AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Journal of Cooperatives

Copyright National Council of Farmers Cooperatives. Duplication is permitted for academic or research purposes but not for commercial purposes. Permission is hereby granted for the redistribution of this material over electronic networks so long as this item is redistributed in full and with appropriate credit given to the author and copyright holder. All other rights reserved.

Debt Covenant Violations of Private Lending Agreements of Agricultural Cooperatives

Frank Michael Messina

Seven years of debt covenant violations of private lending agreements of eighty-three agricultural cooperatives were examined. A LOGIT prediction model of debt covenant violations was developed and the factors that affect debt covenant violations were identified. These factors include cooperative size, working capital, the quick ratio, the existence of a management compensation plan, the tax-exempt status of the cooperative, a bank rating, and the current amount of loan payments.

In a recent perspective on private lending agreements, Smith (1993) called for a clearer understanding of debt covenant violations. However, obtaining access to data on such agreements is often difficult because of confidentiality. Following Smith's recommendation and supported by CoBank[1], this article reports the results of an exploratory study on the debt covenant violations of eighty-three agricultural cooperatives. A LOGIT prediction model of debt covenant violations was developed, and the factors that influence debt covenant violation were identified.

Background and Prior Research

In obtaining external funding, a cooperative agrees to abide by certain debt covenants established by the outside lending institution. Examples include limits placed on fixed asset purchases and cash patronage refunds. These covenants are necessary because the debtor firm has incentives to take actions that may negatively affect the wealth position of the debtholder (Duke and Hunt 1990).

The problem facing cooperatives is that some will violate their debt covenant restrictions. These violations are costly (Beneish and Press 1993; Chen and Wei 1993) and can have adverse consequences for the cooperative.[2] This study sought to determine what factors cause these violations to occur.

It must be noted, however, that the inclusion of these covenants in loan agreements does not ensure that cooperatives will abide by the agreements or that conflicts between the lender and borrower will be completely resolved. In fact, Foster (1986) contends that debt restrictions are best viewed as the opening rules of the lending game, with both the creditor and borrower recognizing that not all violations result in actual adverse consequences to the borrower.

Frank Michael Messina is assistant professor at the Department of Accounting, University of Alabama at Birmingham.

This article is based on the author's doctoral dissertation from Mississippi State University. His special thanks go to George D. Jones of CoBank in Jackson, Mississippi. Without CoBank's support, this study would not have been possible. He also thanks two anonymous reviewers and his colleague, Richard A. Turpen, for excellent suggestions for the article.

Agency Theory

Agency theory may be used to explain why debt covenant restrictions are placed in lending agreements. The basic supposition of this theory is that agency costs arise because all parties act in their own self-interests (Watts and Zimmerman 1979). Lending agreements limit the financing and investing decisions of borrowing firms because of this conflict of interest between debtholders and stockholders. Decisions in the best interests of the borrower are not always in the best interests of the creditor (Leftwich 1981). These managerial, financing, and investing decisions are usually made in favor of the stockholder at the expense of the debtholder (Holthausen and Leftwich 1983). Examples of activities that can cause a shift of wealth or that favor the stockholder over the debtholder include payment of dividends, incurrence of additional debt, maintenance of working capital, and merger activity (Leftwich 1981). As noted earlier, creditors are somewhat able to control these activities by placing debt covenant restrictions in lending agreements.

Prior Studies

The empirical results of a recent study by El-Gazzar and Pastena (1991) confirm that the number and "tightness" of debt covenants placed in loan agreements depend on the financial position of the firm. They found that firms with higher indebtedness had less bargaining power and were forced to accept tighter restrictions. In fact, the greater the debt, the higher the number of restrictions. El-Gazzar and Pastena (1991) also found that larger firms with greater resources were better able to avoid debt covenant violation, and thus were able to negotiate agreements with fewer restrictions.

In economic consequence studies, Holthausen and Leftwich (1983) and Press and Weintrop (1990) found that size and leverage are the most significant contracting factors. Holthausen and Leftwich (1983) also found that a variable indicating the existence of a management compensation plan is a useful proxy for agency costs.

Backer and Gosman (1979) conducted in-depth interviews with twenty-four major banks' executives to determine which financial ratios are being used in making commercial lending decisions. They learned that the quick ratio is an important commercial lending factor.

Castle (1980) examined thirty-seven commercial lending agreements and found that leverage and working capital restrictions are the most frequently used debt covenants. He also noted that the type and number of covenants depend on the company's credit standing, the nature of its business, and the type of loan requested.

Duke and Hunt (1990) examined the relationship of several debt/equity proxies to debt covenant restrictions. They were able to identify the existence and capture the tightness of restrictions on retained earnings, tangible assets, and working capital.

Types of Cooperative Debt

Due to costs and registration requirements of the Securities and Exchange Commission (SEC), most cooperatives do not have public lending agreements. Instead, they rely on private debt agreements that normally consist of term loans and seasonal lines of credit (short-term loans). Both types of loans usually possess the same combination of debt covenant restrictions. The seasonal lines of credit are re-negotiated yearly, while the term loans are not re-negotiated unless the debt covenant restrictions have been violated. CoBank loans are usually secured by the cooperatives' assets.

There are basically two classifications of cooperative debt covenants, negative and affirmative. Negative covenants impede an action—such as paying dividends—if certain requirements are not met. According to Frost and Bernard (1989), a technical violation occurs only if the creditor takes some type of action. An example of a violation of a negative covenant would be if a cooperative simply decided to distribute more cash patronage refunds than were allowed by the creditor in the loan agreement. This violation would trigger the creditor to take action. The action may be as simple as noting the violation and waiving it, or the action may result in real economic consequences to the cooperative. Requirements that specify floors or ceilings are termed affirmative covenants. When the floor or ceiling limit is exceeded, a debt covenant violation automatically occurs. For example, a working capital restriction that establishes a minimum amount of working capital is an affirmative covenant.

Sample and Methodology

As noted previously, CoBank provided the financial data in this study, granting access to the cooperatives' debt covenant files. The sample consists of seven years of financial data and the terms of private lending agreements on eighty-three agricultural cooperatives whose yearly sales average approximately $9.5 million. The sample data period for seventy-six of the cooperatives is from 1985 to 1991, with the exception of seven cooperatives of the eighty-three, to which the participating lending institution no longer lends. The initial period of those seven cooperatives varies from 1982 to 1984.

CoBank maintained detailed loan histories for the cooperatives included in the sample. Debt covenant violations and the corresponding dates of occurrence were identified from correspondence between both CoBank (creditor) and the cooperatives. Analysis of the private lending agreements of each of the eighty-three cooperatives for the seven years revealed seventy-nine actual debt covenant violations and 502 cases where no violation occurred, a total sample size of 581 observations. Table 1 lists the debt covenant violations discovered and indicates whether each involved a negative or affirmative covenant.

A primary objective of this research study was to determine which variables, if any, are useful in predicting the violation of debt covenant restrictions by the cooperatives. Constructing a statistical model for this purpose allows the prediction of

TABLE 1. Debt Covenant Violations.

Negative Covenant Violations	**Number**	**Total**
Exceeded Fixed Asset Purchases Limit	29	
Exceeded Dividend/Cash Patronage Payout	15	
Retired Stock/Equity Without Permission	13	
Violated Other Borrowings Limitation	10	
Other	2	
		69
Affirmative Covenant Violations		
Working Capital Restriction	8	
Current Ratio Restriction	1	
Expenses as a Percent of Sales Restriction	1	
		10
Total Debt Covenant Violations in the Sample		79

effects on the dependent variable resulting from changes in one or more of the independent (predictor) variables. For this research study, the dependent variable was depicted by a '0' for no debt covenant violation and a '1' for violation of at least one debt covenant restriction.

Statistical Method

For studies where dichotomous choices are considered (for example: violate/do not violate, capitalize/do not capitalize), Maddala (1991) suggests the use of the binary LOGIT model. Maddala states that for accounting studies, the logit method is the preferred over the linear probability model and multiple discriminant analysis.

The Binary LOGIT Model

The binary LOGIT model assumes that the probability of a cooperative selecting a particular alternative is based on the characteristics of that cooperative. Moreover, because the cooperative is assumed to be a utility maximizer, it will choose the alternative that provides the highest level of utility.

Utility is made up of deterministic and random components and is expressed as follows:

$$U_n = V_n + \varepsilon_n \tag{1}$$

where
U_n = utility for cooperative n,
V_n = deterministic component of utility for cooperative n,
ε_n = random component of utility for cooperative n.

The deterministic component of utility is specified as a linear, additive combination of the value of debt covenant attributes of the cooperative:

$$V_n = \Sigma^{k}_{k=1} W_k X_{kn} \tag{2}$$

where
X_{kn} = value of attribute k of cooperative n,
W_k = importance of attribute k (estimated parameters),
k = 1,2,...,K attributes.

For binary LOGIT, the error terms of utility are specified to be independently and identically distributed with the Type I extreme value distribution. The binary LOGIT model form is as follows:

$$P_{in} = \frac{1}{1 + \exp^{-(Vn)}} \tag{3}$$

where
P_{in} = probability that alternative i (violation) is chosen by cooperative n.

Selection of Variables

Foster (1986) notes that quantitative models in the lending process should be developed for all industries and suggests examining past research on loans and past experience of the particular lending institution. In selecting variables for this study, variables from prior research were used, as well as those suggested by loan officers at CoBank.

It is expected, based on prior studies (Holthausen and Leftwich [1983] and Press and Weintrop [1990]), that measures for size and leverage will be good predictors of debt covenant violations. In this study, size is measured by total assets, while the debt-to-equity ratio serves as the proxy for leverage (e.g. Duke and Hunt [1990] and Press and Weintrop [1990]). Other independent variables include working capital, the quick ratio, and a dummy indicator for the existence of a management compensation plan (exists = 1).

According to CoBank, other variables that should prove useful in the prediction of violations include cooperative current-year payments to CoBank, tax status (exempt = 0, non-exempt = 1), and an overall rating (bad = 1, average = 2, or good = 3) based on the experiences of loan officers. In its bank rating of the cooperative, CoBank notes three main factors that demonstrate an attractive cooperative. They include superior performance in (1) management, (2) control over accounts receivable, and (3) financial position.

Expected Signs

The expected sign of total assets is negative since the likelihood of violation decreases with cooperative size. As El-Gazzar and Pastena (1991) have shown, larger companies are less likely to violate debt covenants because their greater resources enable them to avoid default.

The expected sign of the debt-to-equity ratio is positive. Here, the tighter restrictions are believed to accompany greater levels of debt, thus increasing the probability that the cooperative will violate the covenants.

For the liquidity measures, working capital and the quick ratio, the expected sign is negative since a greater ability to meet current needs reduces the probability of violation. The expected sign of the existence of a management compensation plan is positive since managers may violate debt covenants to satisfy compensation bonuses.

The expected sign for payments to CoBank is positive. As argued by El-Gazzar and Pastena (1991), the greater the debt, the higher the number of restrictions. More restrictions could lead to more violations. The expected sign for the tax status indicator is negative. According to CoBank, tax-exempt cooperatives will violate covenants more frequently since the cooperatives are smaller and often lack strong management control and record keeping. Accordingly, these conditions may lead to more violations. The expected sign of the loan officer ratings is also negative since cooperatives that receive higher ratings should less often commit covenant violations.

Analyses and Findings

Binary LOGIT Model Results

Table 2 presents the parameter estimates, asymptotic standard errors, t-statistics, expected signs of the independent variables, and goodness-of-fit statistics of the LOGIT model.

Binary LOGIT Model's Goodness-of-Fit

The Chi-square statistic is used to test the overall goodness-of-fit of the binary LOGIT model. Here, the test statistic is 26.1, which is significant at the .001 level. The Likelihood Ratio test is used to measure the goodness-of-fit for the model. As can be seen from table 2, the binary LOGIT model is significant at .001.

The fit of the binary LOGIT model can be evaluated by examining the calculated Rho-square statistic of .4674 from table 2. This statistic exceeds the McFadden (1986) requirement of .20 as the threshold for adequate fit.

TABLE 2. Estimation Results of the Binary Logit Model.

Variable	Parameter Estimate	Standard Error	t-Statistic	Exp. Sign
TOTASTS	.00000004139	.00000002348	1.76[b]	-
DEBTTOEQ	.00997	.0132	.75	+
WC	-.000000213	.0000001262	1.69[b]	-
QUICK	-.3121	.1602	1.95[b]	-
MGTCOMP	.4487	.3011	1.49[a]	+
TAXEMP	-.6708	.2861	2.35[c]	-
RATING	-.6959	.1158	6.00[d]	-
PYMTSBC	.000001783	.00000115	1.55[a]	+

Summary Statistics

Number of Observations	581
Chi-Square Test Statistic	26.1[d]
Likelihood Ratio Test	-376.4[d]
Rho-Square (Pseudo R-square)	.4674
Overall Predictive Accuracy:	
Estimation Data Set	.8726

[a]Significant at 0.10 level or less, two-tailed test.
[b]Significant at 0.05 level or less, two-tailed test.
[c]Significant at 0.025 level or less, two-tailed test.
[d]Significant at 0.001 level or less, two-tailed test.

Signs of Parameter Estimates

The *a priori* signs of seven of the eight variables displayed in table 2 are confirmed. Total assets (TOTASTS), however does not carry the expected sign. This result may be unique to the lending environment between larger cooperatives and CoBank. The larger borrowers from CoBank may feel that they are CoBank's biggest customers and can violate without fear of economic consequences.

Individual Parameters

The t-statistic is used in a two-tailed test of significance for each parameter (Aldrich and Nelson 1984). As evident in table 2, seven of the eight variables exhibit a significance level of at least .10. Only the debt-to-equity ratio (DEBTTOEQ) lacks significance. Thus, each of the seven significant variables influences the likelihood of debt covenant violation.

Specifically, total assets (TOTASTS), the existence of a management compensation plan (MGTCOMP), and current year's payments to CoBank (PYMTSBC) are positive influences, while the working capital (WC) quick ratio (QUICK), tax-exempt status (TAXEMP), and bank rating (RATING) are negative influences on debt covenant violation.

Classification Accuracy of the Binary LOGIT Model

The parameters obtained from the estimation data set of binary LOGIT model, as shown in table 2, have an overall predictive accuracy of .8726. Thus, the model appears to be a good predictor of debt covenant violation.

Table 3 displays the accuracy of the binary LOGIT model in predicting non-violations and violations separately. The model accurately predicts 87.45% of non-violations and 86.08% of violations.

TABLE 3. Classification Accuracy of the Binary Logit Model.

		Predicted Violations	
Actual Violations	*Number*	*No Violations*	*Violations*
No Violations	502	439 (87.45%)	63 (12.55%)
Violations	79	11 (13.92%)	68 (86.08%)

Elasticities of the Parameters

Because the parameters (ß) show changes in log-odds, their elasticities ($e^{ß}$) are more useful for interpretive purposes. These elasticities convert the log-odd probabilities to a one-unit change factor. Table 4 displays the parameter, values, and elasticities.

For example, for QUICK, the exponentiated parameter is .7319, which indicates that a one unit change in the quick ratio will cause a .7319 unit change in violation. The other elasticities can be interpreted similarly.

TABLE 4. Parameter Elasticities of Logit Model

Parameter	*Values*	*Elasticities* ($e^{ß}$)
TOTASTS	.00000004139	1.0000
WC	-.000000213	1.0000
QUICK	-.3121	.7319
MGTCOMP	.4487	1.5662
TAXEMP	-.6708	.5113
RATING	-.6959	.4986
PYMTSBC	.000001783	1.0000

Conclusions

A review of the private lending agreements of eighty-three cooperatives provided by CoBank formed the basis for this research study. The LOGIT model developed appears to be a good predictor of debt covenant violations and non-violations. A good predictive model of debt covenant violations is important in that the ability to know the probability of violation could enable the lender and/or the borrower to prevent the violation and thus avoid adverse consequences to the cooperative.

Factors that influence debt covenant violations were identified and include: (1) the size of the cooperative, (2) the amount of working capital of the cooperative, (3) the quick ratio of the cooperative, (4) the existence of a management compensation plan, (5) whether a cooperative is tax-exempt or not, (6) the bank rating of the cooperative, and (7) the amount of current payments to CoBank.

It should be noted that this is the first study that has attempted to develop a predictive model for debt covenant violations of cooperatives. As such, the influencing factors used in the model should be interpreted with caution. Several of the factors

may be interrelated. For example, loan officer rating may be based in part on accounts receivable and financial position, and, as such, could be related to working capital and the debt-to-equity ratio. The same is true of the quick ratio and working capital. Similarly, the variable for tax-exempt cooperatives, which are usually smaller cooperatives, may partly be related to the variable for size (total assets).

Another limitation of the study is that, given the non-random selection of the sample, the results may not be predictive of all agricultural cooperatives. Also, given the unique form of vested interest in CoBank (creditor) by the cooperatives (borrower), these results may not be generalizable to private lending arrangements of other banks, where the borrowers do not hold vested interests in the banks.

Nevertheless, this is the first known study that examines actual debt covenant violations of private lending agreements of agricultural cooperatives. Thus, this study contributes to the knowledge base for debt covenant violations of private lending agreements and should be useful for future researchers who wish to work in the area. Also, this study should be of interest to other external parties (lenders, managers, and owners) in evaluating cooperative loan agreement violations.

Notes

1. CoBank is a federally chartered and regulated bank of the Farm Credit System. With over $16 billion in assets, it is owned by approximately twenty-three hundred stockholders, consisting of agricultural cooperatives, rural utility systems, and other businesses that serve rural America (CoBank 1994).

2. Examples include a calling of the loan, a reduction in the cooperative's seasonal line of credit, and/or a renegotiation of the loan at a higher interest rate.

References

Aldrich, J., and F. Nelson. 1984. *Linear probability, logit, and probit models.* Beverly Hills, California: Sage Publications.

Backer, M., and M. Gosman. 1979. The predictive value of financial ratios in bank term loan decisions. *Journal of Commercial Bank Lending* (March): 53-67.

Beneish, M., and E. Press. 1993. Costs of technical violation of accounting-based debt covenants. *Accounting Review* (April): 233-57.

Castle, G. 1980. A guide to negotiating term loan covenants and other financial restrictions. *Journal of Commercial Bank Lending* (November): 26-39.

Chen, K., and C. Wei. 1993. Creditors' decisions to waive violations of accounting-based debt covenants. *Accounting Review* (April): 218-32.

CoBank. 1994. *1994 annual report - New horizons.* Englewood, Colorado: CoBank.

Duke, J., and H. Hunt. 1990. An empirical analysis of debt covenant restrictions and accounting-related debt proxies. *Journal of Accounting and Economics* (January): 45-63.

El-Gazzar, S., and V. Pastena. 1991. Factors affecting the scope and initial tightness of covenant restrictions in private lending agreements. *Contemporary Accounting Research* (Fall): 133-51.

Foster, G. 1986. *Financial statement analysis.* 2d ed. Englewood Cliffs, New Jersey: Prentice-Hall.

Frost, C., and V. Bernard. 1989. The role of debt covenants in assessing the economic consequences of limiting capitalization of exploration costs. *Accounting Review* (October): 788-807.

Holthausen, R., and R. Leftwich. 1983. The economic consequences of accounting choice: Implications of costly contracting and monitoring. *Journal of Accounting and Economics* (August): 77-117.

Leftwich, R. 1981. Evidence of the impact of mandatory changes in accounting principles on corporate loan agreements. *Journal of Accounting and Economics* (March): 3-36.

McFadden, D. 1986. The Choice theory approach to marketing research. *Marketing Science* (Fall): 276-97.

Maddala, G.S. 1991. A perspective on the use of limited-dependent and qualitative variables models in accounting research. *Accounting Review* (October): 788-807.

Press, E., and J. Weintrop. 1990. Accounting-based constraints in public and private debt agreements. *Journal of Accounting and Economics* (January): 67-95.

Smith, C., Jr. 1993. A perspective on accounting-based debt covenant violations. *Accounting Review* (April): 289-303.

Watts, R.L., and J.L. Zimmerman. 1979. The demand for and supply of accounting theories: The market for excuses. *Accounting Review* (April): 273-305.