The Journal of Finance / Volume 30, Issue 1 / p. 21-36

Article

A MULTIVARIATE STATISTICAL ANALYSIS OF THE CHARACTERISTICS OF PROBLEM BANKS

Joseph F. Sinkey Jr.

First published: March 1975

https://doi.org/10.1111/j.1540-6261.1975.tb03158.x

A MULTIVARIATE STATISTICAL ANALYSIS OF THE CHARACTERISTICS OF PROBLEM BANKS

JOSEPH F. SINKEY, JR.*

THIS PAPER PRESENTS a multivariate statistical analysis of the balance-sheet and income-statement characteristics of problem banks.[1] Newly identified problem banks are matched with nonproblem (control) banks and multiple discriminant analysis (MDA) is used to test for group mean differences, to describe the overlap between groups, and to construct rules to classify observations (banks) into either the problem-bank group or the nonproblem-bank group. The empirical findings indicate that measures of banking factors such as asset composition, loan characteristics, capital adequacy, sources and uses of revenue, efficiency, and profitability are good discriminators between the groups (i.e., group mean differences exist). The chi-square measures of group overlap indicate that the distributions of the individual bank's characteristics (i.e., vector of variables) overlap substantially. Given the high degree of overlap between groups, the "descriptive" classification results are "better" than might be expected.

The first section of this paper deals briefly with the definition and importance of problem banks. In the next section, a description of the problem-bank group and its control group are presented. The data and methodology are given in the third section, while the empirical findings are presented in the fourth section. In the final section, the summary and conclusions and implications for future research are presented.

I. PROBLEM BANKS: DEFINITION AND IMPORTANCE

A problem bank is one that, in the eyes of the Federal banking agencies, has violated a law or regulation or engaged in an "unsafe or unsound" banking practice to such an extent that the present or future solvency of the bank is in question.[2] Problem banks are identified during bank examinations. The purposes of a bank examination are:[3]

* Financial Economist, Economic Research Unit, Federal Deposit Insurance Corporation. The views expressed in this paper are the responsibility of the author and in no way represent a policy determination endorsed by the FDIC. I thank Robert A. Eisenbeis for his constant and generous help in the preparation of this paper; William D. O'Brien for his research and computer-programming assistance; and Edward J. Kane and especially Edward I. Altman for their helpful comments. This is a revised version of a paper presented by the author at the American Statistical Association meetings in New York, December, 1973. Parts of an earlier version of this paper appear in the 1973 Proceedings Volume of the ASA and are reproduced here with the permission of the Association.

1. A descriptive analysis of the characteristics of these banks can be found in Sinkey [23]. See also Sinkey and Walker [24] for a preliminary problem-bank study.

2. The Comptroller of the Currency supervises national banks, the Federal Reserve System regulates state member banks, and the FDIC examines insured-nonmember commercial banks and federally-insured mutual savings banks. Furthermore, all state banks (insured and noninsured) are

REFERENCES

1 Edward I. Altman. " Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy," Journal of Finance, (September, 1968), pp. 589–609.

Google Scholar

2 Edward I. Altman. " A Reply," Journal of Finance, (December, 1970), pp. 1169–1172.

Google Scholar

3 Edward I. Altman. " Predicting Railroad Bankruptcies in America," The Bell Journal of Management Economics and Management Science, (Spring, 1973), pp. 184–211.

Google Scholar

4 William H. Beaver. "Financial Ratios as Predictors of Failure," *Empirical Research in Accounting* (Chicago: The Institute of Professional Accounting, University of Chicago, 1966.

Google Scholar

5 George J. Benston. "Bank Examination," *The Bulletin*, New York University, Graduate School of Business, May, 1973.

Google Scholar

6 George J. Benston and John T. Marlin. " Bank Examiners" Evaluation of Credit: An Analysis of the Usefulness of Substandard Loan Data," Journal of Money, Credit and Banking, (February, 1974).

Google Scholar

7 Ernest, Black. *The Setting of Standards of Supervision for Savings and Loan Associations*, Washington, D.C.: Federal Home Loan Bank Board, July, 1969.

Google Scholar

8 John T. Boorman. *New Minority-Owned Commercial Banks: A Comparative Analysis*, Washington, D.C.: Federal Deposit Insurance Corporation, 1973.

Google Scholar

9 William W. Cooley, and Paul R. Lohnes. *Mulivariate Data Analysis*, New York: John Wiley and Sons, 1971.

Google Scholar

10 Robert A. Eisenbeis and Robert B. Avery. *Discriminant Analysis and Classification Procedures: Theory and Applications*, Lexington, Mass.: D.C. Heath and Company, 1972.

Google Scholar

11 Robert A. Eisenbeis and Robert B. Avery. " Two Aspects of Investigating Group Differences in Linear Discriminant Analysis," Decision Sciences, (October, 1973), pp. 487–493.

Google Scholar

12 Robert A. Eisenbeis Robert B. Avery Gary G. Gilbert, and Robert B. Avery. " Investigating the Relative Importance of Individual Variables and Variable Subsets in Discriminant Analysis," Communications in Statistics, (September, 1973).

Google Scholar

13 Robert A. Eisenbeis Robert B. Avery. Gary G. Gilbert, Robert B. Avery and Neil B. Murphy. *"Interest Rate Ceilings and Consumer Credit Rationing: A Multivariate Analysis of a Survey of Borrowers*," Working Paper No. 73–4, Washington, D.C.: FDIC, 1973.

Google Scholar

14 R. E. Prank, W. F. Massy and G. D. Morrison " Bias in Multiple Discriminant Analysis," Journal of Marketing Research, (August, 1965), pp. 250–258.

Google Scholar

15 L. N. Holloway and O. J. Dunn " The Robustness of Hotelling's T," Journal of the American Statistical Association, (March, 1967).

Google Scholar

16 Craig G. Johnson. " Ratio Analysis and the Prediction of Firm Failure," Journal of Finance, (December, 1970), pp. 1166–1168.

Google Scholar

17 Ellen, Klisten. " The New OES Rating System," Federal Home Loan Bank Board Journal, (December, 1971), pp. 8–13, 27, 29.

Google Scholar

18 Robert D. Kurtz and Joseph F. Sinkey, Jr. " Bank Disclosure Policy and Procedures, Adverse Publicity, and Bank Deposit Flows," Journal of Bank Research, (Autumn, 1973), pp. 177–184.

Google Scholar

19 P. A. Lachenbruch " An Almost Unbiased Method of Obtaining Confidence Intervals for the Probability of Misclassification in Discriminant Analysis," Biometrics, (December, 1967).

Google Scholar

20 Harry G. Leavy. " Early-Warning System—A New Supervisory Tool," PHLBB Journal, (September, 1969), pp. 12–14.

Google Scholar

21 Paul A. Meyer and Howard W. Pifer. " Prediction of Bank Failures," Journal of Finance, (September, 1970), pp. 853–868.

Google Scholar

22 Joseph F. Sinkey, Jr. " The Failure of United States National Bank of San Diego: A Portfolio and Performance Analysis," FDIC Working Paper No. 74–15, Washington, D.C.

Google Scholar

23 Joseph F. Sinkey, Jr. " The Way Problem Banks Perform," The Bankers Magazine, (Autumn, 1974), pp. 40–51.

Google Scholar

24 Joseph F. Sinkey, Jr. and David A. Walker. " Problem Banks: Identification and Characteristics". Journal of Bank Research (forthcoming), and FDIC Working Paper No. 74–3, Washington, D.C.

Google Scholar

25 David P. Stuhr and Robert Van Wicklen " A Discriminant Analysis Model of the Bank Examination Rating Process," (mimeographed), Federal Reserve Bank of New York, 1972.

Google Scholar

Citing Literature