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CHARACTERISTICS ON BANK LOAN CRITICISMS
ACCURACY: A MULTIVARIATE LOGIT ANALYSIS

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THE EFFECTS OF LOAN AND BANK CHARACTERISTICS ON BANK LOAN
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Hsiu-Kwang Wu and David C. Cheng*

1. Introduction

The purpose of this study is to investigate the effects of certain bank and loan characteristics on the accuracy of bank examiner loan criticisms. The loan evaluation has been considered extremely important and is a focal point of bank examination by the supervisory authorities. The loan criticisms resulting from evaluation are used in calculating a bank's adjusted capital ratio, in determining a bank's risk exposure and consequently its rating, and in deciding whether it should be classified as a "problem" bank.¹ During an examination which usually occurs three times in every two-year period for national banks, all bank loans above a certain minimum amount (established for each bank) are critically evaluated by the examiners.² As a consequence, some of these loans which

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¹For a detailed discussion of this topic, see a statement by James E. Smith, Comptroller of the Currency (11, pp. 13-74).

²The National Bank Act requires that each national bank be examined by the Comptroller of the Currency twice a year. However, one examination in each two-year period can be waived. According to the GAO, 75 percent of the national banks were examined the required three times. See Comptroller General of the United States (3, p. 13).

are considered to be unduly risky by the examiners are formally classified or criticized as "other loans especially mentioned" (OLEM), "substandard," "doubtful" or "loss." "OLEM" is considered the mildest criticism. Substandard is more serious; and doubtful is even more serious than substandard. Loss is considered "uncollectable" and should be charged-off immediately.³

Recent studies indicate that these examiner loan criticisms are highly accurate. The subsequent performances of these criticized loans are usually poorer, and the probabilities of charge-off of the criticized loans are much higher than those of the uncriticized loans. There are two types of errors, however, that can be and have been made by the examiners. The first type of error is that a loan which has been criticized turns out to be a good loan. In short, the predicted poor performance of the loan does not materialize. The second type of error is that a charged-off loan has never been criticized previously by the examiners. In other words, the examiners did not identify the risky loans before they defaulted.⁴

There are two reasons that the second type error is more important and will be the subject of this study. First, from the point of view of the supervisory authorities, they are more interested in minimizing second type errors because their main statutory responsibility is to prevent bank failure. They are interested in knowing why a charged-off loan was not criticized previously during an examination and would also like to improve the examiners'

³For a detailed discussion of these classifications, see Comptroller of the Currency (2, Sec. 3, pp. 5-14) and (11, pp. 30-35).

⁴See Wu (12), Wu (14) and Wu (15).

ability in identifying these loans. Secondly, from a practical point of view, the first type error is very difficult to measure. In fact, some of the first type errors may not be errors at all. Recent studies indicate that examiner criticisms may reduce the probability of charge-off since the management of bank is expected to take remedial actions with regard to these criticized loans.⁵

It should also be noted that loan evaluation as any other auditing procedure is a complex process which depends a great deal on the judgment of the examiners. The examination policy during the period under study does not provide a standard and precise list of factors that examiners are required to consider in their loan evaluations. From discussion with the examiners, it is understood that in their loan evaluations they focus primarily and rightfully on the financial conditions of the borrowers by examining a borrower's financial statements. On the other hand, it is unrealistic to expect that their judgments are not affected by many other factors such as bank and loan characteristics. This study uses a logit regression model to answer the following questions: Do certain bank and loan characteristics affect the examiner's judgment resulting in second type errors? How do they affect the judgments? Are there any logical explanations for these effects? Since loan evaluation is basically a subjective process, these questions are purely empirical questions. They cannot be answered by a priori reasoning. The results of the study should be helpful to the examiners in seeing the pitfalls and consequently in reducing their second type errors.

⁵See Wu (12), Wu (14) and Wu (15).

2. The Data

The data of this study were obtained from bank examination reports and from a questionnaire sent to a sample of 194 national banks chosen from 1,390 national banks in five national bank regions.⁶ These regions represent different geographic sections of the nation. They include some of the most important urban areas in the country and also rural areas in the South. The sample is stratified by bank size measured by total loans outstanding and by state. Out of 194 banks, 164 banks or 85 percent of the sample replied to the questionnaire.

Data on certain bank characteristics from the examination reports were available for these 164 banks for 1973. Data on business loan charge-offs (loan loss) in 1975 and associated loan characteristics were obtained from the questionnaire. Each respondent bank was asked to itemize its business loan charge-off in 1975, and these loans were traced to see whether they had been previously criticized during examinations. Certain loan characteristics of these charged-off loans were also requested. The present study concentrates on business loans only because of their importance. Business loans are broadly defined to include commercial and industrial loans, real estate loans secured by nonfarm and nonresidential properties and loans to other financial institutions besides banks. Real estate loans to nonprofit organizations are not included. The 164 respondent banks had a total of

⁶The regions are 1, 2, 7, 8 and 14. Region 1 consists of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Region 2 consists of New York and New Jersey; Puerto Rico and the Virgin Islands are not included. Region 7 consists of Illinois and Michigan. Region 8 consists of Alabama, Arkansas, Louisiana, Mississippi, and Tennessee. Region 14 consists of California and Nevada; Hawaii is not included.

512 charge-offs in 1975, and 14.5 percent of these charged-off loans were never criticized previously (error).⁷

3. Methodology

From a statistical point of view, the problem of this study is a problem of binary classification (0, 1). A group of charged-off loans are classified into a previously not criticized group and a previously criticized group. These two groups (0, 1) are mutually exclusive and are the values for the dependent variables in the study. The independent variables are certain bank and loan characteristics associated with the charged-off loans. We would like to determine the absolute and relative contribution of each independent variable (bank or loan characteristic) to the conditional probability of the occurrence of one of the two dependent outcomes.

There are three statistical methods for binary classification: (1) Multiple Discriminant Analysis (MDA), (2) Linear Probability Model (LPM) and (3) Logit Model (LM).⁸ Despite the fact that MDA has been very popular recently in financial and economic research, it has some serious shortcomings. First, MDA assumes the equality of the covariance matrices for all the subgroups. This is a very strict assumption; the statistical test will be affected if this assumption is not met. However, the problem can be resolved by using quadratic discriminant analysis.⁹ Second, a more serious MDA assumption is that the data are multivariate normal in distribution.

⁷ For a detailed discussion of the nature of the data, See Wu (14, pp. 60-63) and Wu 15, pp. 122-125 and 132-134).

⁸ For a discussion of these three methods, see Simon (9, pp. 46-79) and Martin (8, pp. 256-262).

⁹ See Gilbert (4).

This is usually not the case in economic and financial studies. For instance, loan criticisms or loan charge-offs are extremely skewed in distribution. Any non-normal marginal distribution of individual variables usually means that the data may not be multivariate normal. In any case, the use of dummy variables, which we plan to use in our study, would preclude the normality assumption. Again violation of this assumption will lead to biases in the test of significance.¹⁰ Third, MDA also assumes the choice of appropriate prior probabilities of subpopulations. These prior probabilities are usually unknown. This is certainly true in the present study. Most of the previous studies in economics and finance assumed equal probabilities for all subpopulations. This procedure will lead to classification errors. The use of the sample proportion would also not solve the problem in most of the cases because it is appropriate only when the sample is a random sample.¹¹ Fourth, as measured by the likelihood function, the fit of MDA estimation is often not as good as that of logit maximum likelihood estimates. This is especially true when one subpopulation is very small in relation to the total population.¹² This is the case in this study; the group of charged-off loans which were never criticized previously is relatively small in number in relation to the total charged-off loans.

In addition to these technical shortcomings, MDA is also less suitable for the present study from a practical point of view because examiners

¹⁰It also precludes the equal covariance matrices assumption. See Martin (8, pp. 258-259), Simon (9, pp. 69-71) and Jones (7, pp. 315-329).

¹¹For a detailed discussion, see Simon (9, pp. 70-71).

¹²For a detailed discussion, see Martin (8, p. 261).

hardly ever face a simple criticism or non-criticism situation. The study is not interested simply in a dichotomous classification of charged-off loans into previously criticized charge-offs and previously not criticized charge-offs that MDA provides. As stated before, the study would like to determine the absolute and relative effects of each bank and loan characteristic on the conditional probability of previous criticism or non-criticism of a charged-off loan.

The Linear Probability Model (LPM) is simply an ordinary least square regression model of which the dependent variable is binary (0, 1). As with any regression model, the purpose is to estimate the effects of independent variables on the dependent variable. However, LPM also has some serious statistical problems. For one thing, unlike the logit model, the predicted probability value (\hat{Y}_i) does not have to lie within the 0 and 1 range. Another statistical problem is heteroscedasticity in the error vector which of course makes ordinary least square inefficient.¹³

The logit regression model, unlike MDA and LPM, does not have the shortcomings described above and will be used in this study.¹⁴ Using conventional notation, let N be the total number of observations (charge-offs); M be the number of independent variables X_{ij} (loan and bank characteristics); and Y_i be the dependent variable where $Y_i = 1$ for a charged-off loan which has

¹³See Johnston (6, pp. 214-221) and Simon (9, pp. 51-52).

¹⁴There are a few studies in finance applying the logit model in recent years. For example, Martin (8) applied the model to the bank early warning system. Simon (9) applied it to the credit union early warning system. And Chesser (1) applied the model to predict loan noncompliance. For a detailed discussion of this technique, see Martin (8, pp. 256-262), Simon (9, pp. 104-152) and Theil (10, pp. 628-635).

been criticized previously, and $Y_i = 0$ for a charged-off loan which has never been criticized before. Assuming examiners can interpret a borrower's financial statement correctly, the model can be written in the following general form:

$$P(Y_i = 1) = G(X_{i1}, X_{i2}, \dots, X_{iM}).$$

Further, we assume that the above probability function is in the form of a logistic function:

$$P(Y_i = 1) = \frac{1}{1 + e^{-k_i}} ; i = 1 \dots, N$$

Where $k_i = b_0 + b_1 X_{i1} + \dots + b_M X_{iM}$, and b's are the parameters to be estimated from the data. The above function represents the probability that the previous examiner criticism of a charged-off loan will occur, given the loan and bank characteristics.¹⁵

4. The Results

The independent variables are chosen on the basis of their relevancy to examination procedures and on the reasonable expectation that these factors may have effects on examiner judgment. The data used are also limited by their availability. For instance, the financial statement data of individual

¹⁵We could also assume the probability function is in the form of a normal distribution, then the model is known as a probit model. Whether the probit model or logit model is more appropriate in the binary analysis is an empirical question. In a pilot study, we have fitted the data to both logit and probit models. We found that the logit model has a better fit. In addition, the logistic distribution is an approximation of a normal distribution, and they basically are the same except at extreme tails. For a discussion of probit model, see Theil (10, pp. 628-635). To compute the maximum likelihood estimates of the logit model, we used CRAWTRAN, a program for analyses of qualitative variables of Yale University Social Science Computer Facility.

borrowers are not available. There are a total of 28 independent variables and these data are for 1973.¹⁶ Since a national bank is required to be examined at least three times in a two-year period, it is safe to assume that one examination prior to actual loan charge-offs in 1975 must have occurred in 1974.¹⁷ It is the normal procedure that, during an examination, examiners review the previous examination reports and the relevant bank data of the previous years. Consequently, their judgments in 1974 examinations may be affected by 1973 data. It should also be emphasized that, in an examination, all previous loan criticisms are thoroughly reviewed. If a criticism is considered no longer appropriate, the criticism will be officially changed or removed (declassified). In other words, once a loan is criticized, it will continue to be criticized in the successive reports unless an intentional change is made. The 1974 reported criticisms for the charge-offs in 1975 are the data used for the dependent variables.

Out of 28 independent variables, 11 are bank characteristics variables which are represented by B's in the equation. The rest, 17 of them, are loan characteristics variables which are represented by L's. A list of these independent variables with their descriptions are presented in Table I. Most of these variables are straightforward. As stated previously, loan criticisms represent subjective judgment. The way the examiners are affected by these variables is strictly an empirical question. It is a priori

¹⁶ Most of the bank and loan characteristics, however, are constant throughout the life of the loan. For example, a bank does not change from one national bank region to another from year to year. The terms of a loan are usually the same unless a renegotiation is made.

¹⁷ If a bank was examined twice in 1974, the data from the examination report dated closest to the end of year were used.

TABLE I
Independent Variables

National Bank Region:

- B1 = 1, if the bank is located in National Bank Region 1;
0, all other banks.
- B2 = 1, if the bank is located in National Bank Region 2;
0, all other banks.
- B3 = 1, if the bank is located in National Bank Region 7;
0, all other banks.
- B4 = 1, if the bank is located in National Bank Region 8;
0, all other banks.

Size of Bank:

- B5 = size of bank measured by total loans outstanding.

Holding Company:

- B6 = 1, if the bank is a member of a holding company;
0, otherwise.

Special Situation (Problem Bank):

- B7 = 1, if a bank is classified as special situation bank
0, otherwise.

Bank Rating by Regulatory Agency:

- B8 = 1, if capital position rating is adequate;
0, otherwise (inadequate or impaired by loss).
- B9 = 1, if quality of assets rating is good or fair;
0, otherwise (unsatisfactory or hazardous).
- B10 = 1, if management rating is satisfactory or fair;
0, otherwise (poor).

TABLE I (continued)
Independent Variables

Profitability Ratio:

B11 = Net income to total assets.

Type of Business:

- L1 = 1, if mining or manufacturing;
0, otherwise.
- L2 = 1, if construction;
0, otherwise.
- L3 = 1, if transportation, communication or utilities;
0, otherwise.
- L4 = 1, if wholesale or retail or service;
0, otherwise.

Size of Borrower:

- L5 = 1, if the total asset of borrower is \$25,000 and under;
0, otherwise.
- L6 = 1, if the total asset of borrower is \$25,001 to \$100,000;
0, otherwise.
- L7 = 1, if the total asset of borrower is \$100,001 to \$500,000;
0, otherwise.

Age of Business:

- L8 = 1, if less than one year (new business);
0, otherwise.
- L9 = 1, if over one year but less than five years;
0; otherwise.
- L10 = 1, if five years but less than ten years;
0, otherwise.

Maturity of the Loan:

- L11 = 1, if demand;
0, otherwise.

TABLE I (continued)
Independent Variables

- L12 = 1, if the maturity date is less than 90 days (but not demand);
0, otherwise.
L13 = 1, if the maturity date is 91 days to a year;
0, otherwise.
L14 = 1, if the maturity date is over a year but less than five years;
0, otherwise.

Collateral:

- L15 = 1, if secured;
0, otherwise.

Special Characteristics:

- L16 = 1, if with special characteristics;
0, otherwise.

Past Irregularities

- L17 = 1, if with past irregularities;
0, otherwise.

reasonable to expect that all these bank and loan characteristics in Table I may have some effects. Different national bank regions consist of different states in different sections of the country and have different political and economic climates. In addition, different regions also have different examination personnel. Therefore, these differences should have effects on examiner performances. As for the size of bank, a large bank with billions of dollars in total loans is certainly very different from a small bank with loans less than \$10 million. To some extent they cannot even be considered as in the same industry. A holding company bank also behaves differently in its loan policy than does an independent bank.

The special situation means the bank is classified as a problem bank. A bank is put on the problem bank list when, in the opinion of the supervisory authorities, the bank needs special attention. For national banks until 1974, the only objective criterion was the ratio of total classified loans (substandard, doubtful and loss) to the gross capital funds. A bank whose classified loans were 40 percent or more of its gross capital funds usually was put on the problem bank list.¹⁸ The special situation certainly should have effects on later loan criticisms. Examiners may be tougher in criticizing the bank's loan portfolio because it is considered to be a problem bank. On the other hand, in order not to make the situation worse, the examiner may let some marginal cases go free without criticisms.

During an examination, the bank is rated by examiners in four categories: capital position, quality of assets, management and bank as a whole

¹⁸See (11, pp. 18).

(composite rating).¹⁹ Since the composite rating is highly correlated with the special situation variable, it is not included in the equation. These ratings again represent the subjective judgment of the examiners. It is certainly reasonable to expect that in loan criticisms, examiners will be affected by their predecessors' judgments (ratings) of the bank. Net income to total assets variable represents the profitability of the bank that undoubtedly was taken into consideration by the examiners during their examinations.

As for the loan characteristics variables, the type of business, size of borrower, age of business (new vs. established), maturity of the loan and collateral are straightforward and need no explanations. A loan to affiliated organization, to insiders (directors, officers or employees), to "minority" or to other public interest groups is considered to be a loan with special characteristics. The examiners usually review these loans more carefully. The past irregularities variable means a loan has had problems in the past such as past due experience or lack of current and satisfactory credit information. These past irregularities should have negative effects on examiner loan criticisms.

As stated previously, the dependent variable only takes two values (0,1). The 1975 charge-offs which were criticized previously resulting in a Y_i equal to 1; and the 1975 charge-offs which were not criticized previously

¹⁹In 1974, the rating of capital position had four categories: (1) adequate in relation to (a) volume of risk assets, (b) volume of marginal and inferior quality assets, (c) volume of deposits and (d) point a, b, and c to be considered in relation to strength of management; (2) inadequate in relation to the same four items; (3) inadequate, worse than defined in 2; and (4) capital impaired by losses. Quality of assets also has four ratings: (1) good, (2) fair, (3) unsatisfactory and (4) hazardous. Management had only three ratings: satisfactory, fair and poor. For a detailed discussion, see (11, pp. 136-139).

resulting in a Y_i equal to 0 (error). At this point, we should note that there are two types of charge-offs: those done voluntarily by the bank management and those forced by an examiner classifying the loan as "loss." There is an obvious difference between these two types of charge-offs. Therefore, in this study, we have estimated two sets of regressions (equations A & B). The first, denoted by dependent variable Y_A , includes both involuntary charge-offs and voluntary charge-offs. The second, denoted by dependent variable Y_B , excludes "loss" charge-offs from the sample. For the dependent variable in equation A (Y_A in Table II), the 1 value includes "OLEM," "substandard" and "doubtful" because these previous criticisms represent the "before-the-fact" judgments of the examiners that these loans have weaknesses and may lead to defaults. On the other hand, "loss" criticism is basically an after-the-fact identification of a bad loan. A loan with "loss" criticism must be charged-off immediately. For instance, if a loan is classified as "loss" during a 1974 examination, it had to be charged-off in 1974 and would not show up in the 1975 charge-off sample. Thus, a 1975 charge-off caused by a "loss" classification and otherwise without previous criticisms should be considered as an examiner error. In other words, for equation A, the 0 value for the dependent variables includes both 1975 "loss" charge-offs without previous criticisms and other charge-offs which were not criticized previously.

The regression results of equation A are reported in the first two columns of Table II. The X-square value for the equation is 40.358 and is significant at the 0.10 level. Out of 28 independent variables, 11 are statistically significant. For the 11 bank characteristics variables (which

TABLE II
Logit Regression Results

Dependent Variables	Y_A		Y_B	
Independent Variables	Coefficients	t-values	Coefficients	t-values
B1	0.23748	0.303	0.10199	0.088
B2	0.21487	0.293	0.36516	0.310
B3	0.84359	1.189	0.99571	0.846
B4	0.31311	0.438	1.00658	0.867
B5	-0.00191	2.551***	-0.00206	1.705**
B6	0.25931	0.486	0.50525	0.686
B7	0.89661	2.226**	1.31983	1.860**
B8	0.17254	0.421	0.61031	0.801
B9	-1.44345	1.950**	-1.62561	1.330*
B10	1.55791	1.842**	1.51931	1.160
B11	0.46462	1.258	0.65820	1.185
L1	0.17838	0.319	-0.20528	0.218
L2	-0.33875	0.775	-0.21403	0.255
L3	-0.26282	0.352	-1.88926	1.044
L4	0.11698	0.287	-0.35050	0.511
L5	-1.33531	1.552*	-2.71210	2.034**
L6	-0.01354	2.574***	-0.59224	0.663
L7	-0.19058	0.455	-0.62321	0.794
L8	1.30577	1.113	1.39935	0.936
L9	-0.32130	0.881	-0.80294	1.372*
L10	0.16210	0.467	0.15198	0.237
L11	-0.74744	1.429*	-2.96504	2.077**
L12	-1.12382	1.625*	-2.14070	1.378*
L13	-0.94455	2.005**	-2.98271	2.253**
L14	-0.86112	1.251	-1.89464	1.261
L15	0.19312	0.579	0.81534	1.434*
L16	-1.40857	1.378*	-1.92998	1.423*
L17	0.52780	1.301*	1.39249	2.298**
Constant	-3.50442	1.014	-3.12172	0.566
	$\chi^2 = 40.358$	$R^2 = 0.106$	$\chi^2 = 46.317$	$R^2 = 0.220$

*Significant at 0.10 level.

**Significant at 0.05 level.

***Significant at 0.01 level.

represent six bank characteristics categories) 4 are significant: bank size (B5), special situation (B7), asset rating (B9) and management rating (B10). The bank size variable, which is highly significant, indicates that the examiner error is inversely related to bank size. The probability that the examiners did not criticize a charged-off loan previously increases with bank size. This result is probably due to the fact that loans in smaller banks are much easier to evaluate. In addition, the criticisms to some extent are joint efforts of examiners and bank officers.²⁰ The officers in a larger bank can usually put out a stronger opposition against examiner criticisms, and also examiners are probably more deferential to the officers in a larger bank. In any case, judging from the regression coefficient, the effect of bank size is relatively moderate.

The special situation variable is significant and positive. The probability that examiners did not criticize 1975 charge-offs previously is smaller for a special situation bank than for a normal bank. This is certainly not surprising. The examiners usually reviewed the loan portfolio more carefully when the bank was considered to be a problem bank by their predecessors.

The asset rating variable is significant and negative. It is reasonable to expect that the previous asset rating of a bank would have some effects on examiner performances. A good asset rating has a negative effect because the examiners are probably less careful in reviewing loans of banks whose loan portfolio as a whole had been considered good during previous examination.

²⁰ Before criticisms, the examiners usually discuss the problem loans with officers of the bank.

The management rating variable is significant and positive. In the eyes of examiners, good management usually means conservative and cooperative management. Since, as stated previously, loan criticisms are to some extent joint efforts of bank management and examiners, cooperative management probably will help the examiners to identify the risky loans.

For the 17 loan characteristics (which represent 7 loan characteristics categories), 7 variables are significant. They are size of borrower (L5 and L6), maturity of the loan (L11, L12 and L13), special characteristics (L16) and past irregularities (L17). In comparison to bank characteristics variables, the statistical significance of these loan characteristics variables is at a relatively less significant level. (See Table II.)

The size of borrower variables are significant and negative. This means that the probability for examiners to make an error is higher for small borrowers with assets less than \$100,000. This is certainly reasonable. Small borrowers probably provide less accurate financial information than do large borrowers.

The maturity of the loan variables are significant and negative. The examiners have a higher probability of making an error in a loan with short maturity because they usually pay less attention to these short maturity loans.

The special characteristics variable is significant and negative. This result is interesting. Examiners are supposed to review loans with special characteristics more carefully. It is therefore rather surprising to find that they are more prone to make mistakes in these loans. On the other hand, loans with special characteristics largely consist of loans to

minority and public interest groups. Perhaps, examiners are more reluctant to criticize these loans.

The past irregularities variable is significant and positive. The interpretation for this result is straightforward. As a rule, examiners review loans with past irregularities more carefully; consequently, they make fewer errors. In addition, by definition, a past irregularities loan is a problem loan. An examiner is more inclined to criticize a problem loan.

As noted above, it could be argued that the "loss"-charge-offs should not be included in the sample, and they should not be treated as voluntary charge-offs without previous criticisms (errors). For one thing, it is possible that the weakness of the loan materializes only after the previous examination. Consequently, the examiners did not necessarily make an error by not criticizing the loan during their examination. Secondly, it is also possible that the "loss"-charge-off was a new loan. In other words, the loan was extended after previous examination. Thirdly, a "loss" criticism is a subjective judgment on the part of examiners. The examiners could give the loan a milder criticism such as "substandard" or "doubtful"; then, the loan would not be charged-off. Because of these complications, we also estimate the logit regression (equation Y_B) by excluding 1975 "loss" classification without previous criticisms from the sample. In other words, for dependent variable Y_B , value 1 includes previous criticisms: "OLEM," "substandard" and "doubtful," and value 0 includes only 1975 voluntary charge-offs without previous criticisms. The 1975 "loss"-charge-offs without previous criticisms are completely excluded from the sample.

The regression results for dependent variable Y_B are reported in the last two columns in Table II. In comparing the results of Y_A and Y_B , the

following observations can be made. First the Y_B equation has a higher χ -square value (46.317) and is significant at the 0.05 level. Consequently, Y_B has a better fit. This gives some support that there are some complications by treating a 1975 "loss" classification without previous criticisms as a simple 1975 charge-off without previous criticisms.

Second, the most striking feature of these two sets of results is their similarities. With a few exceptions, the sign and magnitude of each regression coefficient are the same for both results. Both equations have 11 significant coefficients. With three exceptions, the coefficients which are significant in Y_A are also significant in Y_B . The management rating (B10) is significant in Y_A but not in Y_B . The age of business variable (L9) and the collateral variable (L15) are significant in Y_B but not in Y_A . Age of business variable indicates that examiners are more prone to make an error for a new business less than five years old. This is reasonable because a new business usually provides less accurate financial data. The collateral variable indicates that the probability is less for examiners to make an error when a loan has collateral. The loans with collateral usually also have more information.

The variables which are not significant in both equations are national bank regions, holding company, profitability of the bank and type of business of the borrower. Among these insignificant variables, the results of national bank region variables are surprising. It is generally expected in the profession that different national bank regions will have different examiner performances because different regions have different personnel and economic and political climates. This general belief, of course, is not born out by this study.

5. Conclusion and Public Policy Implication

The purpose of this study is to ascertain the effects, if any, of certain bank and loan characteristics on examiner accuracy in loan criticisms. For the present study, the error is defined as a charge-off loan which was never criticized previously by examiners. Since loan criticisms represent basically subjective judgment, how and in what way a loan or bank characteristics would affect the examiner performance are empirical questions. By using a logit regression model, this study investigates a sample of 512 1975 charged-off loans from 164 national banks which were chosen from five national bank regions. We found that the examiner accuracy is affected by bank size, problem bank status, asset and management ratings, size of borrower, age of business, maturity of loan, collateral status, special characteristics of the loan and past irregularities of the loan. All the effects seem to have logical explanations.

Since bank examination is one of the major functions of bank regulatory agencies, the results of this study are important from public policy point of view. When these results are brought to the attention of the examiners, they should help to minimize future errors. Consequently, they should increase the usefulness of examination as a regulatory tool and the effectiveness of the regulatory agencies in carrying out their congressionally mandated policy to prevent bank failures. In addition, the results show that examiner errors are inversely related to bank size and loan size. These facts seem to indicate that examiners are more reluctant to criticize larger banks and larger borrowers. There is also evidence that examiners treated public interest and minority loans (special characteristics loans) more leniently. From equity point of view, these biases should be corrected.

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