Factors Determining FSA Guaranteed Loan Loss Claim Activity in the U.S. for 1990-1997

By

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Abstract

The study identifies farm operator and economic characteristics explaining variation in FSA guaranteed loan loss claims rates. Regression models using state-level data are estimated. Debt-to-asset ratios, interest rates, off-farm income and bank loan-to-asset ratios explain FO loss rates. Farm size and bank loan-to-asset ratios are important to OL loss rates.

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INTRODUCTION

The Farm Service Agency (FSA) guaranteed loan program is an increasingly important source of funds for production agriculture. FSA provides capital to borrowers who do not meet commercial credit standards, but still possess the potential to establish financially viable farming operations. Until the mid-1980s, the majority of farm loan assistance that FSA provided were direct loans funded entirely by congressional appropriations. Over the last fifteen years, a definite policy commitment has clearly been made at the federal level to shift lending from the public sector to the private sector through the use of guaranteed loans. The source of principal for guaranteed loans comes from private lending institutions such as commercial banks or the Farm Credit System, but FSA guarantees repayment of up to 95 percent of a loan made by a qualifying lender if the borrower defaults.

Between fiscal 1986 and 1995, loan guarantees rose from 35.9 percent of total FSA obligations to 77.5 percent of total FSA obligations (USDA/ERS, 1999). This percentage has recently decreased to 66 percent in fiscal 1998. In fiscal 1986, $2.8 billion in direct loans and $1.6 billion in guaranteed loans were obligated. In contrast, $739 million in direct loans and $1.4 billion in guaranteed loans were obligated in fiscal 1998 (USDA/ERS, 1999). FSA no longer provides the higher volume of direct loans as in past years because Congress has not appropriated the funds to do so.

Under the 1996 Federal Agriculture Improvement and Reform (FAIR) Act, the obligation levels for guaranteed loans are legislated to increase during the 1996 to 2000 time period. Authorized guaranteed farm ownership (FO) loan obligation limits are scheduled to increase from $600 million in 1996 to $750 million in 2000, while funding levels throughout the period are set at a maximum of $85 million for direct FO loans and $500 million for direct operating (OL) loans

(Koenig). For guaranteed OL loans, authorized loan levels gradually rise from $1.9 billion to $2.1 billion (Koenig). In addition, the Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1998 (Omnibus Act) increased the caps on borrower indebtedness for both guaranteed FO and OL loan programs from $300,000 and $400,000, respectively, to $700,000 making the program more accessible to family sized farm operations (USDA/ERS,1999). The above factors combined with the gradual reduction of farmer deficiency payments under the FAIR Act potentially place more demand on the FSA guaranteed loan program.

This study investigates the loss claims aspect of the FSA guaranteed loan program. The payment of a loss claim by FSA is the final step in settling a delinquent loan account with a guaranteed lender. Generally, some effort is made by FSA and the lender to help a delinquent borrower resume payment on the loan by restructuring the terms or conditions of the loan. When such assistance is inadequate, the collateral is sold and the proceeds are disbursed to the lender. If the proceeds from the sale are not sufficient to cover the full amount of the principal due on the loan, FSA pays the lender the guaranteed percentage of the lost principal. This payment is termed a loss claim.

Loss claim payments to guaranteed loans for the U.S. have fluctuated dramatically over the last decade. Guaranteed loss claims for the U.S. were at their lowest for the 1989-98 period in fiscal 1995 at $32.3 million, while they reached a peak in 1997 at $57.8 million (table 1). To understand the full impact of the FSA guaranteed loan program and to make it more effective, it is necessary to know which factors influence loss claims levels. This study identifies farm operator, farm economy, agricultural policy, guaranteed loan program and commercial bank variables most important in explaining the variation in the payment of loss claims. Factors such as debt-to-asset

ratio, net farm income, farm size, government payments, interest rates, interest rate assistance, and bank loan-to-asset ratio are among those variables hypothesized to be important. This study estimates how these factors influence the loss claims rates for both FO and OL loans.

DATA AND METHODS

This study estimates two regression models: one for FO and one for OL loans. For each model the ratio of loss claims paid to principal outstanding is hypothesized to be a function of several variables that measure: (1) the financial well-being of farm operators, (2) the structure of the agricultural industry, (3) the overall health of the agricultural sector and general policy toward agriculture, (4) the level of activity in the various dimensions of the guaranteed loan program, and (5) the agricultural lending policies of commercial banks. These variables represent underlying sources of financial risk either present at the time of loan origination or evolving from circumstances arising during the life of loans that may result in loans becoming unsuccessful. Annual state-level, panel data for forty states from 1990–1997 constitute the estimation sample.

The data used in this study were obtained from several sources: FSA offices in Kansas City and Washington D.C., Economic Research Service, Bureau of the Census, Dun and Bradstreet Corporation *Business Failure Records*, Bureau of Labor Statistics, National Agricultural Statistics Service and Federal Reserve Bank of Chicago's *Report of Bank Condition and Income Database*. Specific details are given in Fultz. The dependent variable for the FO model is the ratio of annual loss claims paid on guaranteed FO loans to beginning of the year

principal outstanding (FONLC).[1] The dependent variable for the OL model, OLNLC, is analogous to FONLC except it is defined for OL loss claims and principal outstanding.

Farm operator characteristics measure various aspects of the financial condition of farm borrowers such as liquidity, solvency and profitability. Variables such as debt-to-asset ratios, net farm income, rates of return on assets, and liquidity measures have been used in prior studies such as Turvey, Shepard and Collins, and Miller and LaDue to measure the financial risk of farm operators. The hypothesis in this study is that a strong financial position promotes timely principal and interest payments of guaranteed loans. Thus with strong financial variables (lower debt-to-asset ratios (DAR), higher net farm income (NFI), higher rates of return on assets (ROA), and lower debt servicing ratios (DEBTSVC)), fewer borrowers become delinquent and loss claims payments decrease.[2]

Different agricultural enterprises face different risks. A broad measure of enterprise diversity is the percentage of agricultural revenues that come from crops as opposed to other agricultural enterprises. There appears to be a difference in the types of agriculture that use the two types of guaranteed loans. For fiscal 1988, Koenig and Sullivan estimate that only 30 percent of those farm operators using OL loan guarantees had livestock (including dairy) as their major farm enterprise. For FO loans, 54 percent of the operators had livestock (including dairy) as their major farm enterprise. Dixon, Ahrendsen and McCollum find that as the proportion of revenues

[1] Since several of the independent variables considered by the study are ratios, the dependent variables, FO and OL loss claims paid, are normalized as proportions of principal outstanding. The normalizations are required because the sizes of the agricultural economies vary greatly across states.

[2] The variables DAR, NFI, ROA and DEBTSVC are computed using aggregate data from each state. DAR and ROA are both ratios, NFI is measured as dollars (in millions) divided by number of farm operations and DEBTSVC is computed as the sum of interest and principal payments divided by gross cash farm income.

coming from crops increases, the more likely banks are to make OL loans and the less likely they are to make FO loans which is consistent with the evidence in Koenig and Sullivan for 1988. The variable CREV is defined as the proportion of agricultural gross revenue from crops. If there is greater concentration in one type of agricultural enterprise, then adversity in that enterprise**S**say low crop prices**S**is likely to lead to more loan defaults given the lack of diversity. Thus we would expect CREV to be positively related to OLNLC and negatively related to FONLC.

The average size of U.S. farms[3] (SIZE) has increased over the past decade. Shepard and Collins hypothesized that an increase in farm size places greater emphasis on machinery, irrigation equipment and other fixed inputs. In addition, a capital intensive operation requires annual purchases of insecticides, seeds, fertilizers, feeds or animals to complement the fixed inputs. Thus, an increase in SIZE may increase financial risk and increase loss claims rates.

In order to reduce a portion of the financial risk associated with production agriculture, a substantial number of farm operators are employed off the farm. In 1994, the proportion of total income for farm operator households derived from off-farm income was 90 percent.[4] The importance of off-farm income to farm operators within a state is measured by the proportion of farm operators working more than 200 days off the farm (WORK). While off-farm income provides a risk-reducing supplement to net farm income, a high proportion of farm operators spending working days off the farm may indicate an absolute need for additional income to avoid financial problems.

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[3] Measured in thousands of acres.

[4] ERS <http://www.econ.ag.gov/briefing/fbe/hhold/hh_t0203.htm> accessed 3/16/99.

Characteristics of the general economic environment reflect the overall condition and health of the agricultural economy. The ratio of total number of agricultural business failures in a given state per year to the number of farm operations (FAIL) is one measure of the health of the agricultural sector. In addition, low state unemployment rates (UNEMP) are generally associated with a healthy economy. We hypothesize that a high number of failures or high unemployment rates indicate financial stress for all areas of the industry, including farm businesses and will likely lead to increases in guaranteed loss claims rates.

As the interest rate charged on loans increases, borrowers may find qualifying for credit given their existing repayment capacity more difficult because lenders are less willing to extend credit. Low interest rates allow farm operators to acquire credit to see them through the difficult times, preventing or delaying failure (Shepard and Collins). To account for this impact, the interest rate charged by commercial banks on long term farm real estate loans (LTINT) is included in the FO model, and the interest rate charged by commercial banks on short term non-real estate farm loans (STINT) is included in the OL model.[5]

Farm policy such as annual direct government payments per farm operation (GOV) may affect loss claims rates by supporting and stabilizing farmer income. However, substantial payments to farmers might also indicate financial stress (more government assistance needed to shield farmers from the full financial effects of natural disasters or unfavorable market conditions). Thus, a directional relationship between farm policy and guaranteed loss rates cannot be determined on a priori grounds.

[5] LTINT and STINT are both nominal interest rates.

Dollar volume of principal outstanding per outstanding guaranteed FO and OL loan[6] (AVGFO and AVGOL) is a good measure of the current level of exposure FSA has to possible loss claims on a per loan basis.[7] The amount of interest rate assistance (IRA) paid per guaranteed FO and OL loan (FOIRA and OLIRA) measures the variation in loss claims due to subsidizing the interest rates on guaranteed loans. Interest rate assistance is thought to facilitate the payment of loan principal by lowering the total interest cost of the loan, but higher amounts of assistance may foreshadow larger loss claim payments since loans are being made to borrowers who merit assistance.

The commercial bank characteristics considered in this study measure the importance of agriculture in bank loan portfolios and the propensity of banks to make agricultural loans. Variation in loss claims rates due to changes in lending behavior to the agricultural sector is captured by the ratio of agricultural loans to total loans made by commercial banks in the state (AGTL). The number of agricultural banks per farm (AGBNK) measures the availability of credit from banks having a significant concentration of agricultural loans to farm operations located within the state.[8] The ratio of total loans made by commercial banks in the state to total assets of commercial banks in the state (LAR) measures lenders' propensities to invest available funds in loans as opposed to other investments.

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[6] AVGFO and AVGOL are both measured in millions of dollars.

[7] Unfortunately, principal outstanding is not the contingent liability for FSA. An attempt was made to obtain such data, but the record keeping system does not record such variables on a yearly basis by state.

[8] An agricultural bank is defined as a bank having loans made for production agriculture and loans secured by farm real estate that comprise at least 17 percent of total loans made (in dollar volume) in a given fiscal year.

Dixon, Ahrendsen and McCollum reported that agricultural banks are likely to make more guaranteed loans than nonagricultural banks and found that increasing loan-to-asset ratios were associated with greater bank participation in the guaranteed loan program. This increased use of guarantees was thought to shield lenders with aggressive lending policies from an otherwise expanded exposure to agricultural loan losses. That is, as banks seek to make more loans in a given area, the base of customers left to extend credit to are marginally less credit worthy.

Since an increase in any of the commercial bank variables is hypothesized to result in a larger number of guaranteed loans made, they are posited to have positive relationships with loss claims rates. However, agricultural lenders may be more sensitive to the potential problems that arise in production agriculture that adversely affect the financial performance of their farm borrowers. These lenders are more likely to make special repayment arrangements to help the farmer through difficult times. This would imply that increases in these variables would decrease loss claims rates.

Since the data are panel in nature, the regression equations used in this study are fixed effects models. This allows for the intercept to vary by cross-sectional group but holds the slope coefficients constant. In the present analysis, intercept variation is examined by both state and USDA production region.[9]

[9] Pacific, Mountain, Northern Plains, Southern Plains, Lake States, Corn Belt, Delta, Northeast, Appalachia and Southeast.

The observations are annual from 1990 to 1997.[10] Eight of the 48 states in the sample were eliminated due to their relatively low levels of guaranteed loan activity.[11] These eight states averaged annual total guaranteed obligations during fiscal years 1989-98 of less than $3 million. The data consist of 320 observations over the eight years. Some of the independent variables included in the study are measured by calendar year, and the dependent variables are measured by fiscal year. Since the calendar year includes one quarter (the fourth) that is not included in the current fiscal year, all calendar year variables are lagged one year in order to avoid having the future explain the present.[12] All dollar figures used in the study were deflated using chain type price indexes for gross domestic product reported in *The Economic Report of the President* with 1992 as the base year.

Both the FO and OL models were first estimated with all sixteen independent variables in addition to regional/state shifters. To reduce the number of independent variables in the models, all variables with a t-ratio less than one were deleted unless this resulted in deleting all variables in one of the five general categories thought fundamental in explaining the variation in loss claims: (1) financial, (2) structural, (3) economic and policy, (4) FSA loan and (5) commercial bank variables. When all variables in a given category had t-ratios less than one in absolute value, the variable with the highest level of significance was retained in the model.[13] This "category" rule

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[10] The years in this study are FSA fiscal years which end on September 30 of each year.

[11] The eight states deleted from the sample were Arizona, Connecticut, Delaware, Maine, Nevada, New Hampshire, New Jersey and Rhode Island.

[12] Independent variables not reported on a fiscal year basis include DAR, NFI, ROA, DEBTSVC, CREV, SIZE, WORK, FAIL, UNEMP and GOV.

[13] Parameter estimates of the two models with all sixteen variables included are presented in Fultz.

was invoked to create a rigorous level of successive significance tests. After re-estimation, variables with a p-value greater than 0.10 were deleted. In this step, the "category" rule was allowed to be broken. The models were then re-estimated for a final time.

Due to the large proportion of FO observations taking on a value of zero in the sample (35 percent), Tobit models were estimated. Although initial OLS estimates indicated that including regions as the fixed effects groupings was less desirable than state-level fixed effects, the LIMDEP algorithm (Greene) would not converge with all 40 state binary variables included. Therefore, regional fixed effects were used instead. Unfortunately, software to estimate the presence of autocorrelation in a model most appropriately estimated by a Tobit estimator was not available. As an approximate test for the presence of autocorrelation, the full model was estimated as a fixed effects model by OLS including all the hypothesized regressors. The estimate of the first order correlation coefficient, assuming it is the same for each state, gave a value of -0.0531. Because this magnitude is so slight, it was assumed in further estimation of the FO model that the error terms were non-autocorrelated.[14] A multiplicative heteroscedastic Tobit model was specified to provide asymptotically efficient coefficient and standard error estimates in the FO model where the sources of heteroscedasticity were the regions.[15] Six of the nine regional heteroscedasticity terms were significant at the 0.05 level for the final FO model.

For the OL loans, a time series/cross section model was specified and estimated using feasible generalized least squares. A Tobit framework was not employed for the OL model

[14] The final models were also calculated using OLS to derive first order correlation coefficient estimates. The estimate for the FO model was 0.02198.

[15] The Harvey multiplicative heteroscedasticity model in LIMDEP (Greene) was used.

because relatively few of the observations for OLNLC were zeros (5 percent). State binary variables were included to represent fixed effects. As with the FO model, a check was made for the presence of autocorrelation. The first order autocorrelation estimate from the OLS fixed effects model for OL loans including all the hypothesized regressors was -0.0422 indicating that the data were not characterized by autocorrelation. Thus, in all subsequent OL models, the error terms were assumed to be non-autocorrelated.[16] A likelihood ratio test for groupwise homoscedasticity was rejected at the 0.05 level, so all subsequent OL models were estimated assuming homoscedastic errors within a state but heteroscedastic errors across states.

RESULTS AND ANALYSIS

The FO Model

The estimated coefficients of the ten continuous independent variables in the final FO model are displayed in table 2. Of the ten explanatory variables in the final FO model, six variables were hypothesized to have specific signs. Of those six variables, DAR, ROA and LTINT have the coefficient signs expected and are significantly different from zero. The sign on NFI is unexpectedly positive but is not significant at the 0.05 level. SIZE was expected to be positively related to FONLC, but its coefficient is negative and insignificant. Of the four variables in the FO model with no a priori signs, all are significant at the 0.05 level.

The positive sign on DAR indicates that as farmers in the state have a greater amount of debt relative to assets, the ratio of FO loss claims to outstanding principal increases. This is expected because a decrease in solvency implies more financial risk. The negative sign on ROA

[16] As with the FO model, the final OL regression model was reestimated using OLS to derive a final autocorrelation estimate. The estimate was -0.017393.

indicates that as farmers are more profitable, loss claim payments to FO loans as a proportion of outstanding principal decrease.

The unexpected positive sign on CREV is perplexing assuming that FO loans are used more by non-crop farmers than crop farmers as found by Koenig and Sullivan for 1988 guaranteed loan participants. We argued earlier that a greater concentration of livestock enterprises would lead to less diversity and therefore a higher default rate for FO loans. The positive sign on CREV may indicate that as a state has a higher proportion of crop revenues then crop farmers using FO guarantees are forced into default when crop prices are low or there is drought (assuming that most of the variability of CREV is due to diversity of enterprise and not price or output fluctuations). Since relatively few loans are defaulted in any year, a modest increase in the absolute number of crop farmers defaulting on FO loans could explain the positive sign on CREV.

The negative coefficient on WORK indicates that as the proportion of farm operators working off the farm more than 200 days per year increases, FO loss claims rates decrease. This might be explained by farm operators reducing financial risk by supplementing farm income with off-farm sources of income. The direct relationship between LTINT and the ratio of FO loss claim payments to outstanding principal supports the hypothesis that as credit costs increase, more farms are financially stressed.

All three commercial bank variables–agricultural-to-total loan ratio (AGTL), loan-to-asset ratio (LAR) and availability of agricultural banks (AGBNK)–were all negatively and significantly related to FO loss claims rates. The significance of AGTL and AGBNK support the notion that agricultural lenders may be more sensitive to farm economy fluctuations that may adversely affect

their borrowers' financial performances. Such lenders are able to select borrowers and adjust loan terms accordingly. Thus, this increased sensitivity on the part of agriculturally oriented commercial banks to agricultural borrowers results in a decrease in FO loss claims rates. The significance of AGTL and AGBNK also emphasizes the role played by lenders with agricultural expertise. As more agricultural banks get merged into larger banks and lose their agricultural interest (Ahrendsen, Dixon and Lee), loss claims might increase, implying a higher cost to the FSA guaranteed loan program.

The sign and significance of LAR are intriguing. Our data show that states with higher loan-to-asset ratios tend to be states that are dominated by larger banks. If larger banks are less aggressive and more uncomfortable in making agricultural loans, then they may require a greater proportion of those agricultural loans made be guaranteed, even though the loans may be of high quality. This would enable such banks to reduce their risk exposure because the guaranteed portion of the loan carries an almost zero risk rating. This decreases the overall risk rating of the bank even though it has a high loan-to-asset ratio. The results imply that such behavior by banks would reduce FO loss claims rates.

In order to compare the effects of these variables on FONLC without accounting for differences in units among the variables, elasticities were computed. The elasticities for all continuous variables retained in the final FO model are listed in table 2. The elasticities of these variables computed at the sample means vary from -3.59 for LAR to 1.75 for LTINT. Four of the eight variables significant at the 0.05 level–ROA, CREV, AGTL and AGBNK–are in the inelastic range. However, the other four variables significant at the 0.05 level–DAR, WORK, LTINT and

LAR–are elastic. Thus proportionate variations in these variables have the greatest impact on the variation of the ratio of loss claims paid to outstanding principal for FO loans.

The elasticity of 1.74 for DAR indicates that loss claim payments are quite sensitive to farm operators' debt situations. In the 1980's when many highly leveraged farmers experienced financial difficulties, FSA's volume of farm loan losses soared rising from $434 million in 1986 to $1.2 billion in 1987 and $3.3 billion in 1989 (USDA/ERS,1998). A farm crisis similar to the 1980's could stimulate high levels of guaranteed loss claims again in the future. The variable LTINT is important in explaining the payment of loss claims as well. An increase in the cost of credit to farm operators for farm real estate could result in a surge of FO loss claim activity. However, the elasticity for WORK implies that farm operators can partially insulate themselves from potentially negative changes in the economy such as higher interest rates or decreases in farm income by diversifying their income. The large negative elasticity for LAR suggests that aggressive lending policies of commercial banks can lead to decreases in loss claim rates as lenders expand their loan portfolio and seek to limit their overall risk exposure by guaranteeing agricultural loans.

The OL Model

The regression statistics for the six continuous explanatory variables retained in the final OL model are presented in table 3. Of the six explanatory variables in the OL model, four variables were hypothesized to have specific signs. Of those four variables, DEBTSVC has a positive sign on its coefficient as expected and is significantly different from zero at the 0.05 level. The SIZE coefficient is also significant, but the sign is unexpectedly negative. Both STINT and AVGOL have unexpectedly negative signs as well but are only significant at the 0.065 and 0.071

levels, respectively. Of the two variables in the OL model with no a priori expected signs (LAR and AGTL), both are statistically significant with negative signs.

The positive sign on DEBTSVC indicates that as the proportion of annual gross farm income needed to service debt payments increases, OL loss claims rates also increase. This is expected because liquid farm operators are able to meet principal and interest payments more easily than less liquid operations. As in the FO model where DAR is significant, farm financial stress is important in the OL model when measured by DEBTSVC.

The negative sign on SIZE is unexpected since an increase in farm size is hypothesized to result in increased financial risk. However, larger farms may be more efficient in all aspects of farming: production, marketing and financing. Thus, increased farm size may result in less risk. This hypothesis is consistent with a negative relationship with loss claim rates.

As with the FO model, the negative and significant signs on AGTL and LAR indicate that agricultural lenders and lenders with aggressive lending policies decrease loss claim rates. The negative sign on AGTL implies that agricultural lenders are more sensitive to borrower repayment capacities. As noted earlier, LAR's negative sign is surprising, but the fact that it is negative in both models suggests that aggressive lenders could be using guaranteed loans more frequently than other lenders to cover risks and therefore have lower loss rates. This hypothesis is partially supported by Dixon, Ahrendsen and McCollum where LAR was positively associated with the propensity of a commercial bank to use loan guarantees.

The elasticities for all continuous variables retained in the OL model are also listed in table 3. These elasticities computed at the sample means vary from -1.66 for SIZE to 0.76 for DEBTSVC. Two of the four variables significant at the 0.05 level–DEBTSVC and AGTL–are

inelastic. The remaining two significant variables–SIZE and LAR–are elastic indicating OLNLC is most sensitive to percentage changes in these variables. Thus the continuing decrease in farm numbers and corresponding increase in farm size imply that the structural change in farm ownership implies lower loss rates. Clearly there is a practical limit to the magnitude and impact of LAR since LAR has an effective upper limit of 1.0. Its sample mean is .61. However, continued bank mergers could lead to higher LARs and thereby lower loss claims ratios.

Implications of Insignificant Variables

In both the FO and OL models, the policy variables GOV, FOIRA and OLIRA were insignificant. The lack of relationship between government payments and the ratio of loss claims to outstanding principal is surprising. This result seems to agree with the Shepard and Collins finding that government policy is typically reactive as opposed to proactive. This would imply that the government responds to farmer difficulties in bad years by prescribing remedies in later years as opposed to dealing with current problems. Also, government program benefits accrue to larger producers and not just those producers on the economic margin who would typically be guaranteed loan users. Indeed, the heterogeneity in loss claims rates across states and lack of association of GOV to both FONLC and OLNLC supports the conjecture that government payments are not particularly effective in lowering loss claims rates.

There is insufficient evidence to reject the hypothesis of no relationship between interest rate assistance and loss claims rates. This does not imply that IRA is necessarily failing to help farmers stay in farming. Undoubtedly those farmers receiving assistance are helped. The fact that IRA is uncorrelated with loss claims rates might indicate that the program is accomplishing its goal of helping marginal farmers survive. That is, given the assistance, such farmers fail at about

the same rate as non-assisted farmers, ceteris paribus. Also, the insignificance of FOIRA and OLIRA might also be attributed to the levels of assistance being too modest to have an observable impact[17].

The lack of significance of net farm income in the models is also surprising. However, it is very likely that the significant variable ROA in the FO model is explaining some of the variation actually influenced by NFI. The simple correlation coefficient between ROA and NFI is 0.7765. This argument cannot be made as strongly for the relationship between DEBTSVC and NFI for the OL model in which the simple correlation coefficient is -0.3836. Thus it seems that in the OL model, DEBTSVC is a better indicator of financial stress than NFI since it directly focuses on debt payments in relation to gross income.

CONCLUSIONS

Several financial characteristics of farm operators–including debt-to-asset ratios, rates of return on assets and debt servicing ratios–are important in predicting loss claims rates. Also, structural characteristics of the farm economy such as percentage of total farm revenue derived from the sale of crops, the proportion of farm operators working off the farm greater than 200 days per year and average farm size can be used to predict loss claims.

The highly significant relationships between the commercial bank characteristics and the loss claims to principal outstanding ratio imply factors external to agriculture impact loss claims. The banking industry has experienced a high level of mergers and acquisitions during the 1990s. As a result, banks necessarily have become more competitive to stay in business. This study

[17] Although the IRA program existed prior to 1992, these data were not available for the study. Thus, observations for this variable prior to 1992 are zeros. Models estimated with only 1992-1997 data are not substantially different from those estimated with 1990-1997 data.

indicates this aggressiveness in lending practices has affected guaranteed loss claims in a positive way. Also, higher agricultural-to-total loan ratios decrease the loss claims ratio for both FO and OL loans though not as strongly as increases in loan-to-asset ratios. Since commercial banks with considerable agricultural lending experience and low levels of loan losses can further streamline guaranteed application procedures through a new Preferred Lender program, perhaps lender participation in the program will increase. Increased program usage by these FSA approved lenders may lower loss claims rates.

The results of the study indicate that interest rate assistance does not affect across state variation in the ratio of loss claims to principal outstanding. So while interest rate assistance allows lenders to charge borrowers lower interest rates, this subsidy does not appear to alter overall state-level loss claims rates. This might indicate that the IRA program is successful in putting all borrowers on a level playing field. However, there is considerable variation in loss claims ratios over regions, so some interest rate assistance reallocations might change this. Of course, interest rate assistance undoubtedly helps a number of farmers stay in business who otherwise would likely fail–the main purpose of the assistance program. Since long term interest rates were found to have a significant impact on FO loss claims rates, interest rate assistance in the future may be used as a policy tool to offset increases in long term interest rates in an effort to limit loss claims rates.

Government payments were found to be insignificant in explaining the ratio of loss claims to principal outstanding. One justification of government payments is that they help the family farmer stay in business. FSA's guaranteed loan program is targeted to family-sized farm operators. While FSA guaranteed borrowers represent only a small sample of the population of

family-sized farm operators, the insignificance of government payments in the payment of loss claims suggest that changes in government programs might be considered.

Table 1. Guaranteed Loss Claims Paid for the U.S.*, Fiscal Years 1989-1998

Fiscal Year	FO Loans	OL Loans	Total Guaranteed
		(Million $ - Nominal)	
1989	9.6	29.6	39.2
1990	5.7	29.9	35.6
1991	7.0	33.6	40.6
1992	7.3	37.4	44.7
1993	8.7	41.1	49.8
1994	8.1	35.7	43.8
1995	5.9	26.4	32.3
1996	5.4	33.2	38.6
1997	6.3	51.5	57.8
1998	7.0	48.0	55.0

* U.S. totals do not include loss claims paid to Alaska, Hawaii or U.S. territories.
Source: Computed from FSA data--Steve Ford, FSA, Washington D.C.

Table 2. Tobit Estimates for Farm Ownership Loan Model

Variable	Coefficient	Standard Error	â/Standard Error	Elasticity*
DAR	0.067	0.025	2.650	1.740
ROA	-0.632E-05	0.308E-05	-2.054	-0.330
NFI	0.137	0.083	1.642	0.503
CREV	0.008	0.004	2.199	0.615
WORK	-0.030	0.010	-3.055	-1.727
SIZE	-0.002	0.001	-1.455	-0.255
LTINT	0.107	0.037	2.867	1.750
AGTL	-0.025	0.009	-2.891	-0.278
LAR	-0.036	0.009	-4.081	-3.590
AGBNK	-1.082	0.426	-2.539	-0.277

* The elasticities for the continuous variables retained in the FO model were computed using the coefficients adjusted for truncation in the TOBIT model (Greene), the sample means of the independent variables and the expected value of the dependent variable evaluated at the sample means of the independent variables (Thraen, Hammond and Buxton). R^2 for the OLS estimates of this model is 0.200.

Table 3. Estimated Coefficients for Operating Loan Model

Variable	Coefficient	Standard Error	â/Standard Error	Elasticity*
DEBTSVC	0.061	0.021	2.980	0.762
SIZE	-0.020	0.005	-3.896	-1.657
STINT	-0.031	0.017	-1.848	-0.225
AVGOL	-0.041	0.023	-1.804	-0.293
AGTL	-0.052	0.024	-2.110	-0.283
LAR	-0.025	0.007	-3.671	-1.253

* Elasticities are computed at sample means. $R^2 = 0.458$.

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