assets (R_a). The rate of return to assets (R_a) is the quotient of NFI plus interest paid minus an opportunity return to labor and management divided by the value of beginning total assets. In the IFFS simulation model, NFI is adjusted for an opportunity return to labor and the family living allowance is used as the opportunity return to management.

$$R_a = (NFI + \text{Int.Pd.} - \text{FL}) / (\text{beg. TA}) \quad (11)$$

The NFI figure in expression (11), reflects the interest expense incurred by the farm business. This interest expense is added back to NFI to arrive at a measure of the profitability of the farm's assets absent of the cost of debt. Therefore the effect of interest expense on the numerator is irrelevant to the determination of the return to assets. In addition family living is near a minimally acceptable level. Therefore it is assumed that any adjustments to the numerator in (11) is a result of changes in the components of NFI excluding interest expense.

The rate of return to assets is closely related to the productivity of the farm business and each of its production activities corresponding price and cost relationships. An example

of a policy initiative that effects the return to assets is a government commodity program. Price support programs contribute significantly to NFI and consequently to the return on assets in the short run. The important role government payments play in the financial performance of the farm are examined by Al-Abdali (1987), Mapp and Walker (1986). The conclusions of both of these studies indicate that government programs play an important role in improving the financial viability of the farm as suggested by the conceptual model.

Alternatively, R_a may be adjusted through a change in the value of total assets. However, if total assets decline a corresponding decline in equity occurs unless debts are also reduced. Therefore, referring to expression (11), R_a will increase if the level of NFI increases relative to the value of total assets or R_a will decrease if NFI decreases relative to the value of total assets.

Asset Sales

The second component to affect R_e is the A/E ratio which provides a weighted adjustment to the rate of return on assets (R_a). It has been shown that a one unit change in R_a effects R_e by the product of (k) times the A/E ratio. If the A/E ratio increases then a one unit change in R_a causes a larger change in the rate of return to equity.

One abatement that effects the A/E ratio is the sale of assets. Restructuring assets through sales generate substantial amounts of cash as long as buyers for the assets are readily available. Proceeds from the sale of assets are used to retire debt increasing the amount of equity (E) relative to debt (D) in the farm business.

Interest Rate and Debt Reductions

The third and fourth components that affect the return to equity are the interest rate (i) and the leverage ratio (D/E). These two terms demonstrate that financial stress arises both from the cost of debt and the amount of debt associated with a farm's assets commonly referred to as the level of leverage. As expressed in (9), increasing the interest

rate, decreases the return to equity *cederas-paribus*.

The level of leverage determines how much of an effect an interest rate reduction will have on the return to equity. As shown, a one unit change in interest rates changes the return to equity by the negative product of (k) and the leverage ratio D/E . Therefore one way to increase the return to equity is to reduce the total cost of debt financing by reducing the leverage ratio. The objective is to reduce debts to a financially feasible level that can be repaid over the long run at market interest rates. However, this approach has a relatively high costs to the government and/or farm lenders.

Equity Infusion

Another abatement to be considered is an infusion of equity capital into the farm business. An equity infusion may be used to either affect the return to equity by changing the ratio of assets-to-equity or by reducing the leverage ratio (D/E) . Another possible advantage of an equity infusion is the greater dispersion of risks among a wider set of claimants on farm assets.

If the equity is used to reduce debts that are financed at very high interest rates not only does the magnitude of debt decline but the average cost of debt declines as well. There should be a charge for the equity capital used in the equity infusion case. A Rate of 6 percent represents an adequate opportunity cost for the equity capital.

Adjusting R_e Under Conditions of Insolvency

If the value of debts is greater than the value of assets, the firm is insolvent. The farm business is technically insolvent when for an extended period of time the farm has been unable to meet debt repayment obligations. Such a situation occurs for farm's that are highly leveraged when the value of assets decline due to some exogenous influence. Equity is depleted and in many cases even negative. When the farm business is insolvent the conceptual model is no longer a growth model but rather the model measures the rate of

decline in equity. Outside of a large injection of capital the operator faces a high probability of liquidation. Another course of action is to try and save the integrity of the business through bankruptcy proceedings.

The Integrated Farm Financial Statements Model

Integrated Farm Financial Statements (IFFS) is a microcomputer software package developed for use with Lotus 1-2-3 (Mapp et. al, 1985). The IFFS model is comprised of three basic components which together allow the user to construct a simulation of the farming enterprise. The IFFS model allows the user to simulate the production unit of the farm and combine this information with other pertinent financial information concerning the farm's asset and liability structure. The IFFS model provides the user with a thorough but concise description of the farm's financial performance absent of risk modification. The model is designed to provide information on an annual basis while allowing the farm to be modelled in a multiperiod framework.

Components of the IFFS Model

The three components of the IFFS model are a budget worksheet, additional information worksheet and an integrated farm financial statements worksheet. The budget worksheet allows the user to construct individual budgets describing each of the production activities of the farm. The enterprise budget is a means of bringing together the projected prices, yields, costs and timing of important events (i.e. planting and harvesting) which describe the production activities of the farm (Appendix A).

The additional information worksheet is much like the budget worksheet but allows the user to account for monthly cash inflows and outflows that are not readily attributable to any one production activity (Appendix A). The additional information worksheet also accounts for non-farm inflows and outflows such as non-farm income and family living expenses.

The integrated farm financial statements worksheet is the heart of the IFFS model and brings together information from the budget and additional information worksheets and combines it with information about the assets and liabilities of the farm business. The integrated farm financial statements worksheet is composed of five sections.

The first section is the net worth statement. The net worth statement indicates the financial position of the farm business at a particular point in time (Appendix A). The net worth statement shows what is owned versus what is owed. The difference between what is owned and owed represents the owner's claim against the assets of the business, or owner's equity.

The second section is the cash flow statement. A cash flow statement is a recorded projection of the amount and timing of all cash inflows and cash outflows that are expected to occur throughout the planning period (Appendix A). In the IFFS model the cash flow consolidates both farm and non-farm cash flows. The cash flow statement can be used to either record actual records of cash inflows and outflows or to make a projection of expected inflows and outflows.

The third section of the IFFS worksheet is the income statement. The income statement measures the profitability of the farm business, as measured by net farm income, over a specific period of time, generally one year (Appendix A). The primary purposes of the income statement are to: 1) measure the profitability of the business through net farm income, 2) identify sources of profits or losses such as farming, non-farm activities and unrealized gain from changes in farm land values, and 3) show disposition of net farm income.

The fourth section of the IFFS worksheet is the financial performance summary statement. The primary purpose of the financial performance summary statement is to provide the user with a summary of many of the financial performance criteria used to evaluate the farm business (Appendix A). The statement consists of three basic parts, the ratios section, the cash flow summary section, and the earnings measures section.

The final section of the IFFS worksheet is the debt worksheet. The debt worksheet records the short term, intermediate term, and long term liability claims still outstanding against the farm's assets (Appendix A).

Using the IFFS Model to Analyze Financial Performance

As pointed out by Barry et. al, it is generally accepted that the overall financial performance of the farm is captured in three key financial performance criteria. These three criteria are the profitability, liquidity and risk/solvency positions of the firm.

The IFFS model provides year to year analysis of the farm business's profitability, liquidity, and solvency positions.

The income statement provides a concise way to convey the components of net farm income and also calculates net farm income on an accrual basis.

The cash flow statement provides a thorough picture of the farm's monthly cash inflows and outflows. The difference between inflows and outflows is the liquidity position of the farm less any liquidity reserves. Since the cash flow statement is on a monthly basis it can be used to project times of the year when liquidity surpluses or shortfalls may occur.

The net worth statement provides information concerning the solvency position of the firm by way of the equity reserves in the farm business. In addition to the equity in the business, the net worth statement summarizes the composition of the farms assets and liabilities and can be used to determine if the farm has the right mix of short term, intermediate and long term debt relative to its asset base.

Although the IFFS model is unable to provide an explicit measure of business or financial risks, the model does provide implicit risk information. Through the solvency and liquidity measures the operator can determine the boundaries of the farm's risk bearing ability and some idea of the likelihood of maintaining financial viability or becoming insolvent and subsequently being liquidated.

In addition to the specific measures for profitability, liquidity, and risk/solvency, the IFFS model also calculates various ratios that can be used in conjunction with the major financial performance criteria to develop trends depicting the farm's overall efficiency of operation.

Profitability

Profit is defined as a monetary return to the owned assets of the farm (Barry, Hopkin and Baker p.120). Consequently, the success or failure of any farm business entity is subject to that entity's ability to sustain annual profits. Profits are important to the business because: 1) profits represent the attainment of reasonable levels of income to provide steady growth in net worth; 2) profits represent security and stability; 3) and profits represent the ability to meet financial obligations. Profitability implies a business structured such that returns from business activities consistently exceed the costs of being involved in those activities.

Profitability is reflected in the margins between per unit costs and returns and in the number of units sold. Hence it is closely tied to both efficiency and scale. For instance a low volume of transactions might be offset by high-efficiency performance or vice versa.

Information regarding the farm's profitability is obtained from the income statement. An income statement measures a farm's profits or the returns to owned resources over a specified accounting period. In agriculture the accounting period is generally one year. Two different accounting methods exist for determining profits, the cash method and the accrual method. Under the cash method, receipts and expenses are reported for the period during which money actually changes hands. Although the cash method is popular for computing income taxes, the accrual method more accurately reports true net income derived from the farming enterprise during the accounting period. The accrual method is superior because it reflects receipts and expenses in the period they actually occurred. Through inventory changes expenses and receipts are allocated to the correct accounting period.

The net farm income (NFI) figure taken from the income statement measures the return to unpaid operator and family labor, management, equity and risk. The calculation of NFI in the income statement can be summarized as follows:

	Net Cash Income (before interest payments)
+	Change in notes and accounts receivable
+	Change in accounts payable and accrued interest
+	Change in capital items (depr./appr./sales/purch.)
=	Adjusted Net Cash Income
-	Cash interest expense (excluding interest)
<hr/>	
=	NET FARM INCOME

The components of NFI are affected by separate business events as well as being interrelated through the assets and liabilities of the farm. A profitability trend can be established by linking together successive income statements. It is possible for the farm to generate a positive NFI but still have generated insufficient returns to cover principal payments and family living expenses. This points to the important distinction between profitability of the farm's assets and the liquidity in the farming operation.

Net farm income is a measure of profitability that is affected by the level of debt. Therefore two farms might have identical production units but have different levels of net farm income because of their different levels of debt. In such cases it is more appropriate to measure profitability in the economic sense of imputing a return to all the factors of production and then to compare this residual return between farms.

Liquidity

Liquidity refers to the firm's ability to generate cash in order to meet cash demands as they occur and to provide for unanticipated events (Barry, Hopkin and Baker p.129). Liquidity exists in the form of assets that can quickly be converted into cash through sales or as reserves in the equity of long and intermediate term assets. It is the occurrence of risk and the need to purchase assets that gives rise to the need for liquidity. In U.S. commercial agriculture, most of the items used for production or family consumption are acquired with cash outlays. Since the seasonal pattern of cash inflows generally varies from that of cash

outflows, seasonal cash deficits and/or cash surpluses arise. The deficits must be met and the surpluses must be managed. Additional needs arise for liquid reserves to meet unpredictable fluctuations in prices, yields, expenses, or to cope with severe tragedies such as fire, hail, sickness and death. The firm's liquidity needs are also influenced by investment and financing decisions. For example a new machine may improve the firm's productivity but its purchase will likely reduce liquidity by committing existing cash reserves for down payment and future debt servicing. In addition, the financial structure of many farms is composed of a large proportion of intermediate and longterm assets which typically earn a relatively low cash return (Boehlje and Eidman p.70). Consequently, the firm may have difficulty generating enough cash receipts to meet current financial obligations.

The liquidity position of the operation can be determined period to period by information in current asset and liability entries of the balance sheet. However, since liquidity problems occur within the accounting period a cash flow statement is superior to the balance sheet for properly evaluating the firm's liquidity position. The cash flow statement, with its month to month projections of income and expenses, provides a better tool for managing cash surpluses and avoiding unnecessary cash deficits. By improving liquidity management, the cash flow statement provides a warning of possible future increases in business and particularly financial risk.

A summary of the pertinent information from the cash flow can be used to arrive at a useful measure of liquidity referred to here as net cash flow (NCF). The NCF calculation can be summarized as follows:

	Total Cash Available for Debt Service
-	Scheduled principal payments
-	Scheduled interest payments
-	Projected interest payments on operating loan
=	Cash Available for New Investment
-	Projected capital expenditures
	<hr/>
=	NET CASH FLOW

Total cash available for debt service is the difference between total farm and nonfarm income and total farm and family living expenses excluding debt servicing and capital reinvestment.

By linking together successive cash flow summaries a liquidity profile can be developed for the farm.

Solvency

Solvency is defined as what the farm operator would have left after all assets are converted to cash and debts are retired (Penson and Lins p. 41). Therefore solvency is a measure of financial security. The balance sheet or net worth statement provides the basis to evaluate the direction and magnitude of changes in solvency over time (Boehlje and Eidman p. 70). The appropriate measure of solvency then is the equity in the farm business.

Equity in the farms assets is defined by the classic accounting equation $TA - TL = NW$. As the equation implies the total value of all assets is divided in some proportion between the claims against those assets and the equity left after debt claims. This ratio is referred to as either the debt to equity or debt to asset ratio and indicates what percent of the farms assets are free of debtor's claims.

In terms of financial performance analysis, the important measure becomes the change in equity from year to year. Change in equity is interpreted in light of changes occurring in total assets and total liabilities and describes the farms ability to continue in business. For instance if asset values decline while the claims against those assets are increasing the changes in equity will be severe and will reflect the increasing probability of financial failure.

IFFS also calculates the rate of return to assets, average interest rate, D/A ratio, D/E ratio and other measures that can be used to evaluate the financial performance of the farm business. Net farm income, Net cash flow, and the solvency position are chosen as the three major components needed to measure financial performance at the firm level. The

other measurements are also evaluated in analyzing the effectiveness of the proposed financial stress abatements.

In the next chapter a representative benchmark farm is developed using the IFFS modeling framework. The farm is constructed to be representative of a typical wheat and livestock farm in North-central Oklahoma with respect to the production unit of the farm. Two different levels of debt are assumed, rather than being typical, specifically to analyze the impacts of financial abatements on the typical wheat and livestock farm.

CHAPTER IV

DEVELOPING A REPRESENTATIVE FARM: CHARACTERISTICS AND ASSUMPTIONS

Implementing the approach to financial analysis presented in Chapter III requires the development of a representative case farm. Possible responses to financial stress are analyzed for a case farm representing the North Central region of Oklahoma (Figure 5). The case farm is constructed to represent the size and structure of the most frequently occurring family owned and operated farms in North Central Oklahoma.

Although the definition of a family farm is somewhat arbitrary, the essential characteristics relate to the contributions of labor and management. A family farm can be defined as a primary agricultural business in which the operator is the risk-taking manager and with his family performs most of the managerial activities (Nikolitch, 1972).

This chapter describes the geographic area and outlines the Integrated Farm Financial Statements case farm model, including production activities, price relationships and initial financial position of the North Central Oklahoma case farm.

Area of Study

Relying on the 1985 Oklahoma Agricultural Statistics and the 1982 Census of Agriculture, a typical farm in North Central Oklahoma is characterized as a family owned and operated farm engaged primarily in the production of wheat and stocker cattle. Census data indicate that a typical farm has been operating from twenty to thirty years. Eighty-nine percent of North Central Oklahoma farms are family operated, 10 percent are partnerships

and only 1 percent are corporate farms (Census of Agriculture, 1982). Thirty-three percent of the operators are full owners, 48 percent are part owners and 19 percent are tenants. Thus, a considerable portion (67 percent) of the farms in this area rely on a combination of rented and owned land. Many farms in the region are large, with 50 percent consisting of 500 acres or more.

Resource Situation

Land

After consultation with the Intensive Financial Management And Planning Support center, a farm of 1280 acres is chosen to represent a typical farm for the North-central region of Oklahoma (Bonnett, 1986). Land is divided into good cropland, average cropland and pasture to obtain a distribution of per acre values (Table XI).

In addition to land composition, assumptions are made concerning major improvements and rental arrangements. Using the census data a rent to own ratio of 2/3 owned to 1/3 rented is chosen to represent a typical North Central Oklahoma Farm. This results in an owned land base of 935 acres of which 800 acres are cropland, 120 acres are pasture, and the remaining 15 acres are the homestead. The total value of owned real estate and improvements as of January 1, 1987, is \$518,300. An additional 360 acres of wheat land are rented on a 1/3 - 2/3 cropshare basis.

To evaluate the financial performance of the case farm assumptions are made about land acquisitions with respect to time and amount of purchase. Since real estate typically comprises three-fourths of the total asset base of a farm, different levels of financial stress exist depending on the year when land is purchased and the accompanying land price, interest rate and accepted amortization period of the loan.

A beginning debt/asset ratio of 50 percent is assumed for the base case farm. The assumed level of debt represents a farm that is undergoing a moderate degree of financial stress based on the USDA's 1986 Costs and Returns Survey (USDA, 1987). The timing of

TABLE XI
LAND AND IMPROVEMENT VALUES
AND TENURE ARRANGEMENTS

Land and Improvements	Owned Acres	\$/acre	Value	Rented Acres	Rental Terms
Homestead	15		81,500	-	-
Good Cropland	320	566	181,200	160	1/3 - 2/3
Avg. Cropland	480	461	221,400	200	1/3 - 2/3
Pasture	120	285	34,200	-	-
Total	935		518300	360	-

TABLE XII
REAL ESTATE PURCHASES
BASE CASE FARM

Purchased 160 acres in 1966							
Year	# Acres	Cost Acre	Total Cost	Amount Financed	Interest Rate	Annual Pymt.	Balance Owed
1968	255	285	72,675	58,140	7.6%	5,241	27,705
1972	280	300	84,000	67,200	8.0%	6,295	44,941
1974	160	370	59,200	41,440	8.8%	4,134	31,366
1979	160	885	141,600	99,120	12.5%	13,078	92,069
1982	80	1355	108,400	65,040	13.2%	8,990	63,069
Total	935						259,150

All Loans are 25 Year Mortgages

debt acquisition offers two insights of general interest (Table XII). First, the impact on cash flows is illustrated by looking at the annual payments column. These figures demonstrate that the cash flow aspect of the financial stress problem could continue for some time unless debt is refinanced at lower interest rates or some similar action is taken. Secondly, if the acquisition of land is shifted towards the latter stages of the farm "boom", it can be illustrated that controlling the same 860 acres of real estate has a very different effect on debt repayment commitments and exposure to risk. Both of these result from changes that occur in the terms of financing including interest rates, required down payments, and length of mortgage.

Production Activities

Production data are examined for the 10 counties in North Central Oklahoma (Figure 5) to determine the primary agricultural activities (Oklahoma Agricultural Statistics, 1982). The census examination included only farms with sales of \$10,000 or more of agricultural products per year.

Wheat is the predominate crop of the area as 83 percent of farms harvested wheat in 1982. The average wheat acreage was 281 acres per farm. The county averages ranged from a low of 209 acres per farm in Dewey County to a high of 378 acres per farm in Grant County.

Grain sorghum is produced on 9 percent of the farms. The average acreage of grain sorghum harvested is 62 acres per farm. Grain sorghum ranges from an average of 44 acres per farm in Dewey County to a high of 85 acres per farm in Kay County.

The average acreage for pasture in the area is 75 acres per farm. The county averages range from a low of 48 acres per farm in Noble County to a high of 94 acres in Woods County.

The three crops considered in this study are wheat, grain sorghum, and summer lovegrass pasture for grazing and haying. The sum of the three average acreages for the

area is 418 acres. The total average acreage per farm of grazed and harvested cropland and summer pasture is 436 acres, so most of the production activities for crops and pasture appear to be accounted for by the wheat, sorghum and pasture activities.

Wheat production is the major crop in the North Central region of Oklahoma and is complimented by the second most important production activity, winter stockers. The census data is somewhat ambiguous in regards to the number of calves pastured on wheat but, it is understood that stocker cattle are a standard complimentary activity to wheat and pasture production in Oklahoma. The case farm for North Central Oklahoma includes production activities for harvested wheat acreage which is grazed by stockers from November through March, grazeout wheat which is grazed by stockers from November through May, and summer stockers run on lovegrass pasture from April through September.

Prices

Crop prices used are the current prices for 1987, and remain at 1987 levels for the entire simulation period of 1987 to 1991. Crop sale prices along with all input prices for each activity are obtained from the Oklahoma Enterprise Budget Price Vectors (Enterprise Budget Price Vectors, 1986).

Because of the cyclical nature of livestock prices and the large capital requirements associated with this activity livestock buy-sell prices for stocker steers are averaged over a ten year period from 1977 - 1986 (Table XIII).

Budgets

An enterprise budget is a listing of all income and expenses associated with a specific farm activity. The Integrated Farm Financial Statements model uses the timing of cash receipts and expenses on a monthly basis that are associated with the activities in the farm plan. These budgets are then combined into the Cash Flow of the farm business which is an integral part of analyzing the financial performance of the farm.

TABLE XIII
STOCKER AVERAGE BUY SELL PRICES*

Buy: October 15 and April 1
Steers: No. 1 Med. Frame
400-500 lbs.

Sell: March 1, May 15 and Sept. 15
Steers: No. 1 Med. Frame
600-700 lbs.

Year	APR	OCT NOV	MAR	MAY	SEP
1978	68.20	74.48	53.35	64.34	59.34
1979	105.82	93.48	89.73	84.06	86.82
1980	82.40	80.01	77.96	75.43	68.18
1981	73.45	69.89	68.15	65.59	63.78
1982	73.80	65.60	65.11	65.70	66.19
1983	77.99	69.68	71.16	57.99	65.43
1984	71.16	67.97	67.70	64.02	63.27
1985	77.77	72.43	67.91	58.87	66.14
1986	72.00	72.11	61.45	65.77	57.24
1987	73.80	72.23	61.45	68.31	64.21
Avg.	77.60	73.80	69.02	67.01	66.06

Source: USDA/ERS Weekly Price Series for Livestock, Oklahoma City,
Oklahoma.

*OKC PRICES: Cwt. Stocker Feeder, Monthly and Annual Average

The eight budgets developed to describe the production unit of the case farm for North Central Oklahoma are found in Appendix A. Included in the eight budgets is the Additional Information Budget (AI budget) which allows the organization of monthly inflows and outflows that are not readily attributed to a specific farming enterprise. The following section describes how each of the eight budgets are constructed and how each is related to the overall farm structure.

Crop Budgets. The wheat activity is described by two budgets. The first budget (WHTDRY1, Appendix A) is for the 360 acres of crop rented land and accounts for 261 acres of harvested wheat as well as 99 acres that are diverted under the government price support program. The second budget (WHTDRY2, Appendix A) is for 736 owned acres and accounts for 522 acres that are harvested and 214 diverted acres 16 of which belong to the grain sorghum allotment (Table XIV).

With passage of the 1985 Food Security Act, government payments became an even larger portion of total farm earnings. New provisions in the bill provided for higher farm incomes with less exposure to risk (Sanders and Anderson, 1987). Because farm managers are assumed to be rational, the manager of the case farm participated in the government program 100 percent. It is further assumed that the case farm has an established wheat crop base of 1080 acres of which 720 are owned and 360 are rented on a 1/3 - 2/3 crop share arrangement. Participation in the program reduces the harvestable acreage to 522 acres owned and 261 acres rented. The entire 1080 acres plus 16 acres from the grain sorghum base or a total of 1096 acres of wheat can be grazed from November first until March fifteenth. The 214 owned and 99 rented diverted acres can be grazed from November first through May fifteenth.

As illustrated in Table XIV, government payments are nearly equal to the total proceeds received from the sale of all crops. The continuation of these large subsidies is a key ingredient in providing the needed cash inflows to service existing debts on most farms (USDA, 1987). Program variables and assumptions for government payment calculations are

TABLE XIV
SUMMARY OF CROP BUDGETS

Wheat Name	Description	Acres	Receipts Sales	Government Payment	Expenses
Wheat					
WHTDRY1	Harvested Rent & Diverted	360	12,806	12,312	20,193
WHTDRY2	" " Own	540	38,419	36,901	44,388
Grain Sorghum					
MILODRY2	Harvest Own	64	5,962	2,291	4,346
Lovegrass					
LOVEGRAS	Hay and Graze	Own 120	0		8,192

presented below and it is assumed that on rented acreages the tenant received 2/3 of the government payment (Table XIV).

The government payments are made in two installments the first coming in March which is 40 percent of the total projected payment. This first payment is calculated by taking the Target Price of \$4.38 and subtracting the formula loan rate of \$2.40. The difference of \$1.98 was then multiplied by the harvested acres and the proven yield per acre. This figure is then reduced by 4.3 percent because of the Gramm - Rudman Budget Balancing Amendment. Forty percent of the figure obtained up to this point would be the portion of the deficiency payment paid in March.

The government diversion payment is all paid in March and is calculated by multiplying 2.5 percent times the base acreage, times the proven yield, times the diversion payment of \$1.10 per bushel times the renter's share where appropriate (Anderson, 1986). The final payment was made in December and is calculated by taking the difference between the Target Price of \$4.38 per bushel and the five month average price of \$2.18 per bushel. This figure is then reduced by the 4.3 percent Gramm - Rudmann cut. The following is then subtracted from this result: The \$4.38 per bushel minus the formula loan rate of \$2.40, times the Gramm - Rudmann reduction, times 40 percent. This is the difference between the actual deficiency payment and the projected deficiency payment. If this number had been negative a refund would have been owed but as it is for wheat the difference is positive and is multiplied by the proven yield of 33 bushel per acre (not the actual yield), the number of harvested acres and the renter's share when appropriate.

In addition to the actual wheat production that is sold, the wheat crop also produces winter grazing for stockers. For grazing purposes the total wheat acreage is reduced by 120 acres. This reflects an assumption that rather than pay pasture rent the operator will agree to pasture only 2/3 of the actual 360 acres of rented wheat land. It is further assumed that under this arrangement the operator of the case farm gains control of the other 240 acres and is able earn stocker rents off of this pasture or graze it.

Pasture production is measured in animal unit months (AUM's). An animal unit month is defined to be 730 pounds of dry matter, based on the estimated requirements per cow per month (Walker, Lusby, and McMurphy, 1987). AUM production on wheat pasture then is a measure of the quantity of dry matter produced in a given month. Data from the OSU Crop and Livestock budgets for wheat indicate for example that during the period November to March an average of 1.1 AUM is produced per acre. This amounts to 1073 AUMs being available for consumption during this period (Table XVI).

The grain sorghum activity (Milodry in Appendix A) is assumed to be on owned land and the entire 80 acres is in an established grain sorghum base for government program participation purposes. Grain sorghum production is assumed to be 25 bu. per acre and sold for \$2.61 per bu. in October. Government payments are calculated in the same way as for wheat using the appropriate numbers for sorghum. Table XV gives the pertinent numbers as follows: The required acreage reduction for standard participation in the program for sorghum is 20 percent of the base acreage or 64 acres. The target price for sorghum was \$2.88 per bushel, the loan rate was \$1.82 per bushel, the maximum deficiency payment per bushel was a \$1.06 and the diversion payment was \$.65 per bushel. As is the case with wheat, 40 percent of the projected total payment is made in March and the remaining payment should be made at the end of the five principal marketing months. This would put the payment coming in February of the next year but is assumed that all payments are received in the year of production.

Lovegrass pasture (Lovegrass, Appendix A) is considered a crop in this study because it produces both a hay crop and forage for stocker consumption. One hundred and twenty acres of lovegrass are owned. One cutting of hay is taken off 40 of these acres in June. Production of 1.9 tons per acre is assumed based on crop and livestock budget information for a total of 76 tons of hay. All of the hay is used to feed stockers during the winter and before wheat pasture is available. The stocker enterprises are charged for the consumption of the hay an amount equal to what the hay could be sold for. The other 80

TABLE XV
 VARIABLES AND ASSUMPTIONS
 FOR GOVERNMENT PAYMENTS

Item	Wheat	Sorghum
1986 Program:		
Required acreage reduction (pct.) <u>1/</u>	25	20
Target Price (dol./bu.) <u>1/</u>	4.38	2.88
Loan rates (dol./bu.) <u>1/</u> , <u>2/</u>	2.40	1.82
Maximum deficiency payment (dol./bu.) <u>1/</u>	1.98	1.06
Diversion rate:		
Dollars per bushel diverted <u>3/</u>	1.10	.65

1/ Program provisions announced for the 1986 program on January 13, 1986.

2/ A 4.3% Gramm-Rudman reduction reduced the effective loan rate to \$2.30 per bushel.

3/ As announced for the 1986 program on January 29, 1986 for 2.5 percent of base acreage.

TABLE XVI
AUM AVAILABILITY AND REQUIREMENTS FOR STOCKER STEERS

Crop or Pasture	Units	Time Frame	AUMS produced/acre	Total Acres	Total Pasture Produced
Source Wheat	AUMS	Nov-Mar	1.1	976	1073.6
Wheat Grazeout	AUMS	Mar-May	1.8	280	504.0
Lovegrass	AUMS	May-Sep	5.55	80	444.0
Livestock User	Units Used Per Head	Time Frame	AUMS produced/acre	Total Head	Total Pasture AUMs Required
Stockers Harvest	AUMS	Nov-Mar	2.54	422	1071.88
Stockers Grazeout	AUMS	Mar-May	1.94	259	502.46
Stockers Lovegrass	AUMS	May-Sep	2.8	158	442.40

Source: Crop and Livestock Budgets, Department of Agricultural Economics, Oklahoma State University and Research Report, p-888, 1987.

acres of lovegrass are grazed by summer stockers from May until September. Relying on OSU Crop and Livestock data, lovegrass pasture produces 5.55 AUM per acre during the period May through September. This comes to a total of 444 units of forage produced for consumption by summer stockers (Table XVI). Because of the capital constraint only 40 of these acres are utilized by the operator and the other 40 acres earn summer stocker rents. The lovegrass pasture is also used in the winter to rotate stockers and to provide extra forage in the event of prolonged bad weather.

Stocker Budgets. Three of the eight budgets are stocker cattle budgets. Because stocker steers are the most common livestock enterprise the case farm plan does not include a cow-calf or dairy operation. The three budgets are classified by dates bought and sold and the respective buy-sell weights for the steers (Table XVII).

The number of stockers is determined using information in Research Report P-888 and a pasture balancing program (Walker, Lusby, and McMurphy, 1987, Walker, 1987) (Table XVI). The pasture availability must be balanced because forage that is produced for example, in December is different in terms of quality if it isn't consumed until February. Therefore to properly balance the available pasture between summer, winter and spring stockers the available AUMs are divided into the three categories of harvest, grazeout and lovegrass (Table XVI). The AUM availability is further divided into grazing periods (Table XVI).

There is adequate pasture for a total of 580 steers (Table XVII). Because of the capital constraint only 290 head are purchased. Budget STKR4_9 (Appendix A) describes the purchase of 79 steers which utilize 40 acres of the 120 acres of lovegrass pasture. These steers are purchased weighing 437 lbs. and cost \$339 per head. The 79 steers are half of 158 total steers for the 80 acres of lovegrass pasture. This stocking rate is based on a nutrient requirement of 2.8 AUM per head during the period May through September (Table XVI). These steers are sold in September for \$443.77 per head resulting in a net operating margin of \$48.63 per head.

TABLE XVII
SUMMARY OF STOCKER STEER BUDGETS

Name	Description	Buy	Sell	Head	Sales	Expenses
STKR4_9	Summer Stockers May-September	4.37	6.49	79	34,170	30,328
STKR10_3	Winter Stockers November-March	4.37	6.65	82	37,492	31,311
STKR10_5	Winter Stockers November-May	4.37	7.63	129	62,799	50,614

TOTAL					SALES	EXPENSES
					243,152	189,372

Budget STKR10_3 (Appendix A) is for 82 head of stockers purchased in November and sold in March. These steers are also purchased at 437 lbs. and cost \$322 per head. Animal nutrient requirements are provided through grazing the entire 976 acres of wheat pasture. The 82 head of stockers must be sold in March to allow the wheat that will be harvested time to mature. Stockers are sold in March at 679 lbs. for \$469 per head. Net operating margin for the stockers sold in March is \$75.37 per head. The 82 head is the difference between the total stockers purchased in November (211 head) and the number sold in May (129 head). Stocker nutrient requirements are 2.54 AUM per head for the period November through March (Table XVI).

Budget STKR10_5 (Appendix A) describes 129 stockers that are also bought in November at \$322 per head but sold in May. These steers are sold at 779 lbs. for \$498.40 per head. Net operating margin for the stockers sold in May is \$94.46 per head. Stocker nutrient requirements are 1.94 AUM per head for the period March through May (Table XVII). The May stockers have 280 acres of grazeout wheat which produce 1.8 AUM per acre. The available AUM's translate into a pasture capacity of 259 head but only 129 of these are purchased due to the capital constraint. The remainder of the pasture production is utilized by someone who is willing to rent the additional pasture for stocker cattle.

The Additional Information Budget

This budget provides a means of accounting for cash inflows and outflows that are not readily attributable to any one production activity (Appendix A). The AI budget records the receipts from pasture rents, off-farm wages, taxes, insurance, family living expenses and new borrowing.

Cash rents received from wheat pasture are calculated assuming a \$2.00 per cwt. per month charge for wheat pasture and a \$1.75 per cwt. per month charge for lovegrass. Rent received for pasture grazed from November through March comes to \$43.70 per head or \$3,583 based on 82 head of stockers. Rent received in May is for 129 head of stockers. These stockers are charged \$70.30 per head for a total rent charge of \$9,068. The 79 head

of steers on lovegrass are charged \$38.50 per head for a total rent charge of \$3,002. The difference between net operating margin per head for purchased livestock verses the per head rental fee for livestock is \$31.67 for stockers sold in March, \$24.16 for stockers sold in May, and \$10.13 for stockers sold in September.

The case farm receives a total of \$15,532 in off-farm wages and salaries. Ten thousand two hundred dollars of the total are derived from full employment of the spouse and the other \$5,332 comes from hourly contract work performed by the farm operator.

Other operating expenses include, hired contract labor of \$4,464, annual real estate taxes of \$2,500, annual insurance premiums of \$3,200, and utilities separate from the farm of \$1,225. The family living expense of \$12,950 is included in the additional information budget as is the annual capital purchases of \$27,714.

The AI budget along with the seven crop and livestock budgets characterize the annual cash inflows and outflows associated with a farm business such as the one modeled in the case farm.

Labor and Management

Labor resources are determined by assuming the farm is owned and operated by a family of four. Labor is provided primarily by the farm household, all additional labor required is hired on an hourly wage basis. The spouse's labor is not used in the farm plan, rather it is employed away from the farm at an annual after tax wage of \$10,200.

The amount of labor required is determined from the OSU Crop & Livestock Budgets per activity chosen to be in the farm plan. Table XVIII illustrates the per month distributions for labor requirements. These figures are based on estimates of the amount of labor required per acre or per head to operate all machinery and equipment involved in the chosen activity. These figures also reflect other labor requirements associated with being involved in the production activities of the case farm. Total labor requirements for the activities chosen are 4282 hours per year. As Table XVIII illustrates, labor requirements

occur in a "lumpy" fashion with a high degree of variation from month to month. As a result throughout the year there will be labor surpluses in some months and labor shortages in others.

Labor provided by the operator is determined by assuming an average of 40 hours per week from October through April and 55 hours per week from May through September. This results in total labor contributions by the operator of 2220 hours per year. Labor contributions from the children are based on an average contribution of 50 hours per week per child during the summer months and 15 hours per week per child during the school year. Together the children contribute an average of 2280 hrs. per year to the farm plan. Annual labor availability averages 4500 hours per year.

The amount of labor that must be hired from an outside source is found by taking the difference between the amount of labor provided and the amount of labor required (Table XVIII). The total amount of labor hired is 1116 hours. Because the need for additional labor arises periodically, it is assumed that labor is hired on as needed bases at \$4.00 per hour.

The amount of labor available for employment off the farm is 1,334 hours. It is assumed that this labor is contracted out on an hourly basis at a wage of \$4.00 per hour. Since the labor is available during the school year the operator might work as a bus driver, janitor or other part-time jobs.

Because the operator and family have an opportunity cost associated with their labor each hour of labor required in the farm business is paid a wage of \$4.00 per hour. This results in total annual labor costs of \$17,128. Of the total labor cost, \$4,464 goes to hire additional labor and the remaining \$12,664 is returned to the operator and family as their imputed return to labor.

The manager of the farm is assumed to be knowledgeable in both crop and livestock production. The manager's objective is to maximize net returns to the operation and to work towards viability in the over all financial performance of the business to insure firm survival.

TABLE XVIII

HOURS OF LABOR REQUIRED FOR THE BASE CASE FARM

Month	Wheat 1096	Grain Sorghum 64 acres	Lovegras 120 acres	Winter Stockers 290 head	Summer Stockers 79 head	Labor Required By Month	Hours Operator & Family	Labor Hired	Labor Off- Farm
January				113		113	288	0	175
February	296			113		409	288	121	0
March		30	18	113		161	288	0	127
April		15		68		83	288	0	205
May		12	18	58	36	124	384	0	260
June	946	17	12		22	996	560	436	0
July	701	24			22	747	560	187	0
August	614	99			23	735	560	175	0
Sept.Oct ober	570				29	599	384	215	0
November				171		171	288	0	117
December	31			114		145	288	0	143
TOTALS	3158	195	48	749	132	4282	4464	1134	1316

To accomplish this the manager chooses a farm plan that in terms of knowledge and expectations makes efficient use of the available resources of land, labor, capital and managerial ability.

Management's wage is imputed from a minimum family living allowance. This allowance is based on the Median non-metropolitan income for 1985 of \$20,938. If this figure is adjusted by the implicit net rental value of the farm dwelling and income tax adjustments, the estimated minimum farm family living needs are reduced to \$12,950 (Duncan and Harrington, 1986). The \$12,950 provides a family living requirement that is above the poverty level and represents an austere budget on which a farm family of four might be expected to live. This figure is separate from the imputed return to labor and serves as a conservative opportunity return to management.

Capital

The credit reserve structure of the farm business is divided into short, intermediate and long term sources. Short term reserves consists of cash on hand, other assets that can be converted to cash within the year, plus short term borrowing through the operating note. Intermediate reserves are primarily the equity in the machinery and equipment and securities that may not be readily marketable within one year. Long term reserves consist of the equity in the firm's fixed assets, namely land.

Short Term Capital. Short term capital is borrowed at an interest rate of 11.5 percent. This is the average rate charged by reporting institutions for agricultural borrowers in the Tenth district of the Federal Reserve System (Financial Letter, 1st quarter, 1987). As discussed in Chapter III, the need for short term borrowing and thus credit reserves arises because of the lag between the beginning of the production process and the culmination of the sale of those commodities produced.

Generally short term borrowing occurs through an operating loan. This loan functions as a line of credit much like a credit card not to exceed some predetermined level.

The operating note insures the farm operator that business can be conducted in an efficient manner without costly delays while protecting the lender from over extending the credit capacity of the borrower. In the case of large downpayments for machinery or stocker cattle purchases special approval often has to accompany the loan and may require the taking of additional security to help insure the lender against the increased risk associated with higher debt loads. For the case farm it is assumed that a capital constraint exist limiting the funds available for stocker purchases by one-half the total carrying capacity of the case farm. The capital constraint is tied to the D/A ratio and thus the 50 percent limit on the total number of stockers that are pastured. It is assumed the borrower has an arrangement with the lender that funds are available for livestock as long as the other available pasture is rented out on a cash for gain in cattle basis. The rent received on the pasture is pledged as additional collateral on the livestock loan.

It is not unusual for short and intermediate term capital reserves to be used together as security for operating loans. In situations where a farm operator continues to over extend the repayment capacity of the farm, financial losses occur resulting in the need for additional forms of security. Where sufficient equity exist, lenders will respond by requesting second or third mortgages on real estate. These mortgages will provide funds to reduce operating loan balances and to inject needed cash flow into the business. Many times, unless prices or yields improve substantially the repayment capacity of the farm is burdened further by these additional mortgages increasing the probability that the farm will experience financial stress. Over the long run financial stress problems are compounded making it difficult to improve financial performance of the farm business.

Intermediate Capital. As stated above, intermediate credit reserves are comprised of some portion of the equity in the machinery and equipment necessary for the production activities included in the farm plan (Table XIX).

In this study it is assumed that intermediate capital is borrowed on an annualized basis to replace machinery and equipment. Although, intermediate assets are usually

TABLE XIX
BASE CASE FARM MACHINERY AND
EQUIPMENT COMPLIMENT

Machinery and Equipment	Year	Years Owned	Useful Life	Purchase Price	Salvage	Annual S/L Depr.	Accum. Depr.	Asset Value
Tractor 155 hp	1981	6	10	49890	9978	5702	34210	15680
Tractor 110 hp	1984	3	10	49484	9897	5655	16966	32518
Tractor 60 hp	1986	1	10	24600	4920	2811	2811	21789
Sp. combine 24 ft.	1979	8	10	47000	11400	6514	52114	11400
M.B. Plow (5-16)	1976	11	12	4500	900	514	5657	900
M.B. Plow (6-18)	1980	7	12	6100	1220	697	4880	1220
Offset Disk 20 ft.	1979	8	12	10000	2000	1143	9143	2000
Offset Disk 16 ft.	1977	10	12	7800	1560	891	8914	1560
Sweep Plow 25 ft.	1986	1	10	11800	2360	1349	1349	10451
Sweep Plow 15 ft.	1986	1	10	8900	1780	1017	1017	7883
Springtooth 30 ft.	1977	10	12	3200	640	366	3657	640
(2) Drills w/o fert. 14 ft.	1981	6	10	11200	2240	1280	7680	3520
Anhydrous Applicators 25 ft.	1985	2	15	5200	1040	594	1189	4011
anhydrous Applicators 15 ft.	1985	2	15	3150	630	360	720	2430
Dozer Blade 6 ft.	1974	13	15	2850	570	326	4234	570
18 ft. Gooseneck	1978	9	10	4995	999	571	5138	999
1978 2.5 ton Truck	1978	9	15	17500	3500	2000	18000	3500
1972 2.5 ton Truck	1972	15	15	14800	2960	1691	25371	2960
1985 3/4 ton Pickup	1985	2	5	13500	2700	1543	3086	10414
1982 3/4 ton Pickup	1982	5	5	9280	1856	1061	5303	3977

TABLE XIX (CONTINUED)

Machinery and Equipment	Year	Years Owned	Useful Life	Purchase Price	Salvage	Annual S/L Depr.	Accum. Depr.	Asset Value
1984 4-door car	1984	3	5	15000	3000	1714	5143	9857
			TOTAL		66150	37800	216583	148280

Source: Purchase Price - National Farm Tractor and Implement Blue Book
 Useful Life - OSU Crop & Livestock Budgets
 Interest Rates - Kansas City Federal Reserve Financial Letter
 S/L Annual Depreciation is for Seven Years

purchased in a lumpy fashion, the farm still must be able to generate the required downpayments and corresponding loan payments necessary to make these purchases when they occur. As a result, over the five year planning horizon of 1987-1991, used in this study, the overall effects on financial performance should work out to be about the same. Choat and Plaxico (1987) suggest that because financial stress may be a short run phenomena capital replacement can be foregone. Although this is a plausible assumption, if the farm operator uses the machinery compliment past its useful life the expense of operating the machinery increases while exhausting all of the assets trade-in value. In such cases the farm operator is faced with borrowing large amounts of capital to finance several pieces of equipment and machinery at one time. This could overload the farm's repayment capacity once again jeopardizing the financial performance of the farm business. In this study it is assumed that capital purchases are averaged and that this accurately portrays the overall effect of capital replacement on the farm's financial performance.

The total amount of equipment that is replaced over the five year analysis period is divided into five equal investments. The annual capital replacement figure is arrived at using the machinery and equipment replacement coefficients from the OSU Crop and Livestock Budget Generator. Machinery and equipment retired each year is carried on the balance sheet at a book value of \$3,000. Machinery and equipment remaining in the inventory is depreciated by \$20,755. To begin the next years business with intermediate assets equal in value to those in the initial year requires purchasing \$27,714 worth of new machinery and equipment annually. The difference between the \$23,755 and the \$27,714 is the depreciation which occurs on the new capital purchases in the first year of ownership (Table XX).

This assumption requires that each year of the analysis a 25 percent down payment of \$6,928 must be made either from cash reserves or through additional borrowing in the operating note. The \$20,786 of additional intermediate borrowing result in increasing principal and interest expenses by \$5,624 annually. The additional debt repayment is made through the cash flow either by cash reserves or increased borrowing on the operating note.

TABLE XX
 ANNUAL MACHINERY AND EQUIPMENT REPLACEMENT SCHEDULE
 FOR BASE CASE FARM

Year	Machinery Vehicles	Retire	Subject to Deprec.	Value 12/31/87	Beginning New Purchase Value	New Purchase Value 12/31/87	Total Ending Value 12/31/87
01/01/87	Machinery Vehicles	2400 600	115171 30109	98718 25796	21995 5719	18853 4902	117571 30709
01/01/88	117571 30709	2400 600	115171 30109	98718 25808	21995 5719	18853 4902	117571 30710
01/01/89	117571 30710	2400 600	115171 30110	98718 25809	21995 5719	18853 4902	117571 30711
01/01/90	117571 30711	2400 600	115171 30111	98718 25809	21995 5719	18853 4902	117571 30711
01/01/91	118581 30711	2400 600	115171 30111	98718 25809	21995 5719	18853 4902	117570 30711

Thus, farms in financial stress with a line of credit are able to increase the operating note in order to make payments on intermediate and long term debt unless the lender exercises considerable control over the expenses by the borrower.

Long Term Capital. The long term credit reserves associated with the benchmark farm are comprised of owned land and other real estate fixtures. Land is divided into 320 acres of good cropland valued at \$535 per acre, 480 acres of average cropland valued at \$430 per acre, and 120 acres of lovegrass pasture valued at \$285 per acre. The average value of the 935 owned acres including fixtures, as of January 1, 1987, is \$554 per acre or \$518,300. Because of the current economic conditions in the farm sector and moreover the imposed financial stress conditions that have been built into the case farm no additional long term investments are considered. However, any equity reserves that accumulate in the land are assumed to act as insurance against loss subsequently reducing the level of financial risk as well as total risk. The following section discusses the initial financial position of the case farm.

Original Plan - Assuming a 50 Percent D/A Ratio

This section discusses the initial financial position of the representative case farm. Information from the IFFS model is presented describing the profitability, liquidity, and solvency/risk position of the case farm assuming a D/A ratio of 50 percent.

Profitability - Net Farm Income. Table XXI illustrates the Income Statement for the base case farm. During 1987 gross farm receipts for the base case are \$258,805 and cash operating expenses totaled \$237,392 of which interest on debt accounted for \$40,966. This interest expense is almost double any other single expense item except for livestock purchases. Gross farm sales minus operating expenses leaves net cash income from operations of \$21,413 to cover family living expenses and capital reinvestment. Living

TABLE XXI

INCOME STATEMENT FOR BASE CASE FARM - 1987

OPERATING RECEIPTS		CASH FARM EXPENSES	
Livestock Purchased for resale:	134461	Hired Labor	17176
Crop Sales:	57187	Machinery Repairs	12802
Other Farm Income:		Other Repairs	543
Government Payments	51504	Cash Interest	40966
Custom Work, Other	15708	Feed Purchased	3028
GROSS FARM RECEIPTS:	258860	Seed and Plants	5428
		Fertilizer & Chemicals	27431
		Machinery Hire	5057
		Supplies	0
		Vet, Medicine	3213
		Fuel, Oil & Lubricants	14985
		Taxes	2500
		Insurance	3200
		Farm Utilities	1350
		Cash Rent & Leases	0
		Freight & Trucking	0
		Livestock Purchased for Resale	94839
		TOTAL CASH EXPENSES	237436
		NET CASH INCOME FROM OPERATIONS	21424
ADJUSTMENTS FOR ACCRUED ITEMS AND INVENTORIES:			
Change in Accounts and Notes Receivable			600
Change in Accounts Payable & Accrued Expenses			723
Changes in Inventories			0
Changes in Capital Stock			-30234
		NET FARM INCOME	- 7487

expenses are excluded from the net farm income calculation but capital reinvestment is not. Along with depreciation of homestead improvements in the amount of \$3,150, other adjustments to net farm income are a \$600 increase in savings and securities and a reduction in interest expense of \$723. Because of the interest expense incurred on previously acquired debt and new capital purchases net farm income in 1987 is a negative \$7,498.

Liquidity - Net Cash Flow. Table XXII illustrates a summary of the financial performance of the base case farm for 1987. The top section provides a summary of cash inflows and outflows as well as the basic financial performance ratios. The middle section provides a summary of the net cash flow's sensitivity to farm receipts and expenses. The bottom section summarizes measures of rates of return to equity, investment and average cost of capital.

With cash farm receipts of \$258,805 plus nonfarm income of \$15,532 and total cash farm expenses of \$196,426 plus \$12,950 in family living expenses \$64,960 are left to service debt and make capital replacement purchases. However, debt payments equal \$58,305 plus interest on the operating note of \$3,777 resulting in cash available for new investment and risk of \$2,878. The \$2,878 is insufficient to cover a down payment on capital purchases of \$6,929 resulting in a negative net cash flow of \$4,050 for 1987.

Beginning in 1987 the operating note has a carry over balance of \$40,000. The ending balance is \$44,050 for an increase of \$4,050. The Maximum balance is \$73,955 which occurs in November when the \$68,048 in stocker purchases are made. The operating note balance is reduced to the ending balance of \$44,050 when \$32,015 in government payments are received in December.

Solvency - Equity Position. Table XXIII represents the beginning Net Worth Statement for the base case farm plan. The base case farm initially controls 50 percent of the \$818,096 of total assets. The assets are distributed as follows: Current Assets of

TABLE XXII
FINANCIAL PERFORMANCE SUMMARY FOR
BASE CASE FARM - 1987

		Beg.	End
		-----	-----
Cash Farm Receipts	258805	Current Ratio	1.283
Total Cash Expenses	196426	Working Asset	1.185
Family Living	12950	Ratio	1.787
Nonfarm Income	15532	Leverage Ratio	1.061
Cash Available for		Debt/Asset	
Debt Service	64960	Ratio	0.510
Interest Payments	37189	-----	
Principal Payments	21116	Operating Note Summary:	
Cash Available for		Beginning Balance	40000
New Investment	2878	Ending Balance	44050
Downpayment on		Change	-4050
Capital Expenditures	6929	Maximum Balance	73955
Interest Payment		Minimum Balance	0
on Operating	3777	-----	
NET CASH FLOW	-4050		
Cash Flow Sensitivity:			

Net Cash Flow as a % of Cash Farm Receipts			-1.56%
Net Cash Flow as a % of Cash Operating Expenses			-2.06%
Interest Paid as a % of Cash Farm Receipts			15.83%

Rate of Return on Equity =	:	Rate of Return on Inv'm't =	
	:		
NFI - Family Living	:	NFI + Int Pd - FL	
----- = -5.14%	:	----- = 2.53%	
Beginning Net Worth	:	Beg. Total Assets	
	:		
Average Interest Rate on Debt =			
Interest Paid + Change in Interest Due			
-----		= 11.00%	
Average Total Debt Outstanding			

TABLE XXIII
NET WORTH STATEMENT FOR BASE CASE FARM 1987

CURRENT ASSETS	Beginning	Ending Balance	Net Balance	Change
Cash & Checking		1000	1000	0
Accounts Receivable		12651	12651	0
Cash Value of Life Insurance		10000	10600	600
Purchased Livestock		73639	73639	0
Stored Crops, Feed, Supplies		3150	3150	0
Cash Investment in Growing Crops		30165	30165	0
TOTAL CURRENT ASSETS		130605	131205	600
-----INTERMEDIATE ASSETS-----				
Vehicles		30709	30709	0
Machinery & Equipment		117571	117571	0
Securities Not Readily Marketable		14550	14550	0
TOTAL INTERMEDIATE ASSETS		162830	162830	0
-----FIXED ASSETS-----				
Buildings & Improvements		31500	28980	-2520
Cropland		452600	452600	0
Pasture		34200	34200	0
TOTAL FIXED ASSETS		518300	515780	-2520
TOTAL ASSETS		811735	809815	-1920
-----CURRENT LIABILITIES-----				
Notes Payable		40000	44050	4050
Interest Due: Current		750	0	-750
Intermediate		8897	9783	886
Long Term		28292	27433	-859
Taxes Due: Real Estate		2500	2500	0
Employee Payroll		220	220	0
Principal Due: Intermediate		11670	16408	4738
Long Term		9446	10305	859
TOTAL CURRENT LIABILITIES		101775	110699	8924
-----INTERMEDIATE LIABILITIES-----				
Notes Payable		62470	66847	4377
-----LONG TERM LIABILITIES-----				
Mortgages and Notes Payable		249674	239369	-10305
TOTAL LIABILITIES		413919	416915	2996
NET WORTH		397816	392900	-4916
TOTAL LIABILITIES AND NET WORTH		811735	809815	-1920

\$136,966, Intermediate Assets of \$162,830 and Long Term Assets of \$518,300.

Net changes in current assets occur through growth in the cash value of life insurance at a rate of 6 percent per year. Because of the nature of the production and price relationships assumed in the base case farm, the value of cash on hand remains at \$1,000. In addition, purchased livestock, inventories, and cash investment in growing crops remain at 1987 levels throughout the analysis period.

Intermediate assets include vehicles, machinery and equipment, and stocks associated with land purchases. Intermediate assets have a zero net change in value because as discussed earlier, capital replacement purchases are assumed to be equal to the sum of the salvage value of machinery, and machinery and equipment depreciation across the analysis period.

Long term assets include the homestead with buildings and improvements, cropland and pasture. It is assumed that the homestead depreciates at 8 percent per year. It is further assumed that all but major repairs can be foregone since the homestead should have only indirect effects on the productivity and efficiency of the farm business. In addition to these assumptions the value of real estate is fixed over the analysis period.

There are total claims of \$413,919 against the assets distributed as follows: Current Liabilities of \$101,775, \$62,470 of Intermediate Liabilities and Long Term Liabilities of \$249,674.

Current liabilities are the operating note, interest due, taxes, and principal due in the current year. The operating note and debt repayment figures vary from year to year and taxes are assumed fixed. The operating note for the base case farm increases gradually over the analysis period as it absorbs interest and principal payments for intermediate and long term liabilities, capital purchases downpayments, and other expenses which exceed the repayment capacity of the farm's production unit.

The only intermediate liabilities are the notes payable for machinery and equipment. Notes payable for machinery and equipment generally decline over the analysis period as a balance is formed between new debts being incurred and the rate of debt retirement.

Long term liabilities are the real estate mortgages discussed at the first of the chapter. Since no real estate purchases are made long term liabilities are declining over the analysis period as long term payments are made. These payments are made through the cash flow and may be borrowed through the operating note if necessary.

The difference between the value of total assets and total liabilities results in a beginning equity position for the base case beginning in 1987 of \$397,816. The equity position declines over the course of the year to \$392,900 for a modest decline of \$4,916 or 1.2 percent. The negative change in equity is primarily due to growth in notes payable of \$4,050. Notes payable increases because of insufficient cash flows to cover interest, principal and downpayments on capital reinvestment expenditures.

Analysis of Financial Performance

In general, for the price and cost relationships assumed here, the 50 percent D/A farm case results in intermediate to long run economic deterioration but avoids bankruptcy over the analysis period. However, the 50 percent D/A case does demonstrate the need to bring the expenses involved in running the business back in line with the long run repayment potential of the production unit and off farm income.

In terms of the conceptual model, the base case farm with an initial D/A ratio of 50 percent, has an average return to assets of 2.69 percent with an average A/E ratio of 2.08. The average cost of debt over the analysis period is 10.9 percent and the average leverage ratio is 1.08. Consumption is already included in the return to assets and tax consequences are ignored in this study. The resulting calculated average return to equity is a negative 6.31 percent. These results are presented in comparative tables in Chapter V. Chapter V presents the results and analysis of the alternative financial stress abatements considered.

CHAPTER V

ANALYSIS AND RESULTS OF THE ALTERNATIVE FINANCIAL STRESS ABATEMENTS CONSIDERED

The main objective of this study is to evaluate the impact of proposed financial stress abatements on the financial performance of a typical North Central Oklahoma wheat and livestock farm.

Debt/Asset Structures Considered

Debt/asset structures of 50 and 150 percent are chosen to represent two different aspects of financial stress occurring in Oklahoma today. In the 50 percent D/A case, problems are arising because of low net farm income and a declining liquidity position which adversely affects the expected future financial performance position of the farm business. Under this scenario, the farm operator maintains the majority of managerial control and is demonstrating that with assistance, the farming enterprise can be a successful business.

The 150% D/A structure represents a situation in which zero liquidity exist in the cash flow, the collateral is pledged at values greater than its worth and farm income continues to fall below levels needed to meet debt repayment, family living expenses and capital replacement costs. Under this scenario the farm's survival is threatened as the operator has forfeited most, if not all, of the managerial control of the farm's assets and has demonstrated an inability to manage existing liabilities.

In the following section, appropriate financial stress abatements are suggested for both the 50 percent and 150 percent D/A cases. The proposal of each abatement is based

on the conceptual model and evaluated by the effect it has on the financial performance of the farm business during the analysis period.

Financial Stress Abatements

Financial Stress abatements considered are

- 1) Interest rate reduction
- 2) Debt reduction
- 3) Equity infusion
- 4) Combination equity infusion and interest rate reduction
- 5) Asset sale no lease back option, and
- 6) Chapter 12 Bankruptcy

If, as suggested by the conceptual model, financial stress is assumed to begin where the rate of return to equity is zero for a given rate of return to assets, level of assets, interest rate, and leverage ratio, then the magnitude for the first through the fifth abatements can be determined from the equation

$$D/E = -R_e/(R_a - i) \quad (12)$$

and the basic accounting equation

$$A - D = E \quad (13)$$

This reasoning assumes that if the rate of return to assets and average interest rates are used from the 50 percent D/A case, the corresponding leverage ratio can be found where the return to equity is zero. By using the relationships between the leverage ratio, D/A ratio, and the A/E ratio, the corresponding debt reduction, equity infusion or asset sale can be determined. Or conversely, for a given rate of return to assets and a known leverage ratio, the required interest rate that gives a zero rate of return to equity can in like manner be determined.

Interest Rate Reduction

For the base case farm the rate of return to assets is 2.53 percent and the leverage ratio is 1.04. Using these values in expression (12) and solving for the interest rate yields a

required interest rate of 4.76 percent. In the interest rate reduction case, interest rates for real estate, intermediate, and the initial operating note balance are reduced to 4.76 percent. The initial intermediate and long term debt balances are then reamortized at the new interest rate for the remaining balance and term of the original loan. All new short term and intermediate borrowing occurs at interest rates of 11.5 and 11 percent respectfully. The production plan and capital purchase outlays are the same for the interest rate reduction case as in the base case presented in Chapter IV.

Equity Infusion

With respect to the conceptual model, the equity infusion is like the debt reduction case if all of the new equity is assumed to be applied towards reducing debts. Therefore the total amount of equity capital required to obtain a zero rate of return to equity for a return to assets of 2.53 percent and an interest rate of 11 percent is \$227,220. Under the equity capital scenario it is likely that the farm operator would have more control over how the capital could be appropriated to pay down debts.

Implementing the equity infusion case results in reducing operating debt from \$40,000 to \$20,000, intermediate debts of \$74,140 are paid off and long term debts are reduced from \$259,120 down to \$130,040. As in the other two cases the farm production unit and capital purchases remain the same for the equity infusion case as in the base case. Also, unlike the debt and interest rate reduction cases, under the equity infusion abatement existing loans that are paid down are not reamortized.

Combination Equity Infusion and Interest Rate Reduction

In Chapter III, it is illustrated that the interest rate and the leverage ratio have a compounding affect on the rate of return to equity. The equity infusion - interest rate reduction case examines a situation in which the farm operator is unable to obtain the necessary equity infusion to reduce debts sufficiently or cannot get lender agreements to

reduce interest rates sufficiently to obtain the zero rate of return which yields a zero level of stress. In this case the farm operator however is able to arrange for some interest rate reduction if equity capital can be secured.

Using an integrative process of reducing debts and the interest rate in 1 percent intervals the return to equity can be set equal to zero where assets equal \$811,735, debts are equal to \$278,087, the interest rate is 7.4 percent and the rate of return to assets is 2.53 percent. An equity infusion of \$137,832 is required to reduce debts to \$278,087. One positive aspect of this abatement is that it involves more parties to spread the costs and risks between than the other abatements considered. Here as in the interest rate reduction case, loans for which the interest rate is adjusted are reamortized over the remaining years of the original loans.

Debt Reduction

Using the rate of return to assets figure of 2.53 percent and the average interest rate of 11 percent from the base case farm, a leverage ratio of 29.87 percent is required to yield a zero rate of return to equity. If the asset structure is assumed to be unchanged then expression (13) details that equity will also be unchanged. This requires that debts then be reduced by \$227,220 to give the needed leverage ratio of 29.87 percent.

The way in which total debt is composed of short, intermediate, and long term debt affects the amount and timing of payments. This in turn affects the liquidity position of the firm. Therefore, in this analysis, implementing the reduction in debt is accomplished by assuming that debt could be reduced across short intermediate and long term categories. The operating note balance is reduced from \$40,000 to \$20,000, intermediate debts are reduced from \$74,140 to \$29,656, and long term debts are reduced from \$259,120 down to \$100,384. The existing intermediate and long term loans are then reamortized at current interest rates over the remaining terms of the original loans. Once again the production unit and capital purchases remains the same as in the base case farm.

Asset Sale-No-Lease Back Option

The asset sale no lease back option assumes a situation where the farm operator is unable to secure an interest rate reduction, debt reduction or equity infusion and as such chooses to sell assets to reduce debt obligations. Although the operator may have the option of leasing back the sold assets, here it is assumed the operator chooses instead to reduce the size of the operation and possibly wait for a longer term equilibrium in agriculture to be established before making any decisions about the size of operation to farm.

Relying on the relationships in expressions (12) and (13) assets are reduced in the amount of \$295,091. This is based on the premise that if the proceeds from assets are applied directly to reduce debts then the change in assets and the change in debts will cancel each other out resulting in no change in the value of equity. Expression (12) indicates that for a rate of return to assets of 2.53 percent and an interest rate of 11 percent from the base farm case a zero rate of return to equity is obtained for a leverage (D/E) ratio of 29.87 percent. Thus, since there is no change in the value of equity, debts after asset sales must equal 29.87 percent of the existing equity or \$118,828. The difference between the new level of debt and the original level of debt is the value of assets sold. Working through expression (13) results in a new total assets base of \$516,644 for asset sales of \$295,091.

This plan is implemented by selling 120 acres of pasture for \$34,200 and 410 acres of wheat land for \$190,795. Real estate taxes are reduced on a percentage basis for the asset sale no lease back option. Intermediate assets are reduced by \$51,898. This figure represents reducing the value of Federal Land Bank stock and selling a portion of the large machinery which is no longer needed to farm the reduced acreage. This plan results in adjustments to current assets of \$18,198 as pasture rents and investment in growing crops decline from the sale of assets.

Implementing the asset sale - no - lease back option requires reducing owned wheat that is harvested to 310 acres and 137 acres of grazeout. Stocker livestock purchases are

reduced by the sale of the 120 acres of lovegrass. Winter stockers purchased remain at 210 head and the number of stockers that run on wheat pasture rented out declines to 40 head in March and 34 head in May. Adjustments in livestock and wheat acres result in adjustments to the labor hired and worked off the farm. As a result of fewer hours required in the farming operation, off farm income not including the spouses \$10,200 increases to \$6,804 per year. The sale of machinery reduces the annual capital replacement expenditure to \$17644 from the \$27714 figure in the base case.

Chapter 12 Bankruptcy

When liability claims against assets exceed the value of those assets the farm business is said to be insolvent. In this study an insolvent farm case is developed by assuming that the farm's asset structure and production unit are the same as in the 50 percent D/A farm case. However, the level of debts across all three categories are increased to bring about the 150 percent D/A ratio. Until late 1986 farm operators had two general options to consider in such instances. The first option was to file Chapter 7 bankruptcy and liquidate all of the farm's assets except those protected under the bankruptcy code. The second option was to file Chapter 13 or possibly 11 bankruptcy with hopes of restructuring debts into a more manageable package. However, neither of these options provided adequate recourse for the serious nature of the farm financial crisis. Under pressure to protect the integrity of American agriculture, legislators devised a new reorganization plan for insolvent farms.

Chapter 12 bankruptcy is an option to restructure debts under the Family Farmer Bankruptcy Act signed into law November 26, 1986. Under the initial act, Chapter 12 is available to qualifying farmers for a period of seven years. Eligibility is limited to an individual or closely held corporation or partnership whose aggregate debt is \$1.5 million or less. The filer must derive more than 80 percent of the debt and 50 percent of the gross

income from farming. Chapter 12 has several provisions of particular interest to farmers (Table XXIV).

After the debtor files a Chapter 12 bankruptcy petition, the debtor has 90 days to submit a farm reorganization plan to the court. Usually this plan gives a detailed description of farm and nonfarm sources of income in addition to documenting farm and nonfarm expenses. During the bankruptcy proceedings the debtor and creditors work out details concerning interest rates, amortization terms and use of any excess generated funds that might occur in the cash flow. The following paragraphs outline the important aspects of qualifying for Chapter 12 and the necessary assumptions required to implement this abatement in the IFFS simulation.

In this study the reorganization plan is implemented by writing debts down to the value of the collateral used to secure them. In the case of short term debt, an operating note of \$200,000 is written down to the value of investment in growing crops and inventories or \$59,645. The \$59,645 is set up as an intermediate loan at 9 percent interest paid out over 5 years. Borrowing for livestock is treated as a separate note where an agreement is reached to continue to loan funds for stocker purchases without creating an intermediate loan for the livestock note at the time of filing for bankruptcy. Intermediate debts are decreased from \$150,000 to \$127,091 which results in a 100 percent D/A ratio for intermediate assets and liabilities. The long term debts consisting of real estate first and second mortgages are written down from \$775,000 to \$515,780.

As is often the case, the equity that should secure these notes disappeared when asset values began to decline in 1983 and 1984. The loss of equity results in \$422,484 of debt being held by unsecured creditors.

The reorganization plan calls for any excess cash flow to be applied as payments to non-secured creditors. Considering that under Chapter 12 guidelines the farm business begins the plan with a 100 percent D/A ratio, meeting debt repayment obligations on farm

TABLE XXIV
CHARACTERISTICS OF CHAPTER 12 BANKRUPTCY

Type	Farm Reorganization
Qualification	<u>Individuals</u> ≤ \$1.5 million in total debt. ≥ 80 percent of debt from farm. ≥ 50 percent of gross income from farming.
Plan	Debtor has 90 days to file Plan.
3-5 year plan.	Debts with terms > 5 years may still be modified under the plan.
Expedited confirmation -- hearing concluded within 45 days after plan is filed.	Only debtor may propose plan.
<u>Secured Creditors</u> may not veto plan if: 1) they are paid at least the net present value of the collateral or 2) they are given their collateral	<u>Unsecured Creditors</u> may not veto plan if: 1) they are paid the amount they would receive in Ch 7 and all projected disposable income is applied toward payments under the plan or 2) they are paid the allowed amount of their claim.
Adequate Protection	Cash payments or additional liens equal to decreased value of security or fair rental value for land.
Trustee	Trustee is required. Fees set by court. Max. = 10 % of \$450,000 plus 3 % of balance.
Filing Fee	\$200
Income tax treatment	Chapter 12 does not create a separate tax entity for federal tax purposes.

income alone may be difficult. Fortunately many farm operators are able to add considerable off-farm income to be used in servicing debt.

Under the base Chapter 12 case the debtor household earns off-farm income of \$33,100 per year. Family living expenses remain at \$12,950 and other farm income such as custom work totals \$20,411. Under Chapter 12 guidelines a "trustee" is appointed by the court. The trustee fee is 10 percent of the total amount of payments made during the plan or \$7,996. The farm reorganization plan assumes no machinery purchases during the three years of the reorganization plan. In years four and five of the analysis, machinery and equipment investment totals \$27,714.

Results and Analysis

In this section the analysis and results of the impact on farm financial performance of the six "financial abatements" are presented. Financial abatements such as interest rate reductions, debt reductions, or combinations involving these abatements require the cooperative effort of both lenders and borrowers and may require the enactment of legislation to outline the implementation of such programs. On the other hand, abatements such as equity infusions or assets sales do not necessarily require any kind of lender cooperation or legislative guidelines for their implementation. An equity infusion or asset sale requires only that someone is willing to provide the equity or purchase the assets. For the Chapter 12 Bankruptcy abatement, legal guidelines have been established to provide a somewhat flexible framework of implementation.

The results and analyses of each of the abatement options are described in the following sections. A financial performance comparison of the 50 percent D/A abatements is presented in Figure 6. Following the financial stress abatements for the 50 percent D/A case, the financial performance of the 150 percent D/A case is briefly described followed by the results and analysis of the financial performance of the farm during and after the Chapter 12 reorganization plan.

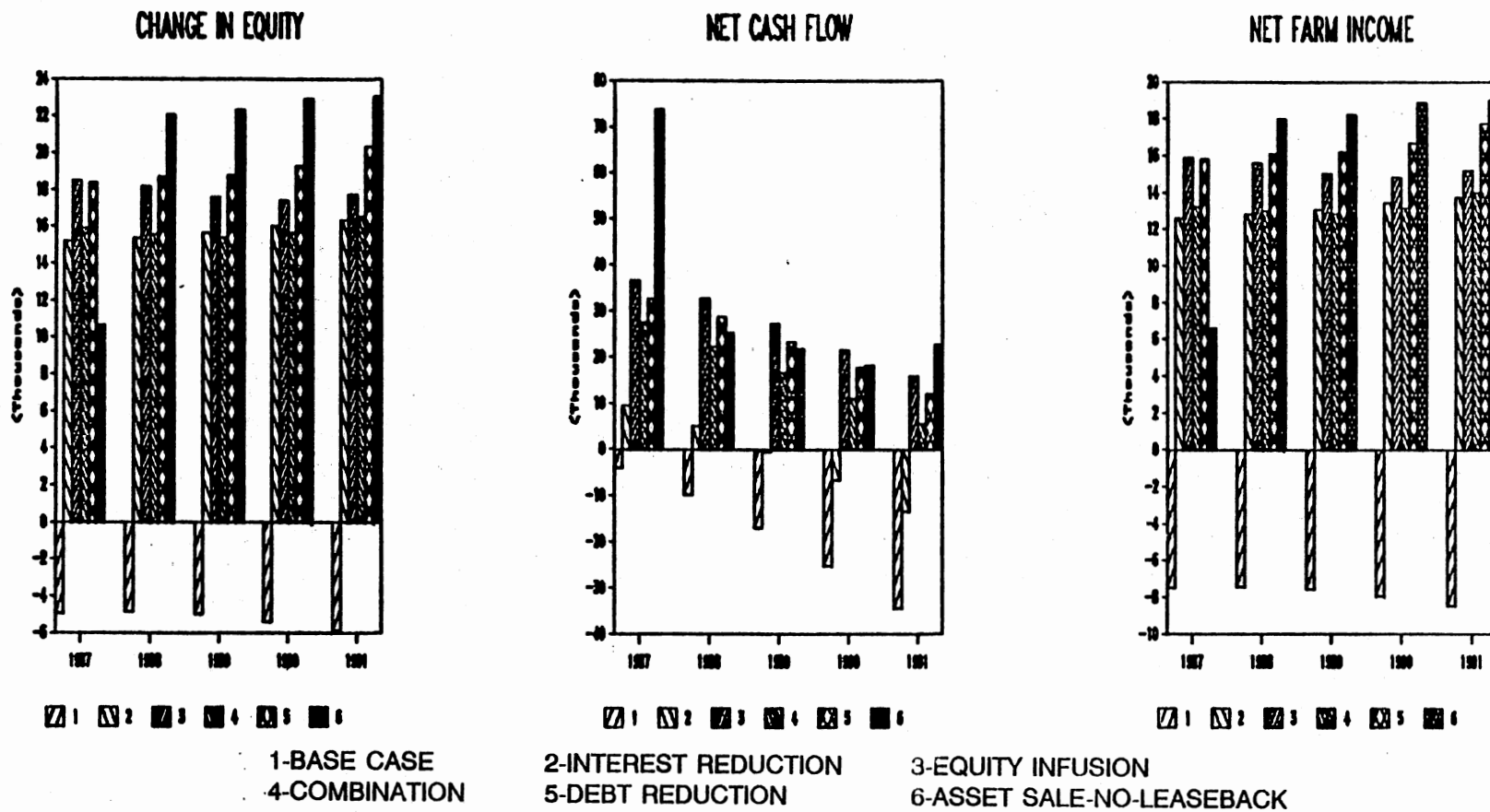


Figure 6. Comparison of NFI, NCF, and Change in Net Worth between Base Case and Financial Abatements for 50 Percent D/A Ratio

Interest Rate Reduction

As prescribed by the conceptual model, interest rates on existing debts are reduced from an average of 11 percent to 4.76 percent. The interest rate reduction results in cutting interest expense by more than half. In the original base case interest expense is twice net cash income from farming. Therefore if interest expense is halved, NFI should almost double. In a like manner, reducing interest rates should improve the liquidity position of the farm business. Because the liquidity and profitability positions of the business are expected to improve, there will be a corresponding increase in equity as long as NFI and NCF are greater than zero.

Results. The reduction in interest rates abatement improves NFI, NCF and the Equity Position of the farm substantially over that of the original case (Table XXV). However, of the five abatements tested, the interest reduction produces the smallest improvement in each of these categories over the analysis period.

Net farm income for this case averages \$13126 and the return to equity in 1991 is positive but closer to zero than to one at 0.17 percent. Net cash flow averages negative \$1259 for the interest rate reduction over the analysis period. Liquidity in current and intermediate assets does improve over the base case with a working assets ratio of almost two. However, the negative NCF is probably more important in terms of measuring improvement in the farms liquidity position over the analysis period. The solvency position of the firm shows slow but steady improvement over the analysis period as the annual change in equity increases from \$15,180 in 1987 to \$16,348 in 1991. The increase in equity results in an ending D/A ratio of 40 percent in 1991.

Analysis. The interest reduction abatement improves the NFI, NCF, and equity positions of the farm over the base case. However, the average NFI of \$13,126 is barely enough to cover the annual family living expense of \$12,950. There is only \$176 left over to be considered as a return to land and risk as indicated by the low rate of return to equity of

TABLE XXV

A COMPARISON OF FINANCIAL PERFORMANCE CRITERIA
CASE FARM VS. INTEREST REDUCTION

	1987		1988		1989		1990		1991	
	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION
PROFITABILITY										

Net Cash Income	62379	62379	62379	62379	62379	62379	62379	62379	62379	62379
+ Adjustments										
Invent. Chngs.	-28911	-29754	-28805	-29829	-27896	-29125	-26921	-28383	-25874	-27601
= A N C I	33468	32625	33574	32550	34483	33254	35458	33996	36505	34778
- Cash Int. Exp.	40966	20026	41030	19770	42048	20192	43407	20571	44989	21012
= NET FARM INCOME	-7498	12599	-7456	12780	-7565	13062	-7949	13425	-8484	13766
LIQUIDITY										

Total Cash										
for Debt Service	64960	64960	64960	64960	64960	64960	64960	64960	64960	64960
- Principal Due	21116	28549	26714	33303	32928	38494	39829	44166	47493	50368
- Interest Due	40966	20026	41030	19770	42048	20192	43407	20571	44989	21012
= Cash for Inv.	2878	16385	-2784	11887	-10016	6274	-18276	223	-27522	-6420
- Proj. Cap. Exp.	6929	6929	6929	6929	6929	6929	6929	6929	6929	6929
= NET CASH FLOW	-4051	9456	-9713	4958	-16945	-655	-25205	-6706	-34451	-13349

TABLE XXV (CONTINUED)

	1987		1988		1989		1990		1991	
	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION	CASE FARM	INTEREST REDUCTION
SOLVENCY										

Beginning										
Total Assets	811735	811735	809815	809815	808133	808133	806674	806674	805426	805426
- Total Liabil.	413919	393260	416915	376160	420108	359117	423632	342014	427753	324761
= Net Worth	397816	418475	392900	433655	388025	449016	383042	464660	377673	480665
Ending										
Total Assets	809815	809815	808133	808133	806674	806674	805426	805426	804378	804378
- Total Liabil.	416915	376160	420108	359117	423623	342014	427753	324761	432607	307365
= Net Worth	392900	433655	388025	449016	383051	464660	377673	480665	371771	497013
CHANGE										
IN NET WORTH	-4916	15180	-4875	15361	-4974	15644	-5369	16005	-5902	16348
DEBT/ASSET RATIO	50.99%	48.45%	51.48%	46.45%	51.99%	44.44%	52.52%	42.40%	53.11%	40.32%

THE AVERAGE CALCULATED RATE OF RETURN TO EQUITY										

$R_e = R_a*(A/E) - i*(D/E)$	AVERAGE RATE OF RETURN TO ASSETS (R_a)		AVERAGE ASSET TO EQUITY RATIO (A/E)		INTEREST RATE (i)		AVERAGE DEBT TO EQUITY RATIO (D/E)		AVERAGE RATE OF RETURN TO EQUITY (R_e)	
BASE CASE FARM	0.0269		2.0846		0.1099		1.0846		-0.0631	
INTEREST REDUCTION	0.0253		1.8038		0.0621		0.8038		-0.0042	

0.17 of a percent. The interest rate reduction abatement provides less improvement in farm profitability than the other abatements. One possible explanation is that the interest rate reduction reduces the cost of debt while the other abatements reduce the amount of outstanding debt. As demonstrated by the expression

$$f'(R_e)/i = (k)*(D/E)$$

from Chapter III, the effect on the rate of return to equity of a one unit change in interest rates is dependent upon the magnitude of the leverage ratio. Because the relationship between the leverage ratio and the interest rate is a positive one, as the leverage ratio increases the effect of a one unit change in the interest rate on the rate of return to equity also increases proportionally.

Since new borrowing occurs at current interest rates the average cost of debt increases over the analysis period. By the third year of the analysis interest expense causes debt payments to exceed the cash available for debt service. Therefore, the interest rate reduction abatement results in the farm continuing to have liquidity problems although less than those experienced by the base case farm.

Equity Infusion

The second abatement investigated is the equity infusion. The equity infusion reduces existing debts by \$227,220. Reducing total farm debt by 54 percent decreases interest expense and total debt payments resulting in improved NFI and NCF. In addition, since the level of assets remains the same as in the base case reducing debts by over half should double the proprietor's equity.

Results. The equity infusion case shows considerable improvement in NFI and NCF over the base farm case (Table XXVI). The average annual NFI is \$15,300 for this abatement with a return to equity in 1991 of 0.31 of a percent. Net cash flow averages \$26,773 per year and the working asset ratio is 4.38. These figures are improved over the previous abatement but demonstrate the same gradual decline in profitability over the analysis period.

TABLE XXVI

A COMPARISON OF FINANCIAL PERFORMANCE CRITERIA
BASE CASE VS. EQUITY INFUSION

	1987		1988		1989		1990		1991	
	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION
PROFITABILITY										

Net Cash Income	62379	62379	62379	62379	62379	62379	62379	62379	62379	62379
+ Adjustments										
Invent. Chngs.	-28911	-30670	-28805	-30767	-27896	-30084	-26921	-29362	-25874	-28597
= A N C I	33468	31709	33574	31612	34483	32295	35458	33017	36505	33782
- Cash Int. Exp.	40966	15826	41030	16031	42048	17279	43407	18190	44989	18591
= NET FARM INCOME	-7498	15883	-7456	15581	-7565	15016	-7949	14827	-8484	15191
LIQUIDITY										

Total Cash										
for Debt Service	64960	64960	64960	64960	64960	64960	64960	64960	64960	64960
- Principal Due	21116	5522	26714	9361	32928	13613	39829	18326	47493	23549
- Interest Due	40966	15826	41030	16031	42048	17279	43407	18190	44989	18591
= Cash for Inv.	2878	43612	-2784	39568	-10016	34068	-18276	28444	-27522	22820
- Proj. Cap. Exp.	6929	6929	6929	6929	6929	6929	6929	6929	6929	6929
= NET CASH FLOW	-4051	36683	-9713	32639	-16945	27139	-25205	21515	-34451	15891

TABLE XXVI (CONTINUED)

	1987		1988		1989		1990		1991	
	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION	CASE FARM	EQUITY INFUSION
SOLVENCY										

Beginning										
Total Assets	811735	811735	809815	829838	808133	860796	806674	886476	805426	906744
- Total Liabil.	413919	163633	416915	163272	420108	176068	423632	184151	427753	187011
= Net Worth	397816	648102	392900	666566	388025	684728	383042	702325	377673	719733
Ending										
Total Assets	809815	829838	808133	860796	806674	886476	805426	906744	804378	921587
- Total Liabil.	416915	163272	420108	176068	423623	184151	427753	187011	432607	184082
= Net Worth	392900	666566	388025	684728	383051	702325	377673	719733	371771	737505
CHANGE IN NET WORTH	-4916	18464	-4875	18162	-4974	17597	-5369	17408	-5902	17772
THE AVERAGE CALCULATED RATE OF RETURN TO EQUITY										

$R_e = R_a*(A/E) - i*(D/E)$	AVERAGE RATE OF RETURN TO ASSETS (R_a)	AVERAGE ASSET TO EQUITY RATIO (A/E)	AVERAGE INTEREST RATE (i)	AVERAGE DEBT TO EQUITY RATIO (D/E)	AVERAGE RATE OF RETURN TO EQUITY (R_e)					
BASE CASE FARM EQUITY INFUSION	0.0269	2.0846	0.1099	1.0846	-0.0631					
	0.0027	1.2552	0.1100	0.2552	0.005					

The solvency position of the farm also improves with the equity infusion with an average annual change in equity of \$17881 and a D/A ratio in 1991 of 21 percent.

Analysis. The equity infusion abatement improves average NFI by more than \$2,000 over the previous abatement. The \$2,000 comes from the reduction in interest expense accompanying the reduced debts. However this improvement assumes that the equity capital injected into the farm business is provided by a family member or friend who does not require an immediate return on that capital. It is unlikely that anyone could part with \$227,220 and not expect to receive some kind of return on their investment. If measured in terms of an opportunity return to equity capital of 6 percent or \$13,633, then the return to equity would be reduced to approximately a negative 1.25 to 1.5 percent. This opportunity return to capital results in the equity infusion being the least desirable choice as measured by the calculated rate of return to equity.

The equity infusion abatement (without the opportunity return) brings large gains to NCF and consequently improves liquidity. In terms of liquidity performance, the equity infusion is the second best abatement option. The improvement in liquidity results from the operator being able to selectively reduce the farm's debts by retiring those with the highest payments first. The selection of which debts to retire might not be left up to the operator in a debt reduction agreement. Such an agreement likely would require reducing specific notes by specific amounts resulting in a different payout structure than that attained with the equity infusion.

In terms of the conceptual model, the equity infusion case results in the fourth lowest return to assets and the third lowest A/E ratio. The leverage ratio is the third lowest but the average annual average interest rate on outstanding debt is the highest of all farm scenarios at 11 percent. Ignoring tax consequences these variables result in an average calculated return to equity closer to zero than all of the other abatements (Table XXVI).

Combination Equity Infusion and Interest Rate Reduction

The combination equity infusion - interest rate reduction abatement considers the possibility of obtaining assistance both from lenders and individual sources. In this abatement both the cost of debt and the magnitude of debt are reduced. Interest rates are reduced to 7.4 percent and debts are reduced by \$135,832 through the equity infusion. Reducing interest expense increases NFI and NCF. In addition the equity position of the business improves because the lower debt repayment costs are below cash available to service debts.

Results. The combination equity infusion - interest rate reduction abatement improves the financial performance of the farm over the base case and is somewhat more effective than the interest rate reduction but not quite as effective as the reduction in indebtedness (Table XXVII). Net farm income averages \$13,233 for this abatement. The rate of return to equity in 1991, as calculated in IFFS, is the same as for the interest rate reduction case at 0.17 percent.

The liquidity position of the farm shows more improvement with this option than with just the interest rate reduction. Average NCF for this abatement is \$16622 but NCF is declining rapidly over the analysis period. The working asset ratio in 1991 is 3.69 reflecting the positive cash balances resulting from lower debt payments and current assets which increased slowly over the analysis period. Although there is an ending cash balance of \$5,476, principal payments increase by \$19,829 over the analysis period primarily because of annual machinery and equipment purchases. The solvency position shows similar improvement to that of the previous abatement. Equity averages an annual increase of \$15,832 and the D/A ratio in 1991 is 30 percent.

Analysis. The equity infusion - interest rate reduction case responds to the financial stress issue by addressing both the cost of debt and the magnitude of existing debts. By assumption the amount of equity infusion and interest rate reduction are chosen that yield a

TABLE XXVII

A COMPARISON OF FINANCIAL PERFORMANCE CRITERIA
 BASE CASE VS. INTEREST RATE/EQUITY INTEREST COMBINATION

	1987		1988		1989		1990		1991	
	CASE FARM	INT/EQUIT COMBINATI	CASE FARM	INT/EQUIT COMBINATI	CASE FARM	INT/EQUIT COMBINATI	CASE FARM	INT/EQUIT COMBINATI	CASE FARM	INT/EQUITY COMBINATION
PROFITABILITY										
Net Cash Income	62379	62379	62379	62379	62379	62379	62379	62379	62379	62379
+ Adjustments										
Invent. Chngs.	-28911	-31090	-28805	-30327	-27896	-29623	-26921	-28881	-25874	-28095
= A N C I	33468	31289	33574	32052	34483	32756	35458	33498	36505	34284
- Cash Int. Exp.	40966	18057	41030	19071	42048	19922	43407	20373	44989	20292
= NET FARM INCOME	-7498	13232	-7456	12981	-7565	12834	-7949	13125	-8484	13992
LIQUIDITY										
Total Cash										
for Debt Service	64960	64960	64960	64960	64960	64960	64960	64960	64960	64960
- Principal Due	21116	12434	26714	16692	32928	21385	39829	26558	47493	32263
- Interest Due	40966	18057	41030	19071	42048	19922	43407	20373	44989	20292
= Cash for Inv.	2878	34469	-2784	29197	-10016	23653	-18276	18029	-27522	12405
- Proj. Cap. Exp.	6929	6929	6929	6929	6929	6929	6929	6929	6929	6929
= NET CASH FLOW	-4051	27540	-9713	22268	-16945	16724	-25205	11100	-34451	5476

TABLE XXVII (CONTINUED)

	1987		1988		1989		1990		1991	
	CASE FARM	INT/EQUITY COMBINATI	CASE FARM	INT/EQUITY COMBINATI	CASE FARM	INT/EQUITY COMBINATI	CASE FARM	INT/EQUITY COMBINATI	CASE FARM	INT/EQUITY COMBINATION
SOLVENCY										

Beginning										
Total Assets	811735	811735	809815	837356	808133	857943	806674	873209	805426	883062
- Total Liabil.	413919	258523	416915	268241	420108	273265	423632	273116	427753	267263
= Net Worth	397816	553212	392900	569115	388025	584678	383042	600093	377673	615799
Ending										
Total Assets	809815	837356	808133	857943	806674	873209	805426	883062	804378	887490
- Total Liabil.	416915	268241	420108	273265	423623	273116	427753	267263	432607	255119
= Net Worth	392900	569115	388025	584678	383051	600093	377673	615799	371771	632371
CHANGE IN NET WORTH	-4916	15903	-4875	15563	-4974	15415	-5369	15706	-5902	16572
DEBT/ASSET RATIO	50.99%	31.85%	51.48%	32.03%	51.99%	31.85%	52.52%	31.28%	53.11%	30.27%
THE AVERAGE CALCULATED RATE OF RETURN TO EQUITY										

$R_e = R_a*(A/E) - i*(D/E)$		AVERAGE RATE OF RETURN TO ASSETS (R_a)	AVERAGE ASSET TO EQUITY RATIO (A/E)	AVERAGE INTEREST RATE (i)	AVERAGE DEBT TO EQUITY RATIO (D/E)	AVERAGE RATE OF RETURN TO EQUITY (R_e)				
BASE CASE FARM		0.0269	2.0846	0.1099	1.0846	-0.0631				
INT/EQUITY COMBINATION		0.233	1.4588	0.0793	0.4588	-0.0025				

zero rate of return to equity. The effect on interest expense is similar for this abatement as it is for the reduction in interest rates and the equity infusion case (Table XXVIII). However, because this abatement reduces both the magnitude of debt and the interest rate, the total debt payments are lower than for the reduction in interest rates case, but not as low as for the equity infusion case. As with NFI, the combination interest rate reduction/equity infusion case also exhibits a growth in equity. The solvency position of the farm declines slowly from 1987 through 1989 but shows modest improvement in 1990 and 91. By 1991 the equity position of the farm is \$83,000 higher for this abatement than for the base case farm scenario.

Debt Reduction

As prescribed by the conceptual model debts are reduced by \$227,220. In percentage terms this is a reduction of 54 percent. A reduction in debt of this magnitude significantly decreases debt repayment commitments. By reducing outstanding debt the interest expense is decreased even more than in the interest reduction case. The decrease in interest expense should increase NFI and by reducing total debt payments should improve NCF. Since debts are reduced there should be a corresponding increase in equity and with a reduction in debt payments the return to equity should improve.

Results. The debt reduction abatement improves NFI to an average of \$16,501 per year (Table XXVIII). The debt reduction abatement results in the largest increase in NFI of any of the abatements examined thus far. Furthermore, it is the first abatement examined to show an increasing trend in NFI throughout the analysis period. The return to equity as calculated in the IFFS program in 1991 is 0.67 percent. The debt reduction abatement has a lower NCF than results from the equity infusion. However NCF is higher than for the other abatements evaluated thus far, averaging \$22,867. In addition, reducing debts creates a steady improvement in the change in equity with an average change of \$19,088 per year. The D/A ratio in 1991 is 19 percent.

TABLE XXVIII

COMPARISON OF FINANCIAL PERFORMANCE CRITERIA
BASE CASE VS. DEBT REDUCTION

	1987		1988		1989		1990		1991	
	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION
PROFITABILITY										
Net Cash Income	62379	62379	62379	62379	62379	62379	62379	62379	62379	62379
+ Adjustments										
Invent. Chngs.	-28911	-30218	-28805	-30258	-27896	-29511	-26921	-28718	-25874	-27873
= A N C I	33468	32161	33574	32121	34483	32868	35458	33661	36505	34506
- Cash Int. Exp.	40966	16357	41030	16034	42048	16663	43407	17001	44989	16758
= NET FARM INCOME	-7498	15804	-7456	16087	-7565	16205	-7949	16660	-8484	17748
LIQUIDITY										
Total Cash										
for Debt Service	64960	64960	64960	64960	64960	64960	64960	64960	64960	64960
- Principal Due	21116	9024	26714	13315	32928	18077	39829	23362	47493	29229
- Interest Due	40966	16357	41030	16034	42048	16663	43407	17001	44989	16758
= Cash for Inv.	2878	39579	-2784	35611	-10016	30220	-18276	24597	-27522	18973
- Proj. Cap. Exp.	6929	6929	6929	6929	6929	6929	6929	6929	6929	6929
= NET CASH FLOW	-4051	32650	-9713	28682	-16945	23291	-25205	17668	-34451	12044

TABLE XXVIII (CONTINUED)

	1987		1988		1989		1990		1991	
	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION	CASE FARM	DEBT REDUCTION
SOLVENCY										

Beginning										
Total Assets	811735	811735	809815	822465	808133	849467	806674	871300	805426	887721
- Total Liabil.	413919	167978	416915	160323	420108	168656	423632	171730	427753	168883
= Net Worth	397816	643757	392900	662142	388025	680811	383042	699570	377673	718838
Ending										
Total Assets	809815	822465	808133	849467	806674	871300	805426	887721	804378	898717
- Total Liabil.	416915	160323	420108	168656	423623	171703	427753	168883	432607	159549
= Net Worth	392900	662142	388025	680811	383051	699597	377673	718838	371771	739168
CHANGE IN NET WORTH	-4916	18385	-4875	18669	-4974	18786	-5369	19268	-5902	20330
DEBT/ASSET RATIO	50.99%	20.69%	51.48%	19.49%	51.99%	19.85%	52.52%	19.71%	53.11%	19.02%

THE AVERAGE CALCULATED RATE OF RETURN TO EQUITY

	AVERAGE RATE OF RETURN TO ASSETS (R_a)	AVERAGE ASSET TO EQUITY RATIO (A/E)	AVERAGE INTEREST RATE (i)	AVERAGE DEBT TO EQUITY RATIO (D/E)	AVERAGE RATE OF RETURN TO EQUITY (R_e)
$R_e = R_a*(A/E) - i*(D/E)$					
BASE CASE FARM	0.0269	2.0846	0.1099	1.0846	-0.0631
DEBT REDUCTION	0.0237	1.2462	0.1097	0.2462	0.00205

Analysis. Depending on the tax structure of the farm in question debt reductions may be treated as taxable income. As tax liabilities increase the gains in NFI and NCF would be offset in the second year of the plan by the amount of the tax liability. Since there may be large variations in tax structures across farms, in this study it is only pointed out that taxes could possibly affect this abatement more than the others except for the asset sale no lease back option with its taxable capital gains implications. As described in the conceptual model, the relationship between tax rates and financial performance is an inverse one implying that increasing the net marginal tax rate diminishes the return to equity by one minus the appropriate tax rate.

One other possible drawback to the debt reduction abatement is the effect it may have on the credit reserve structure of the farm business. Without some kind of legal guidelines, lenders may be unwilling or hesitant to lend money in situations where they know other lenders or themselves may absorb loan losses. Intuitively at least a borrower in this situation would be considered a higher risk and consequently might be required to pay an additional risk premium for the borrowed capital. The additional risk premium could be difficult for farms unable to service debts at existing interest rates.

In terms of the conceptual model, the debt reduction abatement has the second highest return to assets, the fourth lowest average interest rate and the second lowest A/E and D/E ratios. These variables combine to produce the best calculated return to equity of any of abatements before taxes. Considering taxes in a general way creates some minor adjustments to the variables in the model by reducing the calculated rate of return to equity by one minus the tax rate. However simple analysis indicates that the marginal tax rate could be as much as 50 percent and the debt reduction abatement would still have the highest return to equity of all the abatements.

Asset Sale-No-Lease Back

Of all the abatements considered, implementing the asset sale no lease back abatement results in the largest decrease in debts. Therefore this abatement should produce the greatest improvement in financial performance.

Results. The asset sale no lease back option results in the greatest average improvement to NFI, NCF and change in equity (Table XXIX). Net farm income averages \$18,502 over the last four years of the analysis. Net cash flow averages \$32,288 over the analysis period and the change in equity averages \$20,192 over the analysis period. Like the debt reduction abatement, the asset sale results in an increasing trend in NFI, but at a decreasing rate.

Analysis. The asset sale no lease back abatement assumes that a healthy market exist for farm assets. Whether this is true probably would depend on the area of the country and other economic factors. However the number and percentage of farms in financial trouble in Oklahoma is small (Plaxico, 1987). Land values are showing some improvement and most farmland is purchased by other farmers who may see this as a prime time to invest in expanding their operations.

Although, NFI, NCF and change in equity all improve over the base case the average rate of return to equity calculated from the conceptual model is the lowest of all the abatements (Table XXIX). The decrease in the calculated rate of return to equity is explained by the components of the conceptual model. In the previous abatements the rate of return to assets ranged between 2.3 and 2.7 percent. However, in this abatement the percentage decline in the value of assets is less than the percentage increase in NFI earned by those assets. Therefore, the rate of return to those assets declines compared to the other abatements. In addition, although the average interest rate remains close to 10 percent and the leverage ratio is the lowest of all the abatements at 24.2 percent, the decrease in the weighted return to equity is greater than the decrease in the weighted cost

TABLE XXIX

A COMPARISON OF FINANCIAL PERFORMANCE CRITERIA:

	1987		1988		1989		1990		1991	
	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK
PROFITABILITY AS MEASURED BY NFI										
Net Cash Income	62379	30717	62379	42521	62379	42521	62379	42521	62379	42521
+ Adjustments										
Invent. Chngs.	-28911	-17698	-28805	-18893	-27896	-18368	-26921	-17809	-25874	-18175
= A N C I	33468	13019	33574	23628	34483	24153	35458	24712	36505	24346
- Cash Int. Exp.	40966	6425	41030	5632	42048	5915	43407	5837	44989	5357
= NET FARM INCOME	-7498	6594	-7456	17996	-7565	18238	-7949	18875	-8484	18989
LIQUIDITY AS MEASURED BY NCF										
Total Cash										
for Debt Service	64960	329862	64960	46575	64960	46575	64960	46575	64960	46575
- Principal Due	21116	245388	26714	11200	32928	14501	39829	18164	47493	14222
- Interest Due	40966	6425	41030	5632	42048	5915	43407	5837	44989	5357
= Cash for Inv.	2878	78049	-2784	29743	-10016	26159	-18276	22574	-27522	26996
- Proj. Cap. Exp.	6929	4416	6929	4416	6929	4416	6929	4416	6929	4416
= NET CASH FLOW	-4051	73633	-9713	25327	-16945	21743	-25205	18158	-34451	22580

TABLE XXIX (CONTINUED)

	1987		1988		1989		1990		1991	
	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK	BASE CASE FARM	ASSET SALE NO LEASE BACK
SOLVENCY AS MEASURED BY THE CHANGE IN EQUITY										

Beginning										
Total Assets	811735	811735	809815	549157	808133	573538	806674	594499	805426	612032
- Total Liabil.	413919	337750	416915	64525	420108	66856	423632	65524	427753	60129
= Net Worth	397816	473985	392900	484632	388025	506682	383042	528975	377673	551903
Ending										
Total Assets	809815	549157	808133	573538	806674	594499	805426	612032	804378	634137
- Total Liabil.	416915	64525	420108	66856	423623	65524	427753	60129	432607	59191
= Net Worth	392900	484632	388025	506682	383051	528975	377673	551903	371771	574946
CHANGE IN EQUITY	-4916	10647	-4875	22050	-4974	22293	-5369	22928	-5902	23043
DEBT/ASSET RATIO	50.99%	41.61%	51.48%	11.75%	51.99%	11.66%	52.52%	11.02%	53.11%	9.82%

THE AVERAGE CALCULATED RATE OF RETURN TO EQUITY										

$R_e = R_a*(A/E) - i*(D/E)$	AVERAGE RATE OF RETURN TO ASSETS (R_a)		AVERAGE ASSET TO EQUITY RATIO (A/E)		AVERAGE INTEREST RATE (i)		AVERAGE DEBT TO EQUITY RATIO (D/E)		AVERAGE RATE OF RETURN TO EQUITY (R_e)	
BASE CASE FARM	0.0269		2.0846		0.1099		1.0846		-0.0631	
ASSET SALE NO LEASEBACK	0.0155		1.2422		0.0996		0.2422		-0.0049	

of debt. These factors combine to produce the lower calculated rate of return to equity. These figures possibly reflect a less efficient combination of assets, leverage and interest expense than reflected under the base case farm assumptions that are consistent across the other abatements.

Original Plan - 150 Percent D/A Ratio

In this section the NFI, NCF and change in equity are presented for the 150 percent D/A case farm. Under overleveraged conditions such as depicted in this example farm, the loss in equity can be severe. Without the legal options provided through Chapter 12 bankruptcy, the probability of financial failure is close to 100 percent.

Profitability - Net Farm Income. Table XXX illustrates the income statement for the 150 percent D/A case in 1987. During 1987 gross farm receipts for this case are \$258,805 as in the original base farm plan but cash operating expenses have increased from \$237,392 to \$322,079. All of this increase is the result of increased interest costs of \$84,643. Net farm income in 1987 is projected to be a negative \$87,261.

Liquidity - Net Cash Flow. Table XXXI illustrates the financial performance summary statement for the 150 percent D/A base case farm. Net cash flow in 1987 is a negative \$87,261 and the working asset ratio is 0.64 which is considerably below the 2.0 figure lenders would like to see.

Solvency - Equity Position. Table XXXII illustrates the net worth statement for the 150 percent D/A base case farm. In 1987 equity is projected to decline an additional \$74,507 and the initial D/A ratio is 1.51. If the operation continues through 1987, the operating note projects the operator to take on an additional \$87,261 in new debt. Most of the new borrowing is needed to meet debt payments on existing loans.

TABLE XXX

INCOME STATEMENT FOR BASE CHAPTER 12 CASE - 1987

OPERATING RECEIPTS		CASH FARM EXPENSES	
Livestock Purchased for resale:	134461	Hired Labor	17176
Crop Sales:	57187	Machinery Repairs	12802
Other Farm Income:		Other Repairs	543
Government Payments	51504	Cash Interest	125609
Custom Work, Other	15708	Feed Purchased	3028
GROSS FARM RECEIPTS:	258860	Seed and Plants	5428
		Fertilizer & Chemicals	27431
		Machinery Hire	5057
		Supplies	0
		Vet, Medicine	3213
		Fuel, Oil & Lubricants	14985
		Taxes	2500
		Insurance	3200
		Farm Utilities	1350
		Cash Rent & Leases	0
		Freight & Trucking	0
		Livestock Purchased for Resale	94839
		TOTAL CASH EXPENSES	322079
		NET CASH INCOME FROM OPERATIONS	-63219
ADJUSTMENTS FOR ACCRUED ITEMS AND INVENTORIES:			
Change in Accounts and Notes Receivable			600
Change in Accounts Payable & Accrued Expenses			4371
Changes in Inventories			0
Changes in Capital Stock			-23709
		NET FARM INCOME	-81957

TABLE XXXI

FINANCIAL PERFORMANCE SUMMARY FOR
BASE CHAPTER 12 CASE - 1987

			Beg. -----	End -----
Cash Farm Receipts	258860	Current Ratio	0.395	0.315
Total Cash Expenses	196470	Working Asset		
Family Living	12950	Ratio	0.642	0.528
Nonfarm Income	20400	Leverage Ratio	-2.97	-2.62
Cash Available for		Debt/Asset		
Debt Service	69839	Ratio	1.510	1.620
Interest Payments	95500	-----		
Principal Payments	31492	Operating Note Summary:		
Cash Available for		Beginning Balance		200000
New Investment	-87261	Ending Balance		287261
Projected Capital		Change		87261
Expenditures	0	Maximum Balance		310490
Interest Payment		Minimum Balance		200000
on Operating	30109	-----		
NET CASH FLOW	-87261			
Cash Flow Sensitivity:				

Net Cash Flow as a % of Cash Farm Receipts				-33.71%
Net Cash Flow as a % of Cash Operating Expenses				-44.41%
Interest Paid as a % of Cash Farm Receipts				48.52%

Rate of Return on Equity =	:	Rate of Return on Invm't =		
	:			
NFI - Family Living	:	NFI + Int Pd - FL		
----- = n/a	:	----- =		3.78%
Beginning Net Worth	:	Beg. Total Assets		
	:			
Average Interest Rate on Debt =				
Interest Paid + Change in Interest Due				
-----				= 10.43%
Average Total Debt Outstanding				

TABLE XXXII
NET WORTH STATEMENT FOR BASE
CHAPTER 12 CASE-1987

CURRENT ASSETS	Beginning Balance	Ending Balance	Net Change
Cash & Checking	1000	1000	0
Accounts Receivable	12651	12651	0
Cash Value of Life Insurance	10000	10600	600
Purchased Livestock	73639	73639	0
Stored Crops, Feed, Supplies	3150	3150	0
Cash Investment in Growing Crops	30165	30165	0
TOTAL CURRENT ASSETS	130605	131205	600
-----INTERMEDIATE ASSETS-----			
Vehicles	30709	26321	-4388
Machinery & Equipment	117571	100770	-16801
Securities Not Readily Marketable	14550	14550	0
TOTAL INTERMEDIATE ASSETS	162830	141641	-21189
-----FIXED ASSETS-----			
Buildings & Improvements	31500	28980	-2520
Cropland	452600	452600	0
Pasture	34200	34200	0
TOTAL FIXED ASSETS	518300	515780	-2520
TOTAL ASSETS	811735	788626	-23109
-----CURRENT LIABILITIES-----			
Notes Payable	200000	287261	87261
Interest Due: Current	750	0	-750
Intermediate	18000	15167	-2833
Long Term	77500	76712	-788
Taxes Due: Real Estate	2500	2500	0
Employee Payroll	220	220	0
Principal Due: Intermediate	23611	26445	2833
Long Term	7880	8668	788
TOTAL CURRENT LIABILITIES	330462	416973	86511
-----INTERMEDIATE LIABILITIES-----			
Notes Payable	126389	99944	-26445
-----LONG TERM LIABILITIES-----			
Mortgages and Notes Payable	767120	758451	-8688
TOTAL LIABILITIES	1223970	1275368	51398
NET WORTH	-412235	-486742	-74507
TOTAL LIABILITIES AND NET WORTH	811735	788626	-23109

Analysis of Financial Performance. The 150 percent D/A case farm, for the price and cost relationships assumed here, is experiencing serious economic deterioration and without some kind of outside intervention financial failure is imminent. This scenario provides a simulated farm situation under which Chapter 12 bankruptcy may be evaluated.

In terms of the conceptual model, in 1987 the 150 percent D/A case has a return to assets of 3.78 percent, an A/E ratio of -1.97, an average cost of debt of 10.43 percent and a leverage ratio of -2.97. These variables result in a computed weighted return to equity of 2.35 percent. Although the sign on the return to equity is positive it actually is a reflection of the rate of decline in equity. The decline is a result of a negative equity position in the business and the equity position is projected to decline further. Reorganization of the farm's debts is necessary to give the farm business any chance of survival.

Chapter 12 Bankruptcy

Restructuring the farm's debts through Chapter 12 places the business in a 100 percent D/A situation initially. However, because the farm reorganization plan must provide a positive cash flow over the three years of the plan, the financial position of the farm should improve somewhat. Even though off-farm income is increasing enough to provide a positive NCF, NFI is still negative because debt repayment obligations still exceed the repayment capacity of the farm. Because off-farm income is increased substantially, debt payments are met, thus reducing existing liabilities. As a result the equity position of the farm business should improve.

Results. The reorganization plan arising from the Chapter 12 bankruptcy guidelines improves the financial performance of the farm business over that of the 150 percent D/A base case (Table XXXIII). However, the profitability of the farm business, as measured by NFI, remains negative over the analysis period. Net farm income averages a negative \$12,569. Net cash flow is positive for the first four years of the analysis but new machinery purchases cause a negative net cash flow in 1991. The solvency position improves an

TABLE XXXIII
 FINANCIAL PERFORMANCE UNDER CHAPTER 12 BANKRUPTCY

	YEAR	NET FARM INCOME	NET CASH FLOW	WORKING ASSET RATIO	CHANGE IN EQUITY	D/A RATIO	AVERAGES
150 PERCENT D/A BASE CASE	1987	-84957	-87261	0.642	-74507	1.51	Re 0.2352
CHAPTER 12 REORGANIZATION	1987	-31749	488	0.842	-11599	0.953	Ra 0.051
	1988	-11583	503	0.775	8567	0.966	A/E 18.88
	1989	-6200	517	0.783	13950	0.954	I 0.095
	1990	-7311	1630	0.816	12837	0.934	D/E 17.88
	1991	-6000	-4000	0.781	14150	0.919	Re -0.73

average of \$7,581 per year over the analysis period and the D/A ratio improves to 92 percent in 1991.

Analysis. Although Chapter 12 bankruptcy allows the farm operator to reorganize and discharge a large amount of debt, nagging problems still persist that will hinder the recovery of the farm business in the long run. First of all the farm remains unprofitable as measured by net farm income (the residual return to labor, management and owner's equity capital). This residual must provide an acceptable return to the owners' equity capital, labor and management over the long run or other alternatives should be considered for using the resources. Under Chapter 12 the farm operator has committed to nine and 30 years of extremely large debt payments. The calculated average return to equity for this abatement option is a negative .73 percent.

Secondly, the liquidity position of the farm as measured by NCF depends heavily on off-farm income which could lead to problems if and when machinery and equipment purchases are made. Furthermore, a working asset ratio of .799 provides little incentive for lenders to invest operating money in the business.

Finally the solvency position is dependent on the operator's household being able to provide a continual stream of \$33,000 plus to pay off debts. Otherwise, the calculated average rate of return to equity of negative 73 percent indicates a deterioration of the equity position of the farm business.

CHAPTER VI

SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Summary

Financial stress in the U.S. farm sector is widely recognized and well documented. The incidence of insufficient cash flows, credit problems, loan delinquencies, foreclosures, and bankruptcies in agriculture has reached significant levels. Moreover, a rippling effect has occurred to significantly affect the well-being of many farm lenders, agribusinesses, and rural communities whose financial performance is strongly influenced by economic conditions in agriculture. Highly leveraged farms are affected most by this financial stress.

There is wide spread agreement that the farm credit crisis is not a temporary, short-term phenomenon. Instead, it is a long-run adjustment to secular trends that calls for further restructuring of the agricultural industry at all levels. Numerous policy options have been suggested to help alleviate the burdens associated with this massive restructuring. Suggestions include restructuring debts through interest write downs, debt write downs, or combinations of both. Other suggestions focus on simply forgiving debts, opting for land holding companies to provide needed equity capital, and moratoriums on debt repayment. Additional options have focused on selling assets and either leasing them back or adjusting to a downsized farming operation. Chapter 12 bankruptcy is presently being used as an alternative to Chapter 7 Bankruptcy to assist farmers who face liquidation.

The objective of this study is to evaluate the impacts of selected financial stress abatement options on the overall financial performance of a North Central Oklahoma wheat

and livestock farm. To accomplish the objective a typical North Central Oklahoma farm is specified under two levels of financial stress.

The first specification assumes a D/A ratio of 50 percent to simulate moderate financial stress in which the manager still maintains independent control over the management process. For the 50 percent D/A case five suggested financial stress abatements are analyzed. These include an interest rate reduction, an equity infusion, a combination interest rate reduction/equity infusion, a reduction in indebtedness, and an asset sale-no-leaseback option.

The second specification is a case farm with a 150 percent D/A ratio. This simulation is chosen to evaluate the effectiveness of Chapter 12 bankruptcy as an alternative to Chapter 7 liquidation.

A whole farm simulation model (IFFS) is used to simulate the effectiveness of each of these abatements to financial stress over the 1987-1991 period under deterministic assumptions regarding the production plan of the farm and all crop yields and prices. The model simulates the farm's production plan through a set of enterprise budgets that along with an additional information budget depict the timing and amounts of all cash inflows and outflows. These enterprise budgets are compiled into an annual cash flow that is divided into the 12 months of the year. The model simulates the farm's financial structure through a net worth statement and statement of all liabilities and their accompanying payments.

The model is semi-recursive in that it saves specified information about the farm business to be used in the next years calculations but the model allows the financial condition of the farm to be monitored at the end of each simulated year. The IFFS model allows close examination of the farm's financial performance in three important areas. First, the model calculates adjusted net farm income which is a measure of the farm's profitability. Secondly, the model provides monthly information about the farm business's cash flow that when summarized into a net cash flow figure provides a measure of the farm's liquidity. Finally, the model generates beginning and ending net worth figures along with the changes

in the composition of assets and liabilities. These changes in net worth are used as a measure of the farm's solvency position. Each of these three measures is used to construct a five year trend of the farm's financial performance.

The base case farm selected is typical of wheat and livestock farms in the North Central region of Oklahoma and represents a full time family farm operation with the farm operator being both manager and laborer. The base farm situation is a 1280 acre farm unit, with 2/3 of the acres owned and the remaining 1/3 of the farm unit being rented on a 1/3 - 2/3 cropshare basis. The production organization of the base farm includes 720 acres of owned dryland wheat, 360 acres of rented dryland wheat, 80 acres of dryland grain sorghum, and 120 acres of love grass pasture. In addition, wheat pastures supports 422 head of stockers. Half these stockers are owned and the other half are owned by someone else who pays rent on the livestock's weight gain from the wheat pasture. Also the 120 acres of lovegrass pasture support 158 head of cattle of which half are owned by the operator and half are owned by renters. The beginning net worth is \$397,316 for the 50 percent D/A case and a negative \$412,235 for the 150 percent D/A case. The additional decline in net worth results from an additional \$58,311 in interest expense that is due in the first year of the analysis.

The farm operator participates in government commodity programs for wheat and grain sorghum. Government program figures are based on the 1986 farm program. In addition the farm operator's spouse earns an annual off-farm income of \$10,200.

Base Case Farm

The results of the base farm scenario for the 50 percent D/A case demonstrate the nature of the problems associated with financial stress and the consequent need for financial stress solutions. The financial condition of the base farm deteriorates over the five years even though the farm is still solvent at the end of the five year analysis.

The profitability of the farm as measured by net farm income and the calculated rate of return to equity both indicate that under current price and costs assumptions profitability is decreasing at increasing rate over time. Net farm income is negative by an average of \$7,790 per year, and the average calculated rate of return to equity is a negative 6.31 percent.

The liquidity of the base case farm, as measured by net cash flow, also declines over the analysis period. Net cash flow averages a negative \$18,073 per year. The results indicate that the farm's liquidity position continues to decline with a serious deficit of \$34,451 in 1991.

The solvency position of the base case deteriorates over the analysis period although the D/A ratio only increases from 50 percent to an average of 53 percent. Equity in 1991 is \$377,673 for an ending leverage ratio of 1.13 and an ending D/A ratio of 53 percent.

Reduction in Interest Rates

Reducing interest rates to 4.76 percent improves the overall financial performance of the farm over that of the base case. As described by the conceptual model in Chapter III, 4.76 percent is the interest rate which yields a zero rate of return to equity and is defined to be the point at which financial stress begins. Net farm income averages \$13,126 per year and the calculated rate of return to equity averages a negative 0.42 percent per year. The liquidity position of the farm is negative for the last three years of the analysis and averages a negative \$1,259 per year. The solvency position is improved to an annual average increase in equity of \$15,708.

Equity Infusion

An equity infusion of \$227,220 is applied to debts and improves net farm income to an average of \$15,300 per year. The calculated rate of return to equity averages 0.05

percent per year over the analysis period. The liquidity position is improved to an average of \$26,773 per year with this abatement although the liquidity position declines over the entire analysis period. The solvency position improves with this abatement as equity increases an average of \$17,781 per year. The D/A ratio is 21 percent in 1991 for a corresponding leverage ratio of 25 percent.

Combination Interest Rate Reduction and Equity Infusion

For this abatement interest rates are reduced to 7.4 percent and debts are reduced by \$135,832 via the equity infusion. Net farm income averages \$13,233 and the calculated rate of return to equity averages a negative 0.25 percent per year. The liquidity position is improved to an average of \$16,622 per year but declines dramatically each year of the analysis. The solvency position of the farm as measured by the change in equity averages \$15,832 per year. The ending D/A ratio in 1991 is 31 percent.

Reduction in Indebtedness

In this abatement debts are reduced by \$227,220 in the initial year of the plan. Under this abatement net farm income averages \$16,501 per year and the average calculated rate of return to equity is 0.25 percent. The liquidity position of the farm as measured by net cash flow averages \$12,044 per year. The solvency position of the farm as measured by the change in equity averages \$19,088 per year. The ending D/A ratio is 19 percent and the results indicate that equity is increasing at 1 to 1.5 percent per year.

Asset-Sale-No-Leaseback

The asset sale no leaseback option has the largest impact on debts, reducing them by \$295,091 in the initial year of the plan. Net farm income averages \$16,120 per year and the calculated average rate of return to equity is a negative 0.49 percent. The liquidity position of the farm improves dramatically under this abatement to average \$32,288 per year.

The solvency position also shows large improvements as the change in equity averages \$20,192 per year. The ending D/A ratio in 1991 is a low 9.82 percent and the leverage ratio is 10.3 percent.

The 150 Percent D/A Case Farm

Under this scenario the farm's asset structure and production unit are the same as in the base case except that for the 150 D/A case machinery purchases are postponed until 1990. To reflect an insolvent farm business, debts are increased dramatically over the base case resulting in a net worth of a negative \$412,235 in 1987. In addition, the farm is projected to lose \$81,957 as measured by NFI and the cash flow is projected to be a negative \$87,261 as measured by NCF. This scenario evaluates the effectiveness of Chapter 12 bankruptcy in restoring financial vitality to the farm business under conditions of insolvency.

Chapter 12 bankruptcy requires the approval of a reorganization plan that will provide a positive net cash flow for three years. The reorganization plan is implemented by reducing debts to the value of the assets which secure them. To have a workable reorganization plan in this study, off-farm income must increase to \$33,100, and additional income from custom work must be obtained in the amount \$18,409.

Chapter 12 Reorganization

Under Chapter 12 the profitability of the farm as measured by net farm income improves dramatically over the base 150 percent D/A case. However, net farm income still averages a negative \$12,569 per year while the average calculated rate of return to equity is a negative 73 percent. The liquidity position as measured by net cash flow improves to average a negative \$172 per year. The change in equity improves the solvency position of the farm an average of \$7,581 per year and the D/A ratio in 1991 is 94.5 percent.

Conclusions and Implications

The results of this study clearly support the observed data that wheat and livestock farms in the U.S. are undergoing some degree of financial stress. Although not explicitly tested, this study also supports other studies that have pointed to the importance of government program payments for maintaining farm survivability and economic viability for these farms. In addition, leveraged wheat and livestock farms rely on off-farm income to maintain liquidity in the farm business. Furthermore, price and cost relationships in 1986-87 did not bode well for wheat and livestock farms with D/A ratios of 50 percent or higher. In this study annual machinery and equipment purchases are included on the premise that any financial stress abatement must also provide sufficient improvement in financial performance to allow the farm to operate efficiently. Many previous studies have ignored capital replacement assuming that it can be foregone indefinitely. However, from this study it is concluded that machinery purchases are a contributor to liquidity problems and as such should be built into the financial stress abatement evaluations.

The six financial stress abatements analyzed offer promise in assisting the farm's economic viability and long-run financial survival over the five year planning horizon. However, the financial policy options have differential impacts on the farm's profitability, liquidity, and solvency. As the conceptual model developed in Chapter III points out, the degree to which these options are helpful, however, varies as the relationships between the asset base, debt structure, rate of return to assets, and interest rate vary.

For the 50 percent D/A structure each of the abatements considered improved the financial performance of the farm over that of the original base case scenario. The reduction in indebtedness and the asset sale no leaseback options generated the greatest improvement in financial performance. The equity infusion made the next best showing, and the reduction in interest rates and the combination reduction interest rates/equity infusion options had similar effects.

For the 150 percent D/A structure it is obvious that without intervention the farm business has failed. For Chapter 12 Bankruptcy to increase the farm's long run probability of survival, the farm operator will have to earn additional off-farm and farm income to provide the needed cash flow to meet debt repayment commitments and other operating expenses. The analysis conducted in this study indicates that for a wheat and livestock farm the possibility for success exists, but the farm business is unable to build any kind of capital reserve and liquidity problems will exist for sometime. Events which could change this picture would be increasing land and farm prices. On the other hand, if inflation returns, corresponding increases in costs of farm inputs may offset any gains in land values as liquidity will be the number one problem for farms in this category.

This study also reinforces the need to take great care in implementing any of these proposed abatements. Each of them offer the potential to improve a given farms financial performance, but the possible wider scale effects on lenders and the economy are not clear at this time.

Suggestions for Further Research

An important limitation of this study is that it does not consider the feasibility of the different financial stress abatements considered. Intuitively at least, lenders should prefer abatements that can be managed without their cooperation but improve their chances for repayment. Examples are the equity infusion and asset sale abatements. If these are not feasible it seems likely that lenders would prefer reductions in interest rates before they would reduce principal. This abatement is based on the assumption that it would be easier to cover interest income losses than to write off debts that could serve to effect their capitalization structure and consequently their lending limits. Furthermore, from this analysis it is not clear whether Chapter 12 places the lender in a worse position than farm foreclosure and liquidation. Each of these topics needs further research to describe the interrelationships and costs involved to farmers, lenders and society at large.

Some people would argue that the farm credit crisis is no longer an important issue because many policies have been developed to assist financially stressed farmers. However, a review of the literature suggests that the farm financial stress problems may persist for sometime as farmer's and other agricultural businesses adjust to a more conservative set of long run costs and earnings expectations.

This study is limited in that it only evaluates a small set of the many different abatements to financial stress. Furthermore this study looks at only one farm production organization over two very different D/A conditions. Therefore, it would be interesting to expand this study to include simulated farms from other locations in Oklahoma to determine the differences in the abatements that are appropriate for different farm types. Indications are that the current episode of financial stress has posed a large enough number of unanswered questions to challenge researchers for some time. Of primary importance is the need to improve the data base of agriculture's financial indicators. Also a set of theoretically consistent measures needs to be developed to be used in measuring not only the financial performance of the business but also in linking together the different components of the farm business in a more efficient framework.

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APPENDIX

THE INTEGRATED FARM FINANCIAL STATEMENTS MODEL

NET WORTH STATEMENT	Beginning Balance	Ending Balance	Net Change	NAME: THESIS CASE FARM DATE: 01/01/07	Beginning Balance	Ending Balance	Net Change
-----CURRENT ASSETS-----				-----CURRENT LIABILITIES-----			
1. Cash & Checking	1000	1000	0	29. Accounts Payable		0	0
2. Savings & Time Certificates		0	0	30. Notes Payable	40000	41023	1023
3. Marketable Bonds & Securities		0	0	31. Interest Due: Current	750	0	-750
4. Accounts Receivable	12651	12651	0	32. Intermediate	8897	9783	886
5. Cash Value Life Insurance	10000	10600	600	33. Long Term	28292	27433	-859
Market Livestock & Products:				Taxes Due:			
6. Raised Livestock		0	0	34. Real Estate & Personal Prop.	2500	2500	0
7. Purchased Livestock	73639	73639	0	35. Employee Payroll Withholding	220	220	0
8. Stored Crops, Feed, Supplies	3150	3150	0	36. Personal & Self-Employment			0
9. Cash Investment Growing Crops	30165	30165	0	37. Other Accrued Expenses			0
10. Prepaid Expenses		0	0	38. Contingent Tax Liability			0
11. Other Current Assets		0	0	Principal Due in 12 months:			
12. TOTAL CURRENT ASSETS	130605	131205	600	39. Intermediate Liabilities	11670	16408	4738
-----INTERMEDIATE ASSETS-----				-----INTERMEDIATE LIABILITIES-----			
13. Notes Receivable		0	0	40. Long Term Liabilities	9446	10305	859
Breeding Livestock:				41. Other Current Liabilities			0
14. Raised Livestock		0	0	42.			0
15. Purchased Livestock		0	0	43. TOTAL CURRENT LIABILITIES	101775	107672	5897
16. Vehicles	30709	30709	0	-----LONG TERM LIABILITIES-----			
17. Machinery & Equipment	117571	117571	0	44. Notes Payable	62470	66847	4377
18. Securities Not Readily Mktable.	14550	14550	0	45. Contingent Tax Liability			0
19. Other Intermediate Assets		0	0	46. Other Intermediate Liabilities			0
20. TOTAL INTERMEDIATE ASSETS	162830	162830	0	47.			0
-----FIXED ASSETS-----				-----LONG TERM LIABILITIES-----			
21. Contracts & Notes Receivable		0	0	49. Mortgages & Notes Payable	249674	239369	-10305
22. Buildings & Improvements	31500	28980	-2520	50. Contingent Tax Liability			0
23. Cropland	452600	452600	0	51. Other Long Term Liabilities			0
24. Pasture	34200	34200	0	52.			0
25.	0	0	0	53. TOTAL LONG TERM LIABILITIES	249674	239369	-10305
26. Other Long Term Assets		0	0	54. TOTAL LIABILITIES	413919	413888	-31
27. TOTAL FIXED ASSETS	518300	515780	-2520	55. NET WORTH	397016	395927	-1089
28. TOTAL ASSETS	811735	809815	-1920	56. TOTAL LIABILITIES & NET WORTH	811735	809815	-1920

WHOLEFARM CASHFLOW STATEMENT												NAME: THESIS CASE FARM	DATE: 01/01/87
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTALS
<< OPERATING RECEIPTS >>													
1. Livestock Sales:	0	0	37492	0	62799	0	0	0	34170	0	0	0	134461
2. Sale of Livestock Products	0	0	0	0	0	0	0	0	0	0	0	0	0
3.	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Crop Sales:	0	0	0	0	0	51225	0	0	0	5962	0	0	57187
5.	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Government Payments	0	0	19489	0	0	0	0	0	0	0	0	32015	51504
7. Other farm income:	0	0	0	0	0	0	0	0	0	0	0	0	0
8.	0	0	3583	0	9068	0	0	0	3002	0	0	0	15653
9. TOTAL CASH RECEIPTS	0	0	60564	0	71867	51225	0	0	37172	5962	0	32015	258805
<< CAPITAL SALES >>													
10. Breeding Livestock	0	0	0	0	0	0	0	0	0	0	0	0	0
11. Machinery, Equipment, Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
12. Buildings, Land	0	0	0	0	0	0	0	0	0	0	0	0	0
<< OTHER INFLOWS >>													
13. Wages and Salaries	850	850	850	850	850	850	850	850	850	850	850	850	10200
14. Investments	0	0	0	0	0	0	0	0	0	0	0	0	0
15.	700	0	508	820	1112	0	0	0	0	1152	468	572	5332
16. TOTAL CASH INFLOW	1550	850	61922	1670	73829	52075	850	850	38022	7964	1318	33437	274337
<< OPERATING EXPENSES >>													
17. Hired Labor	452	1636	644	332	496	3984	2988	2940	2396	0	684	580	17132
18. Repairs: Mach. & Equip.	104	572	505	140	180	3865	2315	1568	2921	383	109	140	12802
19. Buildings & Fences	91	91	91	50	33	0	0	0	0	0	95	91	543
20. Feed Purchased	194	194	194	174	174	0	0	0	282	0	1621	194	3028
21. Seeds, Plants	0	0	0	0	208	1560	0	0	3660	0	0	0	5428
22. Fertilizer, Lime, Chem.	0	9147	3471	0	3106	0	65	0	11642	0	0	0	27431
23. Machine Hire	0	0	75	0	75	4907	0	0	0	0	0	0	5057
24. Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0
25. Vet., Medicine, Breeding Fees	0	0	0	0	875	0	0	0	0	0	2156	182	3213
26. Fuel, Oil, Lubricants	170	705	396	165	212	4560	2987	1689	3361	262	170	311	14985
27. Storage, Warehousing	0	0	0	0	0	0	0	0	0	0	0	0	0
28. Taxes- R.E & Pers. Prop	2500	0	0	0	0	0	0	0	0	0	0	0	2500
29. Insurance	1600	0	0	0	0	0	1600	0	0	0	0	0	3200
30. Utilities	75	75	75	75	125	150	150	150	150	125	125	75	1350
31. Cash Rents & Leases	0	0	0	0	0	0	0	0	0	0	0	0	0
32. Freight, Trucking	0	0	160	0	142	0	0	0	242	0	710	0	1254
33. Miscellaneous	0	0	958	0	1780	0	0	0	926	0	0	0	3664
34.	0	0	0	0	0	0	0	0	0	0	0	0	0
35. Livestock Purchases	0	0	0	0	26790	0	0	0	0	26445	41603	0	94839
36. TOTAL CASH EXPENSES	5186	12421	6569	936	34197	19025	10104	6347	25579	27216	47272	1573	196426
<< CAPITAL EXPENSES (total cost) >>													
37. Breeding Livestock	0	0	0	0	0	0	0	0	0	0	0	0	0
38. Machinery, Equipment, Vehicles	27714	0	0	0	0	0	0	0	0	0	0	0	27714
39. Buildings, Land	0	0	0	0	0	0	0	0	0	0	0	0	0
<< OTHER OUTFLOWS >>													
40. Family living	1079	1079	1079	1079	1079	1079	1079	1079	1079	1079	1079	1079	12950
41. Income Tax	0	0	0	0	0	0	0	0	0	0	0	0	0
42. Investments	0	0	0	0	0	0	0	0	0	0	0	0	0
43.	0	0	0	0	0	0	0	0	0	0	0	0	0

Scheduled Debt Payments:													
44. Short term - interest	0	0	0	0	0	0	0	0	0	0	0	0	0
45. principal	0	0	0	0	0	0	0	0	0	0	0	0	0
46. Intermediate - interest	0	0	0	8897	0	0	0	0	0	0	0	0	8897
47. principal	0	0	0	11670	0	0	0	0	0	0	0	0	11670
48. Long Term - interest	0	2106	0	0	3595	0	2758	0	11509	0	8325	0	28292
49. principal	0	3135	0	0	2700	0	1376	0	1569	0	665	0	9446
50. Total Cash Outflows	33980	18741	7649	22583	41571	20105	15318	7426	39736	28295	57341	2652	295395
<< NEW BORROWING >>													
51. Short term	0	0	0	0	0	0	0	0	0	0	0	0	0
52. Intermediate	20785	0	0	0	0	0	0	0	0	0	0	0	20786
53. Long Term	0	0	0	0	0	0	0	0	0	0	0	0	0

<< CASH FLOW SUMMARY >>													
Int. Rate=	<< >>												
Minimum Cash Balance=	<< 1000 >>												
54. Beg. Cash Balance=	<< 1000 >>												
55. Inflows- Outflows (16-50)	-32430	-17891	54273	-20913	32258	31971	-14468	-6576	-1714	-20331	-56023	30785	-21059
56. Cash Position (51+52+53+54+55)	-10644	-16891	55273	-19913	33258	32971	13836	7260	5546	-14785	-55023	31785	
57. New Borrowing: Operating	11644	17891	0	20913	0	0	0	0	0	15785	56023	0	122256
58. New Borrowing: Other	20786	0	0	0	0	0	0	0	0	0	0	0	20786
<< Accrued Int. due on Oper. Loan >>	750	750	750	0	0	0	0	0	0	0	0	0	0
59. Interest pay'ts. on Oper. Loan	0	0	750	0	0	0	0	0	0	0	0	0	750
60. Principal pay'ts. on Oper. Loan	0	0	53523	0	32258	4667	0	0	0	0	0	0	30785
61. Ending Cash Balance	1000	1000	1000	1000	1000	28304	13836	7260	5546	1000	1000	1000	
<< DEBT BALANCES >>													
62. Outstanding Operating Debt	51644	69535	16012	36925	4667	0	0	0	0	15785	71808	41023	
63. Outstanding Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0
64. Outstanding Intermediate debt	94926	94926	94926	83255	83255	83255	83255	83255	83255	83255	83255	83255	
65. Outstanding Long Term Debt	259120	255985	255985	255985	253285	253285	251908	251908	250339	250339	249674	249674	
66. Total Outstanding Debt	405690	420445	366922	376165	341207	336540	335164	335164	333594	349379	404738	373953	

INCOME STATEMENT	NAME: THESIS CASE FARM	DATE: 01/01/87		
=====				
A. OPERATING RECEIPTS				
Livestock Sales & Products:				
Raised market livestock	134461			
Livestock purchased for resale:				
Livestock products	0			
	0			
	Subtotal:	134461		
Crop Sales:				
	57187			
	0			
	Subtotal:	57187		
Other Farm Income:				
Government payments	51504			
Custom Work, Cash Rent, Other	0			
Dividends, Refunds, Other	15653			
	Subtotal:	67157		
GROSS RECEIPTS FROM FARMING	258805			
B. CASH FARM EXPENSES				
Hired Labor	17132			
Mach. & Equip. Repairs	12802			
Building & Fence Repairs	543			
Cash Interest	37939			
Feed Purchased	3028			
Seed, Plants	5428			
Fertilizer, Lime, Chemicals	27431			
Machinery Hire	5057			
Supplies	0			
Vet, Medicine, Breeding Fee	3213			
Gas, Fuel, Oil, Lubricants	14985			
Storage, Warehousing	0			
Taxes: Real Est. & Pers. Prop	2500			
Insurance	3200			
Utilities (farm share)	1350			
Cash Rent & Leases	0			
Freight, Trucking	1254			
Miscellaneous Expenses	3664			
	0			
Lvstk. purchased for resale	94839			
TOTAL CASH EXPENSES	234365			
C. NET CASH INCOME FROM OPERATIONS	24439			
D. ADJUSTMENTS FOR ACCRUED ITEMS AND INVENTORY CHANGES:				
1. Accounts & Notes Receivable: Notes & Savings & Accounts Securities Other				
Ending Inventory	12651	0	10600	
Beginning Inventory	12651	0	10000	
Change	0	0	600	
2. Accounts Payable & Accrued Expenses: Accounts Taxes Interest Other				
Beginning Inventory	0	2720	37939	0
Ending Inventory	0	2720	37216	0
Change	0	0	723	0
3. Prepaid Expenses: Ending Inventory Beginning Inventory				
	0	-	0 =	
4. Inventories: Mkt. Livestock & Products Stored Crops, Feed & Supplies Growing Crops				
Ending Inventory	73639	3150	30165	
Beginning Inventory	73639	3150	30165	
Change	0	0	0	
E. ADJUSTMENTS FOR CAPITAL ITEMS: Breeding Lvstk. Mach, Equip Vehicles Bldgs & Land Other				
Ending Inventory	0	148280	515780	14550
Sales	0	0	0	
Subtotal:	0	148280	515780	14550
Beginning Inventory	0	148280	518300	14550
Purchases	0	27714	0	
Subtotal:	0	175994	518300	14550
Change	0	-27714	-2520	0
Change in Capital Items				-30234
F. VALUE OF FARM PRODUCTS USED IN THE HOME				0
G. NET FARM INCOME				-4471

FINANCIAL RATIOS	NAME:	THEISIS CASE FARM	Beginning	Ending	BENCHMARK
Current Ratio =	Current Assets		1.283	1.219	
	Current Liabilities				
Working Asset Ratio =	Current + Int. Assets		1.787	1.685	
	Current+Int. Liabilities				
Leverage Ratio =	Total Liabilities		1.040	1.045	
	Net Worth				
Debt to Asset Ratio =	Total Liabilities		0.510	0.511	
	Total Assets				
Percent Equity =	Net Worth \times 100		49.01%	48.89%	
	Total Assets				

A. Cash Farm Receipts		= 258805	:	Operating Note Summary	
(total cash receipts + capital sales)			:	Beginning Balance	Ending Balance
B. Total Cash Expenses		= 196426	:		Change
C. Nonfarm Expenses (Family Living = 12950)		= 12950	:	40000	41023
D. Nonfarm Income		= 15532	:		1023
E. Cash Available for Debt Service		= 64960	:	Maximum	Minimum
F. Scheduled Interest Payments		= 37189	:	Projected Balance	Projected Balance
G. Scheduled Principle Payments		= 21116	:	71808	0
H. Projected (Actual) Interest Pay't Operating Note		= 750	:	Cash Flow Sensitivity	
I. Projected Cash for New Investment and Risk		= 5905	:		
J. Projected Downpam't for Capital Expenditur		= 6929	:	Net Cash Flow as a % of Cash Farm Receipts	-0.40%
K. Net Cash Flow		= -1023	:	Net Cash Flow as a % of Cash Op. Expenses	-0.52%
			:	Interest Paid as a % of Cash Farm Receipts	14.66%

Rate of Return on Equity =				INPUT DATA	
	Net Farm Income - Oppor. Return to Labor & Mg't \times 100%			Opportunity Return	
	Beginning Equity (Net Worth)	= -4.38%		Labor & Management	
				12950	
Rate of Return on Investment =					
	Net Farm Inc + Int Pd - Oppor. Ret'n to Labor & Mg't \times 100%				
	Beginning Total Assets	= 2.53%			
Average Interest Rate on Debt =					
	Interest Paid + Change in Interest Due \times 100%				
	Average Total Debt Outstanding	= 10.20%			

<<ENTERPRISE BUDGET WORKSHEET>> NAME: NCFRAM - THESIS DATE: 01/01/87 File: stkr10_3
 Enterprise: Stockers - Buy Nov 1, Sell Mar 15 - 437 lbs. in, 679 lbs. out.

Number of head: 82 : OPTIONAL: Sell Weight Calculation : Source: Beef and Pasture Sytens for Oklahoma, Research
 Purchase weight 4.37 cwt : Days on feed 0 : Report P-888, February 1987.
 Purchase price: \$73.80 /cwt: Avg. daily gain (lbs/hd) 0.00 :
 Selling weight 6.79 cwt : >Calculated sell weight= 0.00 cwt: Percent change in costs 0.00 %
 Selling price: \$69.02 /cwt ----- Based on Budget # 13120001
 Death loss 2.00 % Interest rate 11.50 % AUM Source Budget #89102704 Error check 0

 PER
 UNIT TOTAL JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

<< OPERATING RECEIPTS >>

Livestock sales:

Description	unit	price	quan.	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Stockers	cwt	69.02	6.79	468.65	37492		37492									
Due to Death Loss sell 80 hd		0.00		0												
		0.00		0			0									
		0.00		0												
Government payments (totals)		0.00		0												
Other farm income (totals)		0.00		0												
		0.00		0												
TOTAL CASH OPERATING RECEIPTS		468.65		37492	0	0	37492	0	0	0	0	0	0	0	0	0

<< OPERATING EXPENSES >>

Imputed Total Labor Cost \$4./hr	11.80	968	194	194	194										194	194
Repairs: Machinery & equipment	2.33	191	38	38	38										38	38
Buildings & fences	2.52	207	41	41	41										41	41
Feed	12.25	1005	20	20	20										924	20
Seeds, plants	0.00	0														
Fertilizer, lime, chemicals	0.00	0														
Machine hire	0.00	0														
Supplies	0.00	0														
Vet medicine - ls supplies	11.08	909													727	182
Fuel, oil, lubricants	3.77	309	62	62	62										62	62
Storage, warehousing	0.00	0														
Taxes	0.00	0														
Insurance	0.00	0														
Utilities	0.00	0														
Rent Charged on Wheat Pasture	0.00	0			0											
Freight, trucking	3.91	321			160										160	
Marketing Charge	11.68	958			958											
	0.00	0														
Livestock purchased for resale																
Stocker	cwt	73.80	4.37	322.51	26445										26445	
		0.00		0												
TOTAL CASH OPERATING EXPENSES		381.85		31311	355	355	1473	0	0	0	0	0	0	26445	2146	537
NET OPERATING (Rec - Exp)		75.37		6180	-355	-355	36019	0	0	0	0	0	0	-26445	-2146	-537

Operating Interest Expense	0.50	41	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Net Operating After Interest	74.87	6139	-358	-358	36015	-3	-3	-3	-3	-3	-3	-3	-3	-26449	-2150	-540

<<ENTERPRISE BUDGET WORKSHEET>> NAME: NCFRAM - THESIS DATE: 01/01/87 File: stkr10_5
 Enterprise: Stockers - Buy Nov 1, Sell May 15 - 437 lbs. in, 779 lbs. out

Number of head: 129 : OPTIONAL: Sell Weight Calculation : Sources: Beef and Pasture Systems for Oklahoma, Research
 Purchase weight 4.37 cwt : Days on feed 0 : Report P-888, February 1987
 Purchase price: \$73.80 /cwt: Avg. daily gain (lbs/hd) 0.00 :
 Selling weight 7.79 cwt : >Calculated sell weight= 0.00 cwt: Percent change in costs 0.00 %
 Selling price: \$63.98 /cwt :
 Death loss 2.00 % Interest rate 11.50 % Based on Budget #13120003
 AUM source Budget #89102704 Error check 0

PER UNIT	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
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<< OPERATING RECEIPTS >>

Livestock sales:

Description	unit	price	quan.										
Stockers	cwt	63.98	7.79	498.40	62799								
				0.00	0								
				0.00	0								
				0.00	0								
Government payments	(totals)			0.00	0								
Other farm income	(totals)			0.00	0								
	(totals)			0.00	0								
TOTAL CASH OPERATING RECEIPTS				498.40	62799	0	0	0	0	62799	0	0	0

<< OPERATING EXPENSES >>

Imputed Return to Labor \$4/hr	15.64	2018	303	303	303	303	182					323	303
Repairs: Machinery & equipment	3.42	441	66	66	66	66	40					71	66
Buildings & fences	2.58	333	50	50	50	50	30					53	50
Feed	13.50	1742	174	174	174	174	174					697	174
Seeds, plants	0.00	0											
Fertilizer, lime, chemicals	0.00	0											
Machine hire	0.00	0											
Supplies	0.00	0											
Vet medicine,-ls supplies	11.08	1429										1429	
Fuel, oil, lubricants	5.57	719	108	108	108	108	72					108	108
Storage, warehousing	0.00	0											
Taxes	0.00	0											
Insurance	0.00	0											
Utilities	0.00	0	0	0									
Rent Chged on Rented Wheat	0.00	0					0						
Freight, trucking	4.26	550										550	
Marketing Charge	13.80	1780					1780						
	0.00	0											

Livestock purchased for resale

Description	unit	price	quan.										
Stocker	cwt	73.80	4.37	322.51	41603								41603
				0.00	0								
TOTAL CASH OPERATING EXPENSES				392.36	50614	701	701	701	701	2277	0	0	0
NET OPERATING (Rec - Exp)				94.46	12185	-701	-701	-701	-701	60521	0	0	0
Operating Interest Expense	0.52	67	7	13	20	27	0	0	0	0	0	0	0
Net Operating After Interest	93.94	12118	-707	-714	-721	-728	60521	0	0	0	0	0	-44833

<<ENTERPRISE BUDGET WORKSHEET>> NAME: NCFRAM - THESIS DATE: 01/01/87
 Enterprise: Stockers - Buy May 1, Sell Sep 30 - 437 lb. in, 662 lb. out

File: stkr4_9

Number of head: 79 : OPTIONAL: Sell Weight Calculation : Source: Beef and Pasture Systems for Oklahoma
 Purchase weight 4.37 cwt : Days on feed 0 : Research Project P-888, February, 1987
 Purchase price: \$77.60 /cwt: Avg. daily gain (lbs/hd) 0.00 :
 Selling weight 6.62 cwt : >Calculated sell weight= 0.00 cwt: Percent change in costs 0.00 %
 Selling price: \$67.01 /cwt ----- Based on Budget# 13120009
 Death loss 2.00 % Interest rate 11.50 % AUM source Budget #84101302 Error check 0

	PER UNIT	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
<< OPERATING RECEIPTS >>															
Livestock sales:															
Description	unit	price	quan.												
Stockers	cwt	67.01	6.62	443.77											34170
Due to Death Loss Sell 77 hd				0.00											0
				0.00											0
				0.00											0
Government payments	(totals)			0.00											0
Other farm income	(totals)			0.00											0
	(totals)			0.00											0
TOTAL CASH OPERATING RECEIPTS				443.77	34170	0	0	0	0	0	0	0	0	0	
<< OPERATING EXPENSES >>															
Imputed Return to Labor \$4/hr		6.96		550											
Repairs: Machinery & equipment		3.39		268											
Buildings & fences		0.05		4											
Feed		3.57		282											
Seeds, plants		0.00		0											
Fertilizer, lime, chemicals		0.00		0											
Machine hire		0.00		0											
Supplies		0.00		0											
Vet medicine,- Ls Supplies		11.08		875											
Fuel, oil, lubricants		3.16		250											
Storage, warehousing		0.00		0											
Taxes		0.00		0											
Insurance		0.00		0											
Utilities		0.00		0											
Rents, leases		0.00		0											
Freight, trucking		4.86		384											
Marketing Charge		11.72		926											
		0.00		0											
Livestock purchased for resal															
Description	unit	price	quan.												
Stocker	cwt	77.60	4.37	339.11											26790
				0.00											0
TOTAL CASH OPERATING EXPENSES				383.90	30328	0	0	0	0	28024	214	214	1663	0	
NET OPERATING (Rec - Exp)				48.63	3842	0	0	0	0	-28024	-214	-214	32507	0	
Operating Interest Expense		0.00		0	0	0	0	0	0	0	0	0	0	0	
Net Operating After Interest				48.63	3842	0	0	0	0	-28024	-214	-214	32507	0	

<< ENTERPRISE BUDGET WORKSHEET >> NAME: NCFRAM - THESIS DATE: 01/01/87

File: whdry2

Enterprise: Wheat - Dryland - Owned Harvest Equipment

Number of acres: 736 Quantity stored: 0 bu. Source: IFFS vr3, Disk #2, and Budget #76120301
 Acres Harvested: 522
 Yield: per acre 32.00 bu/ac
 Price: per bushel \$ 2.30 /bu. Percent change in costs 0.00 %
 Operator's share 100.0 %
 Gov't Pymt \$36901 Interest rate 11.50 % Error Check 0

		PER	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
<< OPERATING RECEIPTS >>																
Crop sales:																
Description	unit	price	quan.													
Wheat	bu	2.3	32	52.20	38419											
				0.00	0											
Government payments	(totals)	50.14	36901			13690										23211
Other farm income	(totals)	0.00	0													
	(totals)	0.00	0													
TOTAL CASH OPERATING RECEIPTS		102.34	75320	0	0	13690	0	0	38419	0	0	0	0	0	23211	
<< OPERATING EXPENSES >>																
Hired labor	\$4/hr	12.26	9023			722				3158	1985	1624	1534			
Repairs: Machinery & equipment		10.16	7478			374				2916	1645	1047	1496			
Buildings & fences		0.00	0													
Feed		0.00	0													
Seeds, plants		3.75	2760													
Fertilizer, lime, chemicals		21.30	15677			6898							2760			
Machine hire		0.00	0													
Supplies		0.00	0													
Vet medicine, breeding fees		0.00	0													
Fuel, oil, lubricants		12.84	9450			378				3497	2363	1229	1985			
Storage, warehousing		0.00	0													
Taxes		0.00	0													
Insurance		0.00	0													
Utilities		0.00	0													
Rents, leases		0.00	0													
Freight, trucking		0.00	0													
Miscellaneous		0.00	0													
		0.00	0													
TOTAL CASH OPERATING EXPENSES		60.31	44388	0	8372	0	0	0	9571	5993	3900	16553	0	0	0	
NET OPERATING (Rec - Exp)		42.03	30932	0	-8372	13690	0	0	28848	-5993	-3900	-16553	0	0	23211	
Operating Interest Expense		0.11	80	0	80	0	0	0	0	0	0	0	0	0	0	
Net Operating After Interest		41.92	30852	0	-8452	13690	0	0	28848	-5993	-3900	-16553	0	0	23211	

<<ENTERPRISE BUDGET WORKSHEET>> NAME: NCFRAM - THESIS
Enterprise: Wheat - Dryland - Custom Harvest

DATE: 01/01/87

File: whtdry1

Number of acres: 360 Quantity stored: 0 bu. Source: IFFS vr 3, Disk #2 and Budget# 76120101
Acres Harvested 261
Yield: per acre 32.00 bu/ac
Price: per bushel \$ 2.30 /bu.
Operator's share 66.7 % Percent change in costs 0.00 %
Gov't Pymts \$12312 Interest rate 11.50 % Error Check 0

	PER UNIT	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<< OPERATING RECEIPTS >>														
Crop sales:														
Description	unit	price	quan.											
Wheat	bu	2.3	32	35.57	12806			12806						
				0.00	0									
Government payments (totals)				34.20	12312	4572							7740	
Other farm income (totals)				0.00	0									
				(totals) 0.00	0									
TOTAL CASH OPERATING RECEIPTS				69.77	25118	0	0	4572	0	0	12806	0	0	7740
<< OPERATING EXPENSES >>														
Hired labor	\$4/hr			10.00	3600			1116	432	432	1620			
Repairs: Machinery & equipment				8.66	3118	94		717	468	468	1372			
Buildings & fences				0.00	0									
Feed				0.00	0									
Seeds, plants				2.50	900							900		
Fertilizer, lime, chemicals				14.20	5112	2249						2863		
Machine hire				16.50	4307			4307						
Supplies				0.00	0									
Vet medicine, breeding fees				0.00	0									
Fuel, oil, lubricants				8.77	3157	158		852	410	410	1326			
Storage, warehousing				0.00	0									
Taxes				0.00	0									
Insurance				0.00	0									
Utilities				0.00	0									
Rents, leases				0.00	0									
Freight, trucking				0.00	0									
Miscellaneous				0.00	0									
				0.00	0									
TOTAL CASH OPERATING EXPENSES				60.63	20193	0	2501	0	0	6992	1310	1310	8080	0
NET OPERATING (Rec - Exp)				13.68	4925	0	-2501	4572	0	0	5814	-1310	-1310	-8080
Operating Interest Expense				0.29	105	0	24	0	0	0	0	27	27	27
Net Operating After Interest				13.39	4820	0	-2525	4572	0	0	5814	-1310	-1310	-8107

<<ENTERPRISE BUDGET WORKSHEET>> NAME: NCFRAM - THESIS DATE: 01/01/87
 Enterprise: Grain Sorghum - Dryland - Owned Harvest Equipment

File: milodry2

Number of acres 64 Quantity stored: 0 cwt. Source: IFFS vr.3 Disk #2
 Acres harvested 64
 Yield: per acre 45.00 bu/ac
 Prices: per cwt \$ 2.07 /bu Percent change in costs 0.00 %
 Operator's share 100.0 %
 Gov't Pymts \$ 2291 Interest rate 11.50 % Error Check 0

	PER UNIT	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<< OPERATING RECEIPTS >>														
Crop sales:														
Description	unit	price	quan.											
Gr. Sorghum	BU	2.07	45	93.15	5962							5962		
				0.00	0									
Government payments	(totals)			35.80	2291	1227								1064
Other farm income	(totals)			0.00	0									
	(totals)			0.00	0									
TOTAL CASH OPERATING RECEIPTS				128.95	8253	0	0	1227	0	0	0	0	5962	0 1064
<< OPERATING EXPENSES >>														
Hired labor	\$4/hr	12.21		781		164	78	86	86	156		211		
Repairs: Machinery & equipment		19.31		1236		383	74	87	161	148		383		
Buildings & fences		0.00		0										
Feed		0.00		0										
Seeds, plants		3.25		208				208						
Fertilizer, lime, chemicals		20.35		1302				1237		65				
Machine hire		0.00		0										
Supplies		0.00		0										
Vet medicine, breeding fees		0.00		0										
Fuel, oil, lubricants		12.79		819		156	57	90	90	164		262		
Storage, warehousing		0.00		0										
Taxes		0.00		0										
Insurance		0.00		0										
Utilities		0.00		0										
Rents, leases		0.00		0										
Freight, trucking		0.00		0										
Miscellaneous		0.00		0										
		0.00		0										
TOTAL CASH OPERATING EXPENSES		67.91		4346		0	0	703	210	1708	337	533	0	0 856 0 0
NET OPERATING (Rec - Exp)		61.04		3906		0	0	524	-210	-1708	-337	-533	0	0 5106 0 1064
Operating Interest Expense		1.48		95		0	0	0	0	13	17	22	22	22 0 0 0
Net Operating After Interest		59.55		3811		0	0	524	-210	-1721	-353	-555	-22	-22 5106 0 1064

CASHFLOW OF ADDITIONAL INFORMATION													NAME:	NCFARM THESIS		DATE:	01/01/87		Error check	0
TOTALS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC								
<< OPERATING RECEIPTS >>																				
7. Other farm income	0																			
8. Pasture Rents	15653			3583		9068				3002										
<< CAPITAL SALES >>																				
10. Breeding Livestock	0																			
11. Mach.,Equip.,Vehicles	0																			
12. Buildings & Land	0																			
<< OTHER INFLOWS >>																				
13. Wages and Salaries	10200	850	850	850	850	850	850	850	850	850	850	850	850	850	850					
14. Investments	0																			
15. Off-Farm Labor	5332	700		508	820	1112					1152	468	572							
<< OPERATING EXPENSES >>																				
17. Hired Labor	4476		496			1744	748	700	788											
28. Taxes- R.E.	2500	2500																		
29. Insurance	3200	1600					1600													
30. Utilities	1350	75	75	75	75	125	150	150	150	150	125	125	75							
31. Cash Rents & Leases	0																			
33. Miscellaneous	0																			
34.	0																			
<< CAPITAL EXPENSES >> (Total Cost)																				
37. Breeding Livestock	0																			
38. Mach.,Equip.,Vehicles	27714	27714																		
39. Buildings & Land	0	0																		
<< OTHER OUTFLOWS >>																				
40. Family Living	12950	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16	1079.16					
41. Income Tax	0																			
42. Investments	0																			
43.	0																			
<< NEW BORROWING-INTERMEDIATE >>																				
49. Int rt. 11.00	20785.5	20785.5																		
49a. Int rt. 0.00	0																			
<< NEW BORROWING-LONG TERM >>																				
50. Int rt. 0.00	0																			
50a. Int rt. 0.00	0																			
<< PAYMENTS NEW BORROWING-INT >>																				
44. Interest for loan 49	0																			
45. Principal for loan 49	0																			
44a. Interest for loan 49a	0																			
45a. Principal for loan 49a	0																			
<< PAYMENTS NEW BORROWING-LT >>																				
46. Interest for loan 50	0																			
47. Principal for loan 50	0																			
46a. Interest for loan 50a	0																			
47a. Principal for loan 50a	0																			
ANNUAL PAYMENT FOR NEW LOAN ON LINE																				
		49 ==>	5623.93	49a ==>		50 ==>		50a ==>												

VITA²

George B. Wallace

Candidate for the Degree of

Master of Science

**Thesis: AN EVALUATION OF POSSIBLE ABATEMENTS TO FINANCIAL STRESS FOR A
NORTH CENTRAL OKLAHOMA WHEAT AND LIVESTOCK FARM**

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Erick, Oklahoma, March 25, 1958, the son of Mr. and Mrs. Julian Wallace. Married, May 31, 1980, Dorotha Lea Watts.

Education: Graduated from Sweetwater High School, Sweetwater, Oklahoma, in May 1976; received the Bachelor of Science in Agriculture Degree in agricultural economics from the Oklahoma State University in 1981; completed requirements for the Master of Science Degree at Oklahoma State University May, 1989.

Professional Experience: Loan Officer with Farm Credit System, June 1981 to January, 1983; Campus Ministry work, September, 1983 to present; and Graduate Research Assistant, June, 1985 to June, 1987.