PREDICTING FINANCIAL FAILURE: AN EMPIRICAL INVESTGATION ON JORDANIAN INDUSTRIAL AND SERVICE COMPANIES

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ABSTRACT

From year to year, strong attention has been paid to the study of the problems of predicting firms' bankruptcy. Bankruptcy prediction is an essential issue in finance especially in emerging economics. Predicting future financial situations of individual corporate entities is even more significant. Regression analysis is used to develop a prediction model on 22 bankrupt and non-bankrupt Jordanian public listed companies for the period 2000 until 2003. The results show that working capital to total assets, current asset to current liabilities, market value of equity to book value of debt, retained earnings to total asset, and sales to total asset are significant and good indicators of the probability of bankruptcy in Jordan.

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LIST OF ABBREVIATIONS

AID	Agency for International Development
ARM	Adjustable Rate Mortgages
CA / CL	Current Assets / Current Liabilities
C / CL	Cash / Current Liabilities
CFFO	Cash Flow from Operations
CPA	Conditional Probability Analysis
EBIT / I	Earnings before Interest and Tax / Interest
EBIT / TA	Earnings before Interest and Tax / Total Assets
EU	European Union
FCM	Failing Company Model
FDI	Foreign Direct Investment
GDP	General Domestic Product
IMF	International Monetary Fund
JD	Jordanian Dinar
MDA	Multiple Discriminant Analysis
MVE / BVOD	Market Value Equity / Book Value of Total Debt
NI / S	Net Income / Sales
NI / TA	Net Income / Total Assets
RE / TA	Retained Earnings / Total assets
S / TA	Sales / Total Assets
TA / TE	Total Assets / Total Equity
TD / TE	Total Debt / Total Equity

US$	United States Dollar
WC / TA	Working Capital / Total Assets

Chapter 1

Background

1.0 Introduction

A business core aim is to generate profit and by extension, maximization of wealth. In the course of operations, however, a firm might experience financial problems caused by both internal and external environmental factors. These financial factors lead to what we refer to as financial distress.

The failure or bankruptcy of financially distressed companies often results in significant direct and indirect costs to many stakeholders; including shareholders, managers, employees, lenders and clients. Significant cost reductions through failure prevention may arise if financially distressed companies are identified well before failure and estimates then made of their survival probability for a given time frame.

Banks, in operation, have many departments and one of their most important departments is that of credit-risk management because this department makes profits by granting loans. The credit-risk management department needs to make decisions on whether or not they could give loans to their customers. This department normally operates on important procedures based on certain criteria that have been systematized, for example, the extent of customers' credit worthiness prior to getting loans. It is obvious that supporting evidence of credit worthiness will ensure customers' future repayment of loans and therefore critically influence the final decision of the

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References

Adiana, N. H., Halim, A., Ahmad, A. and Md, R. R. (2008). Predicting Corporate Failure of Malaysia's Listed Companies: Comparing Multiple Discriminant Analysis, Logistic Regression and the Hazard Model. International Research *Journal of Finance and Economics*, 15.

Agrawal, S. and C.T. Ho (2007). Comparing the Prime and Subprime Mortgage Markets. *The Federal Reserve Bank of Chicago*, (214).

Alsaeed, K. (2006). The Association between Firm-specific Characteristics and Disclosure: the Case of Saudi Arabia. *Managerial Auditing Journal*, 21*(5)*, 476-96.

Altman, E., I. (1968). Financial Ratios, Discriminate Analysis and the Prediction of Corporate Bankruptcy. *Journal of Finance*, 23, 589-609.

Altman, E. I., (1973). Predicting Railroad Bankruptcies in America. *Bell Journal of Economics and Management Science*, 4, 184-211.

Altman, E. I., R. Haldeman, and P. Narayanan, (1977). ZETA Analysis: A New Model to Identify Bankruptcy Risk of Corporations. *Journal of Banking and Finance*, 1, 29-54.

Altman E. I. (1980). Commercial Bank Lending: Process, Credit Scoring and Costs of Error in Lending. *Journal of Financial and Quantitative Analysis*, 15*(1)*, 35-51.

Altman, E. I. (1984). The Success of Business Failure Prediction Models: An International Survey. *Journal of Banking and Finance*, 8, 171-198.

Altman, E. I., (1993). *Corporate Financial Distress and Bankruptcy*. 2nd ed. New York: Wiley.

Altman, E.I., Marco, G. and Varetto, F. (1994). Corporate Distress Diagnosis: Comparisons using Linear Discriminate Analysis and Neural Networks (the Italian Experience*)*. *Journal of Banking and Finance*, 18, 505-529.

Altman, E. I. (2002). Bankruptcy. *Credit Risk, and High Yield Junk Bonds*. UK: Blackwell Publishers Ltd.

Anderson, D. J. , Sweeney, T. A. and Williams, T. A. (1996). *Statistics for Business and Economics*. Minneapolis, MN: West Publishing.

Barlow, R. E., Marshall, A. W., & Proschan, F. (1963). Properties of Probability Distributions with Monotone Hazard Rate. *The Annals of Mathematical Statistics*, 375-389.

Beaver, W. H. (1966). Financial Ratios as Predictors of Failure. *Journal of Accounting Research*, 4, 71-111.

Beaver, W., (1967). Financial Ratios as Predictors of Failure, Empirical Research in Accounting: Selected Studies, Supplement. *Journal of Accounting Research,* 5, 71-127.

Beaver, W. H. (1968). Alternative Accounting Measures as Predictors of Failure. *Accounting Review*, 113-122.

Bennett, R. and Loucks, C., (1996). Politics and Length of Time to Bank Failure: 1986-1990. *Contemporary Economic Policy*, 14, 29-41.

Blum, M.P. (1974). Failing Company Discriminant Analysis. *Journal of Accounting Research,* 12, *(1)*, 1 -25.

Brau, E. (2004). International Monetary Fund Financial Risk in the Fund and the Level of Precautionary Balances Background Paper. *Prepared by the Finance Department*.

Broecker, T. (1990). Credit-Worthiness Tests and Interbank Competition. *Econometrical: Journal of the Econometric Society,* 58*(2)*, 429-452.

Chancharat, N., Davy, P., & McCrae, M. (2002). Examining Financially Distressed Company in Australia: The Application of Survival Analysis.

Charitou, A., Neophytou, E., and Charalambous, C. (2004). Predicting corporate Failure: Empirical Evidence for the UK. *European Accounting Review*, *(1,)* 3, 465-497

Chuvakhin, Nikolai and L. Wayne Gertmenian (2003). Predicting Bankruptcy in the WorldCom Age.

El Shamy, Mostafa Ahmed (1989). The Predictive Ability of Financial Ratios: A Test of Alternative Models, Ph.D. Dissertation, New York University.

Fama, E. F. (1985). What's Different About Banks?. *Journal of economics,* 15, 29-39.

Figini, F. S. (2005). Random Survival Forest Models for SME Credit Risk Measurement. *Department of Statistics and Applied Economics, University of Pavia, Italy.*

Frydman, Halina, Edward I. Altman, and Duen-Li Kao, (1985). Introducing Recursive Partitioning for Financial Classification, the Case of Financial Distress. *Journal of Finance*, 40*(1)*, 269-291.

Geymueller. (2007). Comparing the Credit Default Risk of the Electricity and Telecom-Industries with DEA, 1-24.

Grice, J.S. & Dugan, M.T. (2001). The Limitations of Bankruptcy Prediction Models: Some Cautions for the Researcher. *Review of Quantitative Finance and Accounting*, 17(2): 151-166.

Gujarati Damodar, N. (1995). Basic Econometrics. Literatür Yayincilik, Istanbul.

Hazak, A., & Mannasoo, K. (2007). Indicators of Corporate Default-an EU Based Empirical Study: Eesti

Hillegeist, S.A., Keeting, E. K., Cram, D.P. and Lundstedt, K.G. (2002). Assessing the Probability of Bankruptcy. *Review of Accounting Studies*, *9(1),* 5-34.

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.*

Kim, B. J. (2003). Altman's Z-score and Option-based Approach for Credit Risk Measure (Bankruptcy Prediction, Book Value or Market Value?). *Department of Finance, Hallym University*, Chuncheon, Kangwon, Korea.

Koh, H. C., & Killough, L. N. (1990). The Use of Multiple Discriminant Analysis in the Assessment of the Going-concern Status of an Audit Client. *Journal of Business Finance & Accounting,* 17*(2)*, 179-192.

Lane, W. R., Looney, S. W., & Wansley, J. W. (1989). An Application of the Cox Proportional Hazards Model to Bank Failure. *Journal of Banking and Finance*, 10*(4)*,511- 531.

Lawrence, E.L., Smith, S. and Rhoades, M. (1992). An Analysis of Default Risk in Mobile Home Credit. *Journal of Banking and Finance*, 299-312.

Li, Kai. (2002). Bayesian Analysis of Duration Models, an Application to Chapter 11 Bankruptcy. *Economics Letters*, 63*(3)*, 305-312.

Lin, L., and Piesse, J. (2004). Identification of Corporate Distress in UK Industrials: A conditional Probability Analysis Approach. *Applied Financial Economic*, 14, 37-82

Marais, D. A. J. (1979). A Method of Quantifying Companies Relative Financial Strength. *Discussion Paper in Bank of England*, London, 4.

Martin, D. (1977). Early Warning of Bank Failure: A logit Regression Approach. *Journal of Banking and Finance*, 1*(3)*, 249-276.

Mihail, N., Cetina, I., & Orzan, G. (2006). Credit Risk Evaluation. *Theoretical and Applied Economics*, 4*(9)*, 499.

Nam, J. and Jinn, T. (2000). Bankruptcy Prediction: Evidence from Korean Listed Companies During the IMF Crisis. *Journal of International Financial Management and Accounting*, 11*(3)* 178-197.

Neophytou, E, Charilou, A. and Charalambous, C. (2000). Predicting Corporate Failure: Empirical Evidence for the U.K. on 24th May 2004.

Ohlson, J. A. (1980). Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research*, 18, 109-31.

Piesse, J. and Wood, D. (1992). Issues in Assessing MDA Models of Corporate Failure. *The British Accounting Review*, 24*, 1*, 33-42.

Platt, H. D., Platt, M. B., & Pedersen, J. G. (1994). Bankruptcy Discrimination with Real Variables. *Journal of Business Finance & Accounting*, 21(4), 491-510.

Purnanan dam, A. (2004). Financial Distress and Corporate Risk Management.

Routledge, J., and Gadenne, D. (2000). Financial Distress, Reorganization and Corporate Performance. *Accounting and Finance*, 40, 233-260.

Santomero, A.M. and Vinso J.D. (1997). Estimating the Probability of Failure for Commercial Banks and the Banking System. *Journal of Banking and Finance*, 1, 185-205.

Sharma, Divesh S. (2001). The Role of Cash Flow Information in Predicting Corporate Failure:The State of the Literature, *Managerial Finance*, 27*(4)*, 3-28.

Shirata, C. Y. (1998). Financial Ratios as Predictors of Bankruptcy in Japan: an Empirical Research.

Shumway, T., (2001). Forecasting Bankruptcy More Accurately: A simple Hazard Model. *Journal of Business*, 74*(1)*,101-124.

Sloan, Richard G., (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?. *The Accounting Review*, 71, (3), 289-315.

Splett, N. and Barry, P. (1992). Credit Evaluation Procedures at Agricultural Banks. Financing Agriculture in a Changing Environment: Macro, Market, Policy and Management Issues. *Proceedings of regional research committee* NC-161, Dept. of Ag. Econ, Kansas State Univ., Manhattan.

Splett, N.S., P.J. Barry, B.L. Dixon and P.N. Ellinger. (1994). A Joint Experience and Statistical Approach to Credit Scoring, *Agricultural Finance Review*, 54, 39-54.

Stiglitz, J.E, and Weiss, A. (1988). Banks As Social Accountants and Screening Device for the Allocation of Credit, *National Bureau of Economic Research Working Paper*, 2710.

Taffler R. (1982). Forecasting Company Failure in the UK Using Discriminant Analysis and Financial Ratio Data, *Journal of the Royal Statistical Society*, 145, 3, 342-358.

Taffler R. (1984). Empirical Models for the Monitoring of UK Corporate, *Journal of Banking and Finance*, 199-227.

Toukan., (2008). Jordanian Economic Performance and Prospects for 2008 and 2009, *Governor of the Central Bank of Jordan.*

Turvey, C., (1991). Credit Scoring for Agricultural Loans: A Review with Applications, *Agricultural Finance Review*, 51, 43-54.

Viscione, J.A., (1985). Assessing Financial Distress, *The Journal of Commercial Bank Lending*, 39-55.

Watson, I. (1996). Financial Distress, The State of the Art in 1996, *International Journal of Business Studies,* 4, 2, 39-65.

West, M., Harrison, P. J., & Migon, H. S. (1985). Dynamic Generalized Linear Models and Bayesian Forecasting. *Journal of the American Statistical Association*, 73-83.

Whalen, G. (1991). A proportional Hazards Model of Bank Failure: An Examination of Its Usefulness as an Early Warning Tool. *Federal Reserve Bank of Cleveland Economic Review*, 27(1), 21–31.

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.*

Zavgren, C.V. (1985). Assessing the Vulnerability to Failure of American Industrial Firms: A Logistic Analysis. *Journal of Business Finance & Accounting*, 12, 1, 19-45.

Zeitun, R., Tian, G., & Keen, K. (2007). Default probability for the Jordanian Companies: A Test of Cash Flow Theory. *International Research Journal of Finance and Economics,* 8.

Ziari, H.A., D.J. Leatham and C.G. Turvey. (1995). Application of Mathematical Programming Techniques in Credit Scoring of Agricultural Loans, *Agricultural Finance Review,* 55.

Zmijewski, M. E., (1984). Methodological Issues Related to the Estimation of Financial Distress Prediction Models, *Journal of Accounting Research* 22, 59-82.

http://www.nationsencyclopedia.com/economies/Asia-and-the-Pacific/Jordan-OVERVIEW-OF-ECONOMY.html