



## **PREDICTING FINANCIAL FAILURE OF YEMENI BANKS**

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## **Predicting Financial Failure of Yemeni Banks**

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A thesis submitted to the  
fulfillment of the requirement for the degree  
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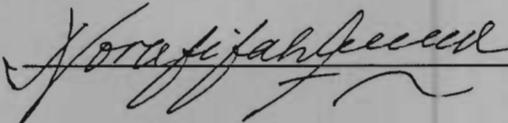
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## **ABSTRACT**

From year to year, strong attention has been paid to the study of the problems of predicting and preventing bank bankruptcy. Bank failures are usually followed by unfavorable consequences on stakeholders outside the failed banks themselves. Sometimes the consequences are felt by non-banking system as a whole. A failure can result in much harm to employment, earnings, financial development and other associated public interests.

Based on the logistic regression (LR) model, Earlier Warning System (EWS) is employed for Yemeni banks during 2002-2006 using micro-level data to identify a set of indicators that best explain the probability of an individual bank in Yemen to fail (become bankrupt) or remain sound across time. In the finding, capital adequacy, management quality and profitability found to be able to identify problem banks in Yemen. Bank's size has the opposite effect of failure probability. It is hoped that the financial ratios and result of the model will be useful to bankers and regulators in identifying problem banks in Yemen.

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## LIST OF ABBREVIATIONS

BDF	Bearing Degradation Factor
CBY	Central Bank of Yemen
CL	Credit Lyonnais
DEA	Data Envelopment Analysis
EU	European Union
EWS	Early Warning System
FDIS	Federal Deposit Insurance System
GDP	General Domestic Products
GME	Generalized Maximum Entropy Estimators
IETL	Interest Expenses/Total Loans
IIIE	Interest income/ Interest expenses
IITI	Interest Income/Total Gross Income
LADMF	Liquid Assets/(Deposits Money Market Funds)
LATA	Liquid Assets/Total Assets
LDAM	Logit and Discriminate Analysis Model
LEF	Life Expectancy Factor
LR	Logistic Regression
LSIZE	Logarithm of Gross Bank's Assets
LTCM	Long -Term Capital Management
MDA	Multiple Discriminate Analysis
NIBTNW	Net Income Before Tax/Net Worth
NIBTTI	Net Income Before Tax/Total Gross Income
NIBTTA	Net Income Before Tax/Total Assets
NPL	Non Performance Loans
NWTA	Net Worth/Total Assets
OLS	Ordinary Least Square
PHM	Proportional Hazard Model
PRA	Probit Regression Analysis
ROA	Return on Assets
SETA	Shareholder's Equity/Total Assets
T.B	Treasury Bills
TLTA	Total Gross Loans/Total Assets
TOENIBT	Total Operating Expense/Net Income Before Tax
TRA	Trait Recognition Analysis
US\$	United State Dollar
YR	Yemeni Riyal
$\varepsilon$	Error term

## CHAPTER ONE

### 1.0 Introduction

From year to year, strong attention has been paid to the study of the problems of predicting and preventing bank bankruptcy. Bank failures are usually followed by unfavorable consequences on stakeholders outside the failed banks themselves. Sometimes the consequences are felt by non-banking system as a whole. A failure can result in much harm to employment, earnings, financial development and other associated public interests. The failure of a bank has great adverse effect on the economy and so is considered very important (Benston & Kaufman, 1996).

The reason that contributes to bank failure is inadequate risk management practices. The nature of banking business is risky. Banks are exposed to several risks when they carry out their operations. They have to manage these risks carefully so that the realizations of the risks do not threaten their existence. Lack of regulation and supervision related to risk management also contribute to bank failures.

Based on the logistic regression (LR) model as suggested by earlier studies, Earlier Warning System (EWS) is employed for Yemeni banks during 2002-2006 to show how the interaction of all these factors affects the bank's fragility. This investigation allows us to answer the question on how banks should adjust their activity to minimize risk of failure and how banking regulation should respond to the added risk, if any. of bank failure and what changes in banking structure and regulatory procedure are necessary in order to

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## REFERENCES

Altman, E. I. (1968). Financial ratios, discriminate analysis and the prediction of corporate bankruptcy. *Journal of Finance*, 23, 589-609.

Altman, E. I. (1977). Predicting performance in the savings and loan association industry. *Journal of Monetary Economics*, 3, 443-466.

Arena, M. (2005). Bank failures and bank fundamentals: A comparative analysis of Latin America and East Asia during the nineties using bank level data. *Bank of Canada Working Paper*, 2005-19.

Arturo, E., Park, S., & Peristiani, S. (2000). Capital ratios as predictors of bank failure. *ERBNY Economic Policy Review*, July.

Barr, R. S., & Siems, T. F. (1996). Bank Failure prediction using DEA to measure management quality. *Department of Computer Science and Engineering, University of Dallas*.

Barr, R. S., & Siems, T. F. (1996). Bank failure prediction using DEA to measure management quality. *Unpublished manuscript*.

Barr, R. S., Seiford, L. M., & Siems, T. F. (1994). Forecasting bank failure: A non parametric frontier estimation approach. *Unpublished manuscript*.

Borovokivo, V. (2000). The determinants of bank failure: The case of Belarus. *Unpublished master dissertation*, National University of Kyiv-Mohila Academy.

Brewer III, E., Genay, H., Curt, W., & Kaufman, G. (2002). The value of banking relationship during a financial crisis: Evidence from failures of Japanese banks. *Federal Reserve Bank of Chicago Economic Research*.

Brewer, III, E. (2002). The value of banking relationships during a financial crisis: Evidence from failures of Japanese banks. *Federal Reserve Bank of Chicago*, March 1.

Calomiris, C. W., & Mason, J. R. (2000). Causes of U.S. bank distress during the depression. *Columbia University*, September.

Cebula, R. J. (1999). New evidence on determinants of bank failures in the US. *Applied Economics Letters*, 6, 45-47.

Charles W. Calomiris, C. W., & Mason, J. R. (2000). Causes of U.S. bank distress: The Depression. *Columbia University*.

Cole, R. A., & Gunther, J. W. (1995). Separating the likelihood and timing of bank failure. *Journal of Banking and Finance*, 19, 1073-1089.

Cordella, T., & Yeyati, E. L. (1998). Public disclosure and bank failure. *IMF Staff Papers*, 45(1), 110-131.

Dabos, M., & Sosa, W. (2004). Explaining and predicting bank failure using duration models: The case of Argentina after the Mexican crisis. *Journal of Economic Analysis*, 19(1), June, 31- 49.

Datta, S., & Datta, I. M. E. (1995). Reorganization and financial distress: An empirical investigation. *The Journal of Financial Research*, 18, 1-4.

Demirgüç-Kunt, A., & Detragiache, E. (2005). Cross-country empirical studies of systemic bank distress. *Development Research Group, The World Bank and Research Department, International Monetary Fund*, March.

Demirguc-Kunt, A., & Detragiache, E. (1998). The determinants of banking crises in developing and developed countries. *IMF Staff Papers*, 45(1), 81-109.

Elloumi, F., & Queyle, J. P. (2001). Financial distress and corporate governance: An empirical analysis. *Journal of Corporate Governance*, 1, 15-23.

Espahbodi, P. (1991). Identification of problem banks and binary choice models. *Journal of Banking and Finance*, 15, 53-71.

Estrella, A., Park, S., & Peristiani, S. (2000). Capital ratios as predictors of bank failure. *FRBNY Economic Policy Review*, 33-52.

Gart, A. (1994). Regulation, deregulation, re-regulation: The future of the banking, insurance and securities industry. *New York: Simultaneously*

Glaennon, D., & Golan, A. (2003). A Markov Model of bank failure estimated using an information-theoretic approach. *Risk Analysis Division, Office of Comptroller of the Currency*, the American University.

Glennon, D., & Golan, A. (2003). A Markov model of bank failure estimated using an information theoretic approach. *Unpublished Manuscript*.

Golin, J. (2001). *The Bank Credit Analysis Handbook: A Guide for Analysts, Bankers and Investors*. London: John Wiley & Sons (Asia).

Gonzalez-Hermosillo, B. (1999). Determinants of ex-ante banking system distress: A macro-micro empirical exploration of some recent episodes. *IMF Working Paper*, 99/33.

Gonzalez-Hermosillo, B. (1999). Developing indicators to provide early warnings of banking crises. *Finance and Development*, 36-39.

Gropp, R., Vesala, J., & Vulpes, G. (2004). Market indicators, bank fragility, and indirect market indiscipline. *FRBNY Economic Policy Review*, 53-62.

Halling, M. (2006). Bank failure prediction: A two-step survival time approach, *Banking Analysis and Inspections Division* (Austrian National Bank), May.

Hanousek, J., & Roland, G. (2001). Banking passivity and regulatory failure in emerging markets: Theory and evidence from the Czech Republic. *William Davidson Working Paper*, Number 424.

Heffernan, S. (2003). *The causes of bank failure*. in A. W. Mullineux and V. Murinde (Ed.) *Handbook of International Banking*, 366-402. US: Edwar Elgar Publishing Limited.

Henebry, K. L. (1997). A test of temporal stability of proportional Hazards models for predicting Bank failure. *Journal of Finance and Strategic Decisions*, 10 (3), Fall.

Henebry, K. L. (1997). A test of temporal stability of proportional hazards models for predicting bank failure. *Journal of Financial and Strategic Decisions*, 10(3).

Hutchison, M., & McDill, K. (1998). Determinants, costs, and duration of banking sector distress: The Japanese experience in international comparison. *Paper presented at the NBER-TCER Japan Project Meeting in Tokyo*, October 29-30.

Hwang, D. Y., Lee, C. F., & Liaw, K. T. (2001). Forecasting bank failures and deposit insurance premium. *International Review of Economics and Finance*, 6(3), 317-334.

Idris, F., & Ahmad, N. (2008). A comparative analysis of bank distress using bank level data. *4th International Conference in Banking and Finance (ICBF) proceedings*, Faculty of Finance and Banking, Universiti Utara Malaysia.

Jagtiani, J. A., James W., Catharine, K., M, Lemieux., & Shin, G. (2000). Predicting inadequate capitalization: Early warning system for bank supervision. *Federal Reserve Bank of Chicago Working Paper*.

Kamiski, T. L. (1999). Currency and banking crises: The earning warning system of distress. *George Washington University Working Paper*.

Karacabey, A. A. (2007). Bank failure prediction using modified minimum deviation model. *International Research Journal of Finance and Economics* ISSN 1450-2887, Issue 12, 148-158

Kim, B. J. (1977). Altman's Z-score and option-based approach for credit risk measure. *Department of Finance, Hallym University, Korea.*

Kim, B. J. (2002). Altman's Z-score and option approach for credit risk measure (Bankruptcy prediction: Book value or market value?). Department of Finance, *Hallym University, Korea.*

Kolari, J., Glennon, D., Shin, H., & Caputo, M. (2002). Predicting large US commercial bank failures. *Journal of Economics & Business*, 54, 361-387.

Kwok, C. H. (1992). The application of discriminate analysis (MDA) and logistic regression (logit analysis) in predictions of financial distress of banks/ financial institutions – issues and comparisons. *Centre for Research in Financial Services*. Nanyang Technological University, Singapore.

Lane, W. R., Looney, S. W., & Wansley, J. W. (1986). An application of the Cox proportional hazards model to bank failure. *Journal of Banking and Finance*, 10(4), 511- 531.

Mendis, C. (2002). Internal shocks and banking crises in developing countries: Does the exchange rate regime matter? *CESifo Working Paper* No. 759.

Meyer, P. A., & Piefer, H. W. (2001). Prediction of bank failures. *Journal of Finance*, 853-868.

Montgomery, H., Bich, T., & Santoso, W. (2005). Coordinated Failure? A Cross-country bank failure prediction model. *ADB Institute Discussion Paper* No. 32.

Purnanandram, (2004). Do banks hedge in response to the financial distress costs? *University of Michigan Business School Working Paper*.

Rahman, S., Tan, L. H., Hew, O. L., and Tan, Y. S. (2004). Identifying financial distress indicators of selected banks in Asia. *Asian Economic Journal*, 18(1), 45-57.

Rahman, S., Tan, L. H., Ooi, L H., &, Tan, Y. S. (1998). Identifying financial distress indicators of selected banks in Asia. *Asian Economic Journal*, 12(3) 45-57

Schaeck, K. (2002). Identifying problem banks in the German co-operative and savings bank sector. *Centre for Risk Research*, University of Southampton, Highfield, Southampton, SO17 1BJ, United Kingdom.

Snkey, J. F. Jr. (1975). A multivariate statistical analysis of characteristics of problem banks. *The Journal of Finance*, 30(1), March 21-36

Thomson, J. B. (1989), An analysis of bank failures: 1984 to 1989. *Working Paper 8916*, Federal Reserve Bank of Cleveland.

Wheelock, D. C. (1992). Deposit insurance and bank failures new evidence from the 1920s. *Economic Inquiry* 33, 530-543.

Wheelock, D. C., & Wilson, P. (1999). The contribution of on-site examination ratings to an empirical model of bank failures. *Federal Reserve Bank of St. Louis Working Paper*.

Wheelock, D. C., & Wilson, P. W. (1995). Explaining bank failures: Deposit insurance, regulation, and efficiency. *The Review of Economics and Statistics*, 77(4), 689-700.