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Selecting Risk Efficient Crop Insurance Alternatives for Northeast Kansas Corn/Soybean Farms

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ABSTRACT

Concerns about the drought of 1988 continuing on into 1989 have lead to increased interest in the use of crop insurance to mitigate the effects of low yields on farm income. This paper analyzes the selection of crop insurance yield guarantee levels and indemnity prices based on risk preferences for corn/soybean farmers in northeastern Kansas. Using stochastic dominance with respect to a function analysis, it was determined that for other than the most risk-preferring producers, some level of crop insurance is contained in the preferred set of strategies. For the most risk-averse producers, the highest yield guarantee level and indemnity price election are preferred.

INTRODUCTION

The 1980 Crop Insurance Act expanded the availability of Multiple Peril Crop Insurance with the goal of replacing the USDA's low-yield disaster program. Crop insurance is currently subsidized by the federal government and is intended to be the primary continuous government program which farm managers can use to reduce the impact of lost income due to yield losses associated with poor weather conditions, disease, pests, fire, and earthquakes (Barnaby).

The government commodity program reduces income variability by reducing price risk. Crop insurance, which is designed to reduce yield risk, should be analyzed to determine whether the additional reduction is economically worthwhile. Further, crop insurance has been intended to replace the low-yield disaster programs, but was available for the 1988 crop. It is also important to determine if the farm manager would be better off by purchasing crop insurance versus receiving disaster aid under a program similar to that available for 1988.

In the crop insurance program, the farmer is faced with ten alternatives for each crop grown. A farmer may decide not to purchase crop insurance or to purchase insurance using any of the nine available combinations of yield guarantees and indemnity prices. Recent interest in crop insurance has lead to the development of budgets and worksheets designed to facilitate the selection among these crop insurance alternatives (Barnaby).

The decision of whether to participate in the federal crop insurance program, however, is dependent not only on the agricultural producers' knowledge of expected net returns from the various combinations of prices and yields, but also on their attitudes towards risk. Stochastic dominance is a risk analysis technique that chooses between a set of risky alternatives by

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comparing the distribution of possible incomes for each alternative, selecting preferred alternatives based on risk preferences. Three stochastic dominance tools are available to the researcher: first-degree stochastic dominance, second-degree stochastic dominance, and stochastic dominance with respect to a function (SDRF). The first two analyze the problem for generalized categories of risk behavior, while SDRF analyzes specific intervals which approximate specific risk categories. For SDRF, preferred alternatives are identified by comparing the cumulative density function of net returns from each alternative for the risk categories of interest.

Examples of the use of stochastic dominance in evaluating the purchase of crop insurance can be found in Kramer and Pope, in Williams, and in Harper, Williams, and Barnaby. Kramer and Pope conducted second degree stochastic dominance on crop insurance alternatives for corn in northern Virginia. Their findings indicate that for risk neutral and risk averse farmers, the highest yield guarantee and indemnity price is the preferred crop insurance alternative. The drawback with using second degree stochastic dominance, however, is that it can not evaluate alternatives for risk-preferring individuals. In addition, for many parts of the United States, the examination of crop insurance in a single crop context (in this case, corn) overlooks the possible risk-reducing effects of crop diversification. Research by Williams and Harper, Williams, and Barnaby did not specifically address the question of crop insurance alternatives in that only one crop insurance alternative is considered (along with various government program options) in each of these analyses.

This paper examines the use of federal crop insurance for reducing income risk. The impact crop insurance has on net return risk given variable prices and yields is discussed. Statistical and stochastic dominance with respect to a function (SDRF) analysis are conducted on corn and soybean data from 18 farms in northeastern Kansas for the period 1973 to 1987 to determine which of the ten available alternatives may be preferred to reduce income variability and maintain net returns. SDRF is used as the analysis tool because it allows for consideration of all classes of risk behavior. Corn/soybean rotations are evaluated so that possible crop diversification effects on the selection of crop insurance alternatives can be examined. The effect of the availability of a disaster aid program like that in force for 1988 is also evaluated.

Overview of Crop Insurance

The cost and coverage of crop insurance is based on insurable yields, yield guarantee levels, indemnity prices, and premium rates. These terms and their significance are discussed in this section.

Traditionally, insurable crop yields are determined for areas identified by the Federal Crop Insurance Corporation (FCIC) as having similar soil types, production practices, yields, and histories of crop losses. Crop yield guarantees are based on the Actual Production History (APH) for each producer. Under the APH method, if less than ten years of records are available, yield guarantees are based on a combination of the available farm yields and county average yields. If ten or more years of records are available, the guarantee is based on the farmer's latest ten-year average yield.

Once the insurance yield is established, a yield guarantee level and one of three indemnity prices is selected by the manager. The yield guarantee levels are currently 50 percent, 65 percent, and 75 percent of the APH yield. Essentially, yield guarantee levels function as a 50 percent, 35 percent, or 25 percent deductible for the crop insurance. The three indemnity price elections for corn are $1.50, $2.00, and $2.60 per bushel in 1989. For soybeans, the indemnity prices are $5.00, $5.50, and 85 percent of the average November futures price for the last five trading days of March 1989. For this study, 85 percent of the average November futures price for the five trading days from January 5 to January 11 ($6.33/bu.) is used to approximate the high (or market-based) indemnity price election. If a yield occurs which is less than the yield guarantee, then an indemnity payment is due the farmer. The indemnity payment is calculated as the difference between the yield guarantee and harvested yield multiplied by the indemnity price.

Premium rates are based on historical yields and the production and loss history for the county in which the farm is located. The premium charged depends on the amount of coverage purchased (yield guarantee level and indemnity price election) and the APH yield. The cost of crop insurance per acre is calculated by multiplying the yield guarantee by the indemnity price election and by the premium rate supplied by the FCIC (Barnaby).

The purpose of crop insurance is to provide for some income protection from yield risk. It is not intended to provide protection from variable prices. The effect of changes in market price on per acre net returns both with and without crop insurance for corn experiencing a 75 percent yield loss is illustrated in Figure 1. The indemnity price election is only used to value the crop that is lost and does not reflect the value lost if market prices are substantially above the indemnity price selected. In addition, crop insurance does not provide protection against low prices when the actual yield is above the yield guarantee selected. Only when a producer suffers a loss in excess of the yield guarantee and market prices are below the indemnity price selected does the producer have some degree of price protection.

The impact of yield variability on net returns is illustrated in Figure 2 given corn with a market price equal to the medium indemnity price of $2.00/bu. In this example, a yield guarantee of 65 percent of APH is used. As can be seen, crop insurance substantially reduces lost income when the yield falls below the guaranteed yield level of 65 percent of program yield.

<u>Overview of the 1988 Disaster Aid Program</u>

The goal of the Federal Crop Insurance Act of 1980 was to replace the Federal Disaster Payment Program administered by the Agricultural Stabilization and Conservation Service (ASCS). Due to the widespread drought of 1988, however, the largest disaster relief measure in U.S. history was passed by Congress (Lipton and Pollack).

Disaster aid is available to all farmers, including those participating in the government commodity program and crop insurance. Producers were eligible for disaster aid in 1988 if harvested yield is less than or equal to

65 percent of the government program yield. The procedure used to estimate total deficiency and disaster payments is outlined in Williams, Harper, and Barnaby.

Farms receiving disaster aid for yield losses in excess of 65 percent of program yield (harvested yield is less than 35 percent of program yield) are required to purchase crop insurance for the 1989 crop year. Farmers are allowed to purchase crop insurance at the lowest yield guarantee level and indemnity price election. This results in the lowest premium possible. In addition, total disaster aid plus any indemnity payment from crop insurance cannot exceed 100 percent of expected gross income.

RISK ANALYSIS PROCEDURES

Crop insurance alternatives are analyzed to determine which would be preferred for corn/soybean producers with differing risk preferences who also participate in the government commodity program for corn. The following ten crop insurance alternatives are examined:

1.) No purchase of crop insurance.
2.) Purchase crop insurance at the highest indemnity price and yield guarantee.
3.) Purchase crop insurance at the middle indemnity price and highest yield guarantee.
4.) Purchase crop insurance at the lowest indemnity price and highest yield guarantee.
5.) Purchase crop insurance at the highest indemnity price and middle yield guarantee.
6.) Purchase crop insurance at the middle indemnity price and middle yield guarantee.
7.) Purchase crop insurance at the lowest indemnity price and middle yield guarantee.
8.) Purchase crop insurance at the highest indemnity price and lowest yield guarantee.
9.) Purchase crop insurance at the middle indemnity price and lowest yield guarantee.
10.) Purchase crop insurance at the lowest indemnity price and lowest yield guarantee.

Distributions of per acre net returns for each crop insurance alternative and cropping pattern are calculated using historical corn and soybean yields and market price data for a fifteen-year period to reflect the potential outcomes given the provisions from the 1989 government farm program. The net return distributions are examined for variability. Per acre net returns compared in this study are equal to gross income minus all costs, including those for labor, interest, and land. Means, minimums, maximums, standard deviation and coefficient of variation statistics for the distributions of per acre net returns are compared and stochastic dominance analysis is conducted. This evaluation utilizes stochastic dominance with respect to a function (SDRF), which analyzes risk categories to select preferred alternatives given differing attitudes towards risk in individuals. These may range from a risk-preferring attitude to one that is risk-neutral to one that is risk-averse. In this analysis, preferred alternatives are identified for seven categories of risk preferences. The risk preference categories used in this analysis are whole farm coefficients developed for northeastern Kansas (Llewelyn, Williams, and Gross) adjusted to per acre use (Raskin and Cochran). SDRF analysis is conducted using a program developed by Cochran and Raskin.

Loan rates, target prices and acreage reduction percentages for the 1989 cropping year are used to determine returns for government commodity program participation. Crop insurance premiums for each alternative are based on the price election and yield guarantee chosen.

DATA

The yield and price data for corn and soybeans used in this study are from northeastern Kansas for the years 1973 to 1987. The yield data is from the Kansas Farm Management Data Bank (Langemeier) for the 18 farms in Brown, Doniphan, and Atchison Counties who were active during this entire period. Average crop acreage in corn and soybeans during the past five years was 720 acres per farm, with 45 percent in corn base and 55 percent in soybeans. The maximum average corn yield during this period was 128.7 bu./acre in 1986 and the minimum average yield was 25.6 bu./acre in 1980. The maximum average soybean yield was 42.4 bu./acre in 1986 and the minimum average yield was 18.8 bu./acre in 1976. Average program yield is 76.8 bu./acre for corn (soybeans are a nonprogram crop). Average APH yields for crop insurance are 90.4 bu./acre for corn and 32.7 bu./acre for soybeans. Market prices for northeastern Kansas (Kansas State Board of Agriculture) were converted to 1988 dollars by using the USDA index of prices received by farmers. Crop insurance premium rates were provided by the FCIC (Link). Assumptions used for the estimates of per acre net returns (the cost of production estimates are for conventional tillage practices) are found in Table 1. Procedures used for calculating net returns to crop insurance are outlined in Williams, Harper, and Barnaby.

RESULTS OF RISK ANALYSIS

Statistical Analysis

The statistics associated with the crop insurance alternatives for the corn/soybean rotation are shown in Table 2. Since the decision to insure one crop does not require insuring the other, combinations of the same level of each of the ten crop insurance alternatives along with each level of crop insurance on one crop and no crop insurance on the other are considered in the analysis. Means, standard deviations, maximum and minimum values, and coefficients of variation are listed for the various combinations for comparison purposes.

For the corn/soybean rotation used in this study, it is found that for all strategies, the lowest means and highest standard deviations (variability around the mean) for net returns are for the strategies when there is no purchase of crop insurance for corn and crop insurance with a 50 percent yield guarantee is purchased for soybeans (combinations 26-28). No benefit is derived from purchasing crop insurance for soybeans with a 50 percent yield guarantee since no yield in the period 1973 to 1987 fell below 16.3 bu./acre. For every other case (combinations 2-25), the purchase of crop insurance causes the standard deviation around the mean to decline relative to not purchasing crop insurance (combination 1). For crop insurance combinations 2-25, the maximum loss decreases substantially, while the maximum return is lowered slightly by the amount of the insurance premium incurred. In crop insurance combinations 2-7 and 11-19 the average net return increases with the purchase of crop insurance. In these cases, the use of crop insurance both improves per acre net returns and has the expected effect of lowering the standard deviation (reducing variability). The highest net return is associated with the purchase of crop insurance at the highest yield guarantee and indemnity price for corn with no purchase for soybeans (combination 11). The lowest standard deviation (and second highest mean) is the situation in which the highest yield guarantee and indemnity price are chosen for both crops. This type of result is not unique to this study. Pfleuger and Barry, for example, found a similar result in their simulation study of farmer's use of crop insurance. They found that crop insurance alone and in combination with farm credit increases the expected level and stability of net returns. It may be that federal subsidization of crop insurance is partly responsible for the increased net returns. At present, the premium rates for the 50 and 65 percent levels of coverage are subsidized by 30 percent and the 75 percent level by 16.9 percent (Link). In addition, the federal government pays for all of the administrative costs associated with operating the program, which in effect represents an additional subsidy of approximately 20 percent (Barnaby). The impact of removing the subsidy is explored in the SDRF analysis.

The coefficient of variation (standard deviation divided by the mean) is a measure of relative variability or risk. The lowest positive coefficient of variation indicates the least risk per dollar of net return (combination 2). Since the purchase of crop insurance lowers the standard deviation considerably in most cases, the coefficient of variation is smaller than for the situation without crop insurance. This indicates that relative income risk is reduced through the purchase of that level of crop insurance.

Stochastic Dominance Analysis

SDRF analysis is used to analyze which strategies may be preferred by farm managers having different risk preferences (Table 3). Except for the strongly risk-preferring category, some level of crop insurance is included as a preferred risk management strategy for the corn/soybean rotation (column 3 of Table 3). For the most risk-averse producers, participation in crop insurance at the highest yield guarantees and indemnity price levels becomes the preferred risk management strategy. This finding agrees with the conclusions of Kramer and Pope in their analysis of crop insurance for corn in northern Virginia. This is true even if the government subsidy on crop insurance were to be removed. The government subsidy of 16.9 percent on the premium rate for the highest yield guarantee is equivalent to $1.72/acre. Accounting for the additional administrative cost subsidy of 20 percent, the total crop insurance subsidy is equal to $3.78/acre. Willingness-to-pay analysis (Cochran and Mjelde) indicates that the moderate to strongly risk-averse producers would be willing to pay between $7.05 and $29.00/acre more for this level of crop insurance than they are currently, which far exceeds the subsidy.

For the fifteen years of data used in this analysis, corn yields fell below the 75 percent yield guarantee level four times, below the 65 percent level three times, and below the 50 percent level three times. For soybeans, yields fell below the 65 and 75 percent yield guarantee levels three times and never fell below the 50 percent level. Crop insurance alternatives with the 50 percent yield guarantee level were not included in the preferred sets for any of the seven categories of risk behavior analyzed.

Effect of Crop Diversification

The effect of crop diversification (corn/soybean rotation) on crop insurance usage is investigated by conducting SDRF analysis on hypothetical cropping situations where only corn or soybeans are grown on the entire acreage. The results of this analysis are listed in columns 4 and 5 of Table 3. By comparing these two columns, it is evident that corn is a more risky crop to grow than soybeans in northeastern Kansas. While crop insurance is included in the preferred set for corn by moderately risk-preferring and more risk-averse decision-makers, crop insurance is not included in the preferred set for soybeans for any of the risk-preferring categories. For slightly risk-preferring and more risk-averse individuals, crop insurance alternatives constitute the entire set of preferred strategies for corn. This is true for soybeans only for the moderately and strongly risk-averse categories. These are not unexpected results, however, since the coefficient of variation associated with yield is 0.39 for corn as compared to only 0.26 for soybeans. The overall effect of crop diversification on the selection of crop insurance alternatives, however, appears to be quite limited.

Effect of the Availability of Disaster Aid

The availability of a disaster aid program like that in force during 1988 effectively negates the incentive to purchase crop insurance as a risk management tool for all but the most risk-averse producers. The average return under the disaster program is $59.65, which is higher than any of the combinations considered in Table 2. The standard deviation is 39.10, which is lower than all except combinations 2-5. Since disaster aid comes at no additional cost to the farmer, it is easy to see the attractiveness of such a program. Only for the moderately and strongly risk-averse does crop insurance enter into the preferred set. For the moderately risk-averse, disaster aid and the 75 percent yield guarantee/high indemnity price alternative constitute the preferred set. Only for the strongly risk-averse is this crop insurance alternative preferred to disaster aid.

SUMMARY

This paper reviews the impact of crop insurance on income risk. Ten crop insurance options are evaluated for risk (net return variability) by making statistical comparisons and conducting stochastic dominance with respect to a function analysis.

The results of this analysis indicate that other than for the most risk-preferring producers, the set of preferred strategies includes the purchase of some level of crop insurance. For risk-averse producers, the highest yield guarantee level and indemnity price are preferred. Crop insurance combinations including the 50 percent yield guarantee level were never included in any of the preferred sets. The effect of crop diversification on the choice of crop insurance alternatives is negligible.

The effect of the availability of a disaster aid program like that in force in 1988 is to negate the incentives to purchase crop insurance for all but the most risk-averse producers. This is true since farmers receive protection from yield loss below 65 percent of program yield at no additional cost to themselves. With the large budget deficit facing the federal government, however, farmers should take a harder look at purchasing crop insurance since it is questionable whether a disaster aid program similar to that of 1988 would be available for 1989 (de la Garza).

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Table 1. Assumptions Used for the Calculation of Per Acre Net Returns for Conventional Tillage Corn and Soybeans in Northeastern Kansas.

Item	Units	Value
----------CORN-----------		
Variable Production Costs	$/acre	53.48
Land/Equipment Costs	$/acre	97.07
Harvest Cost (Fixed)	$/acre	18.00
Harvest Cost (Variable)	$/bu.	0.10
Acreage Reduction Requirement	percent	10.00
Target Price	$/bu.	2.84
Announced Loan Rate	$/bu.	1.65
Program Yield	bu./acre	76.8
APH Yield	bu./acre	90.4
75% of APH Yield	bu./acre	67.8
65% of APH Yield	bu./acre	58.7
50% of APH Yield	bu./acre	45.2
Indemnity Price Elections:		
High	$/bu.	2.60
Medium	$/bu.	2.00
Low	$/bu.	1.50
--------SOYBEANS---------		
Variable Production Costs	$/acre	49.07
Land/Equipment Costs	$/acre	97.07
Harvest Cost (Fixed)	$/acre	18.00
Harvest Cost (Variable)	$/bu.	0.14
APH Yield	bu./acre	32.7
75% of APH Yield	bu./acre	24.5
65% of APH Yield	bu./acre	21.2
50% of APH Yield	bu./acre	16.3
Indemnity Price Elections:		
High	$/bu.	6.33 (est.)
Medium	$/bu.	5.50
Low	$/bu.	5.00

Table 2. Descriptive Statistics for the Distributions of Per Acre Net Returns for a Corn/Soybean Rotation in Northeast Kansas Under Different Crop Insurance Alternatives (in dollars).

	Crop Insurance Combination	Mean	Standard Deviation	Maximum Value	Minimum Value	Coefficient of Variation
	(corn, soybeans)					
1	O,O	54.30	46.60	112.66	-36.57	0.86
2	A,A	57.08	33.81	104.15	-4.76	0.59
3	B,B	56.41	35.72	105.71	-5.62	0.63
4	C,C	55.85	37.39	106.89	-5.90	0.67
5	D,D	57.02	38.57	108.63	-11.65	0.68
6	E,E	56.35	39.97	109.37	-11.85	0.71
7	F,F	55.77	41.18	109.92	-15.67	0.74
8	G,G	54.60	42.87	110.39	-20.96	0.79
9	H,H	54.42	43.66	110.80	-24.67	0.80
10	I,I	54.24	44.36	111.12	-27.79	0.82
11	A,O	57.34	39.64	108.16	-19.25	0.69
12	B,O	56.64	40.84	109.20	-18.22	0.72
13	C,O	56.06	42.03	110.06	-17.35	0.75
14	D,O	57.47	40.95	110.55	-16.86	0.71
15	E,O	56.74	42.03	111.04	-16.38	0.74
16	F,O	56.13	43.03	111.44	-19.23	0.77
17	G,O	55.68	42.87	111.47	-19.88	0.77
18	H,O	55.36	43.66	111.74	-23.73	0.79
19	I,O	55.10	44.36	111.97	-26.94	0.81
20	O,A	54.04	41.02	108.65	-22.77	0.76
21	O,B	54.07	41.71	109.17	-24.58	0.77
22	O,C	54.09	42.13	109.49	-25.67	0.78
23	O,D	53.85	44.37	110.73	-32.06	0.82
24	O,E	53.91	44.66	110.98	-32.65	0.83
25	O,F	53.95	44.83	111.14	-33.01	0.83
26	O,G	53.22	46.60	111.58	-37.65	0.88
27	O,H	53.36	46.60	111.72	-37.51	0.87
28	O,I	53.45	46.60	111.80	-37.43	0.87

Crop Insurance Options:

O: No crop insurance
A: 75% yield guarantee, high indemnity price
B: 75% yield guarantee, medium indemnity price
C: 75% yield guarantee, low indemnity price
D: 65% yield guarantee, high indemnity price
E: 65% yield guarantee, medium indemnity price
F: 65% yield guarantee, low indemnity price
G: 50% yield guarantee, high indemnity price
H: 50% yield guarantee, medium indemnity price
I: 50% yield guarantee, low indemnity price

Table 3. Stochastic Dominance With Respect to a Function Results for Crop Insurance Options for Corn and Soybeans in Northeastern Kansas.

Approximate Risk Attitude	Range of Pratt-Arrow Risk Aversion Coefficients	Preferred Risk Management Strategies: Corn/Soybean Rotation (Corn,Soybeans)	Corn Only	Soybeans Only
Strongly Risk Preferring	-.08 to -.04	(O,O)	O	O
Moderately Risk Preferring	-.04 to -.008	(O,O),(D,O), (E,O),(F,O)	O,D,E,F	O
Slightly Risk Preferring	-.008 to 0.0	(D,O)	D	O
Risk Neutral	-.008 to +.008	(A,A),(D,D), (A,O),(D,O)	A,D	O,A,B,C, D,E,F
Slightly Risk Averse	0.0 to +.008	(A,A),(A,O), (D,O)	A,D	O,A,B,C
Moderately Risk Averse	+.008 to +.04	(A,A)	A	A
Strongly Risk Averse	+.04 to +.08	(A,A)	A	A

Crop Insurance Options:

O: No crop insurance
A: 75% yield guarantee, high indemnity price
B: 75% yield guarantee, medium indemnity price
C: 75% yield guarantee, low indemnity price
D: 65% yield guarantee, high indemnity price
E: 65% yield guarantee, medium indemnity price
F: 65% yield guarantee, low indemnity price
G: 50% yield guarantee, high indemnity price
H: 50% yield guarantee, medium indemnity price
I: 50% yield guarantee, low indemnity price

AN EVALUATION OF FINANCIAL STRESS ABATEMENTS FOR AN OKLAHOMA FARM SITUATION

George B. Wallace and Harry P. Mapp

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 reached significant levels during the 1980's. In 1986, survey results indicated that most farmers earned enough to make 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 indicated that not all farmers were sharing equally in the recovery. Highly leveraged farmers still held roughly 66 percent of all debt suggesting a continued need for research on possible abatements to financial stress (USDA).

Recent research on farm financial stress is primarily of three types. One group of studies provides a perspective on the financial condition of agriculture, discusses the severity of the farm financial crisis, and suggests possible abatements to financial stress (Chicoine; Ginder; Melichar; Harshbarger and Chite). A second group of studies employs statistical techniques to identify the extent of farm financial stress by location, size, and type of farming enterprise (USDA; Lines and Morehart; Choat and Plaxico). A third group of studies investigates the merits of proposed farm-level abatements to financial stress using farm simulation modeling techniques (Perry, Rister, Richardson, and Leatham; Mapp and Walker; Al-Abdali; Barry). Throughout the literature, there is widespread 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 debt forgiveness, moratoriums on debt repayment and attracting additional equity capital into the farm sector. Selling farm assets and either leasing them back or adjusting to a downsized farming operation are additional possibilities.

The purpose of this study is to evaluate the impacts of selected financial stress abatement options on the overall performance of a financially stressed Northcentral Oklahoma wheat and livestock farm. The initial farm situation is specified to represent a high level of financial stress. The initial debt to asset ratio is 50 percent. This base farm situation is first simulated over a 5-year-period using the Integrated Farm Financial Statements (IFFS) model [Mapp, Love and Hesser; Love, Mapp, Haefner, and Richardson]. IFFS is a set of Lotus 1-2-3 spreadsheets integrated through the use of menus and macros. Key components include net worth, cash flow and income statements, and a debt worksheet. The model is used to measure liquidity, solvency, and profitability for the base case.

A conceptual model is presented and used to specify financial abatements to be included in the analysis. Financial abatements evaluated include a reduction in interest rates, an infusion of equity, an equity infusion/interest rate reduction combination, debt reduction, and sale of assets without a lease back provision. The abatements are evaluated in terms of their impacts on net farm income, net cash flow, changes in equity, rate of return on equity and rate of return on assets.

BASE FARM ANALYSIS

A base wheat and livestock farm for Northcentral Oklahoma is constructed using county census data. The typical farm consists of 1,280 acres and has an established wheat