DETERMINANTS OF SME's FAILURE IN MALAYSIA AND NIGERIA

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ABSTRACT

Small and medium-sized enterprises (SMEs) play an important role toward economic development worldwide. Predicting bankruptcy among SMEs can have a significant impact on the economy as an effective early warning signal. This study develops bankruptcy prediction models for Malaysian and Nigerian SMEs by combining financial, non-financial, corporate governance and macroeconomic variables using the logistic regression and artificial neural network (ANN) methods. The accuracy rates obtained by those two methods were then compared. In developing the estimated model, 1,556 (632) SMEs from the manufacturing sector in Malaysia (Nigeria) are selected. Three sub-samples are created representing 3-years, 2-years and 1-year prior to bankruptcy, with total observations of 666 (344), 470 (172) and 420 (116) respectively. Each sub-sample comprises 50 percent non-bankrupt and 50 percent bankruptcy firms, from years 2000 to 2014. The findings show that four of the financial variables, namely, lower profitability, high leverage, insufficient liquidity and high operating expenses are associated with bankruptcy among SMEs in Malaysia and Nigeria. As for the non-financial variables, the results indicate that young SMEs and those located in less industrialised states are more likely to go bankrupt. In addition, the corporate governance variables, such as number of directors, independent director, managing director duality, controlling shareholder, ethnicity and gender of managing director are found significant. Moreover, high unemployment rate is associated with bankruptcy among SMEs in Malaysia and Nigeria, while high inflation rate as well as lending rate are associated with SMEs bankruptcy only in Nigeria. The result shows that the ANN model leads to a higher predictive accuracy rate compared to the logistic regression model for Malaysia and Nigeria. The study reveals that SMEs should increase the number of independent directors, discourage CEO duality and reduce ownership concentration. Financial institutions could use this study as a reference model to manage credit risk of SMEs while the government agencies may use it to improve their existing policies.

Keywords: bankruptcy prediction, corporate governance, logistic regression, neural network, small and medium-sized enterprises.

ABSTRAK

Industri kecil dan sederhana (IKS) memainkan peranan penting ke arah pembangunan ekonomi di seluruh dunia. Ramalan kebankrapan dalam kalangan IKS boleh memberikan kesan yang ketara kepada ekonomi kerana ia berfungsi sebagai satu isyarat awal yang berkesan. Kajian ini membangunkan model ramalan kebankrapan bagi IKS di Malaysia dan juga Nigeria dengan menggabungkan pemboleh ubah kewangan, bukan kewangan, tadbir urus korporat dan ekonomi makro dengan menggunakan regresi logistik dan kaedah rangkaian neural tiruan atau artificial neural network (ANN). Kadar ketepatan yang diperolehi melalui dua kaedah tersebut kemudiannya dibandingkan. Pembangunan model anggaran ini dilakukan melalui pemilihan 1,556 (632) IKS daripada sektor pembuatan di Malaysia (Nigeria). Tiga sub-sampel diwujudkan bagi mewakili 3-tahun, 2-tahun dan 1-tahun sebelum bankrap, dengan 666 (344), 470 (172) dan 420 (116) pemerhatian masing-masing. Setiap sub-sampel terdiri daripada 50 peratus syarikat bukan-bankrap dan 50 peratus syarikat bankrap, daripada tahun 2000 hingga 2014. Dapatan kajian menunjukkan bahawa antara empat daripada pemboleh ubah kewangan, iaitu keuntungan yang rendah, leveraj yang tinggi, kekurangan kecairan dan perbelanjaan operasi yang tinggi dikaitkan dengan kebankrapan IKS di Malaysia dan Nigeria. Bagi pemboleh ubah bukan kewangan pula, IKS baru dan syarikat yang terletak di negeri yang perindustriannya kurang maju, adalah lebih cenderung untuk menjadi bankrap. Di samping itu, antara pemboleh ubah tadbir urus korporat yang didapati signifikan adalah bilangan pengarah, pengarah bebas, dualiti pengarah urusan, pemegang saham yang berkuasa, etnik dan jantina pengarah urusan. Selain itu, kadar pengangguran yang tinggi mempunyai kaitan dengan kebankrapan dalam kalangan IKS di Malaysia dan Nigeria, manakala kadar inflasi yang tinggi serta kadar pinjaman dikaitkan dengan kebankrapan IKS hanya di Nigeria. Hasil kajian menunjukkan bahawa model ANN memberikan kadar kejituan ramalan yang lebih tinggi berbanding model regresi logistik bagi Malaysia dan Nigeria. Kajian ini mendedahkan bahawa IKS perlu meningkatkan bilangan pengarah bebas, mengelakkan dualiti atau penggandaan tugas CEO dan mengurangkan konsentrasi pemilik saham. Institusi kewangan boleh mengunakan kajian ini sebagai model rujukan untuk menangani risiko kredit IKS, manakala agensi kerajaan boleh menggunakannya untuk menambahbaik dasar yang sedia ada.

Kata Kunci: meramal kebankrapan, tadbir urus korporat, regresi logistik, kaedah rangkaian neural tiruan, Industri kecil dan sederhana.

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I dedicate this research to my late parents
~~ Alh. Kawu Muhammad Ma'aji and Laraba Mika'il ~~

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LIST OF ABBREVIATIONS

ACCA	Association of Chartered Certified Accountants
ANN	Artificial Neural Network
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AUC	Area Under the Curve
BPNN	Back-Propagation Neural Networks
CAC	Corporate Affairs Commission
CAMEL	Capital, asset, management, equity and liquidity
CBN	Central Bank of Nigeria
CCM	Companies Commission of Malaysia
CPI	Consumer Price Index
DOSM	Department of Statistics Malaysia
GDP	Gross Domestic Product
LDA	Linear discriminant analysis
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
MATRADE	Malaysian External Trade Development Corporation
MCCG	Malaysian Code on Corporate Governance
MDA	Multiple Discriminant Analysis
MITI	Ministry of International Trade and Industry
MM	Modigliani and Miller
MLP	Multilayer Perceptron
MSMEDF	Micro, Small and Medium Enterprises Development Funds
NBS	National Bureau of Statistics Nigeria
NCCG	Nigerian Code on Corporate Governance
NEDEP	National Enterprise Development Program
NID	Neural Interpretation Diagram
NSDC	National SME Development Council
SMEs	Small and Medium-size Enterprises
SMECGS	Small and Medium Enterprises Credit Guarantee Scheme
SMEDAN	Small and Medium-size Enterprises Development Agency of Nigeria
SMIEIS	Small and Medium Industries Equity Investments Scheme
SMEWG	Small and Medium Enterprises Working Group
RBT	Resource-based Theory
RMA	Robert Morris Associates
ROC	Receiver Operating Characteristics

CHAPTER 1

INTRODUCTION

1.1 Background of Study

In recent years, small and medium-sized enterprises (SMEs) are viewed as one of the leading contributors to national economic development in the area of creating employment opportunities, developing indigenous skills and technologies, building market competitiveness, and realising a poverty free society (Jahur & Quadir, 2012). More than 95 percent of the established enterprises across the globe are SMEs, contributing approximately 60 percent of the private sector manpower (Ayyagari, Demirgüç-Kunt & Maksimovic, 2011).

SMEs play a significant role in driving the growth of gross domestic products (GDP) and sustaining employment (Leung & Rispoli, 2011). In the US, Germany, UK, and France, SMEs contribute approximately 51 to 56 percent of the countries' GDP (Association of Chartered Certified Accountants (ACCA), 2013). SMEs in the Association of Southeast Asian Nations (ASEAN) region make up 96 percent of all enterprises, with a 50 to 95 and 30 to 53 percent of contribution to domestic employment and GDP, respectively (SME Corp Malaysia, 2013). For example, Malaysia, as an ASEAN member, SMEs' contribution to GDP is 35.9 percent. However, in Ghana, SMEs are considered to be significant to the local economy, accounting for 90 percent of the businesses and contributing 49 percent to the GDP in 2012 (PricewaterhouseCoopers (PWC), 2013). SMEs' contribution in Nigeria is about 48.7 percent of GDP in terms of nominal value (Agusto & Co., 2016; Nnabugwu, 2015).

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REFERENCES

Abdullah, N., Ahmad, A., Ahmad, H., & Md. Rus, 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 & Economics*, 15, 201-217.

Abdullah, N., Ahmad, A., Md. Rus, R., & Zainudin, N. (2014). Modelling small business failures in Malaysia. Available at SSRN: http://ssrn.com/abstract =2402129 or http://dx.doi.org/10.2139/ssrn.2402129

Abdullah, M., Ma'aji, M., & Khaw-Lee, H. (2016). The value of governance variables in predicting financial distress among small and medium-sized enterprises in Malaysia. *Asian Academy of Management Journal of Accounting & Finance*, 12(1), 77-91.

Abor, J., & Biekpe, N. (2007). Corporate governance, ownership structure and performance of SMEs in Ghana: implications for financing opportunities, *Corporate Governance*, 7(3), 288-300.

ACCA (2013). The growth challenge, *Association of Chartered Certified Accountants, ACCA.*

Agarwal, V. & Taffler, R. (2007). Twenty-five years of the Taffler z-score model: Does it really have predictive ability? *Accounting and Business Research*, 37(4), 285-300.

Agrawal, A., & Knoeber, R. (1996). Firm performance and mechanisms to control agency problems between managers and shareholders. *The Journal of Financial and Quantitative Analysis*, 31(3), 377-397

Ahmad, A., Mohd, N., Rizal, A., & Marzuki, A. (2008). Macroeconomic Determinants of Corporate Failures in Malaysia, *International Journal of Business and Management*, 3(3) 3-10.

Ahmad, N., & Seet, P. (2009). Dissecting behaviours associated with business failure: A qualitative study of SME owners in Malaysia and Australia. *Asian Social Science.* 5(9), 98–104.

Ali, S., Liu, B., & Su, J. (2014). Does corporate governance quality reduce financial distress? New panel evidence from Australia. Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2481892

Alifiah, M., Salamudin, N., & Ahmad, I. (2013). Prediction of financial distress companies in the consumer products sector in Malaysia. *Jurnal Teknologi*, 64(1), 85-91.

Alifiah, M., Salamudin, N., & Ahmad, I. (2011). Revisiting financial distress prediction in the development sector in Malaysia, *Business Management Quarterly Review*, 2(2), 25-38.

Alowaihan, A. (2004). Gender and business performance of Kuwaiti small firms: A comparative approach. *IJCM*, 14(3&4), 69-82.

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

Altman, E., Marco, G., & Varetto, F. (1995). Corporate distressed diagnosis: comparisons using linear discriminant analysis and neural networks (The Italian experience). *Journal of Banking and Finance,* 18, 505 - 529.

Altman, E., Edward, I., Haldeman, R., & Narayanan, P. (1977). A new model to identify bankruptcy risk of corporation. *Journal of Banking and Finance*, 1, 29–54.

Altman, E., & Loris. B. (1976). A financial early warning system for over-the-counter broker dealers. *Journal of Finance*, 31(4), 1201-1217.

Altman, E., Marco, G., & Varetto, F. (1994). Corporate distress diagnosis: comparisons using linear discriminant analysis and neural networks (the Italian Experience). *Journal of Banking and Finance*, 18, 505-529.

Altman, E., & Sabato, G. (2007). Modeling credit risk for SMEs: Evidence from US market. *A Journal of Accounting, Finance and Business Studies (ABACUS)*, 43(3), 332-357.

Altman, E., Sabato, G., & Wilson, N. (2010). The value of non-financial information in small and medium-sized enterprise risk management. *Journal of Credit Risk,* 6(2), 95-127.

Aoki, I., Komatsu, T., (1999). Analysis and prediction of the fluctuation of sardine abundance using a neural network. *Oceanol. Acta*, 20, 81–88.

Aurelle, D., Lek, S., Giraudel, J.-L., Berrebi, P., (1999). Microsatellites and artificial neural networks: tools for the discrimination between natural and hatchery brown trout (Salmo trutta, L.) in Atlantic populations. *Ecol. Model*. 120, 313–324

Akingbolu, R. (2010). Why 70% of SMEs fail in Nigeria? *This Day Live*, Retrieved May 16, 2015 http://www.thisdaylive.com/articles/why-70-of-smes-fail-in-nigeria%20experts/71911/

Amran, N.A. (2011). The effect of owner's gender and age on firm performance: A review on Malaysian public listed family businesses. *Journal of Global Business and Economics*, 2(1), 104-116.

Anderson, M. Banker, R., Huang, R., & Janakiraman, S. (2007). Cost behavior and fundamental analysis of SG&A costs. *Journal of Accounting, Auditing & Finance*, 22(1), 1-28.

Aneta, P. & Anna, M. (2014). Default prediction for SME using discriminant and survival models, evidence from Polish market, *Quantitative Methods In Economics*, XV(2), 369–381.

Anthony, B. (2005). Small and medium enterprises (SMEs) in Nigeria: problems and prospects, PhD Dissertation, ST. Clements University.

Anthony, E. (2014). The role of SME firm performance in Nigeria, *Arabian Journal of Business and Management Review*, 3(12), 33-47.

Anthony, E. & Harry, E. (2014). SME firms performance in Nigeria: Competitive advantage and its impact, *International Journal of Research Studies in Management*, 3(2), 75 - 86.

Argenti, J. (1976). Corporate planning and corporate collapse, *Long Range Planning*, 9(6), 12–17.

Argenti, J. (1986). Predicting corporate failure. *Accountancy*, 97(112), 157–158.

Arrow, K. (1962). The economic implications of learning by doing. *American Economic Review*, 29, 155-173.

Arslan, Ö. & Karan, M. (2009). Credit Risks and internationalization of SMEs. *Journal of Business Economics and Management*, 10(4), 361-368.

Ashiquzzaman, A., Tushar, K., Islam, M., & Kim, M. (2017). Reduction of overfitting in diabetes prediction using deep learning neural network. arXiv preprint arXiv:1707.08386, 2017.

Ayyagari, M., Demirgüç-Kunt, A. & Maksimovic, V. (2011). Small vs. young firms across the world – Contribution to employment, job creation, and growth, *Policy Research Working Paper 5631* (The World Bank Development Research Group).

Aziz, M. A. and Dar, H. A. (2006). Predicting corporate bankruptcy: Where we stand? *Corporate Governance*, 6(1), 18–33.

Azoff, E. M. (1994). *Neural network time series forecasting of financial markets*, Wiley, Chichester, NY.

Back, B., Sere, K., & Vanharanta, H. (1996). Data mining accounting numbers using self-organizing maps, *Proceedings of STeP'96, Finnish Artificial Intelligence Conference*, Finnish Artificial Intelligence Society, Vaasa, Finland.

Balcaen, S. & Ooghe, H. (2004). 35 years of studies on business failure: An overview of the classical statistical methodologies and their related problems, *Working Paper 2004/248*, Ghent University, Belgium.

Barnes, P. (1987). The analysis and use of financial ratios: A review article. *Journal of Business Finance and Accounting*, 14(4), 449-461.

Barber, B., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, 116(1), 261–292.

Bart, C., & Bontis, N. (2003). Distinguishing between the board and management in company mission: Implications for corporate governance. *Journal of Intellectual Capital*, 4(3), 361–381.

Bauer, J., & Agarwal, V. (2014). Are hazard models superior to traditional bankruptcy prediction approaches? A comprehensive test. *Journal of Banking & Finance*, 40, 432-442.

Baum, C., Schaffer, M., & Stillman, S. (2003). Instrumental variables and GMM: Estimation and testing. *Stata Journal*, 3, 1–31.

Beale, R. & Jackson, T. (1990). *Neural Computing: An Introduction,* Hilger, Bristol

Beaver, W. (1967). Financial ratios as predictor of failure, *Journal of Accounting Research*, 4, 71-111.

Behr, P., & Guttler, A. (2007). Credit risk assessment and relationship lending: an empirical analysis of German small and medium-sized enterprises, *Journal of Small Business Management*, 45(2), 194-213.

Bellovary, J., Giacomino, D. & Akers, M. (2007). A review of bankruptcy prediction studies: 1930-present. *Journal of Financial Education*, 33, 1-42.

Bennett, R., & Smith, C. (2002). Competitive conditions, competitive advantage and the location of SMEs. *Journal of Small Business and Enterprise Development* 9(1), 73-86.

Bhagat, S., & Bolton, B. (2008). Corporate governance and firm performance. *Journal of Corporate Finance*, 14, 257–273.

Bhandari, S., & Weiss, A. (1996). *Corporate Bankruptcy: Economic and Legal Perspectives*, Cambridge University Press,

Bhattacharjee A., Higson C., Holly S., & Kattuman P., (2002). Macro economic instability and business exit: Determinants of failures and acquisitions of large

UK firms. *Working Paper nr. 0206, Cambridge Working Papers in Economics, Department of Applied Economics*, University of Cambridge March 2002.

Biggins, J. V. (1999). Making board diversity work. *Corporate Board*, 20(117), 11–17.

Bilimoria, D., & Wheeler, J. (2000). Women corporate directors: Current research and future directions. In M. J. Davidson and R. J. Burke, (eds.). Women in management. *Current Research Issues*, II, 138 – 163.

Bismark, R. & Pasaribu, F. (2012). Capital structure and corporate failure prediction. *Journal of Economics and Business*, 5(3), 209-220.

Blanco, A., Irimia, A. & Oliver, M. (2007). The prediction of bankruptcy of small firms in the UK using logistic regression. *Análisis Financiero,* 118, 32-40.

Bliss, R., & Potter, M. (2002). Mutual Fund managers: Does gender matter? *Journal of Business and Economic Studies*, 8(1), 1–15.

Blum, M. (1974). Failing company discriminant analysis. *Journal of Accounting Research*, 12(1), 1-25.

Boritz, J., & Kennedy, D. (1995). Predicting corporate failure using a neural network approach. *Intelligent Systems in Accounting, Finance and Management*, 4(2), 95–111.

Börsch-Supan, A., & Köke, J. (2002). An applied econometricians' view of empirical corporate governance studies. *German Economic Review*, 3(3), 295-326.

Bozec, Y., & Laurin, C. (2008). Large shareholder entrenchment and performance: Empirical evidence from Canada. *Journal of Business Finance & Accounting*, 35(1-2), 25–49.

Bumgardner, M., Buehlmann, U., Schuler, A. & Crissey, J. (2011). Competitive actions of small firms in a declining market. *Journal of Small Business Management*, 49 (4), pp. 578-598.

Burke, R. J. (2003). Women on corporate boards of directors: The timing is right. *Women in Management Review*, 18(7), 364-368.

Braunschweig, C. (2003). No business plans, please. *Venture Capital Journal*, 43(8), 24-31.

Brickley, J., & James, C. (1987). The takeover market, corporate board composition, and ownership structure. *Journal of Law and Economics*, 30, 161-168.

Brosse, S., Lek, S., Townsend, C. (2001). Abundance, diversity, and structure of freshwater invertebrates and fish communities: An artificial neural network approach. *New Zealand J. Mar. Fresh. Res*, 35, 135–145.

Byrd, J., & Hickman, K. (1992). Do outside directors monitor managers? Evidence from tender offer bids. *Journal of Financial Economics*, 32, 195-207.

Cadbury, A. (1992). *Report of the committee on the financial aspects of corporate governance*. Gee Publishing, London.

Cadden, D. (1991). Neural networks and mathematics of chaos, *The First International Conference on AI Applications on Wall Street, IEEE Computer Society Press*, New York, NY, 52-7.

Cant, C. & Wiid, A. (2013). Establishing the challenges affecting South African SMEs, *International Business & Economics Research Journal*, 12 (6), 707 – 716.

Campbell, S. & Choudhury, A. (2005). The relationship between interest rates on the number of large and small business failures. *Academy of Accounting and Financial Studies Journal*, 9(3), 29-40.

Cardone-Riportella, C. & Cazorla-Papis, L. (2001). New approaches to the analysis of the capital structure of SMEs: Empirical evidence from Spanish firms, Department de Economia de la Empresa*, Working Paper 01-10*, Business Economics Series 03.

Central Bank of Nigeria (2014). Statistical bulletin 2014. Retrieved May 16, 2015 from http//www.cenbank.org

Certo S., Richard, H., & Dalton, R. (2006). Top management teams, strategy and financial performance: A meta-analytic examination. *Journal of Management studies*, 43, 813-839.

Chaganti, R., Mahajan, V., & Sharma, S. (1985). Corporate board size, composition and corporate failures in retailing industry, *Journal of Management Studies*, 22(4), 400–417.

Chancharat, N. (2011). SMEs failure prediction: Literature review, *ABAC Journal,* 31(3), 70-81.

Charalambous, C., Neophytou, E., & Charitou, A. (2004). Predicting corporate failure: empirical evidence for the UK. *European Accounting Review*, 13(3), 465-497.

Charitou, A., Neophytou, E., & Charalambous, C. (2004). Predicting corporate failure: Empirical evidence for the UK. *European Accounting Review*, Vol. 13, No. 3, 465 – 497.

Chatfield, C. (1995). *Problem Solving: a Statistician's Guide*. Chapman & Hall, London

Chava, S., & Jarrow, R. (2004). Bankruptcy prediction with industry effects. *Review of Finance*, 8 (4), 537-569.

Chen, D., & Ware, D. (1999). A neural network model for forecasting fish stock recruitment. *Can. J. Fish. Aquat. Sci*., 56, 2385–2396.

Chenhall, R. & Moers, F. (2007). The issue of endogeneity within theory-driven, quantitative management accounting research. *European Accounting Review*, 16(1), 173–195.

Chirwa, E. (2008). Effects of gender on the performance of micro and small enterprises in Malawi. *Development Southern Africa*, 25 (3), 347–362.

Chotima, S. (2013). SME manufacturing credit risk model forecast correctness and result of model. *IOSR Journal of Business and Management*, 11(4), 67-74.

Ciampi, F., Vallini, C., & Gordini, N. (2009). Using artificial neural networks analysis for small enterprise default prediction modelling: statistical evidence from Italian Firms. *Oxford Business & Economics Conference Proceedings*. Oxford, 1, 1-26.

Ciampi, F. (2015). Corporate governance characteristics and default prediction modelling for small enterprises. An empirical analysis of Italian firms, *Journal of Business Research*, 68, 1012–1025.

Coada, A., Segarrab, A. & Teruel, M. (2013). Like milk or wine: Does firm performance improve with age? *Structural Change and Economic Dynamics*, 24(C), 173-189.

Coates, P. & Fant, L. (1993). Recognizing financial distress patterns using a neural network tool. *Financial Management*, 142-155.

Coleman, S., & Cohn, R. (1999). Small firm use of leverage: a comparison of man and woman-owned firms, *Conference Proceedings, United States Association of Small Business and Entrepreneurship*, San Diego, January 14-17.

Collens, R. A., & Green, R. D. (1982). Statistical methods for bankruptcy forecasting. *Journal of Economics and Business*, 34(4), 349-354.

Cooper, A., Gimeno-Gascon, F., & Woo, C. (1991). A resource-based prediction of new venture survival and growth. *Academy of Management Proceedings*, 113-119.

Coughlan, A., & Schmidt, R. (1985). Executive compensation, managerial turnover, and firm performance: An empirical investigation. *Journal of Accounting and Economics*, 7, 43-66.

Cornett, M., McNutt, J., & Tehranian, H. (2009). Earnings management at large US bank holding companies. *Journal of Corporate Finance*, 15, 412–30.

Cressy, R (1992). UK small firm bankruptcy prediction: A logit analysis of financial trend, industry, and macro effects, *The Journal of Small Business Finance*, 1(3), 233-253.

Cuba, R., DeCenzo, D., & Anish, A. (1983). Management practices of successful female business owners. *American Journal of Small Business*, 8(5), 40–46.

Cuthbertson, K. & Hudson, J. (1996). The determinants of compulsory liquidations in the UK. *The Manchester School*, 64(3), 298–308.

Cybenko, G. (1989). Approximation by superposition of a sigmoidal function. *Mathematics of Control, Signals and Systems*, 2, 303-314.

Daily, C., & Dalton, D. (1994). Corporate governance and the bankrupt firm: An empirical assessment. *Strategic Management Journal*, 15(8), 643–654.

Dalberg (2011). Report on support to SMEs in developing countries through financial intermediaries. *SME Briefing Paper, EIB Draft Version* (Geneva: European Investment Bank).

Dalton, D., Daily, C., Johnson, J. & Ellstrand A. (1999). Number of directors and financial performance: A meta-analysis, *Academy of Management Journal*, 42, 674–686.

Davis, J., Schoorman, F., & Donaldson, R. (1997). Toward a stewardship theory of management. *Academy of Management Review*, 22(1), 20-47.

Davis, P., Babakus, E., Englis, P., & Pett, T. (2010). The influence of CEO gender on market orientation and performance in service small and medium sized service businesses. *Journal of Small Business Management*, 48(4), 475–496.

Davis, E. (1995). *Debt, financial fragility, and systemic risk*, revised and expanded edition. New York, Oxford University Press.

Davis, E., & Karim, D. (2008a). Comparing early warning systems for banking crises. *Journal of Financial Stability*, 4, 89—120.

Davis, E., & Karim, D. (2008b). Could early warning systems have helped to predict the sub-prime crisis? *National Institute Economic Review*, 206, 35—47.

Darayseh, M., Waples, E., & Tsoukalas, D. (2003). Corporate failure for manufacturing industries using firms specifics and economic environment with logit analysis. *Managerial Finance*, 29(8), 23-37.

Deakin, E. (1972). A discriminant analysis of predictors of business failure, *Journal of Accounting Research*, 10(1), 167-179.

Deakin, S., & Hughes, A. (1997). *Comparative corporate governance: An interdisciplinary agenda*, in Deakin, S. and Hughes, A. (Eds), *Enterprise and*

Community: New Directions in Corporate Governance, Blackwell Publishers, Oxford.

Deng, L., & Wang, J. (2006). Corporate governance and financial distress. Evidence from Chinese listed companies. *The Chinese Economy*, 39(5), 5–27.

Department of Statistics (2013). 2005 – 2013 National accounts small and medium enterprises. *Department of Statistics Malaysia*. Available at https://www.dosm.gov.my/v1/uploads/files/4_Portal%20Content/3_Methods%20%26%20Classifications/1_Metadata/2_Metadata%20-%20Publication%20Level/National%20Account/5_%20Metadata%20National%20Accounts%20SME_22Dis16.pdf

Department of Statistics (2012). Economic census 2011 profile of small and medium enterprise. *Putrajaya, Malaysia: Department of Statistics Malaysia*. Available at https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=T2pLUVNDNFh2UGw5azJvYzRJOWFMZz09

DOSM (2017). Economic Census 2016: Establishment Statistics. Available at https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=431&bul_id=KzRDejQ0d0tXenpsRFFXOEpKaDc4UT09&menu_id=WjJGK0Z5bTk1ZElVT09yUW1tRG41Zz09

Derksen, S. & Keselman, H. (1992). Backward, forward and stepwise automated subset selection algorithms: Frequency of obtaining authentic and noise variables. *British Journal of Mathematical and Statistical Psychology*, 45, 265–282.

Dimitras A., Zanakis S. & Zopudinis C. (1996). A survey of business failures with an emphasis on failure prediction methods and industrial applications. *European Journal of Operational Research*, 90 (3), 487-513.

DiPietro, W., & Sawhney, B. (1977). Business Failures, Managerial Competence, and Macroeconomic Variables, *American Journal of Small Business,* II (2), 4–15.

Dirickx, Y. & Van Landeghem, G. (1994). Statistical faillure previsisn problems, *Tijdschrift voor Economie en Management*, Vol. XXXIX(4), 429 – 462.

Donaldson, G. (1961). Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity, *Boston: Division of Research*, Harvard School of Business Administration.

Donaldson, L., (1985). *In defence of organization theory, A reply to the critics*, Cambridge, Cambridge University Press.

Donaldson, L., & Davis, J. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1), 49–64.

Doumpos, M., & Zopoudinis, C., (1999). A multicriteria discrimination method for the prediction of financial distress: the case of Greece. *Multinational Finance Journal*, 3(2), 71-101.

Douma, S., George, R., & Kabir, R. (2006). Foreign and domestic ownership, business groups, and firm performance: Evidence from a large emerging market, *Strategic Management Journal*, 27(7), 637-657.

Dowell, G., Shackell, M., & Stuart, N. (2011). Boards, CEOs, and surviving a financial crisis: Evidence from the internet shakeout. *Strategic Management Journal*, 32(10), 1025–1045.

Edmister, R. (1972). An empirical test of financial ratio analysis for small business failure prediction, *Journal of Financial and Quantitative Analysis*, 1477-1493.

Eickelpasch, A., Hirte, G., & Stephan, A. (2015). Firm's evaluation of location quality: Evidence from East Germany. *German Institute for Economic Research*, *Discussion Paper*, 58, 1-38.

Eisenbeis, (1977). Pitfalls in the application of discriminant analysis in business. *Journal of Finance*, 32(3), 875-900.

Eisenberg, T., Sundgren, S., & Wells, M. (1998). Larger board size and decreasing firm value in small firms, *Journal of Financial Economics*, 48, 35-54.

Eisenhardt, K. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 57-74.

Eniola, A. (2015). We can double Lagos GDP, says Ambode. The Punch NG. Retrieved 16 March 2015. Available at http://www.latestnigeriannews.com/news/1079836/we-can-double-lagos-gdp-says-ambode.html

Ericson, R., & Pakes, A. (1995). Markov-perfect industry dynamics: A framework for empirical work. *Review of Economic Studies*, 62, 53-82.

Elliot, J. & Kennedy, D. (1988). Estimation and prediction of categorical models in accounting research. *Journal of Accounting Literature*, 13(1), 202-42.

Elloumi, F., & Gueyié, J. (2001). Financial distress and corporate governance: an empirical analysis, Corporate Governance. *The International Journal of Business in Society*, 1(1), 15 – 23.

EU (2014). A recovery on the horizon? Annual report on European SMES 2012/2013.

Everett, J. & Watson, J. (1998). Small business failure and external risk factors. *Small Business Economics*, 1998, 11(4), 371-90.

Faccioa, M., Marchicab, M., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance*, 39, 193–209.

Fairlie, R.W., & Robb, M. (2009). Gender differences in business performance: Evidence from the characteristics of business owners survey. *Small Business Economics*, 33(4), 375–395

Fama, E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy*, 88(2), 288-307

Fama, E., & Jensen, M. (1983). Separation of ownership and control. *The Journal of Law and Economics*, 26(2), 301-325.

Fasci, M., & Valdez, J. (1998). A performance contrast of male- and female owned small accounting practices. *Journal of Small Business Management*, 36(3), 1–7.

Fernandez, E., & Olmeda, I. (1995). Bankruptcy prediction with artificial neural networks. *International Workshop on Artificial Neural Networks, IWANN '95, Malaga-Torremolinos*, Spain, June 7-9, 1995.

Fischer, E., Reuber, A., & Dyke, L. (1993). A theoretical overview and extension of research on sex, gender, and entrepreneurship. *Journal of Business Venturing*, 8, 151-168.

FitzPatrick, P. (1932). A comparison of ratios of successful industrial enterprises with those of failed companies. *The Certified Public Accountant* (October, November, December): 598-605, 656-662, and 727-731, respectively.

Flerackers, P. (1998). Het success van Nieuwe Bedrijven: Slaag- en Faalfactoren van Nieuwe Bedrijven in Nederland, Master thesis, Faculty of Social Sciences, Utrecht.

Florackis, C. (2008). Agency costs and corporate governance mechanisms: evidence for UK firms, *International Journal of Managerial Finance*, 4(1), 37 - 59

Ferreira, S., Grammatikos, T., & Michala, D. (2014). Forecasting distress in European SME portfolios. Available at SSRN: http://ssrn.com/abstract=2266426 or http://dx.doi.org/10.2139/ssrn.2266426

Fidrmuc, J., Hainz, C., & Malesich, A. (2006). Default rates in the loan market for SMEs: Evidence from Slovakia. *William Davidson Institute Working Paper,* Number 854.

Fidrmuc, J. & Hainz, C. (2010). Default rates in the loan market for SMEs: Evidence from Slovakia. *Economic Systems*, 34(2), 479-496.

Fitz, P. (1932). A Comparison of ratios of successful industrial enterprises with those of failed firms, *Certified Public Accountant*, 598-605.

Fletcher, D. & Goss, E. (1993). Forecasting with neural network: an application using bankruptcy data, *Information and Management*, 24(3), 159-67.

Fondas, N., & Sassalos, S. (2000). A different voice in the boardroom: How the presence of women directors affects board influence over management. *Global Focus*, 12(2), 13–22.

Ford, R., & Richardson, W. (1994). Ethical decision making: A review of the empirical literature. *Journal of Business Ethics*, 13(3), 205–221.

Frank, M. & Goyal, V. (2004). Capital structure decision: Which factors are reliably important? *Working Paper,* University of British Columbia.

Fuller-Love, N., Midmore, P., & Thomas, D. (2006). Entrepreneurship and rural economic development: a scenario analysis approach. *International Journal of Entrepreneurial Behaviour & Research*, 12(5), 289-305.

Garcia-Posada, M. & Mora-Sanguinetti, J. (2013). Are there alternatives to bankruptcy? A study of small business distress in Spain. *Banco de Espana Working Paper No*. 1315. Available at SSRN: http://ssrn.com/abstract=2341527

Garson, G.D., (1991). Interpreting neural-network connection weights. *Artif. Intell. Expert,* 6, 47–51.

Gbandi, E. & Amissah, G. (2014). Financing options for small and medium enterprises (SMEs) in Nigeria. *European Scientific Journal*, 10(1), 327 – 340.

Gentry, A., Newbold, P., & Whitford, D. (1985). Classifying bankrupt firms with funds flow components. *Journal of Accounting Research*, 23(1), 146-160.

Gepp, A., & Kumar, K. (2012). Business failure prediction using statistical techniques: A review. *Bond Business School Publications*. Paper 675.

Goodstein, J., Gautam, K., & Boeker, W. (1994). The effects of board size and diversity on strategic change. *Strategic Management Journal*, 15(3), 241–250.Hambrick, D., & D'Aveni, R. (1992). Top team deterioration as part of the downward spiral of large corporate bankruptcies. *Management Science*, 38, 1445-1466.

Gorodnichenko, Y., & Roland, G. (2011). Individualism, innovation, and long-run growth. *PNAS*, 108(4), 21316–21319.

Gujarati, D.N. (2003). *Basic econometrics*. New York: McGraw Hill Book Co.

Gunto, M., & Haji, M. (2013). SMEs development in Malaysia: Lesson for Libya, *Prosiding PERKEM*, 8(3), 1521-1530.

Graen, G. & Scandura, T., (1987). Toward a psychology of dyadic organizing, In B. Slaw, and L.L. Cummings (Eds.). *Research in Organizational Behavior*, 9, 175-208.

Gray, D., Saunders, M., & Goregaokar, H. (2012). Success in challenging times: Key lessons for UK SMEs, *Working Paper,* University of Surrey.

Hair, J., Black, W., Babin, B., & Anderson, R (2010). *Multivariate Data Analysis*, 7/E, Prentice Hall, New York.

Hall, G., & Young, B. (1991). Factors associated with insolvency amongst small firms. *International Small Business Journal*, 9(2), 54–63.

Hambrick, D., Cho, T., & Chen, M. (1996). The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly*, 41, 659-684.

Hambrick, D., & D'Aveni, R. (1992). Top team deterioration as part of the downward spiral of large corporate bankruptcies. *Management Science*, 38(10), 1445–1466.

Hamer, M. (1983). Failure prediction: Sensitivity of classification accuracy to alternative statistical methods and variable sets. *Journal of Accounting and Public Policy*, 2(4), 287-307.

Haniffa, R. & Cooke, T. (2000). Culture, corporate governance and disclosure in Malaysian corporations. *Asian AAA World Conference in Singapore*, 28-30 August 2000.

Hart, O. (1995). Corporate governance: Some theory and implications. *The Economic Journal*, 105(430), 678-98.

Haslam, S., & Ryan, M. (2008). The road to the glass cliff: Differences in the perceived suitability of men and women for leadership positions in succeeding and failing organizations. *The Leadership Quarterly*, 19, 530-546.

Hay, D., Knechel, W., & Wong, N. (2006). Audit fees: A meta-analysis of the effect of supply and demand attributes. *Contemporary Accounting Research*, 23 (1), 141-191.

Headd, B. (2003). Redefining business success: Distinguishing between closure and failure. *Small Business Economics*, 21, 51-61.

Hermalin, E., & Weisbach, S. (2003). Boards of directors as an endogenously determined institution: A survey of the economic literature. *FRBNY Economic Policy Review*, 7 – 26.

Hermalin, B., & Weisbach. M. (1988). The determinants of board composition. *Rand Journal of Economics*, 19(4), 589-606.

Hillman, A., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review,* 28(3), 383–396.

Hirshleifer, J. (1966). Investment decisions under uncertainty: Application of the state-preference approach. *Quarterly Journal of Economics*, 80, 262-27.

Hu, H. & Sathye, M. (2015). Predicting financial distress in the Hong Kong growth enterprises market from the perspective of financial sustainability. *Sustainability,* 7, 1186-1200.

Hudson, J. (1989). The birth and death of firms. *Quarterly Review of Economics and Business*, 29(2), 68–86.

Huse, M., & Solberg, A. (2006). Gender related boardroom dynamics: How Scandinavian women make and can make contributions on corporate boards. *Women in Management Review*, 21(2), 113-130.

Hofstede, G. (1991). Management in a multicultural society. *Malaysian Management Review*, 26(1), 3-12.

Houben, G. (2000). De Eigenheid van het Startproces Vertaald in een Aangepast Ondernemingsplan. Ph.D. dissertation. Limburgs Universitair Centrum

Houben, G., Bakker, W., & Vergauwen, P. (2005). Assessing the non-financial predictors of the success and failure of young firms in the Netherlands. *Journal of Economics and Applied Informatics*, 1, 5-14.

Hornik, K., Stinchcombe, M, & White, H. (1989). Multilayer feedforward networks are universal approximators. *Neural Networks*, 2, 359-366.

Hosmer, W., & Lemeshow, S. (2000). *Applied Logistic Regression*, 2nd Ed. John Wiley & Sons, Inc.

Hsu, C., Kuo, L., & Chang, B. (2013). Gender difference in profit performance– evidence from the owners of small public accounting practices. *Asian Journal of Finance & Accounting,* 5(1), 140–159.

Inmyxai, S., & Takahashi, Y. (2010). Performance contrast and its determinants between male and female headed firms in Lao MSMEs. *International Journal of Business and Management*, 5(4), 37–52.

Ishak, Z., & Napier, C. (2006). Expropriation of minority interests and corporate diversification in Malaysia. *Asian Academy of Management Journal of Accounting and Finance*, 2, 85–113.

Isik, O., & Soykan, M. (2013). Large shareholders and firm performance: Evidence from Turkey. *European Scientific Journal*, 9(25), 23 – 37.

Jabeur, B. (2014). Macroeconomic variables in financial distress: A non-parametric method, *IPAG Working Papers 2014*, 313, 1-12.

Jahur, M., & Quadar, S. (2012). Financial distress in small and medium enterprises (SMEs) of Bangladesh: Determinants and remedial measures. *Economia Series Management*, 15(1), 432-444.

Jamali, D., Safieddine, A., & Daouk, M. (2007). Corporate governance and women: An empirical study of top and middle women managers in Labanese banking sector. *Corporate Governance*, 7(5), 574-585.

Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure, *Journal of financial Economics*, 3, 305 – 360.

Jensen, M. (1993). The modern industrial revolution, exit, and the failure of internal control systems, *Journal of Finance*, 48, 831-880.

Joos, P., Vanhoof, K., Ooghe, H., & Sierens N. (1998). Credit classification: A comparison of logit models and decision trees. Proceedings Notes of the Workshop on Application of Machine Learning and Data Mining in Finance, *10th European Conference on Machine Learning*, April 24, Chemnitz (Germany), 59-72.

Joos, P, Ooghe, H., & Sierens, N. (1998). Methodologie bij het opstellen en beoordelen van kredietclassificatiemodellen. *Tijdschrift voor Economie en Management*, 18(1), 1-48.

Jovanovic, B. (1982). Selection and the evolution of Industry, *Econometrica*, 50, 649–670.

Joy, O., & Tollefson, J. (1975). On the financial applications of discriminant analysis. *Journal of Financial and Quantitative Analysis*, 10(5), 723-739.

Judge, W., & Zeithaml, C. (1992). Institutional and strategic choice perspectives on board involvement in the strategic decision process. *Academy of Management Journal*, 35(4), 766–794.

Kadiri, I. (2012). Small and medium scale enterprises and employment generation in Nigeria: The role of finance. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 1(9), 66–79

Kam A, Citron, D. & Muradoglu, G. (2008). Distress and restructuring in China: Does ownership matter? *China Economic Review*, 19(4), 567-579.

Karels G., & Prakash, A. (1987) Multivariate normality and forecasting of bankruptcy. *Journal of Business Finance & Accounting*, 14(4), 573-593.

Karim, A. & Suhaimi, A. (2013). Factors affecting small and medium enterprises success: An exploratory study. *Jurnal Teknologi (Social Sciences,)* 64(3), 69–72.

Keasey, K., & Watson R. (1987). Non-financial symptoms and the prediction of small company failure: a test of Argenti's hypotheses, *Journal of Business Finance and Accounting*, 14(3), 335-354.

Keasey, K., Thompson, S., & Wright, M. (1997). Introduction: the corporate governance problem: Competing diagnoses and solutions, in Keasey, K., Thompson, S. and Wright, M. (Eds), Corporate Governance: *Economic and Financial Issues, Oxford University Press, Oxford*, 1-17.

Kerling, M., & Poddig, T. (1994). *Klassifikation von Unternehmen mittels KNN*. In: Rehkugler, H. – Zimmermann, H. G. (eds): Neuronale Netze in der Ökonomie. München: Vahlen Verlag: 424–490.

Keynes, J. M. (2008). *The General Theory of Employment, Interest and Money*. Chapter 19: BN Publishing.

Khan, W., & Vieito, J. (2013). CEO gender and firm performance. *Journal of Economics and Business*, 67, 55–66.

Kim, K., Al-Shammari, H., Kim, B., & Lee, S. (2009). CEO duality leadership and corporate diversification behavior. *Journal of Business Research*, 62(11), 1173–1180.

Kim-Soon, N., Mohammed, A. & Agob, F. (2013). A Study of financial distress companies listed in the Malaysian Stock Exchange using financial liquidity ratios and Altman's model. *European Journal of Scientific Research*, 114(4), 513-525.

King, M. (1977). *Public policy and the corporation.* Chapman and Hall Publishers, London, 87-91.

Khorasgani, A. (2011). The optimal model for UK SMEs credit risk considering the industry and corporate governance effects. *International Conference on Business and Management* April 2011, Izmir, Turkey.

Klapper, F. & Love, I. (2004). Corporate governance, investor protection, and performance in emerging markets, *Journal of Corporate Finance*, 10 (5), 703–728.

Kumar, K., & Thakur, G. (2012). Extracting explanation from artificial neural network. *International Journal of Computer Science and Information Technologies*. Vol 3 (2), 3812-3815.

Kumar, K., & Bhattacharya, S. (2006). Artificial neural network vs linear discriminant analysis in credit ratings forecast, *Review of Accounting and Finance*, 5 (3), 216 – 227.

Kraus, A., & Litzenberger, H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, 28(4), 911-922.

Lau, A. (1987). A five-state financial distress prediction model. *Journal of Accounting Research*, 25(1), 127-138.

La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance*, 54, 471–517.

Laitinen, T., & Kankaanpää, M. (1999). Comparative analysis of failure prediction methods: the Finnish case. *The European Accounting Review*, 8(1), 67-92.

Larcker, D. F. and Rusticus, T. O. (2005). On the use of instrumental variables in accounting research, *Working Paper*, University of Pennsylvania. Available at: http://ssrn.com/abstract = 694824.

Lee, P., & O'Neill, H. (2003). Ownership structures and R&D investments of US and Japanese firms: Agency and stewardship perspectives. *Academy of Management Journal*, 46(2), 212-225.

Lee K., Booth, D., & Alam, P. (2005). A comparison of supervised and unsupervised neural networks in predicting bankruptcy of Korean firms. *Expert Systems with Applications*, 29, 1-16.

Lennox, C. (1999). Identifying failing companies: A re-evaluation of the logit, probit, and DA approaches. *Journal of Economics and Business*, 51(4), 347-364.

Lehmann B., (2003). Is it worth the while? The relevance of qualitative information in credit rating. *Working Paper presented at the EFMA 2003 Meetings*, Helsinki, 1-25.

Lehn, K., Sukesh, P. & Zhao, M. (2004). Determinants of the size and structure of corporate boards: 1935-2000, *Working Paper*, Katz Graduate School of Business.

Letendre, L. (2004). The dynamics of the boardroom. *Academy of Management Executive*, 18(1), 101–104.

Leung, D., & Rispoli, L. (2011). The contribution of small and medium-sized businesses to gross domestic product: A Canada–United States comparison, *Economic Analysis (EA) Research Paper Series,* 11F0027M — No. 070, ISSN 1703-0404.

Lichtenstein, B., & Brush, C. (2001). How do "resource bundles" develop and change in new ventures? A dynamic model and longitudinal exploration Entrepreneurship. *Theory and Practice*, 25, 37-58

Liu, J., (2004). Macroeconomic determinants of business failures in the UK. *Applied Economics*, 36(4), 939-935.

Liu, J. (2009). Business failures and macroeconomic factors in the UK. *Bulletin of Economic Research*, 61(1), 47–72.

Lipton, M. & Lorsch, J. W. (1992). A modest proposal for improved corporate governance, *Business Lawyer*, 48(1), 59-77.

Liu, J. & Pang, D. (2009). Financial factors and company investment decisions in transitional China. *Managerial and Decisions Economics*, 30(2), 91-108.

Liu, J. and Wilson, N. (2002). Corporate failures and the impact of the 1986 Insolvency Act. *Managerial Finance*, 28(6), 61-71.

Loscocco, K. A., Robinson, J., Hall, R. H., & Allen, J. K. (1991). Gender and small business success: An inquiry into women's relative disadvantage. *Social Forces*, 70(1), 65-85.

Lugovskaja, L. (2009). Predicting default of Russian SMEs on the basis of financial and non-financial variables. *Journal of Financial Services Marketing*, 14(4), 301-313.

Luppi, B., Marzo, M. & Scorcu, E. (2007). A credit risk model for Italian SMEs, *Working papers / Università di Bologna, Dipartimento Scienze Economiche*, 600.

Lussier, R. (1995). A non-financial business success versus failure prediction model for young firms. *Journal of Small Business Management*, 33(1), 8-20.

Lussier, R., & Pfeifer, S. (2000). Business success and failure comparisons between the US and East Central Europe Croatia. *Entrepreneurship Theory and Practice*, 24(4), 59-67.

Lussier, R., & Halabi, E. (2010). A three-country comparison of the business success versus failure prediction model. *Journal of Small Business Management*, 48(3), 360–377.

Mackinnon, M.J. and Glick, N. (1999). Data mining and knowledge discovery in databases - an overview. *Australian and New Zealand Journal of Statistics*, 41(3), 255-276.

Mačerinskienė, I., & Mendelsonas, T. (2013). Macroeconomic determinants of corporate insolvency. *KSI Transactions on Knowledge Society*, 6(3), 35-40

Majumdar, K. (1997). The impact of size and age on firm-level performance: Some evidence from India. *Review of Industrial Organization*, 12, 231–241

Mallette, P., & Fowler, K. (1992). Effects of board composition and stock ownership on the adoption of poison pills. *Academy of Management Journal*, 35(5), 1010–1035.

Mannasoo, K., & Mayes, D. (2009). Explaining bank distress in Eastern European transition economies. *Journal of Banking and Finance*, 33(2), 244-253.

Markwell, Donald (2006). *John Maynard Keynes and International Relations: Economic Paths to War and Peace*. New York: Oxford University Press.

Marouani, A. & Bellier, A. (2014). Detecting early indicators of SMEs failure: survival analysis techniques. Available at SSRN: http://ssrn.com/abstract=2505915

Mayer, F. (1997). *Corporate governance, competition, and performance*, in Deakin, S. and Hughes, A. (Eds), Enterprise and Community: New Directions in Corporate Governance, Blackwell Publishers, Oxford.

Mazzarol, T. (2013). Small business policy for 2013: What should be on the list. *The Conversation*, retrieved 2 June, 2015 from, http://theconversation.com/small-business-policy-for-2013-what-should-be-on-the-list-11902

Mcleay, S., & Omar, A. (2000). The sensitivity of prediction models to the non-normality of bounded and unbounded financial ratios. *British Accounting Review*, 32, 213-230.

McNally, J. & Tophoff, H. (2014). Leveraging effective risk management and internal control. *International Federation of Accountants (IFAC)*, 21-36.

Md-Rus, R., Nisham K., Abdul Latif, R., & Nadakkavil, Z. (2013). Ownership structure and financial distressed. *Journal of Advanced Management Science*, 1(4), 363-267.

Memić, D. (2015). Assessing credit default using logistic regression and multiple discriminant analysis: Empirical evidence from Bosnia and Herzegovina. *Interdisciplinary Description of Complex Systems*, 13(1), 128-153.

Mensah, Y. (1984). An examination of the stationarity of multivariate bankruptcy prediction models: A methodological study. *Journal of Accounting Research*, 22(1), 380-395.

Meyer, D., Balemi, A., & Wearing, C. (2000). Neural nets - their use and abuse for small data sets. *Res.Lett.Math.Sci*, 1, 145–158.

Michael J., & William C. (2013). Small business borrowing and the bifurcated economy: Why quantitative easing has been ineffective for small business. *Business Economics,* 48, 214-223.

Miglani, S., Ahmed, K., & Henry, D. (2015). Voluntary corporate governance structure and financial distress: Evidence from Australia. *Journal of Contemporary Accounting & Economics*, 11, 18–30.

Miguel, E., Shanker, S., & Ernest, S. (2004). Economic Shocks and Civil Conflict: An Instrumental Variables Approach. *Journal of Political Economy*, 112(4), 725–753

Milliken, F., & Martins, L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review*, 21(2), 402.

Millington, K. (1994). The impact of selected economic variables on new business formation and business failures. *The Journal of Small Business Finance,* 3(2), 177–179.

Minai, M., & Lucky, E. (2011). The moderating effect of location on small firm performance: Empirical evidence. *International Journal of Business and Management*, 6(10), 178-192.

Mine, U., & Hakan, A. (2006). Prediction of corporate financial distress in an emerging market: The case of Turkey. *Cross Cultural Management: An International Journal*, 13(4), 277 – 295.

Mirchandani, K. (1998). Protecting the boundary: Teleworker insights on the expansive concept of "work." *Gender & Society*, 12(2), 168-87.

Modigiliani, F., & Miller, M. (1958). The cost of capital, corporate finance and the theory of investment. *American Economic Review*, 48, 261 – 297.

Modigiliani, F. & Miller, M. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review*, 53(3), 433-443.

Mohd Noor, Z. & Mohd Iskandar, T. (2012). Corporate governance and corporate failure: A survival analysis. *Prosiding Perkem*, 7(1), 684 – 695.

Monelos, P., & Rodríguez (2011). DEA as a business failure prediction tool Application to the case of galician SMEs. *Contaduría y Administración,* 59(2), 65-96.

Moscalu, M. (2012). Business failure prediction for Romanian SMEs using multivariate discriminant analysis. *Revista Economica, Journal of economic-financial theory and practice*, 4, 457-466.

Mossman, E., Bell, G., Swartz, L., & Turtle, H. (1998). An empirical comparison of bankruptcy models. *The Financial Review*, 33(2), 35-54.

Mueller, G., & Barker, V. (1997). Upper echelons and board characteristics of turnaround and non-turnaround declining firms. *Journal of Business Research*, 39, 119-134.

Muhammad, S., & Bala, G. (2013). An assessment of the contribution of commercial banks to the growth of small and medium scale enterprises in Nigeria, *International Journal of Research In Social Sciences*, 2(4), 47 – 55.

Murtaza, M., & Shah, J. (2000). A neural network based clustering procedure for bankruptcy prediction. *American Business Review*, 18(2), 80-86.

Myers, S. (1984). The capital structure puzzle, *Journal of Finance*, 39, 575 – 592.

NBS (2010). Survey report on micro, small and medium enterprises (MSMEs) in Nigeria, National Bureau of Statistics, Nigeria. Available at https://nigerianstat.gov.ng/pdfuploads/SMEDAN%202013_Selected%20Tables.pdf

Neophytou E, Charitou A, & Charalambous C. (2001). Predicting corporate failure: empirical evidence for the UK. *Working Paper, University of Southampton, Department of Accounting and Management Science*, 1-29.

Norfian, M. (2013). Prediction of financial distress companies in Malaysia: a comparison between consumer products and industrial products sectors, *2nd International Conference on Management, Economics and Finance* (2nd ICMEF 2013) Proceeding, ISBN: 978-967-5705-12-0, 382-392.

NSDC (2013). Guidelines for New SME Definition, SME Corp. Malaysia, retrieved from http://www.smecorp.gov.my/vn2/node/533

Odom, M. & Sharda, R. (1990). A neural network model for bankruptcy prediction, *Proceedings of the IEEE International Conference on Neural Networks*, San Diego, CA, 1163-8.

Ohlson, J. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research*, 18, 109-131.

Ooghe, H., Joos P., & De Bourdeaudhuij C. (1995). Financial distressed models in Belgium: The results of a decade of empirical research. *International Journal of Accounting*, 30, 245-274.

Ooghe, H., Joos, P., & De Vos, D. (1993). Risico-indicator voor een onderneming aan de hand van falingspredictie-modellen. *Accountancy en Bedrijfskunde Kwartaalschrift*, 18(3), 3-26.

Ooghe, H., Joos, P., De Vos, D., & De Bourdeaudhuij, C. (1994). Towards an improved method of evaluation of financial distress models and presentation of their results. *Working Paper, January 1994, Department of Corporate Finance*, Ghent University, Belgium, 22.

Ortecho, L., & Bengoa, A. (2014). Enhancing the competitiveness of SMEs through the innovative cooperative business model (CBM). *APEC Small and Medium Enterprises*, retrieved from http://publications.apec.org/publication-detail. php?pubid=1520

Oseifuah, K. & Gyekye, B. (2013). Internal control in small and microenterprises in the Vhembe district, Limpopo province, South Africa. *European Scientific Journal*, 9(4), 241-251.

O'Sullivan, Arthur; Sheffrin, Steven M. (2003). *Economics: Principles in Action*. Upper Saddle River: Pearson Prentice Hall.

Ozesmi, S. & Ozesmi, U. (1999). An artificial neural network approach to spatial habitat modelling with interspecific interaction. *Ecol. Model*. 116, 15–31.

Palat, P. (1989). *Understanding ratios – A practicle guide for business, finance and banking*, Kogan Page Ltd., London.

Pandey, M. (2004). Capital structure, profitability and market structure: evidence from Malaysia. *Asia Pacific Journal of Economics and Business*, 8(2), 45.

Parker, G., Peters, F., & Turetsky, H. (2002). Corporate governance and corporate failure: A survival analysis. *Corporate Governance*, 2, 4-12.

Park, S. (2005). A comparative study of logit and artificial neural networks in predicting bankruptcy in the hospitality industry. Unpublished Masters Thesis, Oklahoma State University.

Partington, G., Russell, P., Stevenson M., & Torbey, V. (2001). Predicting return outcomes for the shareholders of companies entering chapter 11 bankruptcy. *Managerial Finance*, 27(5), 143-168.

Patuwo, E., Hu, Y., & Hung, S. (1993). Two-group classification using neural networks. *Decision Sciences*, 24(4), 825–845

Pederzoli, C. & Torricelli, C. (2010). A parsimonious default prediction model for Italian SMEs, *Banks and Bank Systems*, 5(4), 5-9.

Peni, E. (2014). CEO and chairperson characteristics and firm performance. *Journal of Management and Governance*, 18(1), 185–205.

Penrose, E. (1959). *The theory of the growth of the firm*. New York, John Wiley

Pervan, I., & Kuvek, T. (2013). The relative importance of financial ratios and nonfinancial variables in predicting of insolvency. *Croatian Operational Research Review*, 13(4), 187-197.

Peterson, R., Kozmetsky, G., & Ridgway, N. (1983). Perceived causes of small business failures: A research note. *American Journal of Small Business,* VIII (1), 15–19.

Pfeffer, J., & Salancik, G. (1978). *The external control of organizations: A resource dependence perspective*. New York, Harper & Row.

Phelps, N., Fallon, R. & Williams, C. (2001). Small firms, borrowed size and the urban-rural shift. *Regional Studies*, 35(7), 613-624.

Pindado J, & Rodrigues L. (2005). Determinants of financial distress costs. *Financial Markets and Portfolio Management*, 19(4), 343–359.

Platt, H., & Platt, M. (1990). A note on the use of industry-relative ratios in bankruptcy prediction. *Journal of Banking and Finance*, 15(6), 1183-1194.

Plattner, D. (2002). Why firms go bankrupt. The influence of key financial figures and other factors on the insolvency probability of small and medium sized enterprises. *KfW Research*, 28, 37–51.

Pofeldt, E. (2016). Cities leading the way in loans to American entrepreneurs. CNBC. Available at https://www.cnbc.com/2016/08/18/these-25-cities-are-best-for-small-business-loan-approvals.html

Pregibon, D. (1980). Goodness of link tests for generalized linear models. *Appl. Statist.*, 29, 15-24.

Press, J., & Wilson, S. (1978). Choosing between logistic regression and discriminant analysis. *Journal of the American Statistical Association*, 73(364), 699-705

PwC, (2013). 2013 Ghana banking survey harnessing the SME potential, PricewaterhouseCoopers, 2013. Available at https://www.pwc.com/gh/en/assets/pdf/2016-banking-survey-report.pdf

Raheja, C. (2005). Determinants of board size and composition: A theory of corporate boards. *Journal of Financial and Quantitative Analysis*, 40, 283–306.

Rajan, G. & Zingales, L. (1995). Do we know about capital structure? Some evidence from international data. *The Journal of Finance*, 50, 1421-60.

Reynolds, P. (1987). New firms: Societal contribution versus survival potential. *Journal of Business Venturing*, 2(3), 231-246.

Richardson, F., & Davidson L. (1984). On linear discrimination with accounting ratios. *Journal of Business Finance and Accounting*, 11(4), 511-525.

Roberson, M. & Park, H. (2007). Examining the link between diversity and firm performance: The effects of diversity reputation and leader racial diversity. *Group & Organization Management*, 32, 548-568.

Robb, A. (2008). An investigation of new firm performance by owner race, ethnicity, and gender. Available at http://sbaer.uca.edu/research/sbi/2008/chalo3f.html

Robb, A., & Watson, J. (2010). Comparing the performance of female- and male controlled SMEs: Evidence from the United States and Australia. *Frontiers of Entrepreneurship Research*, 30(8), 1–12.

Robichek, A. & Myers, S. (1965). *Optimal Financing Decisions*, Englewood Cliffs, N.J., PrenticeHall.

Roe, M. (2004). The Institutions of Corporate Governance. *Harvard Law School John M. Olin Center for Law, Economics and Business Discussion Paper Series*, 488, 1-28.

Rommer, D. (2005). A comparative analysis of the determinants of financial distress in French, Italian and Spanish firms. *Danmarks National Bank Working Papers* 2005, 26, 1-80.

Roulston, M. S. (2007). Performance targets and the Brier score. Meteorological Applications, 14(2), 185-194.

Ryan, K., Haslam, S., & Postmes, T. (2007). Reactions to the glass cliff: Gender differences in the explanations for the precariousness of women's leadership positions. *Journal of Organizational Change Management*, 20(2), 182-197,

Ryan, K., Haslam, S., Hersby, D., & Bongiorno, R. (2011). Think crisis-think female: the glass cliff and contextual variation in the think manager-think male stereotype. *Journal of Applied Psychology*, 96(3), 470–84.

Sajter, D. (2008). Economic aspects of bankruptcy and restructuring in bankruptcy, Doctoral dissertation, Faculty of Economics, University of J. J. Strossmayer in Osijek.

Salchenberger, M., Cinar, E., & Lash, A. (1992). Neural networks: A new tool for predicting thrift failures. *Decision Sciences*, 23(4), 899–916.

Salman, A., Fuchs, M., & Zampatti, D. (2015). Assessing risk factors of business failure in the manufacturing sector: A count data approach from Sweden. *International Journal of Economics, Commerce and Management*, 3(9), 42-62.

Šarlija, N. (2002). Credit risk models in assessing the creditworthiness of small businesses. Ph.D. Thesis. In Croatian. University of Zagreb, Zagreb.

Sarlija, N., & Jeger, M. (2011). Comparing financial distress prediction models before and during recession. *Croatian Operational Research Review (CRORR)*, 2, 133-142.

Schultz, E., Tan, D., & Walsh, D., (2015). Corporate governance and the probability of default. *Accounting and Finance,* 57 (Suppl.), 235–253

Schwartz, E., & van Tassel, R. (1950). Some suggestsed changes in the corporate tax structure. *The Journal of Finance*, 5(4), 410-20.

Securities Commission Malaysia, (2017). Malaysian code on corporate governance (MCCG, 2017). *Securities Commission Malaysia*, Online. Retrieved 30 October, 2017 from https://www.sc.com.my/wp-content/uploads/eng/html/cg/mccg2017.pdf

Service (2016). States & Regions. Available at http://services.gov.ng/states

Shane, S. (1996). Hybrid organizational arrangements and their implications for company growth and survival: A study of new franchisors. *Academy of Management Journal,* 39(1), 216–234.

Shin, K., & Lee, Y. (2002). A genetic algorithm application in bankruptcy prediction modelling. *Experts Systems with Applications*, 23(3), 321-328.

Shleifer, A., & Vishny, R. (1997). A survey of corporate governance. *Journal of Finance*, 52, 737–783.

Shoorvarzy, R., Tuzandehjani, M., & Garkaz, M. (2012). The effect mitigating creditors-shareholder conflicts over dividend policy accounting conservatism: evidence from Iran. *World Applied Sciences Journal*, 17(2), 211-217.

Shumway, T. (2001). Forecasting bankruptcy more accurately: A simple hazard model. *The Journal of Business,* 74 (1), 101-124.

Simona, S. (2008). Estimating the negative impact of business failure on Lithuania, *Social Research*, 4 (14), 113 – 120.

Singhathep, T. & Pholphirul, P. (2015). Female CEOs, Firm Performance, and Firm Development: Evidence from Thai Manufacturers. *Gender, Technology and Development*, 19(3) 320–345.

Siow, H., Singh, G. & Anwar, S. (2011). A success versus failure prediction model for small businesses in Singapore. *American Journal of Business*, 26(1), 50 – 64.

Sirirattanaphonkun, S., & Pattarathammas, M. (2012). Default prediction for small-medium enterprises in emerging market: Evidence from Thailand. *Seoul Journal of Business,* 18(2), 25-54.

SME Corp. (2017). Budget 2017 comment SME Corp Malaysia. Online. Retrieved 30 October, 2017 from http://www.smecorp.gov.my/index.php/en/resources /2015 -12-21-10-55- 22/news/1793-budget-2017-comment-sme-corp-malaysia

SMECorps, (2013), Annual Report 2012/2013, SMECorp Malaysia.

SMECorps, (2014), Annual Report 2013/2014, SMECorp Malaysia.

SMEDAN (2003) National Policy on Micro, Small and Medium Scale Enterprises. Retrieved 2 June, 2015 from http://www.smedan.gov.ng/search.Php?searwords /National%20policy%20on%20%msmes

Soderbom, M. (2009). Applied Econometrics. Lecture 2: Instrumental Variables, 2SLS and GMM. Available http://www.soderbom.net/lec2n_final.pdf

Steele, A., (1995). Going concern qualifications and bankruptcy prediction. *European Accounting Association*, February 1995, 1-28.

Stinchcombe, A. (1965). *Social structure and organizations*, in March, J. (Ed), Handbook of Organizations, Rand McNally, Chicago, IL, 142-193.

Stiglitz, J. E. (2000). Capital market liberalization, economic growth, and instability. *World Development*, 28(6), 1075-1086.

Stiglitz, J., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 74, 194-199

Stinchcombe, A. (1965). *Social structure and organizations*. In March, J. G., editor, Handbook of Organizations, pages 142-193. Rand McNally, Chicago.

Stock, J., & Yogo, M. (2005). Testing for weak instruments in linear IV regression, in identification and inference for econometric models: Essays in Honor of Thomas Rothenberg, Chap. 5, 80–108.

Su, Y., Xu, D., & Phan, H. (2008). Principal–Principal Conflict in the Governance of the Chinese Public Corporation. *Management and Organization Review*, 4(1), 17–38.

Sulaiman, M. (2001). Predicting corporate failure in Malaysia: An application of logit model to financial ratios. *Asian Academy of Management Journals*, 6(1), 99-118.

Sullivian, T., Warren, E., & Westbrook, J. (1998). Financial difficulties of small businesses and reasons for their failure, *University of Texas at Austin.*

Storey, D., Keasey, K., Watson, R., & Wynarczyk, P. (1987). *Performance of small firms: Profits, jobs and failure*. London: Croom Helm.

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. & Tisshaw, H. (1977). Going, going, gone - Four factors which predict. *Accountancy*, 88, 50-54.

Tam, K., & Kiang, Y. (1992). Management applications of neural networks: The case of bank failure predictions. *Management Sci.,* 38(7), 926-947.

Tam, K. (1991). Neural network models and the prediction of bank bankruptcy. *Omega: The International Journal of Management Science*, 19(5), 429 – 445.

Tanthanongsakkun, S., Pitt, D., & Treepongkaruna, S. (2007). A comparison of corporate bankruptcy models in Australia: The Merton vs accounting-based models. *Working Paper*, ANU School of Finance and Applied Statistics.

Teti, E., Dell'Acqua A., & Brambilla, M. (2012). Bankruptcy predictors during the financial crisis. A study of Italian SME's, *World Finance Conference 2012*.

Theodossiou, P. (1991). Alternative models for assessing the financial condition of business in Greece. *Journal of Business and Accounting*, 18(5), 697-720.

Thornhill, S., & Amit, R. (2003). Learning about failure: Bankruptcy, firm age, and the resource-based view. *Organization Science*, 14(5), 497-509.

Titman, S. & Wessels, R. (1988). The determinants of capital structure, *Journal of Finance*, 43, 1-19.

Tucker, J. (1996). Neural networks versus logistic regression in financial modelling: a methodological comparison. *Paper published in Proceedings of the 1996 World First Online Workshop on Soft Computing (WSC1)*, Nagoya University, Japan, 19-30.

Triandis, H. (1993). Collectivism and individualism a cultural syndromes. *Cross Cultural Research,* 27, 150-180.

Tzeng, F. (2005). Opening the black box — Data driven visualization of neural networks. *IEEE Visualization*, (x), 383–390.

Vallejo, M. (2009). The effects of commitment of non-family employees of family firms from the perspective of stewardship theory. *Journal of business ethics*, 87(3), 379-390.

Vandergrift, D., & Brown, P. (2005). Gender differences in the use of high-variance strategies in tournament competition. *Journal of Socio-Economics*, 34(6), 834–849.

Villalonga, B. & Amit, R. (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics*, 80(2), 385-417.

Vlieghe, W. (2001). Indicators of fragility in the UK corporate sector. *Bank of England Working Paper No. 146*. Retrieved from SSRN: http://ssrn.com/abstract =293186

Wadhwani, S. (1986). Inflation, bankruptcy, default premia and the stock market. *The Economic Journal*, 96, 120–138.

Watson, J. (2002). Comparing the performance of male- and female-controlled businesses: Relating outputs to inputs. *Entrepreneurship Theory and Practice*, 26(3), 91–100.

Watson, W., Kumar, K. & Michaelson, L. (1993). Cultural diversity's impact on interaction and performance: Comparing homogeneous and diverse task groups. *Academy of Management Journal*, 36(3), 590-602.

Wei, X. (2007). Wage compensation for job-related illness: Evidence from a matched employer and employee survey in the UK. *Journal of Risk and Uncertainty*, 34(1), 85–99

Weisbach, M. (1988). Outside directors and CEO turnover. *Journal of Financial Economics*, 20(1,2), 431–460.

Westhead, P., Ucbasaran, D., Binks, M., (2004). Internationalization strategies selected by established rural and urban SMEs. *Journal of Small Business and Enterprise Development*, 11(1), 8-22.

Whited, T. (1992). Debt, liquidity constraints and corporate investment evidence from panel data. *Journal of Finance*, 47, 1425-60.

Wilson, R. L. & Sharda, R. (1994). Bankruptcy prediction using neural networks. *Decision Support Systems,* 11, 545-557.

Wiklund, J., Baker, T., & Shepherd, D. (2010). The age-effect of financial indicators as buffers against the liability of newness. *Journal of Business Venturing*, 25, 423–437.

Wiwattanakantang, Y. (2001). Controlling Shareholders and Corporate Value: Evidence from Thailand. *Pacific-Basin Finance Journal*, 9(4), 323–362.

Williamson, O. (1985). *The economic institutions of capitalism: Firms, markets, relational contracting*. New York, Free Press.

World Bank. (2016). Small is the new big – Malaysian SMEs help energize, drive economy. Available at http://www.worldbank.org/en/news/feature/2016/07/05/small-is-the-new-big---malaysian-smes-help-energize-drive-economy

Wooldridge, J. (2002). *Econometric analysis of cross section and panel data*, Cambridge, MA, MIT Press

Xie, B., Davidson, W., & DaDalt, P. (2003). Earnings management and corporate governance: the role of the board and the audit committee. *Journal of Corporate Finance*, 9(3), 295-316.

Yegnanarayana, B. (1999). *Artificial neural networks*. New Delhi, Prentice-Hall

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics*, 40(2), 185-212.

Young, G. (1995). Company liquidations, interest rates and debt. *Manchester School of Economic and Social Studies*, 63(0), 57-69.

Zahra, S. A., Hayton, J. C., Neubaum, D. O., Dibrell, C., & Craig, J. (2008). Culture of family commitment and strategic flexibility: The moderating effect of stewardship. *Entrepreneurship Theory and Practice*, 32(6), 1035-1054.

Zavgren C. (1983). The prediction of corporate failure: The state of the art, *Journal of Accounting Literature*, 2, 1-38.

Zavgren, C. (1985). Assessing the vulnerability to failure of American industrial firms: A logistic analysis. *Journal of Business Finance and Accounting*, 12(1), 19-45.

Zeitun, R. & Tian, G. (2007). Capital structure and corporate performance: Evidence from Jordan. *Australasian Accounting, Business and Finance Journal*, 1(4), 40-61.

Zhang, J., Chung, T., & Oldenburg, K. (1999). A simple statistical parameter for use in evaluation and validation of high throughput screening assays. *Journal of Biomol Screen*, 4(2), 67-73.

Zmijewski, M. (1984). Methodological issues related to the estimation of financial distress prediction models. *Journal of Accounting Research*, 22, 59-86.

Zoppa, A., & McMahon, G. (2002). Pecking order theory and the financial structure of manufacturing SMEs from Australia's business longitudinal survey. *Small Enterprise Research*, 10(2), 23-41.

Zulkarnian, M., Ali, M., Md. Nasir, A., & Mohamad, Z. (2001). Forecasting corporate failure in Malaysian industrial sector firms. *Asian Academy of Management Journals*, 6(1), 15-30.

Zulkarnian, M. (2006). Prediction of corporate financial distress: evidence from Malaysian listed firms during the Asian financial crisis. *Staff Paper 2/2006*, University Putra Malaysia.

APPENDICES

APPENDIX 1: Logistic Regression for Malaysian Sample

APPENDIX 1a: Model 1 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	550.442[a]	.429	.572

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.901	8	.940

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	269	64	80.8
		Failed	65	268	80.5
	Overall Percentage				80.6

a. The cut value is .500

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	242	91	72.7
		Failed	43	290	87.1
	Overall Percentage				79.9

a. The cut value is .400

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	EBIT	.361	.311	1.352	1	.245	1.435
	ROE	-1.063	.321	10.991	1	.001	.345
	TLA	1.591	.243	43.031	1	.000	4.907

	LTA	.057	.279	.041	1	.839	1.058
	CTA	-.328	.189	3.007	1	.083	.720
	CLE	.104	.076	1.859	1	.173	1.109
	LQT	-.076	.044	2.895	1	.089	.927
	WCT	.021	.007	9.891	1	.002	1.021
	NWC	.085	.002	3.332	1	.068	1.085
	AST	-.029	.065	.196	1	.658	.972
	EXP	-.020	.030	.444	1	.505	.980
	LogTA	.072	.059	1.503	1	.220	1.075
	LogCAP	.077	.035	4.985	1	.026	1.080
	AGE	-.170	.015	123.126	1	.000	.843
	BLC	-.454	.229	3.918	1	.048	.635
	Constant	2.645	1.104	5.745	1	.017	14.090

a. Variable(s) entered on step 1: EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.

```
Logistic regression                                   Number of obs   =        666
                                                      LR chi2(2)      =     374.77
                                                      Prob > chi2     =     0.0000
Log likelihood = -274.25018                           Pseudo R2       =     0.4059

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |    1.016471   .0831364    12.23   0.000     .8535266    1.179415
      _hatsq |   -.0486231   .0268604    -1.81   0.110    -.1012686    .0040224
       _cons |    .083769   .1159705     0.72   0.470    -.1435289     .311067
------------------------------------------------------------------------------

brier status var27

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.6832
ROC area                      0.8915  p = 0.0000

Brier score                   0.1333
Spiegelhalter's z-statistic  -0.1250  p = 0.5498
Sanders-modified Brier score  0.1341
Sanders resolution            0.1336
Outcome index variance        0.2500
Murphy resolution             0.1164
Reliability-in-the-small      0.0005
Forecast variance             0.1158
Excess forecast variance      0.0618
Minimum forecast variance     0.0541
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.2325
```

APPENDIX 1b: Model 2 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	739.306[a]	.228	.305

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.691	8	.464

Classification Table[a]

	Observed		Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	236	91	72.2
		Failed	91	238	72.3
	Overall Percentage				72.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.155	.207	31.172	1	.000	3.175
	MDD	.966	.231	17.435	1	.000	2.627
	NDIR	-.609	.113	28.952	1	.000	.544
	IND	.401	.257	2.424	1	.119	1.493
	CONT	.843	.197	18.349	1	.000	2.324
	CINA	.407	.266	2.336	1	.126	1.503
	INDIAN	1.263	.409	9.551	1	.002	3.538
	MELAYU	.855	.313	7.471	1	.006	2.352
	CPI	-.079	.121	.428	1	.513	.924
	GDP	.041	.035	1.335	1	.248	1.041
	BLR	2.206	1.897	1.352	1	.245	9.075
	EMPY	2.615	1.378	3.600	1	.058	13.662
	Constant	-.398	.454	.766	1	.381	.672

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY.

```
linktest

Iteration 0:   log likelihood = -455.39694
Iteration 1:   log likelihood = -366.61158
Iteration 2:   log likelihood = -365.66665
Iteration 3:   log likelihood = -365.66383
Iteration 4:   log likelihood = -365.66383

Logistic regression                                     Number of obs   =        657
                                                        LR chi2(2)      =     179.47
                                                        Prob > chi2     =     0.0000
Log likelihood = -365.66383                             Pseudo R2       =     0.1970

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   .9988134   .0888126    11.25   0.000     .8247438    1.172883
      _hatsq |  -.0066124   .0695887    -0.10   0.924    -.1430038     .129779
       _cons |   .0070042   .1163959     0.06   0.952    -.2211275    .2351359
------------------------------------------------------------------------------

brier status var28

Mean probability of outcome   0.5015
                of forecast  0.5015
```

```
Correlation                    0.4945
ROC area                       0.7834  p = 0.0000

Brier score                    0.1889
Spiegelhalter's z-statistic   -0.2701  p = 0.6065
Sanders-modified Brier score   0.1888
Sanders resolution             0.1869
Outcome index variance         0.2500
Murphy resolution              0.0631
Reliability-in-the-small       0.0019
Forecast variance              0.0592
Excess forecast variance       0.0447
Minimum forecast variance      0.0145
Reliability-in-the-large       0.0000
2*Forecast-Outcome-Covar       0.1203
```

APPENDIX 1c: Model 3 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	467.129[a]	.490	.654

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.493	8	.254

Classification Table[a]

	Observed		Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	276	51	84.4
		Failed	52	277	84.2
	Overall Percentage				84.3

a. The cut value is .500

Model | Estimates | Plot | Statistics | Code | Log | Output | Notes |

Fit Statistic	Label	Training	Validation	Test
AIC	Akaike's Information Criterion	438.32103811	.	.
ASE	Average Squared Error	0.1082335505	0.1249985712	.
AVERR	Average Error Function	0.3473930939	0.4098121876	.
DFE	Degrees of Freedom for Error	499	.	.
DFM	Model Degrees of Freedom	34	.	.
DFT	Total Degrees of Freedom	533	.	.
DIV	Divisor for ASE	1066	266	.
ERR	Error Function	370.32103811	109.0100419	.
FPE	Final Prediction Error	0.1229828119	.	.
MAX	Maximum Absolute Error	0.9738751426	0.98640392	.
MSE	Mean Square Error	0.1156081812	0.1249985712	.
NOBS	Sum of Frequencies	533	133	.
_NW_	Number of Estimate Weights	34	.	.
RASE	Root Average Sum of Squares	0.3289886784	0.35355137	.
RFPE	Root Final Prediction Error	0.350689053	.	.
RMSE	Root Mean Squared Error	0.3400120309	0.35355137	.
SBC	Schwarz's Bayesian Criterion	583.79076653	.	.
SSE	Sum of Squared Errors	115.37696483	33.24961994	.
SUMW	Sum of Case Weights Times Freq	1066	266	.
MISC	Misclassification Rate	0.1519699812	0.1729323308	.
PROF	Total Profit for STATUS	268	65	.
APROF	Average Profit for STATUS	0.5028142589	0.4887218045	.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.142	.274	17.393	1	.000	3.134
	MDD	.702	.311	5.094	1	.024	2.018
	NDIR	-.482	.141	11.725	1	.001	.618
	IND	.827	.370	4.989	1	.026	2.287
	CONT	.456	.265	2.965	1	.085	1.578
	CINA	1.200	.387	9.635	1	.002	3.320
	INDIAN	2.058	.563	13.359	1	.000	7.828
	MELAYU	1.367	.437	9.782	1	.002	3.925
	CPI	-.123	.156	.625	1	.429	.884
	GDP	.010	.046	.047	1	.828	1.010
	BLR	3.106	2.503	1.540	1	.215	22.341
	EMPY	2.790	1.927	2.096	1	.148	16.273
	EBIT	.397	.385	1.065	1	.302	1.487
	ROE	-1.151	.376	9.349	1	.002	.316
	TLA	1.435	.244	34.699	1	.000	4.200
	LTA	.308	.296	1.077	1	.299	1.360
	CTA	-.232	.195	1.414	1	.234	.793
	CLE	.113	.088	1.660	1	.198	1.120
	LQT	-.083	.047	3.153	1	.076	.920
	WCT	.018	.007	7.259	1	.007	1.018
	NWC	.000	.000	1.391	1	.238	1.000
	AST	-.013	.072	.034	1	.853	.987
	EXP	-.033	.030	1.144	1	.285	.968
	LogTA	.115	.066	3.001	1	.169	1.122
	LogCAP	.054	.040	1.890	1	.083	1.056
	AGE	-.168	.017	93.626	1	.000	.846
	BLC	-.546	.263	4.305	1	.038	.579
	Constant	1.311	1.354	.937	1	.333	3.711

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY, EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.

```
linktest

Iteration 0:   log likelihood = -455.39694
Iteration 1:   log likelihood = -236.13964
Iteration 2:   log likelihood = -232.27156
```

```
Iteration 3:   log likelihood = -232.01051
Iteration 4:   log likelihood = -232.00823
Iteration 5:   log likelihood = -232.00823

Logistic regression                                     Number of obs   =        657
                                                        LR chi2(2)      =     446.78
                                                        Prob > chi2     =     0.0000
Log likelihood = -232.00823                             Pseudo R2       =     0.4905

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.006421   .0789202    12.75   0.000     .8517402    1.161102
      _hatsq |  -.0239055   .0351267    -0.68   0.496    -.0927526    .0449415
       _cons |   .0542201   .1414131     0.38   0.701    -.2229446    .3313848
------------------------------------------------------------------------------

brier status var29

Mean probability of outcome   0.5015
                of forecast   0.5015

Correlation                   0.7483
ROC area                      0.9215  p = 0.0000

Brier score                   0.1100
Spiegelhalter's z-statistic  -0.3571  p = 0.6395
Sanders-modified Brier score  0.1103
Sanders resolution            0.1075
Outcome index variance        0.2500
Murphy resolution             0.1425
Reliability-in-the-small      0.0029
Forecast variance             0.1374
Excess forecast variance      0.0605
Minimum forecast variance     0.0769
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.2774
```

ROC Curve 3 year sub-sample models

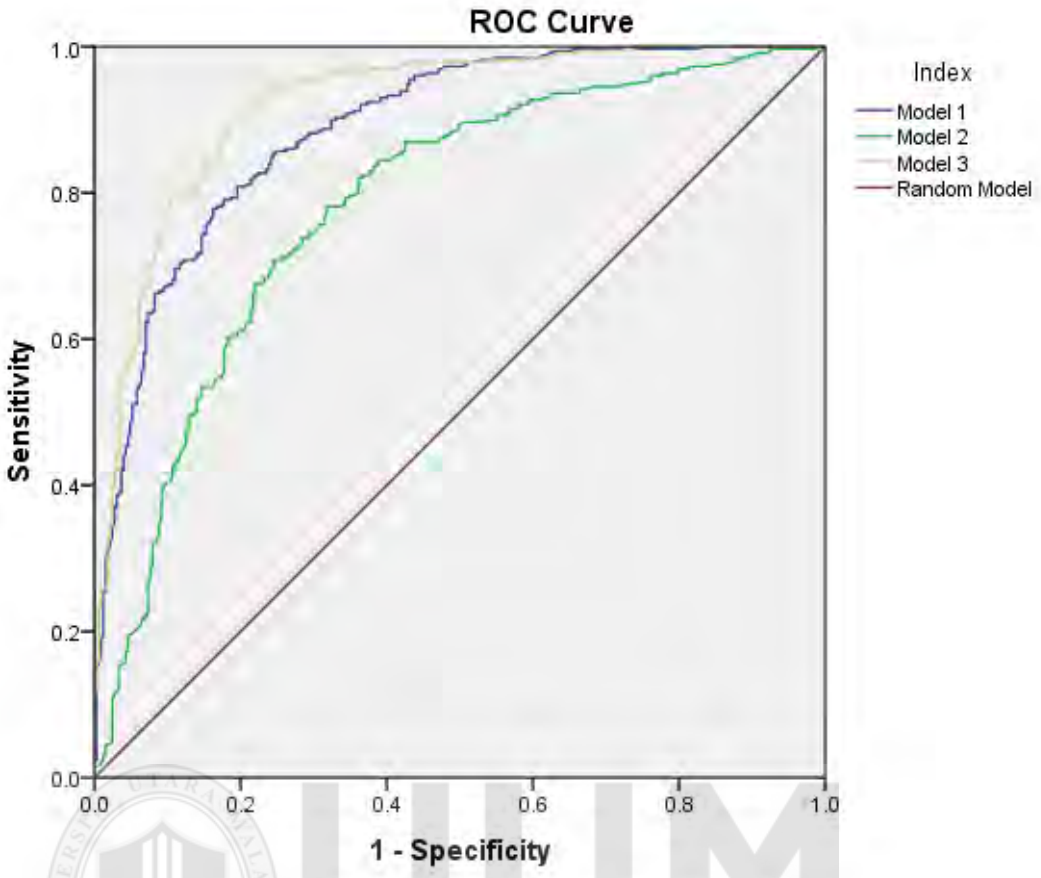
Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.888	.012	.000	.864	.913
Model 2	.783	.018	.000	.748	.819
Model 3	.921	.011	.000	.901	.942

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5



APPENDIX 1d: Model 1 (2-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	223.111[a]	.598	.797

a. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	19.403	8	.013

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-failed	Failed	
Step 1	STATUS	Non-failed	214	21	91.1
		Failed	26	209	88.9
	Overall Percentage				90.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	EBIT	-6.407	1.212	27.969	1	.000	.002
	ROE	-.345	.165	4.381	1	.036	.708
	TLA	3.912	.599	42.623	1	.000	50.010
	LTA	-1.857	1.118	2.760	1	.097	.156
	CTA	.590	.270	4.788	1	.029	1.805
	CLE	.077	.061	1.630	1	.202	1.081
	LQT	-.593	.398	2.220	1	.136	.553
	WCT	.620	.407	2.325	1	.127	1.859
	NWC	.024	.011	5.822	1	.016	1.000
	AST	-.032	.102	.099	1	.754	.969
	EXP	-.002	.019	.009	1	.925	.998
	LogTA	.076	.110	.487	1	.485	1.079
	LogCAP	.125	.055	5.121	1	.024	1.134
	AGE	-.159	.024	43.294	1	.000	.853
	BLC	-.401	.379	1.119	1	.290	.670
	Constant	-3.026	1.692	3.198	1	.074	.049

a. Variable(s) entered on step 1: EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.


```
linktest

Iteration 0:   log likelihood = -325.77917
Iteration 1:   log likelihood = -129.03169
Iteration 2:   log likelihood = -120.41721
Iteration 3:   log likelihood = -110.37363
Iteration 4:   log likelihood = -109.98733
Iteration 5:   log likelihood = -109.98643
Iteration 6:   log likelihood = -109.98642

Logistic regression                               Number of obs   =        470
                                                  LR chi2(2)      =     431.59
                                                  Prob > chi2     =     0.0000
Log likelihood = -109.98642                       Pseudo R2       =     0.6624

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.017407    .108106     9.41   0.000     .8055234    1.229291
      _hatsq |  -.0213964   .0037266    -5.74   0.081    -.0287005   -.0140923
       _cons |    .056562   .1711062     0.33   0.741       -.2788    .3919241
------------------------------------------------------------------------------

brier status var27

Mean probability of outcome   0.5000
                of forecast  0.5000
```

```
Correlation                    0.8482
ROC area                       0.9675  p = 0.0000

Brier score                    0.0701
Spiegelhalter's z-statistic   -0.6123  p = 0.7298
Sanders-modified Brier score   0.0723
Sanders resolution             0.0719
Outcome index variance         0.2500
Murphy resolution              0.1781
Reliability-in-the-small       0.0004
Forecast variance              0.1757
Excess forecast variance       0.0493
Minimum forecast variance      0.1264
Reliability-in-the-large       0.0000
2*Forecast-Outcome-Covar       0.3555
```

APPENDIX 1e: Model 2 (2-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	491.568[a]	.289	.385

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	19.120	8	.014

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-failed	Failed	
Step 1	STATUS	Non-failed	170	65	72.3
		Failed	41	194	82.6
	Overall Percentage				77.4

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.258	.257	23.899	1	.000	3.518
	MDD	.615	.309	3.978	1	.046	1.850
	NDIR	-1.097	.158	48.523	1	.000	.334
	IND	.361	.308	1.376	1	.241	1.435
	CONT	.948	.244	15.061	1	.000	2.581
	CINA	.584	.358	2.662	1	.103	1.794
	INDIAN	1.673	.526	10.121	1	.001	5.329
	MELAYU	1.151	.415	7.680	1	.006	3.161
	CPI	.019	.142	.018	1	.893	1.019

	GDP	.055	.042	1.690	1	.194	1.056
	BLR	2.278	2.661	.733	1	.392	9.760
	EMPY	-2.087	1.987	1.103	1	.294	.124
	Constant	.544	.599	.824	1	.364	1.722

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY.

```
linktest

Iteration 0:   log likelihood = -325.77917
Iteration 1:   log likelihood = -244.54564
Iteration 2:   log likelihood = -244.39823
Iteration 3:   log likelihood = -244.39657
Iteration 4:   log likelihood = -244.39657

Logistic regression                                     Number of obs   =        470
                                                        LR chi2(2)      =     162.77
                                                        Prob > chi2     =     0.0000
Log likelihood = -244.39657                             Pseudo R2       =     0.2498

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.040994   .1025262    10.15   0.000     .8400462    1.241942
      _hatsq |   .0817878    .036761     2.22   0.126     .0097376     .153838
       _cons |  -.1069528   .1222062    -0.88   0.381    -.3464725     .132567
------------------------------------------------------------------------------

brier status var28

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.5675
ROC area                      0.8270  p = 0.0000

Brier score                   0.1696
Spiegelhalter's z-statistic  -0.5695  p = 0.7155
Sanders-modified Brier score  0.1711
Sanders resolution            0.1659
Outcome index variance        0.2500
Murphy resolution             0.0841
Reliability-in-the-small      0.0052
Forecast variance             0.0755
Excess forecast variance      0.0512
Minimum forecast variance     0.0243
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.1559
```


APPENDIX 1f: Model 3 (2-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	154.985[a]	.652	.870

a. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	88.360	8	.000

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-failed	Failed	
Step 1	STATUS	Non-failed	221	14	94.0
		Failed	17	218	92.8
	Overall Percentage				93.4

a. The cut value is .500

Model | Estimates | Plot | Statistics | Code | Log | Output | Notes

Fit Statistic	Label	Training	Validation	Test
AIC	Akaike's Information Criterion	191.76525252	.	.
ASE	Average Squared Error	0.04343353	0.0592007858	.
AVERR	Average Error Function	0.1619218783	0.2022459027	.
DFE	Degrees of Freedom for Error	341	.	.
DFM	Model Degrees of Freedom	35	.	.
DFT	Total Degrees of Freedom	376	.	.
DIV	Divisor for ASE	752	188	.
ERR	Error Function	121.76525252	38.022229704	.
FPE	Final Prediction Error	0.0523495039	.	.
MAX	Maximum Absolute Error	0.9998954887	0.9813912625	.
MSE	Mean Square Error	0.0478915169	0.0592007858	.
NOBS	Sum of Frequencies	376	94	.
_NW_	Number of Estimate Weights	35	.	.
RASE	Root Average Sum of Squares	0.2084071256	0.2433121161	.
RFPE	Root Final Prediction Error	0.2288001396	.	.
RMSE	Root Mean Squared Error	0.2188413054	0.2433121161	.
SBC	Schwarz's Bayesian Criterion	329.30087254	.	.
SSE	Sum of Squared Errors	32.662014551	11.129747736	.
SUMW	Sum of Case Weights Times Freq	752	188	.
MISC	Misclassification Rate	0.0585106383	0.0744680851	.
PROF	Total Profit for STATUS	189	46	.
APROF	Average Profit for STATUS	0.5026595745	0.4893617021	.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.241	.528	5.518	1	.019	3.460
	MDD	1.415	.618	5.243	1	.022	4.116
	NDIR	-1.575	.337	21.791	1	.000	.207
	IND	.876	.684	1.640	1	.200	2.402
	CONT	.977	.496	3.878	1	.049	2.656
	CINA	-.509	.720	.500	1	.479	.601
	INDIAN	-.060	1.014	.004	1	.953	.942
	MELAYU	-.111	.850	.017	1	.897	.895
	CPI	.117	.290	.162	1	.687	1.124
	GDP	-.012	.088	.017	1	.895	.988
	BLR	2.187	5.011	.190	1	.663	8.907
	EMPY	-4.257	4.044	1.108	1	.292	.014
	EBIT	-6.770	1.561	18.819	1	.000	.001
	ROE	-.268	.228	1.386	1	.239	.765
	TLA	4.534	.780	33.762	1	.000	93.091
	LTA	-3.399	1.484	5.247	1	.022	.033
	CTA	.618	.334	3.424	1	.064	1.856
	CLE	.100	.080	1.571	1	.210	1.106

	LQT	-.983	.537	3.355	1	.067	.374
	WCT	1.058	.545	3.771	1	.052	2.880
	NWC	.580	.320	2.975	1	.085	1.000
	AST	.003	.025	.019	1	.890	1.003
	EXP	.012	.021	.309	1	.578	1.012
	LogTA	.133	.125	1.124	1	.289	1.142
	LogCAP	.116	.063	3.355	1	.067	1.123
	AGE	-.168	.032	28.239	1	.000	.845
	BLC	-.747	.496	2.274	1	.132	.474
	Constant	-1.023	2.369	.186	1	.666	.359

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY, EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.

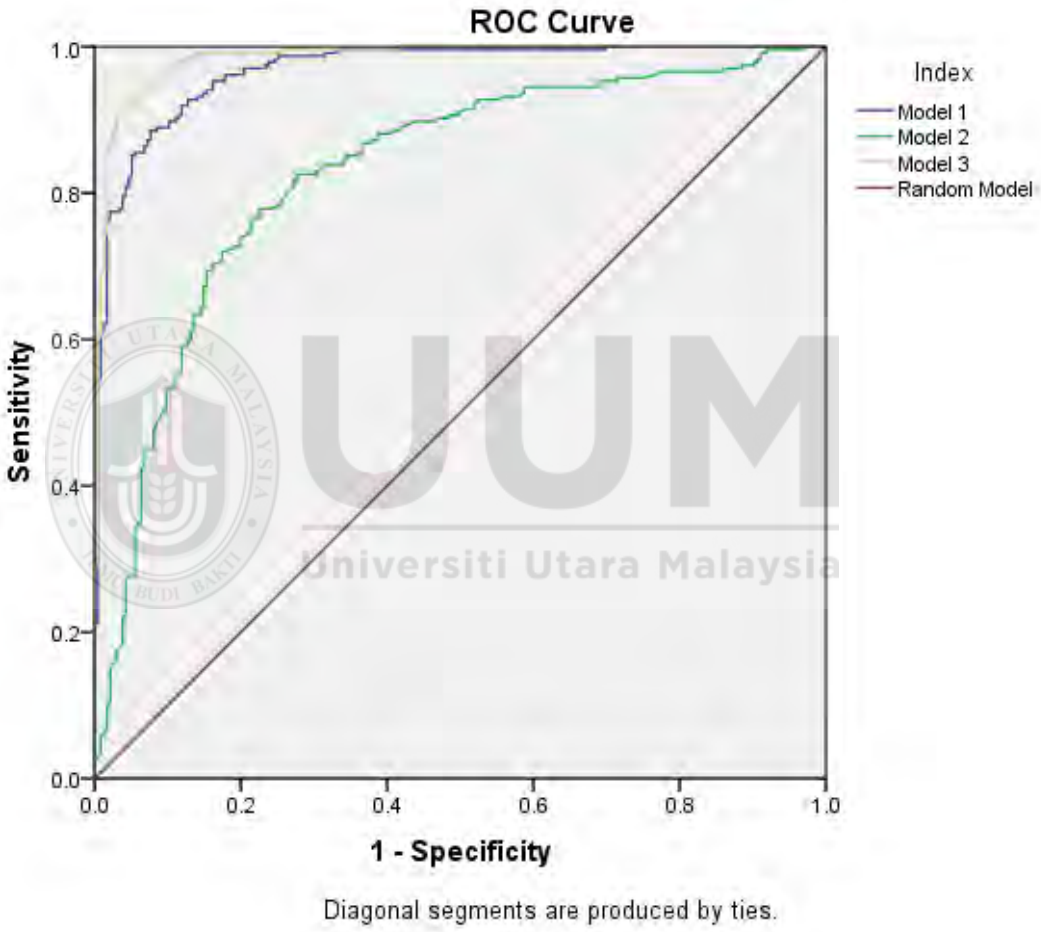
```
linktest

Iteration 0:   log likelihood = -325.77917
Iteration 1:   log likelihood = -76.387427
Iteration 2:   log likelihood =  -75.92187
Iteration 3:   log likelihood = -75.894544
Iteration 4:   log likelihood = -75.894017
Iteration 5:   log likelihood = -75.894016

Logistic regression                                     Number of obs   =        470
                                                        LR chi2(2)      =     499.77
                                                        Prob > chi2     =     0.0000
Log likelihood = -75.894016                             Pseudo R2       =     0.7670

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |      1.0234   .1163551     8.80   0.000      .7953481    1.251452
      _hatsq |   -.0189316   .0032175    -5.88   0.121     -.0252378   -.0126254
       _cons |      .066105   .2098488     0.32   0.753      -.345191    .4774011
------------------------------------------------------------------------------

brier status var29

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.9050
ROC area                      0.9841  p = 0.0000

Brier score                   0.0453
Spiegelhalter's z-statistic  -0.7383  p = 0.7698
Sanders-modified Brier score  0.0507
Sanders resolution            0.0502
Outcome index variance        0.2500
Murphy resolution             0.1998
Reliability-in-the-small      0.0005
Forecast variance             0.2002
Excess forecast variance      0.0362
Minimum forecast variance     0.1640
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.4049
```

ROC Curve 2 year sub-sample models

Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.968	.007	.000	.954	.981
Model 2	.827	.019	.000	.789	.865
Model 3	.984	.005	.000	.975	.993

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.
a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5



APPENDIX 1g: Model 1 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	244.011[a]	.553	.737

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.443	8	.598

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	183	27	87.1
		Failed	19	191	91.0
	Overall Percentage				89.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	EBIT	-.257	.422	.370	1	.543	.774
	ROE	-.432	.107	16.209	1	.000	.649
	TLA	1.200	.350	11.739	1	.001	3.321
	LTA	-.172	.620	.077	1	.781	.842
	CTA	-.068	.425	.026	1	.873	.934
	CLE	.284	.114	6.242	1	.012	1.328
	LQT	-.864	.239	13.062	1	.000	.421
	WCT	.756	.239	10.030	1	.002	2.131
	NWC	.000	.000	1.013	1	.314	1.000
	AST	-2.404	.372	41.651	1	.000	.090
	EXP	-.701	.359	3.820	1	.051	.496
	LogTA	.140	.099	1.984	1	.159	1.150
	LogCAP	-.034	.071	.223	1	.637	.967
	AGE	-.124	.019	44.777	1	.000	.883
	BLC	-.712	.377	3.576	1	.059	.490
	Constant	3.991	1.330	8.998	1	.003	54.105

a. Variable(s) entered on step 1: EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.

```
linktest

Iteration 0:   log likelihood = -291.12182
Iteration 1:   log likelihood = -123.35153
Iteration 2:   log likelihood = -122.06682
Iteration 3:   log likelihood = -121.92007
Iteration 4:   log likelihood = -121.89403
Iteration 5:   log likelihood = -121.89386
Iteration 6:   log likelihood = -121.89386

Logistic regression                               Number of obs   =        420
                                                  LR chi2(2)      =     338.46
                                                  Prob > chi2     =     0.0000
Log likelihood = -121.89386                       Pseudo R2       =     0.5813

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.002409    .101132     9.91   0.000     .8041943    1.200625
      _hatsq |   .0185495   .0381774     0.49   0.627    -.0562767    .0933758
```

```
       _cons |  -.0496087   .1943761    -0.26   0.799    -.4305789    .3313616
------------------------------------------------------------------------------

brier status var27


Mean probability of outcome   0.5000
                 of forecast  0.5000

Correlation                   0.8048
ROC area                      0.9479  p = 0.0000

Brier score                   0.0881
Spiegelhalter's z-statistic  -0.2876  p = 0.6132
Sanders-modified Brier score  0.0874
Sanders resolution            0.0863
Outcome index variance        0.2500
Murphy resolution             0.1637
Reliability-in-the-small      0.0011
Forecast variance             0.1595
Excess forecast variance      0.0562
Minimum forecast variance     0.1033
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.3215
```

APPENDIX 1h: Model 2 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	418.674[a]	.321	.428

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.217	8	.250

Classification Table[a]

	Observed		Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	162	48	77.1
		Failed	48	161	77.0
	Overall Percentage				77.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.207	.285	17.902	1	.000	3.344
	MDD	1.429	.310	21.189	1	.000	4.175
	NDIR	-.893	.166	28.983	1	.000	.409
	IND	.529	.337	2.458	1	.117	1.697
	CONT	.856	.259	10.892	1	.001	2.354
	CINA	.659	.410	2.582	1	.108	1.933
	INDIAN	1.527	.576	7.022	1	.008	4.603
	MELAYU	1.398	.467	8.954	1	.003	4.047
	CPI	.296	.170	3.034	1	.082	1.345
	GDP	.125	.057	4.786	1	.029	1.133
	BLR	2.995	2.706	1.225	1	.268	19.985
	EMPY	4.065	1.333	9.298	1	.002	58.268
	Constant	-.156	.661	.056	1	.813	.855

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY.

```
linktest

Iteration 0:   log likelihood = -290.42748
Iteration 1:   log likelihood = -209.94448
Iteration 2:   log likelihood = -209.34503
Iteration 3:   log likelihood = -209.32896
Iteration 4:   log likelihood = -209.32896

Logistic regression                               Number of obs   =        419
                                                  LR chi2(2)      =     162.20
                                                  Prob > chi2     =     0.0000
Log likelihood = -209.32896                       Pseudo R2       =     0.2792

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |    1.000267   .1012978     9.87   0.000     .8017267    1.198807
      _hatsq |    .0076864   .0608362     0.13   0.899    -.1115504    .1269231
       _cons |   -.0108247   .1476234    -0.07   0.942    -.3001612    .2785118
------------------------------------------------------------------------------

brier status var28

Mean probability of outcome   0.4988
                of forecast   0.4988

Correlation                   0.5935
ROC area                      0.8397  p = 0.0000

Brier score                   0.1620
Spiegelhalter's z-statistic  -0.3587  p = 0.6401
Sanders-modified Brier score  0.1629
Sanders resolution            0.1596
Outcome index variance        0.2500
Murphy resolution             0.0904
Reliability-in-the-small      0.0032
Forecast variance             0.0847
Excess forecast variance      0.0549
Minimum forecast variance     0.0298
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.1727
```

APPENDIX 1i: Model 3 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	174.905[a]	.620	.827

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	11.691	8	.132

Classification Table[a]

			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed	
Step 1	STATUS	Non-Failed	191	19	91.0
		Failed	17	192	91.9
	Overall Percentage				91.4

a. The cut value is .500

Model | Estimates | Plot | Statistics | Code | Log | Output | Notes

Fit Statistic	Label	Training	Validation	Test
AIC	Akaike's Information Criterion	187.40235566	.	.
ASE	Average Squared Error	0.0497072516	0.1169838215	.
AVERR	Average Error Function	0.1806582674	0.5148348786	.
DFE	Degrees of Freedom for Error	303	.	.
DFM	Model Degrees of Freedom	33	.	.
DFT	Total Degrees of Freedom	336	.	.
DIV	Divisor for ASE	672	168	.
ERR	Error Function	121.40235566	86.492259601	.
FPE	Final Prediction Error	0.0605345738	.	.
MAX	Maximum Absolute Error	0.998097095	0.9999918695	.
MSE	Mean Square Error	0.0551209127	0.1169838215	.
NOBS	Sum of Frequencies	336	84	.
_NW_	Number of Estimate Weights	33	.	.
RASE	Root Average Sum of Squares	0.2229512315	0.3420289775	.
RFPE	Root Final Prediction Error	0.2460377486	.	.
RMSE	Root Mean Squared Error	0.2347784332	0.3420289775	.
SBC	Schwarz's Bayesian Criterion	313.36702394	.	.
SSE	Sum of Squared Errors	33.40327309	19.653282008	.
SUMW	Sum of Case Weights Times Freq	672	168	.
MISC	Misclassification Rate	0.0654761905	0.1666666667	.
PROF	Total Profit for STATUS	166	44	.
APROF	Average Profit for STATUS	0.494047619	0.5238095238	.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	1.112	.464	5.745	1	.017	3.040
	MDD	2.044	.558	13.437	1	.000	7.725
	NDIR	-.578	.222	6.769	1	.009	.561
	IND	.133	.619	.046	1	.830	1.142
	CONT	.862	.443	3.784	1	.052	2.368
	CINA	1.098	.726	2.289	1	.130	2.999
	INDIAN	2.765	1.025	7.276	1	.007	15.873
	MELAYU	2.421	.858	7.957	1	.005	11.259
	CPI	.349	.292	1.434	1	.231	1.418
	GDP	.145	.090	2.617	1	.106	1.156
	BLR	-4.834	4.729	1.045	1	.307	.008
	EMPY	-.115	2.230	.003	1	.959	.891
	EBIT	-.354	.458	.597	1	.440	.702
	ROE	-.505	.131	14.850	1	.000	.604
	TLA	1.095	.425	6.649	1	.010	2.988
	LTA	-.417	.779	.286	1	.592	.659
	CTA	.580	.619	.878	1	.349	1.785
	CLE	.265	.141	3.510	1	.061	1.303
	LQT	-1.087	.271	16.080	1	.000	.337
	WCT	.940	.265	12.596	1	.000	2.561
	NWC	.106	.410	2.769	1	.096	1.000
	AST	-2.615	.472	30.669	1	.000	.073
	EXP	-.846	.511	2.742	1	.098	.429
	LogTA	.135	.122	1.227	1	.268	1.144
	LogCAP	.031	.097	.101	1	.750	1.031
	AGE	-.131	.025	28.423	1	.000	.877
	BLC	-1.039	.495	4.401	1	.036	.354
	Constant	1.914	1.963	.951	1	.329	6.783

a. Variable(s) entered on step 1: GENDER, MDD, NDIR, IND, CONT, CINA, INDIAN, MELAYU, CPI, GDP, BLR, EMPY, EBIT, ROE, TLA, LTA, CTA, CLE, LQT, WCT, NWC, AST, EXP, LogTA, LogCAP, AGE, BLC.

```
linktest

Iteration 0:   log likelihood = -290.42748
Iteration 1:   log likelihood = -88.918037
Iteration 2:   log likelihood = -87.904237
Iteration 3:   log likelihood = -87.408675
Iteration 4:   log likelihood = -87.370513
Iteration 5:   log likelihood = -87.370426
Iteration 6:   log likelihood = -87.370426

Logistic regression                               Number of obs   =        419
                                                  LR chi2(2)      =     406.11
                                                  Prob > chi2     =     0.0000
Log likelihood = -87.370426                       Pseudo R2       =     0.6992

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _hat |    1.00981   .1153383     8.76   0.000     .7837507    1.235869
     _hatsq |  -.0157248   .0389211    -0.40   0.686    -.0920088    .0605592
      _cons |   .0470808   .2264335     0.21   0.835    -.3967207    .4908823
------------------------------------------------------------------------------

brier status var29

Mean probability of outcome   0.4988
                of forecast   0.4988

Correlation                   0.8714
```

```
ROC area                        0.9733  p = 0.0000

Brier score                     0.0602
Spiegelhalter's z-statistic    -0.5069  p = 0.6939
Sanders-modified Brier score    0.0629
Sanders resolution              0.0619
Outcome index variance          0.2500
Murphy resolution               0.1881
Reliability-in-the-small        0.0010
Forecast variance               0.1862
Excess forecast variance        0.0448
Minimum forecast variance       0.1414
Reliability-in-the-large        0.0000
2*Forecast-Outcome-Covar        0.3760
```

ROC Curve 1 year sub-sample models

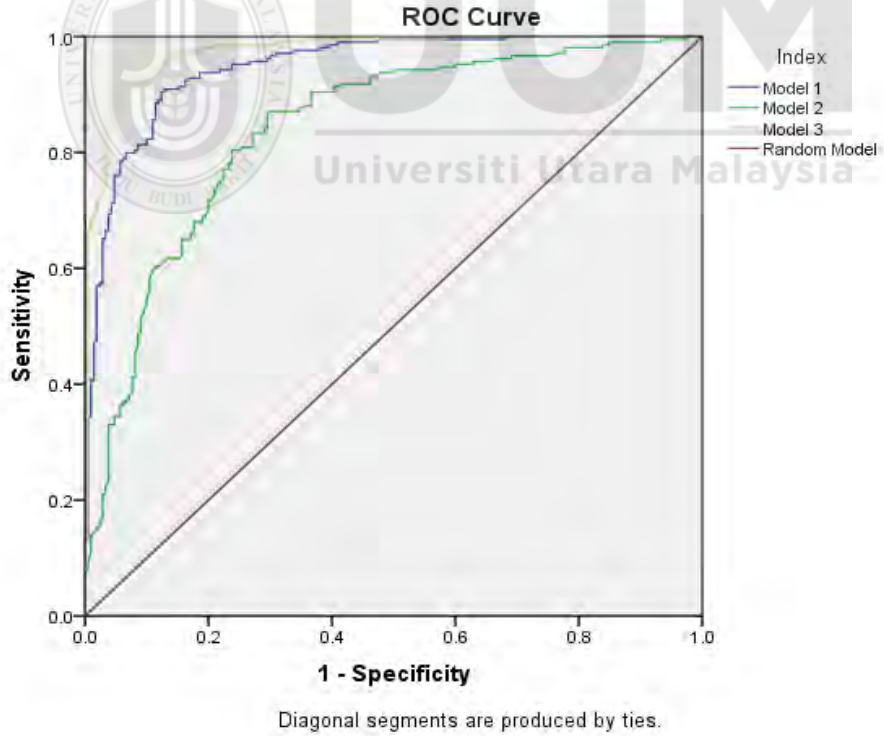
Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.948	.010	.000	.928	.968
Model 2	.840	.020	.000	.801	.878
Model 3	.973	.007	.000	.960	.987

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5



APPENDIX 2a: 3-year Prior to bankruptcy sample endogeneity test

Model 2

NDIR

```
First-stage regressions
-----------------------

reg ndir gender mdd ind cont e1 e3 e4 cpi gdp blr empy l_ind_ndir

      Source |       SS       df       MS              Number of obs =     657
-------------+------------------------------           F( 12,   644) =    4.70
       Model |  45.4966414    12  3.79138678           Prob > F      =  0.0000
    Residual |  519.611426   644   .80685004           R-squared     =  0.0805
-------------+------------------------------           Adj R-squared =  0.0634
       Total |  565.108067   656  .861445224           Root MSE      =  .89825

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.3183718   .0789679    -4.03   0.000    -.4734375   -.1633061
         mdd |  -.1591371   .0909928    -1.75   0.081    -.3378156    .0195414
         ind |   .2900705   .1027506     2.82   0.005     .0883039    .4918371
        cont |   .0081399    .079135     0.10   0.918     -.147254    .1635338
          e1 |   -.289323   .1110966    -2.60   0.009    -.5074783   -.0711677
          e3 |  -.0619091   .1647978    -0.38   0.707    -.3855151    .2616969
          e4 |  -.0752404   .1279666    -0.59   0.557    -.3265227    .1760419
         cpi |  -.0183934   .0470557    -0.39   0.696    -.1107945    .0740076
         gdp |   -.011658   .0138528    -0.84   0.400    -.0388601    .0155442
         blr |   .6909678   .7398639     0.93   0.351    -.7618693    2.143805
        empy |  -.1780719   .5153023    -0.35   0.730    -1.189948    .8338039
  l_ind_ndir |   .0497341   .0286848     1.73   0.083     -.006593    .1060612
       _cons |   2.831024    .169401    16.71   0.000     2.498379    3.163669
------------------------------------------------------------------------------

. predict ndirH
(option xb assumed; fitted values)
(9 missing values generated)

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  .055955  (p = 0.8130)
  Wu-Hausman F(1,643)             =  .054767  (p = 0.8150)


 Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .140325  (p = 0.7080)
  Basmann chi2(1)        =  .137364  (p = 0.7109)
```

MDD

```
First-stage regressions
-----------------------

. reg mdd gender ndir ind cont e1 e3 e4 cpi gdp blr empy l_dirown

      Source |       SS       df       MS              Number of obs =     657
-------------+------------------------------           F( 12,   644) =   13.05
       Model |  23.5783098    12  1.96485915           Prob > F      =  0.0000
    Residual |  96.9422382   644  .150531426           R-squared     =  0.1956
-------------+------------------------------           Adj R-squared =  0.1806
       Total |  120.520548   656  .183720347           Root MSE      =  .38798

------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
      gender |   .0828058   .0343565     2.41   0.016     .0153416      .15027
        ndir |  -.0284473   .0169462    -1.68   0.094    -.0617237    .0048291
         ind |  -.3326505   .0427448    -7.78   0.000    -.4165866   -.2487145
        cont |   .2617919    .032469     8.06   0.000      .198034    .3255498
          e1 |   .1862554   .0477674     3.90   0.000     .0924566    .2800541
          e3 |   .0466491   .0711427     0.66   0.512    -.0930505    .1863488
          e4 |   .2039544   .0547257     3.73   0.000     .0964921    .3114167
         cpi |   .0090256   .0203374     0.44   0.657    -.0309101    .0489613
         gdp |   .0130674   .0059645     2.19   0.029     .0013552    .0247797
         blr |  -.0891349   .3198464    -0.28   0.781    -.7172028    .5389329
       empy  |  -.2650757   .2224095    -1.19   0.234    -.7018111    .1716597
    l_dirown |   .0559787   .0558628     1.00   0.017    -.0537165    .1656739
       _cons |  -.0041954   .0831959    -0.05   0.960    -.1675634    .1591726
------------------------------------------------------------------------------

. predict mddH
(option xb assumed; fitted values)
(9 missing values generated)

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  .125913  (p = 0.7227)
  Wu-Hausman F(1,643)             =  .123254  (p = 0.7256)

  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  1.48513  (p = 0.2230)
  Basmann chi2(1)        =  1.45678  (p = 0.2274)
```

Model 3

NDIR

```
First-stage regressions
-----------------------
```

Instrumental variables (2SLS) regression Number of obs = 657

```
                                                Wald chi2(27) =  537.74
                                                Prob > chi2   =  0.0000
                                                R-squared     =  0.4424
                                                Root MSE      =  .37335

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ndir |   -.160868   .1354521    -1.19   0.235    -.4263493    .1046133
        ebit |   .0466446   .0485141     0.96   0.336    -.0484413    .1417306
         roe |  -.0887897   .0349754    -2.54   0.011    -.1573402   -.0202392
         tla |   .1269728   .0235558     5.39   0.000     .0808043    .1731413
         lta |   .0342624   .0421189     0.81   0.416    -.0482891    .1168138
         cta |  -.0309136   .0258947    -1.19   0.233    -.0816663    .0198392
         cle |   .0168944    .011215     1.51   0.132    -.0050867    .0388754
         lqt |  -.0028995   .0044988    -0.64   0.519    -.0117169    .0059179
         wct |   .0005068   .0011611     0.44   0.663    -.0017689    .0027824
         nwc |  -1.46e-09   2.83e-09    -0.52   0.606    -7.00e-09    4.09e-09
         ast |   -.000488   .0095428    -0.05   0.959    -.0191915    .0182155
         exp |  -.0009173   .0053399    -0.17   0.864    -.0113833    .0095488
       logta |   .0123439    .008771     1.41   0.159    -.0048469    .0295348
      logcap |   .0111465   .0049514     2.25   0.024     .0014419    .0208511
         age |  -.0140345   .0021669    -6.48   0.000    -.0182815   -.0097875
         blc |  -.0425748   .0332567    -1.28   0.200    -.1077568    .0226071
      gender |    .156609   .0521476     3.00   0.003     .0544016    .2588165
         mdd |   .0763106   .0426984     1.79   0.074    -.0073767     .159998
         ind |   .0955238   .0536835     1.78   0.075    -.0096939    .2007416
        cont |   .0893685   .0351633     2.54   0.011     .0204496    .1582873
         cpi |  -.0117918    .019865    -0.59   0.553    -.0507265     .027143
         gdp |   .0043141   .0060419     0.71   0.475    -.0075279    .0161561
         blr |   .5049953   .3173674     1.59   0.112    -.1170333    1.127024
        empy |   .3073889   .2171206     1.42   0.157    -.1181598    .7329375
          e1 |  -.0477121   .0526516    -0.91   0.365    -.1509074    .0554832
```

```
          e2 |  -.2475615    .053905    -4.59   0.000    -.3532134   -.1419096
          e3 |   .0901995   .0656428     1.37   0.169     -.038458     .218857
       _cons |   .8625341   .3593447     2.40   0.016     .1582315    1.566837
------------------------------------------------------------------------------
Instrumented:  ndir
Instruments:   ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age
               blc gender mdd ind cont cpi gdp blr empy e1 e2 e3 l_ind_ndir
               l_tngasset

. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .509884  (p = 0.4752)
  Wu-Hausman F(1,628)             =  .487756  (p = 0.4852)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .039963  (p = 0.8416)
  Basmann chi2(1)        =  .038201  (p = 0.8450)
```

MDD

```
First-stage regressions
-----------------------

Instrumental variables (2SLS) regression              Number of obs =     657
                                                      Wald chi2(27) =  487.17
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.3737
                                                      Root MSE      =   .3957
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -.3245251    .698302    -0.46   0.642    -1.693172    1.044122
        ebit |   .0700524   .0661006     1.06   0.289    -.0595023    .1996072
         roe |  -.1271836   .0764011    -1.66   0.096     -.276927    .0225598
         tla |   .1563216   .0439972     3.55   0.000     .0700888    .2425545
         lta |    .043295   .0404204     1.07   0.284    -.0359275    .1225174
         cta |   -.052167   .045197    -1.15   0.248    -.1407516    .0364176
         cle |   .0123297   .0098602     1.25   0.211    -.0069959    .0316554
         lqt |   -.003412   .0053136    -0.64   0.521    -.0138265    .0070026
         wct |   .0000868   .0016698     0.05   0.959     -.003186    .0033596
         nwc |  -1.86e-09   2.79e-09    -0.67   0.505    -7.34e-09    3.61e-09
         ast |  -.0041021   .0108417    -0.38   0.705    -.0253515    .0171472
         exp |  -.0051393   .0085543    -0.60   0.548    -.0219054    .0116268
       logta |   .0112014    .009039     1.24   0.215    -.0065146    .0289175
      logcap |    .013377   .0070625     1.89   0.058    -.0004651    .0272192
         age |  -.0156771    .001463   -10.72   0.000    -.0185445   -.0128098
         blc |  -.0783448    .059256    -1.32   0.186    -.1944844    .0377949
      gender |   .2138105    .062193     3.44   0.001     .0919144    .3357065
        ndir |  -.0771101   .0245281    -3.14   0.002    -.1251842   -.0290359
         ind |  -.0666609   .2425222    -0.27   0.783    -.5419957    .4086739
        cont |    .180771   .1697951     1.06   0.287    -.1520212    .5135632
         cpi |  -.0067974   .0214234    -0.32   0.751    -.0487864    .0351916
         gdp |   .0102887    .010249     1.00   0.315    -.0097988    .0303763
         blr |   .4301503   .3313222     1.30   0.194    -.2192294     1.07953
        empy |   .2234104   .2814882     0.79   0.427    -.3282964    .7751172
          e1 |  -.0285335   .0428507    -0.67   0.505    -.1125194    .0554523
          e2 |  -.3331586   .1533184    -2.17   0.030    -.6336571   -.0326601
          e3 |   .0275959   .1186818     0.23   0.816    -.2050161    .2602078
       _cons |   .7948477   .3133716     2.54   0.011     .1806507    1.409045
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age
               blc gender ndir ind cont cpi gdp blr empy e1 e2 e3 l_dirown
               l_tngasset
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  .413483  (p = 0.5202)
  Wu-Hausman F(1,628)             =  .395481  (p = 0.5297)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .405881  (p = 0.5241)
```

```
  Basmann chi2(1)        =  .388205  (p = 0.5332)
```

IND

```
First-stage regressions
-----------------------
                                                Number of obs   =        657
                                                F(  28,    628) =       7.61
                                                Prob > F        =     0.0000
                                                R-squared       =     0.2533
                                                Adj R-squared   =     0.2200
                                                Root MSE        =     0.3362
------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ebit |  -.0026062   .0437502    -0.06   0.953    -.0885206    .0833083
         roe |  -.0384971   .0314626    -1.22   0.222    -.1002817    .0232874
         tla |   .0158607   .0192287     0.82   0.410    -.0218997    .0536211
         lta |   .0314216   .0338779     0.93   0.354    -.0351061    .0979493
         cta |  -.0221761   .0233317    -0.95   0.342    -.0679937    .0236415
         cle |  -.0035337   .0083753    -0.42   0.673    -.0199806    .0129133
         lqt |   .0017103    .003689     0.46   0.643    -.0055341    .0089546
         wct |  -.0016322   .0009696    -1.68   0.093    -.0035364    .0002719
         nwc |  -1.07e-09   2.28e-09    -0.47   0.637    -5.54e-09    3.40e-09
         ast |  -.0064165   .0085112    -0.75   0.451    -.0231304    .0102974
         exp |  -.0046153    .004777    -0.97   0.334    -.0139962    .0047655
       logta |   .0291712   .0075818     3.85   0.000     .0142825    .0440599
      logcap |  -.0032949   .0043888    -0.75   0.453    -.0119133    .0053236
         age |   .0025001   .0011003     2.27   0.023     .0003394    .0046607
         blc |  -.0153561   .0286485    -0.54   0.592    -.0716146    .0409024
      gender |   .0700927    .030829     2.27   0.023     .0095524    .1306331
         mdd |  -.2686871   .0335514    -8.01   0.000    -.3345736   -.2028006
        ndir |   .0313954   .0151824     2.07   0.039     .0015811    .0612098
        cont |   .2250367   .0290343     7.75   0.000     .1680207    .2820528
         cpi |   .0529498   .0176377     3.00   0.003     .0183138    .0875857
         gdp |   .0155901   .0052062     2.99   0.003     .0053665    .0258137
         blr |  -.2896817   .2801697    -1.03   0.302    -.8398645    .2605012
        empy |   .2311989   .1992909     1.16   0.246    -.1601583     .622556
          e1 |  -.0969109   .0355142    -2.73   0.007    -.1666518     -.02717
          e2 |  -.0009026    .048537    -0.02   0.985    -.0962169    .0944118
          e3 |  -.0604715   .0587721    -1.03   0.304    -.1758852    .0549422
  l_ind_ind |  -.0627315   .0739917    -0.85   0.397    -.2080326    .0825697
l_tngasset |   .0521752   .0345788     1.51   0.132    -.0157289    .1200793
       _cons |  -.2281275   .1385373    -1.65   0.100    -.5001798    .0439248
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression              Number of obs =     657
                                                      Wald chi2(27) =  565.82
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.4587
                                                      Root MSE      =  .36787
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |  -.0765755   .6167688    -0.12   0.901     -1.28542    1.132269
        ebit |   .0457692   .0477921     0.96   0.338    -.0479015      .13944
         roe |  -.0936576   .0423698    -2.21   0.027    -.1767009   -.0106142
         tla |   .1364737   .0233722     5.84   0.000      .090665    .1822825
         lta |   .0529559   .0428937     1.23   0.217    -.0311142     .137026
         cta |  -.0339629   .0284135    -1.20   0.232    -.0896524    .0217265
         cle |   .0119626   .0094421     1.27   0.205    -.0065435    .0304687
         lqt |  -.0012808   .0042205    -0.30   0.762    -.0095527    .0069912
         wct |   .0005587    .001471     0.38   0.704    -.0023243    .0034417
         nwc |  -2.58e-09   2.63e-09    -0.98   0.327    -7.74e-09    2.58e-09
         ast |  -.0027243   .0103694    -0.26   0.793    -.0230479    .0175992
         exp |  -.0020284   .0059701    -0.34   0.734    -.0137296    .0096729
       logta |   .0153171   .0199882     0.77   0.443    -.0238591    .0544933
      logcap |   .0100358   .0051911     1.93   0.053    -.0001385    .0202102
         age |  -.0149018   .0019588    -7.61   0.000    -.0187409   -.0110626
         blc |  -.0522503   .0332979    -1.57   0.117     -.117513    .0130124
      gender |   .1947056    .055408     3.51   0.000     .0861078    .3033034
         mdd |   .0481744   .1683397     0.29   0.775    -.2817653    .3781142
        ndir |  -.0621835   .0262963    -2.36   0.018    -.1137233   -.0106437
        cont |    .116373   .1422635     0.82   0.413    -.1624583    .3952042
         cpi |  -.0020888   .0368165    -0.06   0.955    -.0742478    .0700702
         gdp |   .0077872   .0111541     0.70   0.485    -.0140745    .0296489
```

```
         blr |   .4074534   .3653917     1.12   0.265    -.3087013    1.123608
        empy |   .3462222   .2382988     1.45   0.146    -.1208348    .8132792
          e1 |  -.0379354   .0704552    -0.54   0.590     -.176025    .1001542
          e2 |  -.2487437   .0530846    -4.69   0.000    -.3527877   -.1446998
          e3 |   .0749539   .0756484     0.99   0.322    -.0733144    .2232221
       _cons |   .5966113   .2148678     2.78   0.005     .1754782    1.017744
------------------------------------------------------------------------------
Instrumented:  ind
Instruments:   ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age
               blc gender mdd ndir cont cpi gdp blr empy e1 e2 e3 l_ind_ind
               l_tngasset

. estat endog, forcenonrobust
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .061245  (p = 0.8045)
  Wu-Hausman F(1,628)             =  .058547  (p = 0.8089)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .035078  (p = 0.8514)
  Basmann chi2(1)        =  .033532  (p = 0.8547)
```

APPENDIX 2b: 2- year prior to bankruptcy sample endogeneity test

Model 2

NDIR

```
First-stage regressions
-----------------------

reg ndir gender mdd ind cont e1 e3 e4 cpi gdp blr empy l_ind_ndir

      Source |       SS       df       MS              Number of obs =     470
-------------+------------------------------           F( 12,   457) =    3.34
       Model |    43.23143    12  3.60261917            Prob > F      =  0.0001
    Residual |  493.034527   457  1.07885017            R-squared     =  0.0806
-------------+------------------------------           Adj R-squared =  0.0565
       Total |  536.265957   469  1.14342422            Root MSE      =  1.0387

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.2853706   .1083013    -2.63   0.009    -.4982009   -.0725404
         mdd |  -.2356271   .1336453    -1.76   0.079    -.4982627    .0270084
         ind |   .3034555   .1334878     2.27   0.023     .0411295    .5657816
        cont |   .0242958   .1091984     0.22   0.824    -.1902974    .2388891
          e1 |  -.4271641   .1520123    -2.81   0.005    -.7258939   -.1284344
          e3 |  -.1283443   .2273348    -0.56   0.573    -.5750956    .3184069
          e4 |  -.4215662   .1736305    -2.43   0.016    -.7627794    -.080353
         cpi |  -.0080272   .0613787    -0.13   0.896    -.1286467    .1125923
         gdp |  -.0287721   .0180892    -1.59   0.112    -.0643205    .0067763
         blr |   .7844066   1.164292     0.67   0.501    -1.503623    3.072436
        empy |  -.6380885   .8737312    -0.73   0.466    -2.355118    1.078941
  l_ind_ndir |  -.0358924   .0387096    -0.93   0.004    -.0119632    -.941784
       _cons |   3.341961   .2260059    14.79   0.000     2.897821    3.786101
------------------------------------------------------------------------------

. predict ndirH
(option xb assumed; fitted values)

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  3.92117  (p = 0.0477)
  Wu-Hausman F(1,456)             =  3.83638  (p = 0.0508)
```

```
  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .336463  (p = 0.5619)
  Basmann chi2(1)        =  .326674  (p = 0.5676)
```

MDD

```
First-stage regressions
-----------------------

. reg mdd gender ndir ind cont e1 e3 e4 cpi gdp blr empy l_dirown

      Source |       SS       df       MS              Number of obs =     470
-------------+------------------------------           F( 12,   457) =    7.10
       Model |   11.243574    12  .936964503           Prob > F      =  0.0000
    Residual |  60.2798302   457  .131903348           R-squared     =  0.1572
-------------+------------------------------           Adj R-squared =  0.1351
       Total |  71.5234043   469  .152501928           Root MSE      =  .36319

------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |   .0444987   .0381185     1.17   0.244    -.0304107    .1194081
        ndir |  -.0299586   .0162809    -1.84   0.066    -.0619533    .0020361
         ind |  -.2506874   .0455233    -5.51   0.000    -.3401484   -.1612264
        cont |   .2346075   .0366183     6.41   0.000     .1626464    .3065686
          e1 |    .088268   .0535475     1.65   0.100     -.016962    .1934979
          e3 |  -.0627403   .0790424    -0.79   0.428    -.2180719    .0925913
          e4 |   .0721356   .0611484     1.18   0.239    -.0480313    .1923025
         cpi |  -.0277309   .0213704    -1.30   0.195    -.0697273    .0142654
         gdp |  -.0046856   .0063642    -0.74   0.462    -.0171923    .0078212
         blr |   .2575629   .4072688     0.63   0.527     -.542789    1.057915
        empy |   .5823639   .3049999     1.91   0.057    -.0170124     1.18174
    l_dirown |    .047833   .0684065     0.70   0.043    -.0865974    .1822633
       _cons |   .0926229    .091531     1.01   0.312    -.0872509    .2724967
------------------------------------------------------------------------------

. predict mddH
(option xb assumed; fitted values)

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  .380466  (p = 0.5374)
  Wu-Hausman F(1,456)             =  .369432  (p = 0.5436)


 Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .224559  (p = 0.6356)
  Basmann chi2(1)        =  .217974  (p = 0.6406)
```

Second Stage

```
. logit status gender ind cont ndirH mddH e1 e3 e4 cpi gdp blr empy

Iteration 0:   log likelihood = -325.77917
Iteration 1:   log likelihood = -249.70114
Iteration 2:   log likelihood = -248.67002
Iteration 3:   log likelihood = -248.66574
Iteration 4:   log likelihood = -248.66574

Logistic regression                               Number of obs   =        470
                                                  LR chi2(12)     =     154.23
                                                  Prob > chi2     =     0.0000
Log likelihood = -248.66574                       Pseudo R2       =     0.2367

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
      gender |    .898432   .4540557     1.98   0.048    -1.788363    .9984974
         ind |   8.658591   1.240479     6.98   0.000     6.227298    11.08988
        cont |   6.013049   1.076996     5.58   0.000     1.123922    9.902176
      ndirH  |  -3.198818   1.160285    -2.76   0.006    -5.472934   -.9247014
        mdd  |   29.70568   4.545715     6.53   0.000     20.79625    38.61512
          e1 |  -3.260316   .7545365    -4.32   0.000     -4.73918   -1.781452
          e3 |   3.068766   .6242337     4.92   0.000      1.84529    4.292241
          e4 |  -2.209931    .728017    -3.04   0.002    -3.636818    -.783044
         cpi |   .8440215   .1867491     4.52   0.000         .478    1.210043
         gdp |   .1218778   .0557371     2.19   0.029     .0126351    .2311205
         blr |  -3.867718   2.963842    -1.30   0.192    -9.676742    1.941306
        empy |    21.8911   3.549523     6.17   0.000    -28.84794    44.93407
       _cons |   6.565407   3.742356     1.75   0.079    -.7694756    13.90029
-------------------------------------------------------------------------------
```

Model 3

NDIR

```
First-stage regressions
-----------------------

Instrumental variables (2SLS) regression              Number of obs =     470
                                                      Wald chi2(27) =  389.71
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.3127
                                                      Root MSE      =  .41453
-------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
        ndir |   .1764924   .1643633     1.07   0.283    -.1456537    .4986384
        ebit |  -.2103154    .044253    -4.75   0.000    -.2970497   -.1235812
         roe |  -.0383041    .016089    -2.38   0.017    -.0698378   -.0067703
         tla |    .138196   .0219491     6.30   0.000     .0951765    .1812156
         lta |  -.0295615   .1474766    -0.20   0.841    -.3186103    .2594874
         cta |   .0021649   .0139737     0.15   0.877     -.025223    .0295528
         cle |   .0236681   .0093557     2.53   0.011     .0053312     .042005
         lqt |   .0087038   .0348656     0.25   0.803    -.0596315    .0770391
         wct |  -.0145481    .038282    -0.38   0.704    -.0895795    .0604832
         nwc |  -3.59e-09   2.51e-09    -1.43   0.153    -8.50e-09    1.33e-09
         ast |  -.0003503    .000421    -0.83   0.405    -.0011753    .0004748
         exp |  -.0007491   .0010903    -0.69   0.492     -.002886    .0013878
       logta |   .0095155   .0117633     0.81   0.419    -.0135401    .0325712
      logcap |   .0088981   .0062088     1.43   0.152    -.0032709    .0210671
         age |  -.0157199   .0028247    -5.57   0.000    -.0212561   -.0101836
         blc |   -.067788   .0453519    -1.49   0.135    -.1566762    .0211002
      gender |   .2044254    .057006     3.59   0.000     .0926958     .316155
         mdd |   .1676254    .064943     2.58   0.010     .0403395    .2949113
         ind |   .0408193    .060338     0.68   0.499    -.0774411    .1590796
        cont |   .0671236   .0474716     1.41   0.157    -.0259189    .1601662
         cpi |  -.0170179   .0254774    -0.67   0.504    -.0669528     .032917
         gdp |   .0048374   .0080954     0.60   0.550    -.0110293    .0207041
         blr |   .0783931     .48416     0.16   0.871    -.8705431    1.027329
        empy |  -.1226184   .3643466    -0.34   0.736    -.8367245    .5914878
          e1 |  -.0185294   .0554194    -0.33   0.738    -.1271494    .0900906
          e2 |  -.1903881   .0835873    -2.28   0.023    -.3542163     -.02656
          e3 |  -.1098492   .0951728    -1.15   0.248    -.2963845    .0766861
       _cons |  -.2697381   .4651613    -0.58   0.562    -1.181438    .6419613
-------------------------------------------------------------------------------
Instrumented:  ndir
Instruments:   ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age
               blc gender mdd ind cont cpi gdp blr empy e1 e2 e3 l_ind_ndir
               l_tngasset

. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =   .82627  (p = 0.2186)
  Wu-Hausman F(1,441)             =   .96939  (p = 0.2591)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .114066  (p = 0.7356)
```

```
  Basmann chi2(1)        =  .107053  (p = 0.7435)
```

MDD

```
Instrumental variables (2SLS) regression              Number of obs =     470
                                                      Wald chi2(27) =  675.77
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.5796
                                                      Root MSE      =  .32417
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |   .3557872   .9120838     0.39   0.696    -1.431864    2.143439
        ebit |  -.2207666   .0751788    -2.94   0.003    -.3681143   -.0734188
         roe |  -.0180927   .0247343    -0.73   0.464     -.066571    .0303856
         tla |   .1180418   .0182805     6.46   0.000     .0822126    .1538709
         lta |  -.1459744   .1063943    -1.37   0.170    -.3545035    .0625546
         cta |   .0213055   .0066358     3.21   0.001     .0082996    .0343114
         cle |   .0152949   .0098266     1.56   0.120     -.003965    .0345548
         lqt |  -.0103926   .0369405    -0.28   0.778    -.0827947    .0620095
         wct |  -.0111026    .037573    -0.30   0.768    -.0847444    .0625392
         nwc |  -2.66e-09   2.76e-09    -0.96   0.335    -8.07e-09    2.75e-09
         ast |   .0001538   .0002492     0.62   0.537    -.0003346    .0006422
         exp |  -.0000777   .0009758    -0.08   0.937    -.0019902    .0018348
       logta |   .0081652   .0092338     0.88   0.377    -.0099328    .0262631
      logcap |   .0090536   .0111295     0.81   0.416    -.0127597     .030867
         age |   -.011917   .0013804    -8.63   0.000    -.0146225   -.0092114
         blc |  -.0172484   .0799964    -0.22   0.829    -.1740385    .1395417
      gender |   .1332717   .0505316     2.64   0.008     .0342317    .2323118
        ndir |  -.0985493   .0298625    -3.30   0.001    -.1570787   -.0400198
         ind |   .1488625   .2556286     0.58   0.560    -.3521603    .6498853
        cont |   .0395504   .2105699     0.19   0.851     -.373159    .4522597
         cpi |  -.0008447   .0341767    -0.02   0.980    -.0678299    .0661404
         gdp |   .0009424   .0086862     0.11   0.914    -.0160822     .017967
         blr |   .2023403   .4112718     0.49   0.623    -.6037377    1.008418
        empy |  -.3762678   .5696679    -0.66   0.509    -1.492796    .7402608
          e1 |  -.0479458   .0419366    -1.14   0.253    -.1301401    .0342485
          e2 |   -.098768   .0877757    -1.13   0.260    -.2708052    .0732691
          e3 |  -.0134251   .1248865    -0.11   0.914    -.2581981    .2313479
       _cons |   .4321082   .2151335     2.01   0.045     .0104543     .853762
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age
               blc gender ndir ind cont cpi gdp blr empy e1 e2 e3 l_dirown
               l_tngasset
```

```
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .080241  (p = 0.7770)
  Wu-Hausman F(1,441)             =  .075303  (p = 0.7839)

 estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .683457  (p = 0.4084)
  Basmann chi2(1)        =   .64222  (p = 0.4229)
```

APPENDIX 2c: 1- year prior to bankruptcy sample endogeneity test

Model 2

NDIR

First-stage regressions

```
reg ndir gender mdd ind cont e1 e3 e4 cpi gdp blr empy l_ind_ndir

      Source |       SS       df       MS              Number of obs =     419
-------------+------------------------------           F( 12,   406) =    2.87
       Model |  37.5813188    12  3.13177656           Prob > F      =  0.0008
    Residual |  443.187178   406  1.09159403           R-squared     =  0.0782
-------------+------------------------------           Adj R-squared =  0.0509
       Total |  480.768496   418  1.15016387           Root MSE      =  1.0448

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.1494469   .1184187    -1.26   0.208    -.3822372    .0833435
         mdd |  -.3411453   .1295553    -2.63   0.009    -.5958283   -.0864624
         ind |   .2820741    .147735     1.91   0.057    -.0083469    .5724951
        cont |    .053707   .1107047     0.49   0.628     -.163919     .271333
          e1 |  -.3198723   .1712836    -1.87   0.063    -.6565856    .0168411
          e3 |  -.0791367    .252466    -0.31   0.754    -.5754404     .417167
          e4 |  -.1528371   .1931028    -0.79   0.429    -.5324433     .226769
         cpi |  -.0883966   .0705629    -1.25   0.211    -.2271108    .0503177
         gdp |  -.0153937   .0210972    -0.73   0.466    -.0568671    .0260797
         blr |  -1.219778   1.135133    -1.07   0.283    -3.451249    1.011694
       empy  |  -.9419932   .5261735    -1.79   0.074    -1.976358    .0923714
  l_ind_ndir |   .0114914   .0446925     0.26   0.079    -.0763663    .0993491
       _cons |   2.954944   .2797605    10.56   0.000     2.404984    3.504904
------------------------------------------------------------------------------

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  22.6102  (p = 0.0000)
  Wu-Hausman F(1,404)             =  23.1026  (p = 0.0000)


  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .009596  (p = 0.9220)
  Basmann chi2(1)        =  .009275  (p = 0.9233)
```

MDD

First-stage regressions

```
reg mdd ndir ind cont gender e1 e3 e4 cpi gdp blr empy l_dirown

      Source |       SS       df       MS              Number of obs =     419
-------------+------------------------------           F( 12,   406) =    7.63
       Model |  14.5681776    12   1.2140148           Prob > F      =  0.0000
    Residual |  64.6155933   406  .159151708           R-squared     =  0.1840
-------------+------------------------------           Adj R-squared =  0.1599
       Total |  79.1837709   418  .189434859           Root MSE      =  .39894

------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ndir |  -.0506439   .0187828    -2.70   0.007    -.0875677   -.0137201
         ind |  -.2780936   .0545156    -5.10   0.000    -.3852617   -.1709255
        cont |   .1317361   .0417008     3.16   0.002     .0497597    .2137125
      gender |   .1431841   .0445236     3.22   0.001     .0556586    .2307096
          e1 |   .1640107   .0651938     2.52   0.012     .0358512    .2921702
          e3 |  -.0619676   .0961187    -0.64   0.519    -.2509201    .1269848
          e4 |   .1718477   .0732774     2.35   0.019     .0277973    .3158981
```

```
         cpi |   .0335811   .0269456     1.25   0.213    -.0193893    .0865515
         gdp |   .0184193   .0080104     2.30   0.022     .0026724    .0341663
         blr |  -.0850466   .4337152    -0.20   0.845    -.9376544    .7675612
       empy |   .0661627   .2016111     0.33   0.743    -.3301693    .4624947
   l_dirown |  -.1350791   .1063177    -1.27   0.035     -.344081    .0739228
       _cons |    .193564   .1044175     1.85   0.065    -.0117025    .3988304
------------------------------------------------------------------------------

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  4.62424  (p = 0.0315)
  Wu-Hausman F(1,404)             =  4.51936  (p = 0.0341)


  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .322446  (p = 0.5701)
  Basmann chi2(1)        =  .311887  (p = 0.5765)
```

Second Stage

```
logit status gender mddHat ndirHat cont ind e1 e3 e4 cpi gdp blr empy

Iteration 0:   log likelihood = -290.42748
Iteration 1:   log likelihood = -208.92727
Iteration 2:   log likelihood = -208.20109
Iteration 3:   log likelihood = -208.19835
Iteration 4:   log likelihood = -208.19835

Logistic regression                               Number of obs   =        419
                                                  LR chi2(12)     =     164.46
                                                  Prob > chi2     =     0.0000
Log likelihood = -208.19835                       Pseudo R2       =     0.2831

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |    1.54892   .4927134     3.09   0.002    -2.490595     .591945
     mddHat |    14.2757   2.665267     5.36   0.000     9.051871    19.49953
    ndirHat |   -4.481904   .9152563    -4.90   0.000    -6.275773   -2.688034
        cont |    .884957   .4149108     1.97   0.049    -1.631706     .052854
         ind |   5.76669   .8969751     6.43   0.000     4.008651    7.524729
          e1 |  -2.998559   .6923674    -4.33   0.000    -4.355574   -1.641543
          e3 |   2.055155   .6085155     3.38   0.001     .8624863    3.247823
          e4 |  -1.698174   .6529996    -2.60   0.009     -2.97803   -.4183186
         cpi |   .5750639   .2085858     2.76   0.006     .9838846    2.166432
         gdp |   .2138784   .0760038     2.81   0.005    -.3628431   .67649136
         blr |  -1.099293   2.923527    -0.38   0.707    -6.829301    4.630714
       empy |   -.998131   1.544966    -0.65   0.518    -4.026209    2.029946
       _cons |   10.79019   2.762796     3.91   0.000     5.375207    16.20517
------------------------------------------------------------------------------
```

Model 3

NDIR

```
First-stage regressions
-----------------------

reg ndir ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age blc gender mdd
ind cont e1 e3 e4 cont cpi gdp blr empy l_ind_ndir
note: cont omitted because of collinearity

      Source |       SS       df       MS              Number of obs =     419
-------------+------------------------------           F( 27,   391) =    2.89
       Model |   80.026226    27   2.9639343           Prob > F      =  0.0000
    Residual |   400.74227   391  1.02491629           R-squared     =  0.1665
-------------+------------------------------           Adj R-squared =  0.1089
       Total |  480.768496   418  1.15016387           Root MSE      =  1.0124

------------------------------------------------------------------------------
```

```
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ebit |   .1410147   .1200681     1.17   0.241    -.0950452    .3770745
         roe |   .0361513   .0236007     1.53   0.126     -.010249    .0825515
         tla |  -.1052028   .0818028    -1.29   0.199    -.2660312    .0556257
         lta |    .033969    .180499     0.19   0.851    -.3209009    .3888389
         cta |  -.0310053   .1285867    -0.24   0.810    -.2838132    .2218026
         cle |   .0007835    .032696     0.02   0.981    -.0634985    .0650655
         lqt |   .0532845   .0553212     0.96   0.336    -.0554796    .1620486
         wct |  -.1210154   .0671675    -1.80   0.072    -.2530701    .0110392
         nwc |   7.83e-09   8.85e-09     0.88   0.377    -9.57e-09    2.52e-08
         ast |   .1878657   .0491634     3.82   0.000     .0912081    .2845233
         exp |  -.1715328   .1344195    -1.28   0.203    -.4358083    .0927426
       logta |  -.0277264   .0270413    -1.03   0.306     -.080891    .0254381
      logcap |   .0373969   .0172489     2.17   0.031     .0034846    .0713092
         age |   .0039483   .0045015     0.88   0.381    -.0049019    .0127985
         blc |   .0580656   .1082793     0.54   0.592    -.1548169    .2709481
      gender |  -.0232329   .1188027    -0.20   0.845    -.2568049    .2103392
         mdd |   -.275184   .1283586    -2.14   0.033    -.5275433   -.0228246
         ind |   .3366202   .1509548     2.23   0.026     .0398356    .6334048
        cont |    .085477   .1091395     0.78   0.434    -.1290967    .3000506
          e1 |  -.2369829   .1717266    -1.38   0.168    -.5746059    .1006401
          e3 |   .0033629   .2535117     0.01   0.989    -.4950536    .5017794
          e4 |  -.0351725   .1934925    -0.18   0.856    -.4155884    .3452433
         cpi |  -.1021356   .0694706    -1.47   0.142    -.2387182     .034447
         gdp |  -.0144549   .0210808    -0.69   0.493    -.0559007    .0269909
         blr |   -.825564   1.126653    -0.73   0.464    -3.040619    1.389491
       empy |  -.4921144   .5244287    -0.94   0.349    -1.523167    .5389384
  l_ind_ndir |  -.0190209   .0443504    -0.43   0.038     -.106216    .0681741
       _cons |   2.737516   .4906063     5.58   0.000      1.77296    3.702072
------------------------------------------------------------------------------

. predict ndirHat , xb
(1 missing value generated)

. estat endog

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  17.6442  (p = 0.0000)
  Wu-Hausman F(1,389)             =  17.1438  (p = 0.0000)

. estat overid

  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .002841  (p = 0.9575)
  Basmann chi2(1)        =  .002644  (p = 0.9590)
. estat endog
```

MDD

```
First-stage regressions
-----------------------

. reg mdd ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age blc gender
ndir ind cont e1 e3 e4 cpi gdp blr empy l_dirown

      Source |       SS       df       MS              Number of obs =     419
-------------+------------------------------           F( 27,   391) =    4.04
       Model |  17.2834986    27  .640129576           Prob > F      =  0.0000
    Residual |  61.9002723   391  .158312717           R-squared     =  0.2183
-------------+------------------------------           Adj R-squared =  0.1643
       Total |  79.1837709   418  .189434859           Root MSE      =  .39789

------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ebit |   .0018855   .0472092     0.04   0.968    -.0909302    .0947012
         roe |  -.0009714   .0092769    -0.10   0.917    -.0192102    .0172674
```

```
         tla |   .0155322    .032181     0.48   0.630    -.0477372    .0788016
         lta |  -.0248031    .071053    -0.35   0.727    -.1644969    .1148906
         cta |   -.023126   .0507995    -0.46   0.649    -.1230005    .0767484
         cle |   .0160224   .0128233     1.25   0.212    -.0091889    .0412337
         lqt |  -.0191329   .0217348    -0.88   0.379    -.0618646    .0235988
         wct |   .0361784   .0264423     1.37   0.172    -.0158084    .0881653
         nwc |   1.62e-09   3.48e-09     0.47   0.642    -5.22e-09    8.46e-09
         ast |  -.0249896   .0196377    -1.27   0.204    -.0635983    .0136191
         exp |  -.0649386   .0526159    -1.23   0.218     -.168384    .0385069
       logta |  -.0099019   .0106126    -0.93   0.351    -.0307668     .010963
      logcap |    .008362    .006804     1.23   0.220     -.005015    .0217389
         age |  -.0007692   .0017706    -0.43   0.664    -.0042504     .002712
         blc |  -.0130278   .0425632    -0.31   0.760    -.0967092    .0706535
      gender |   .1175554   .0461661     2.55   0.011     .0267905    .2083203
        ndir |  -.0423842    .019765    -2.14   0.033    -.0812432   -.0035252
         ind |  -.2810546   .0577851    -4.86   0.000    -.3946629   -.1674463
        cont |   .1187024   .0424769     2.79   0.005     .0351907    .2022141
          e1 |   .1577799   .0671992     2.35   0.019      .025663    .2898969
          e3 |  -.0779701   .0993377    -0.78   0.433     -.273273    .1173328
          e4 |     .17047   .0755355     2.26   0.025     .0219635    .3189765
         cpi |   .0326263    .027329     1.19   0.233    -.0211039    .0863565
         gdp |   .0152897   .0082504     1.85   0.065    -.0009309    .0315104
         blr |  -.1323407    .442271    -0.30   0.765    -1.001867    .7371861
        empy |    .047295    .206208     0.23   0.819    -.3581203    .4527102
    l_dirown |  -.1308298   .1081021    -1.21   0.001    -.3433638    -.081042
       _cons |   .3735038   .1903498     1.96   0.050    -.0007334    .7477409
------------------------------------------------------------------------------

. predict mddHat
(option xb assumed; fitted values)
(1 missing value generated)

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  2.76962  (p = 0.08903)
  Wu-Hausman F(1,389)             =  2.71755  (p = 0.08097)

. estat overid

  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .741451  (p = 0.3892)
  Basmann chi2(1)        =  .691236  (p = 0.4057)
```

Second stage

```
. logit status ebit roe tla lta cta cle lqt wct nwc ast exp logta logcap age blc
gender ndirHat mddHat ind cont e1 e3 e4 cpi gdp blr empy

Iteration 0:   log likelihood = -290.42748
Iteration 1:   log likelihood = -103.42471
Iteration 2:   log likelihood = -90.227464
Iteration 3:   log likelihood = -88.388842
Iteration 4:   log likelihood = -88.381547
Iteration 5:   log likelihood = -88.381547

Logistic regression                               Number of obs   =        419
                                                  LR chi2(27)     =     404.09
                                                  Prob > chi2     =     0.0000
Log likelihood = -88.381547                       Pseudo R2       =     0.6957

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ebit |   .4622178   .5077928     0.91   0.363    -.5330377    1.457473
         roe |  -.2405449   .1387364    -1.73   0.083    -.5124632    .0313734
         tla |   .3036579   .4756603     0.64   0.023    -.6286191    1.235935
         lta |    .200271   .7292782     0.27   0.784    -1.229088     1.62963
         cta |   .6919346   .6278077     1.10   0.270    -.5385459    1.922415
         cle |   .0741327   .1545613     0.48   0.631    -.2288019    .3770674
         lqt |  -.5254507   .2784484    -1.89   0.059      -1.0712    .0202982
         wct |  -.2920542   .3688501    -0.79   0.428    -1.014987    .4308787
```

nwc	-2.36e-08	3.66e-08	-0.64	0.519	-9.54e-08	4.82e-08
ast	-1.018908	.5418858	-1.88	0.060	-2.080984	.043169
exp	-1.126935	.6848204	-1.65	0.100	-2.469159	.215288
logta	.1089366	.1393684	0.78	0.434	-.1642205	.3820937
logcap	.1565173	.1261968	1.24	0.215	-.0908239	.4038584
age	-.090632	.0238068	-3.81	0.000	-.1372926	-.0439715
blc	-.4910855	.504107	-0.97	0.030	-1.479117	.4969459
gender	-.6295123	.6803399	-0.93	0.355	-1.962954	.7039295
ndirHat	**-6.574097**	**1.999179**	**-3.29**	**0.001**	**-10.49242**	**-2.655779**
mddHat	**13.97943**	**4.801198**	**2.91**	**0.004**	**4.569257**	**23.38961**
ind	6.321943	1.721564	3.67	0.000	2.94774	9.696146
cont	.1715148	.737244	0.23	0.016	1.616487	1.273457
e1	-2.561488	1.19005	-2.15	0.031	-4.893943	-.2290325
e3	3.973091	1.131032	3.51	0.000	1.756308	6.189873
e4	-.0901203	1.128068	-0.08	0.936	-2.301093	2.120852
cpi	-.825382	.3784602	-2.18	0.029	-1.56715	-.0836136
gdp	-.177437	.1183364	-1.50	0.134	-.4093722	.0544982
blr	-7.824671	5.107602	-1.53	0.126	-17.83539	2.186045
empy	3.55441	2.408337	1.47	0.010	-8.270695	1.169812
_cons	14.63927	5.86652	2.50	0.013	3.141104	26.13744

Note: 3 failures and 0 successes completely determined.

APPENDIX 3: Artificial Neural Network for Malaysia Sample

APPENDIX 3a: Model 1 (3-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	68.921
	Percent Incorrect Predictions	17.1%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.07
Holdout	Percent Incorrect Predictions	23.9%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-.491		
	EBIT	-.150		
	ROE	.936		
	TLA	-2.438		
	LTA	.298		
	CTA	.058		
	CLE	-.174		
	LQT	1.006		
	WCT	-.328		
	NWC	1.196		
	AST	.083		
	EXP	-.769		
	LogTA	-.034		
	LogCAP	-.501		
	AGE	3.434		
	BLC	.238		
Hidden Layer 1	(Bias)		-1.844	1.846
	H(1:1)		4.652	-4.652

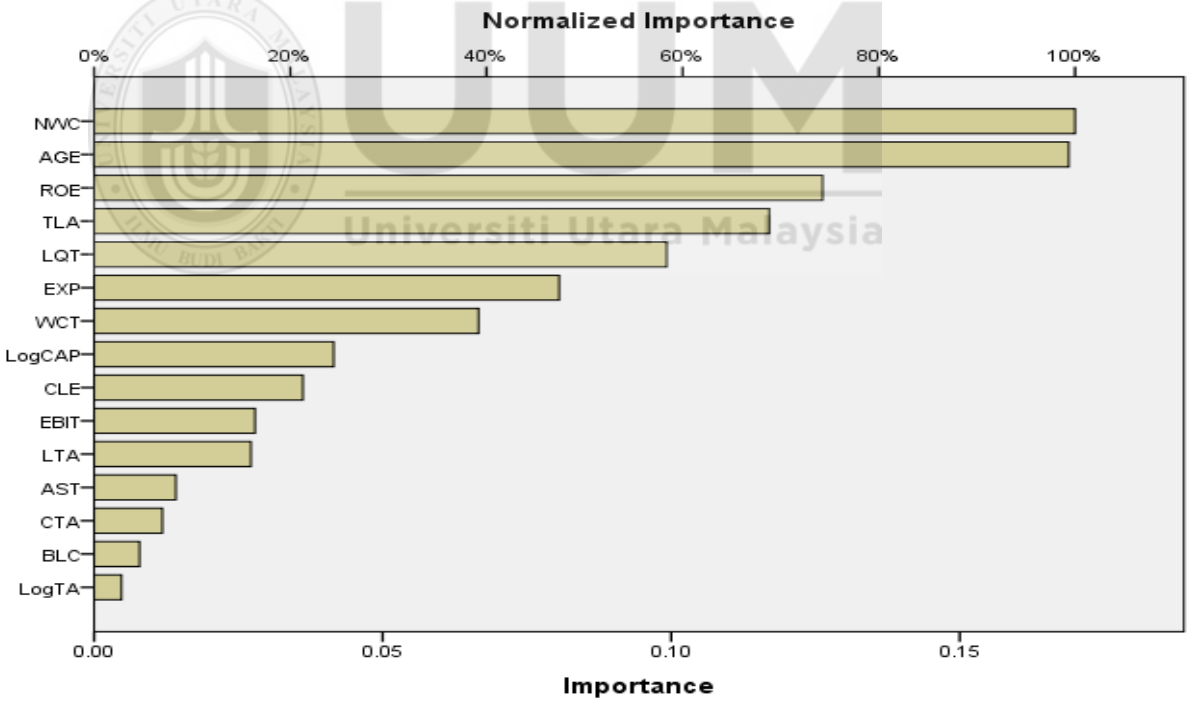
Classification

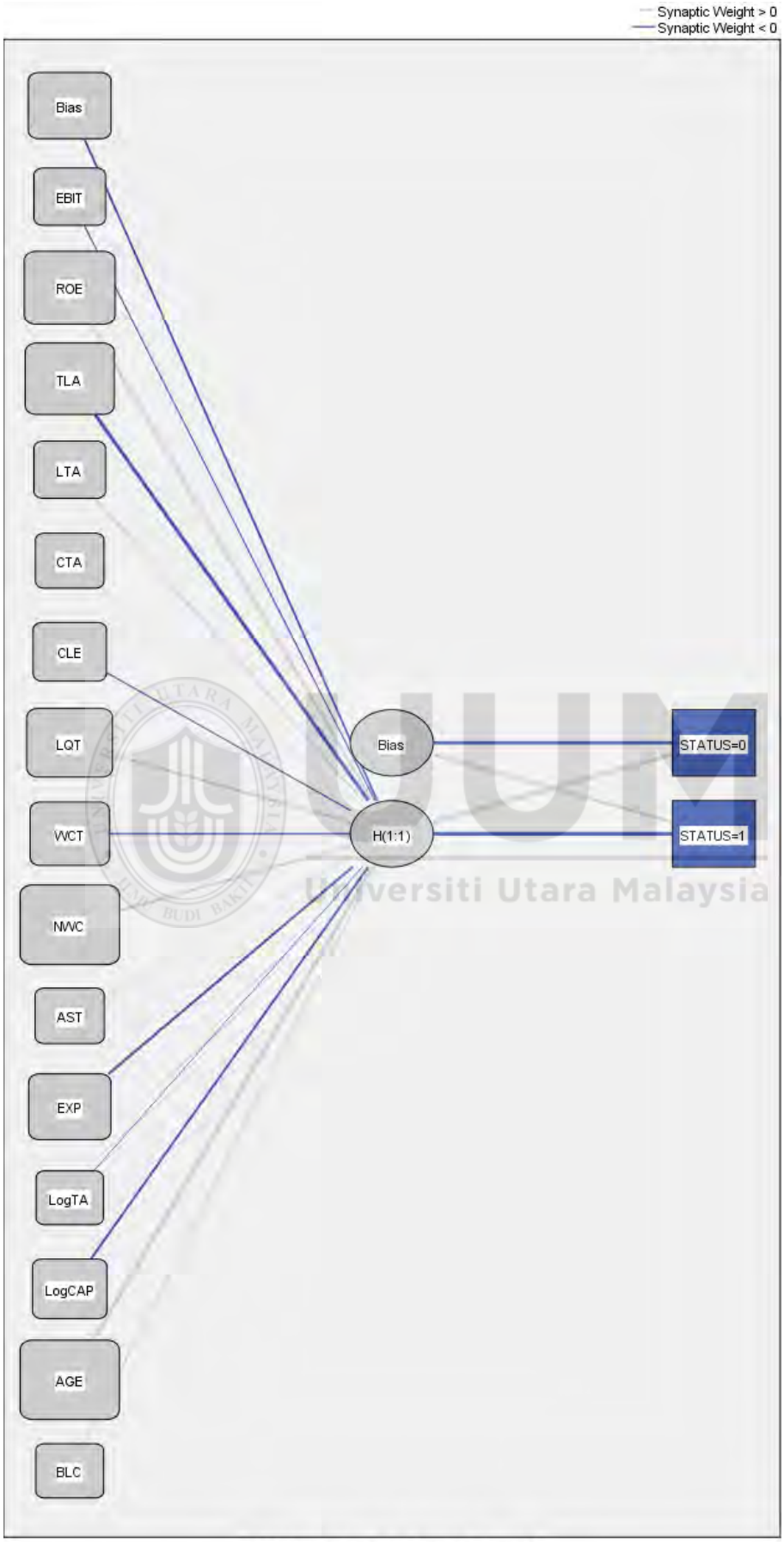
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	211	56	79.0%
	Failed	35	230	86.8%
	Overall Percent	46.2%	53.8%	82.9%
Holdout	Non-Failed	49	17	74.2%
	Failed	15	53	77.9%
	Overall Percent	47.8%	52.2%	76.1%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
EBIT	.028	16.4%
ROE	.126	74.3%
TLA	.117	68.8%
LTA	.027	16.0%
CTA	.012	7.0%
CLE	.036	21.3%
LQT	.099	58.4%
WCT	.067	39.2%
NWC	.170	100.0%
AST	.014	8.3%
EXP	.081	47.4%
LogTA	.005	2.8%
LogCAP	.042	24.4%
AGE	.169	99.4%
BLC	.008	4.6%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3b: Model 2 (3-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	97.222
	Percent Incorrect Predictions	25.2%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.12
Holdout	Percent Incorrect Predictions	26.4%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-3.588		
	GENDER	-4.587		
	MDD	-6.483		
	NDIR	8.133		
	IND	-.805		
	CONT	-4.173		
	CINA	-1.209		
	INDIAN	-3.630		
	MELAYU	-4.867		
	CPI	-.307		
	GDP	-1.016		
	BLR	1.097		
	EMPY	-.577		
Hidden Layer 1	(Bias)		-1.074	1.060
	H(1:1)		2.627	-2.635

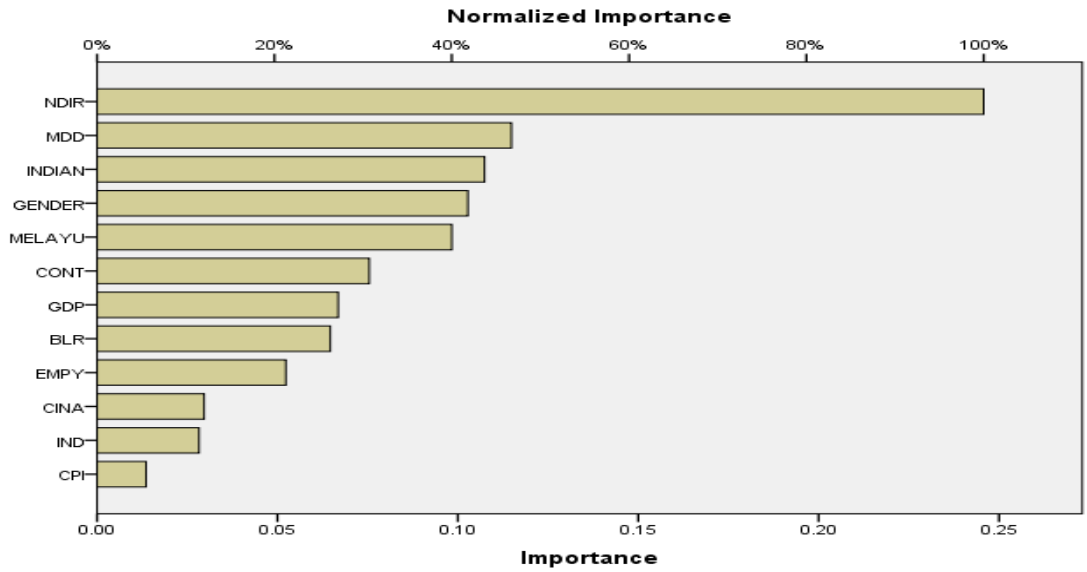
Classification

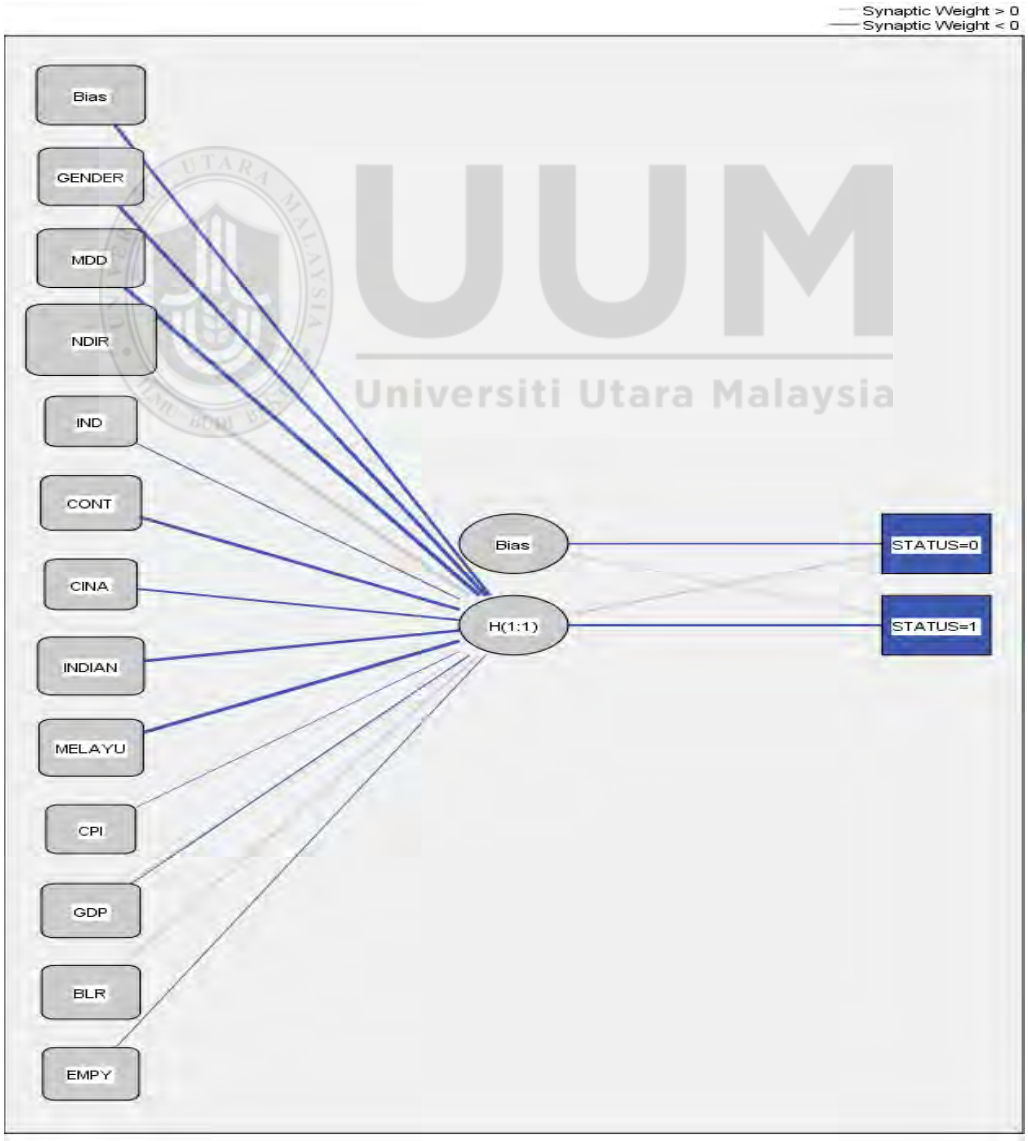
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	176	82	68.2%
	Failed	51	218	81.0%
	Overall Percent	43.1%	56.9%	74.8%
Holdout	Non-Failed	46	23	66.7%
	Failed	11	49	81.7%
	Overall Percent	44.2%	55.8%	73.6%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.103	41.8%
MDD	.115	46.7%
NDIR	.246	100.0%
IND	.028	11.5%
CONT	.075	30.7%
CINA	.030	12.1%
INDIAN	.107	43.7%
MELAYU	.098	40.0%
CPI	.014	5.5%
GDP	.067	27.2%
BLR	.065	26.3%
EMPY	.052	21.3%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3c: Model 3 (3-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	49.904
	Percent Incorrect Predictions	10.3%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.17
Holdout	Percent Incorrect Predictions	16.5%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-.877		
	GENDER	-3.916		
	MDD	-1.854		
	NDIR	3.179		
	IND	-1.540		
	CONT	-.093		
	CINA	-4.243		
	INDIAN	-4.241		
	MELAYU	-4.168		
	CPI	2.260		
	GDP	1.000		
	BLR	-2.097		
	EMPY	-1.630		
	EBIT	.040		
	ROE	2.311		
	TLA	-5.809		
	LTA	-.522		
	CTA	1.022		
	CLE	-1.391		
	LQT	2.167		
	WCT	-1.315		
	NWC	2.172		
	AST	1.500		
	EXP	.938		
	LogTA	-3.203		
	LogCAP	.468		
	AGE	13.024		
	BLC	2.423		
Hidden Layer 1	(Bias)		-2.012	2.015
	H(1:1)		5.410	-5.368

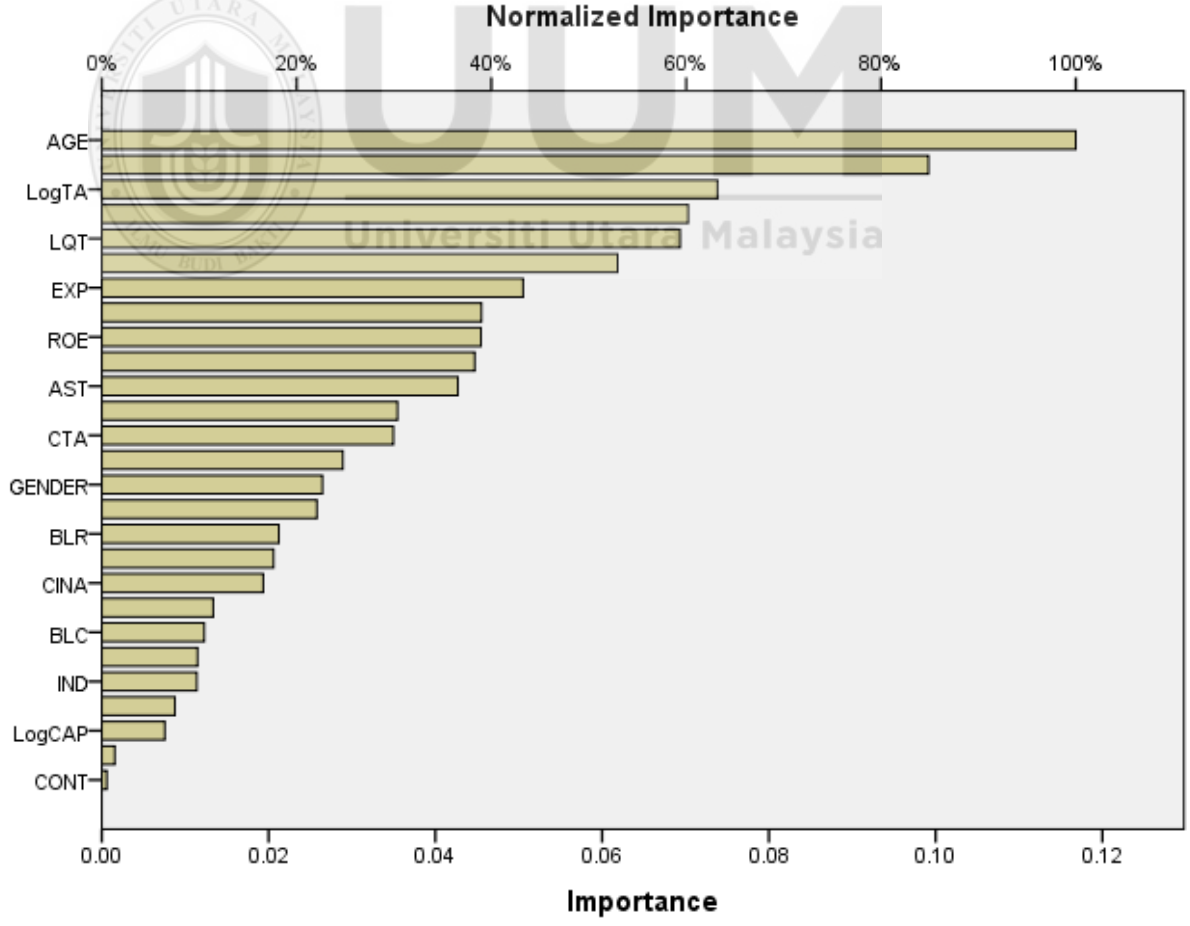
Classification

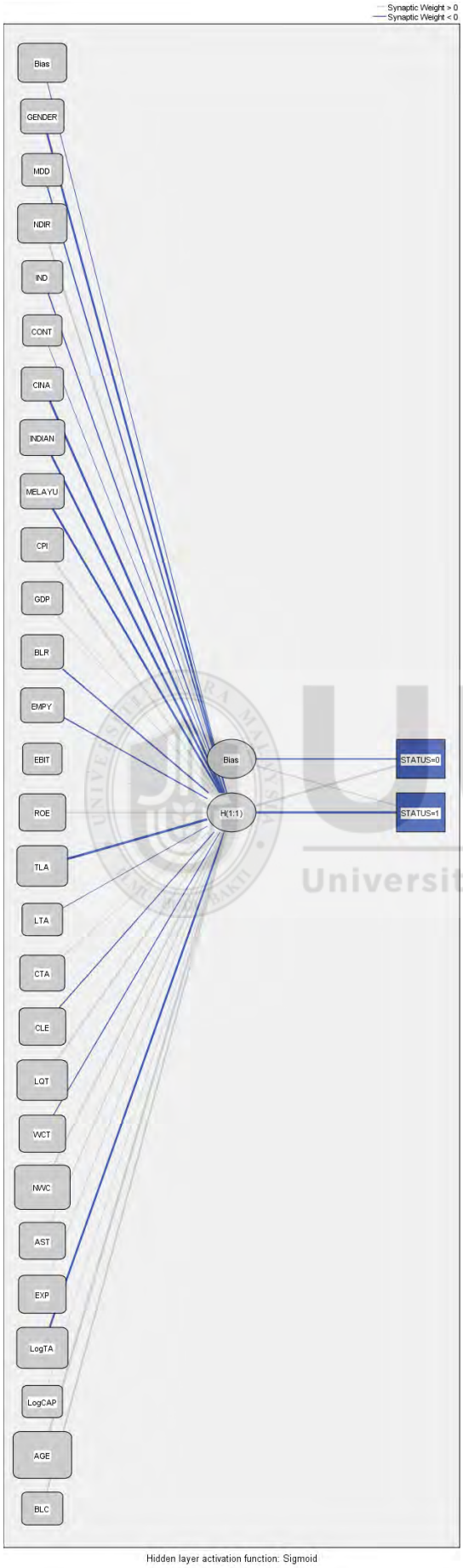
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	220	37	85.6%
	Failed	17	249	93.6%
	Overall Percent	45.3%	54.7%	89.7%
Holdout	Non-Failed	57	13	81.4%
	Failed	9	54	85.7%
	Overall Percent	49.6%	50.4%	83.5%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.026	22.6%
MDD	.011	9.8%
NDIR	.062	53.0%
IND	.011	9.7%
CONT	.001	0.5%
CINA	.019	16.6%
INDIAN	.035	30.3%
MELAYU	.029	24.8%
CPI	.021	17.6%
GDP	.013	11.4%
BLR	.021	18.2%
EMPY	.026	22.1%
EBIT	.002	1.3%
ROE	.045	38.9%
TLA	.070	60.2%
LTA	.009	7.5%
CTA	.035	29.9%
CLE	.046	39.0%
LQT	.069	59.4%
WCT	.045	38.3%
NWC	.099	84.9%
AST	.043	36.5%
EXP	.051	43.2%
LogTA	.074	63.2%
LogCAP	.008	6.5%
AGE	.117	100.0%
BLC	.012	10.5%





APPENDIX 3d: Model 1 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	23.609
	Percent Incorrect Predictions	7.7%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.11
Holdout	Percent Incorrect Predictions	9.3%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-2.164		
	EBIT	6.543		
	ROE	-.864		
	TLA	-3.670		
	LTA	.521		
	CTA	-2.974		
	CLE	-.971		
	LQT	.845		
	WCT	-.588		
	NWC	.027		
	AST	.286		
	EXP	1.067		
	LogTA	-.456		
	LogCAP	-.373		
	AGE	1.942		
	BLC	-.228		
Hidden Layer 1	(Bias)		-3.383	3.383
	H(1:1)		6.972	-6.973

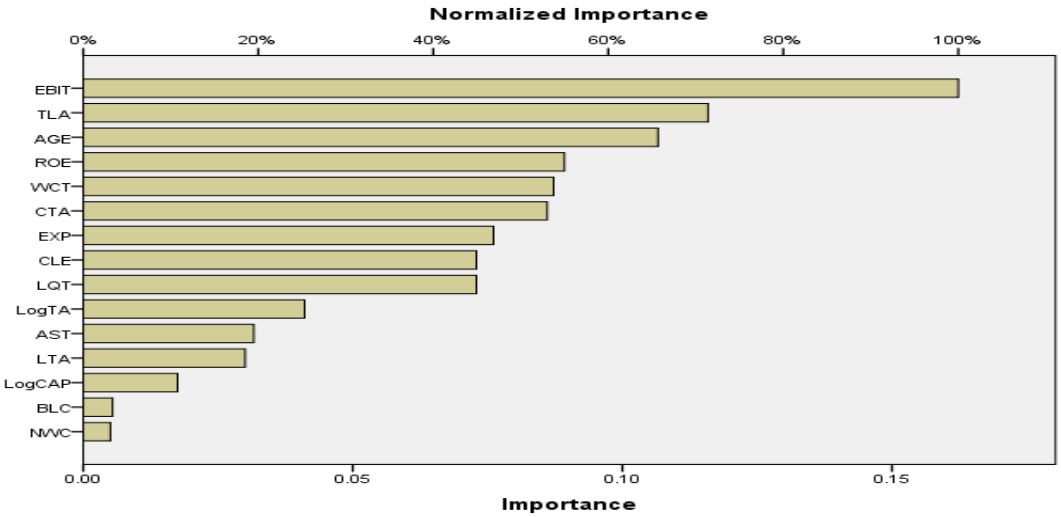
Classification

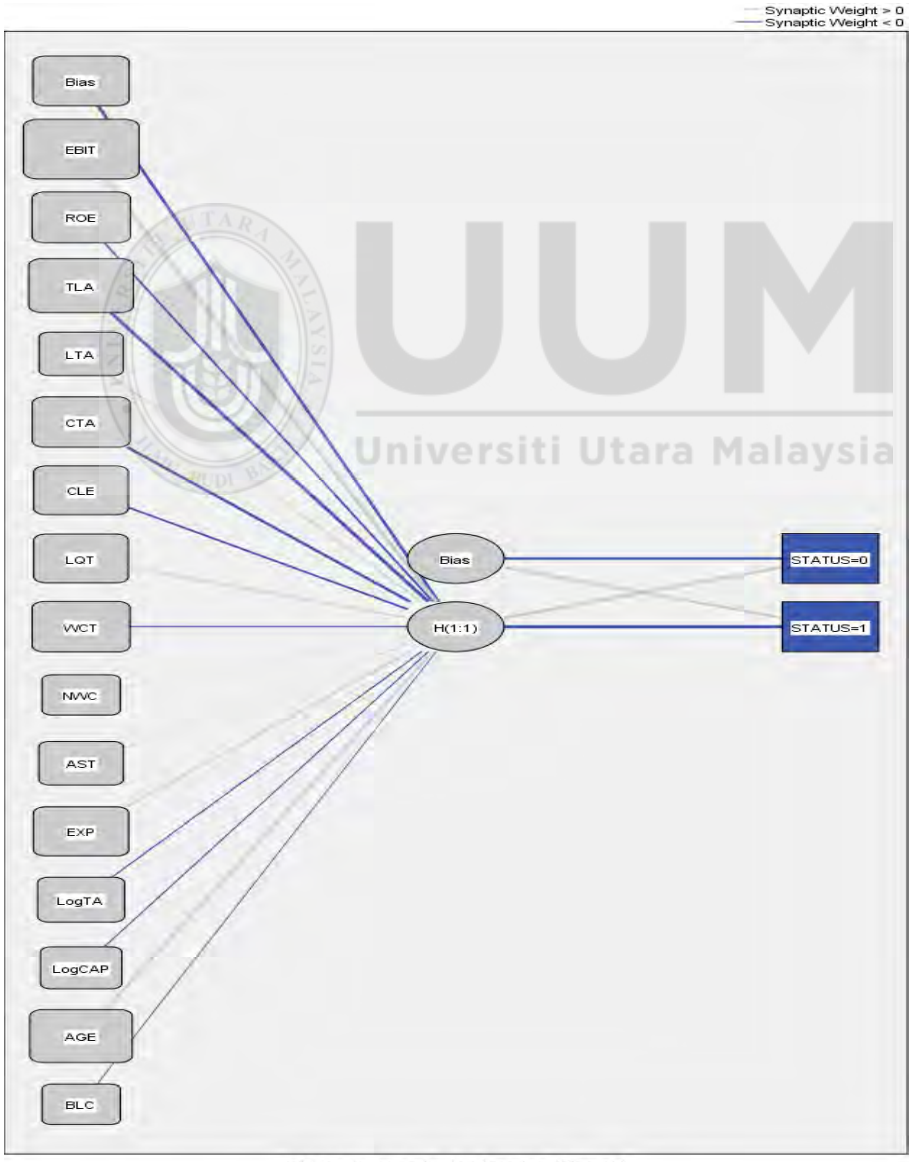
Sample	Observed	Predicted		
		Non-failed	Failed	Percent Correct
Training	Non-failed	157	18	89.7%
	Failed	10	177	94.7%
	Overall Percent	46.1%	53.9%	92.3%
Holdout	Non-failed	53	7	88.3%
	Failed	3	45	93.8%
	Overall Percent	51.9%	48.1%	90.7%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
EBIT	.162	100.0%
ROE	.089	55.0%
TLA	.116	71.4%
LTA	.030	18.5%
CTA	.086	53.0%
CLE	.073	44.9%
LQT	.073	44.9%
WCT	.087	53.8%
NWC	.005	3.1%
AST	.032	19.5%
EXP	.076	46.9%
LogTA	.041	25.3%
LogCAP	.018	10.8%
AGE	.107	65.7%
BLC	.005	3.3%





APPENDIX 3e: Model 2 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	56.282
	Percent Incorrect Predictions	20.5%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.07
Holdout	Percent Incorrect Predictions	26.7%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	.426		
	GENDER	-1.617		
	MDD	-.535		
	NDIR	3.418		
	IND	-.493		
	CONT	-1.162		
	CINA	-.871		
	INDIAN	-1.423		
	MELAYU	-1.408		
	CPI	-.629		
	GDP	-.763		
	BLR	-.380		
	EMPY	.196		
Hidden Layer 1	(Bias)		-1.890	1.891
	H(1:1)		3.737	-3.736

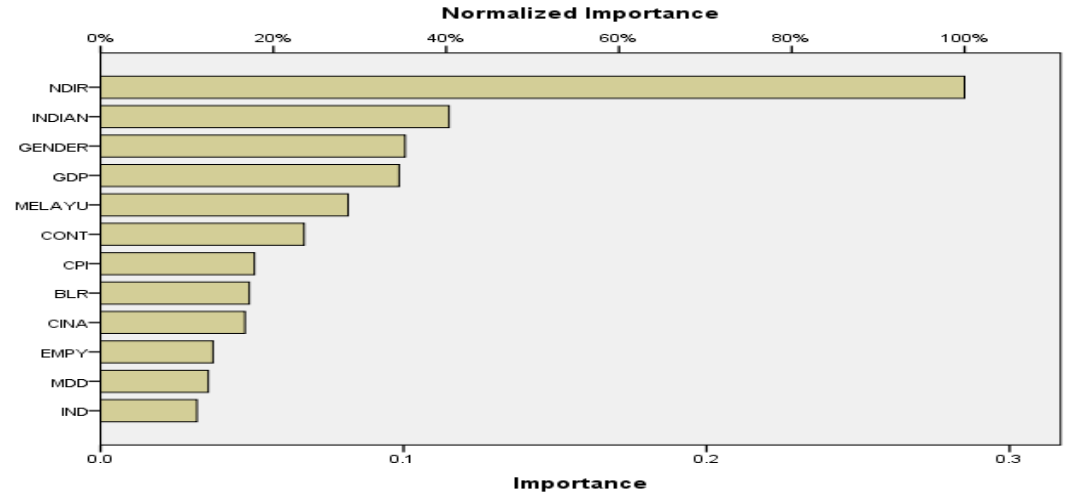
Classification

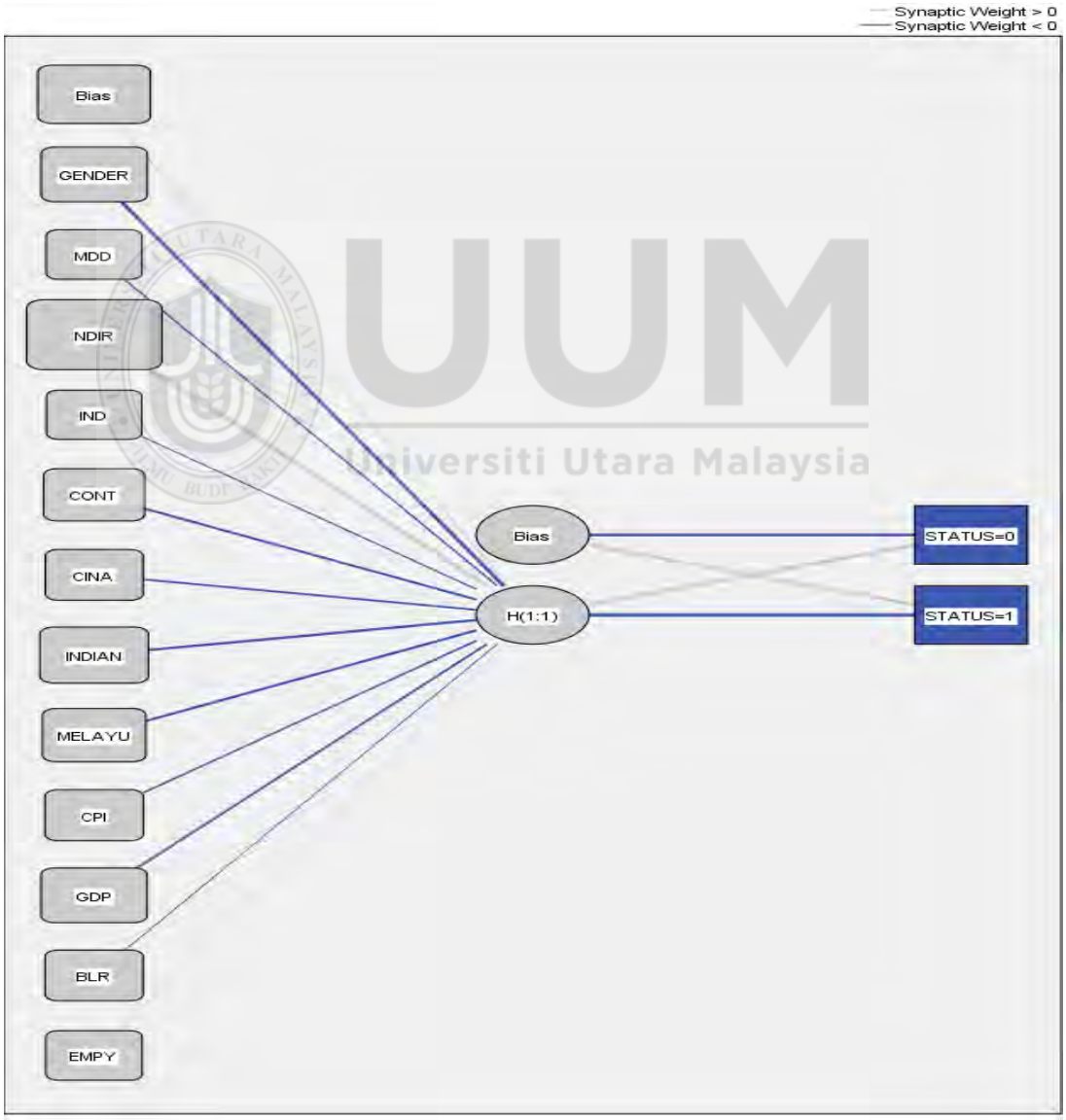
Sample	Observed	Predicted		
		Non-failed	Failed	Percent Correct
Training	Non-failed	139	40	77.7%
	Failed	35	151	81.2%
	Overall Percent	47.7%	52.3%	79.5%
Holdout	Non-failed	40	16	71.4%
	Failed	12	37	75.5%
	Overall Percent	49.5%	50.5%	73.3%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.100	35.2%
MDD	.036	12.5%
NDIR	.285	100.0%
IND	.032	11.2%
CONT	.067	23.6%
CINA	.048	16.7%
INDIAN	.115	40.3%
MELAYU	.082	28.6%
CPI	.051	17.8%
GDP	.099	34.5%
BLR	.049	17.2%
EMPY	.037	13.0%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3f: Model 3 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	10.773
	Percent Incorrect Predictions	2.4%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.09
Holdout	Percent Incorrect Predictions	8.9%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	1.587		
	GENDER	.313		
	MDD	1.152		
	NDIR	-2.550		
	IND	.932		
	CONT	.587		
	CINA	-.695		
	INDIAN	.018		
	MELAYU	.018		
	CPI	-.765		
	GDP	-.027		
	BLR	.671		
	EMPY	-.962		
	EBIT	-6.891		
	ROE	-1.264		
	TLA	8.900		
	LTA	-.633		
	CTA	3.140		
	CLE	.213		
	LQT	-2.571		
	WCT	1.859		
	NWC	-.780		
	AST	.629		
	EXP	.724		
	LogTA	1.335		
	LogCAP	.665		
	AGE	-5.080		
	BLC	.317		
Hidden Layer 1	(Bias)		4.284	-4.306
	H(1:1)		-10.210	10.203

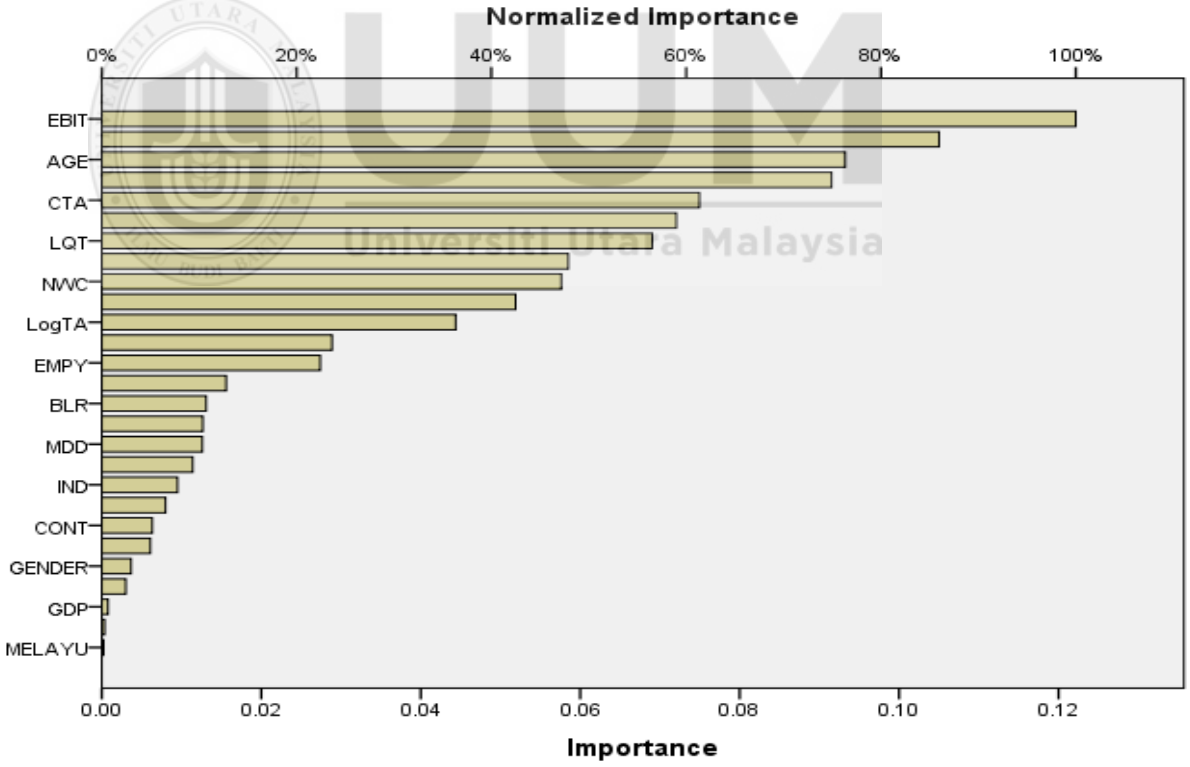
Classification

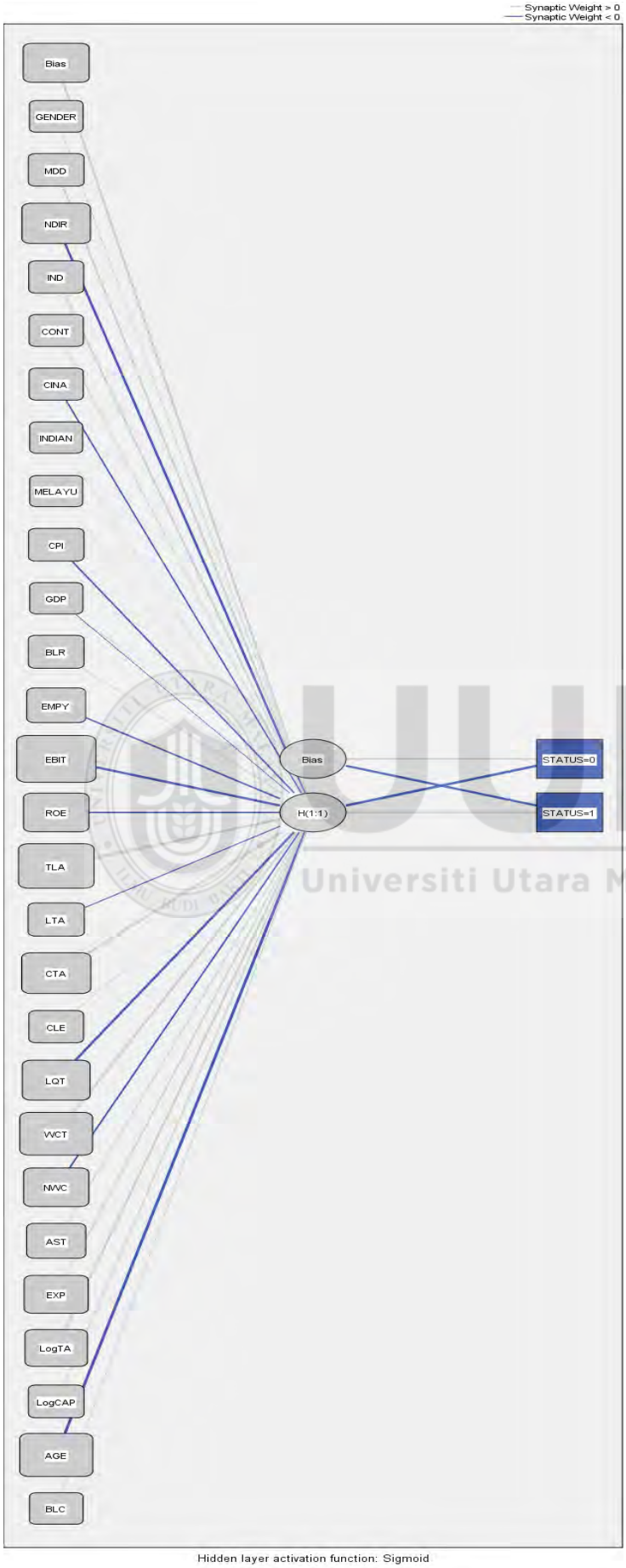
Sample	Observed	Predicted		
		Non-failed	Failed	Percent Correct
Training	Non-failed	178	3	98.3%
	Failed	6	182	96.8%
	Overall Percent	49.9%	50.1%	97.6%
Holdout	Non-failed	50	4	92.6%
	Failed	5	42	89.4%
	Overall Percent	54.5%	45.5%	91.1%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.004	3.0%
MDD	.013	10.3%
NDIR	.072	59.0%
IND	.009	7.8%
CONT	.006	5.2%
CINA	.006	5.0%
INDIAN	.000	0.3%
MELAYU	.000	0.2%
CPI	.011	9.3%
GDP	.001	0.6%
BLR	.013	10.7%
EMPY	.027	22.4%
EBIT	.122	100.0%
ROE	.059	47.9%
TLA	.105	86.0%
LTA	.016	12.8%
CTA	.075	61.3%
CLE	.008	6.5%
LQT	.069	56.5%
WCT	.092	74.9%
NWC	.058	47.2%
AST	.029	23.6%
EXP	.052	42.5%
LogTA	.044	36.3%
LogCAP	.013	10.4%
AGE	.093	76.3%
BLC	.003	2.5%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3g: Model 1 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	25.346
	Percent Incorrect Predictions	8.1%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.10
Holdout	Percent Incorrect Predictions	11.8%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-5.059		
	EBIT	-1.415		
	ROE	-9.064		
	TLA	1.617		
	LTA	.543		
	CTA	2.172		
	CLE	1.017		
	LQT	-7.747		
	WCT	.842		
	NWC	2.160		
	AST	-17.394		
	EXP	-2.967		
	LogTA	2.735		
	LogCAP	.574		
	AGE	-5.788		
	BLC	-2.331		
Hidden Layer 1	(Bias)		3.111	-3.115
	H(1:1)		-5.560	5.557

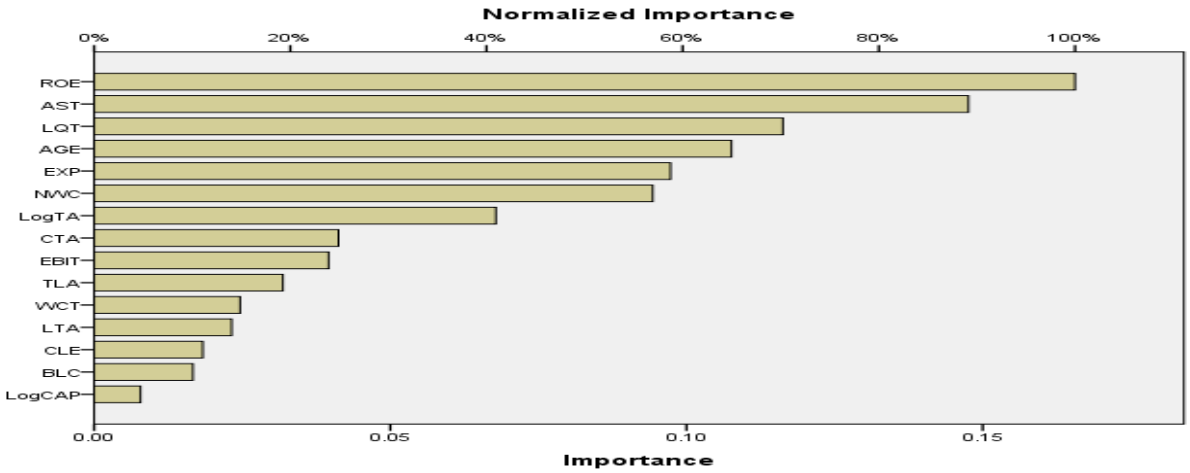
Classification

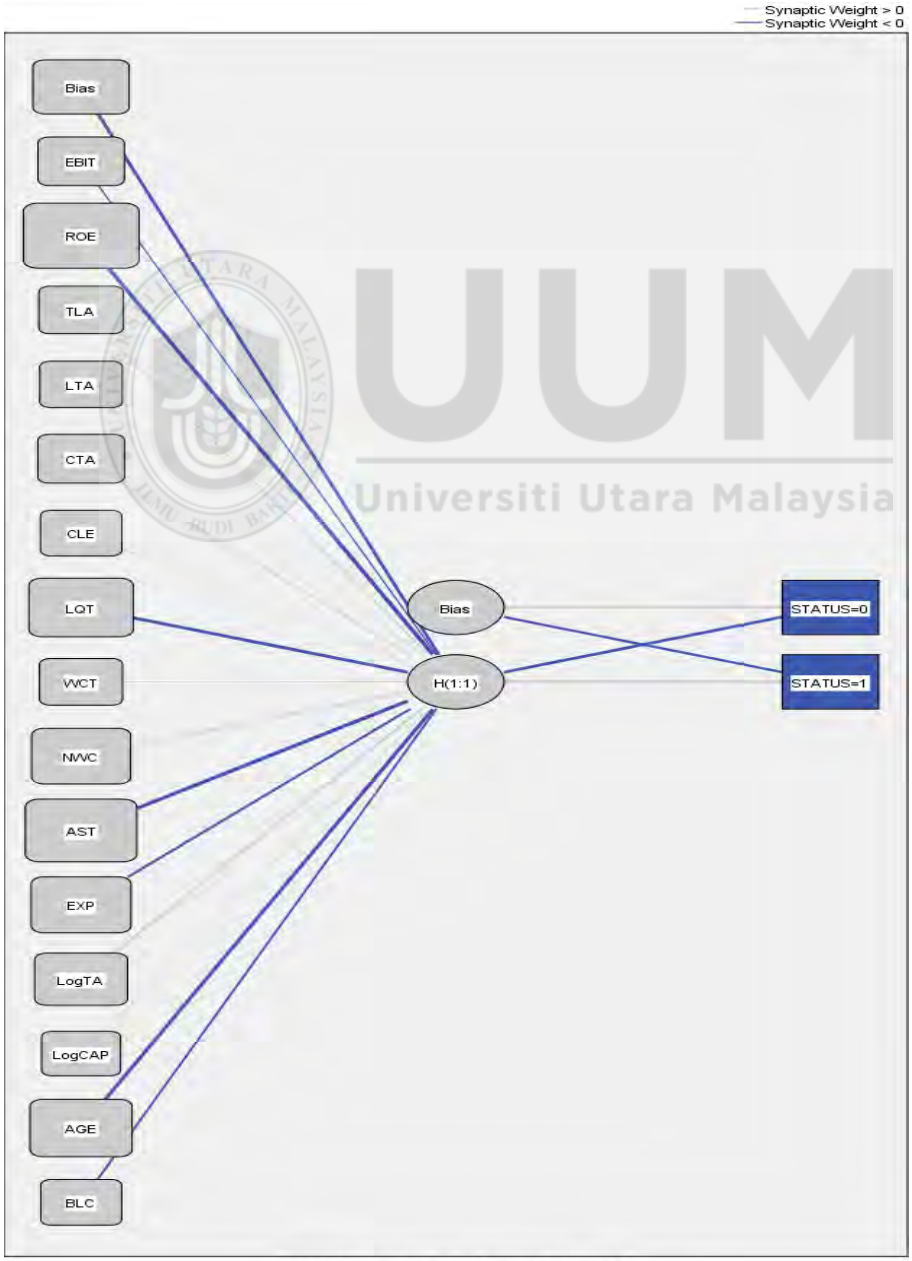
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	157	15	91.3%
	Failed	12	151	92.6%
	Overall Percent	50.4%	49.6%	91.9%
Holdout	Non-Failed	31	7	81.6%
	Failed	3	44	93.6%
	Overall Percent	40.0%	60.0%	88.2%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
EBIT	.040	23.9%
ROE	.166	100.0%
TLA	.032	19.3%
LTA	.023	14.0%
CTA	.041	24.9%
CLE	.018	11.1%
LQT	.116	70.2%
WCT	.025	14.9%
NWC	.094	56.9%
AST	.148	89.1%
EXP	.097	58.8%
LogTA	.068	40.9%
LogCAP	.008	4.7%
AGE	.108	65.0%
BLC	.017	10.1%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3h: Model 2 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	47.524
	Percent Incorrect Predictions	19.4%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.11
Holdout	Percent Incorrect Predictions	32.1%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-.799		
	GENDER	-.688		
	MDD	-1.218		
	NDIR	2.177		
	IND	-.785		
	CONT	-.843		
	CINA	-.790		
	INDIAN	-.789		
	MELAYU	-1.156		
	CPI	.035		
	GDP	-.299		
	BLR	-.473		
	EMPY	-.600		
Hidden Layer 1	(Bias)		-1.796	1.798
	H(1:1)		5.928	-5.947

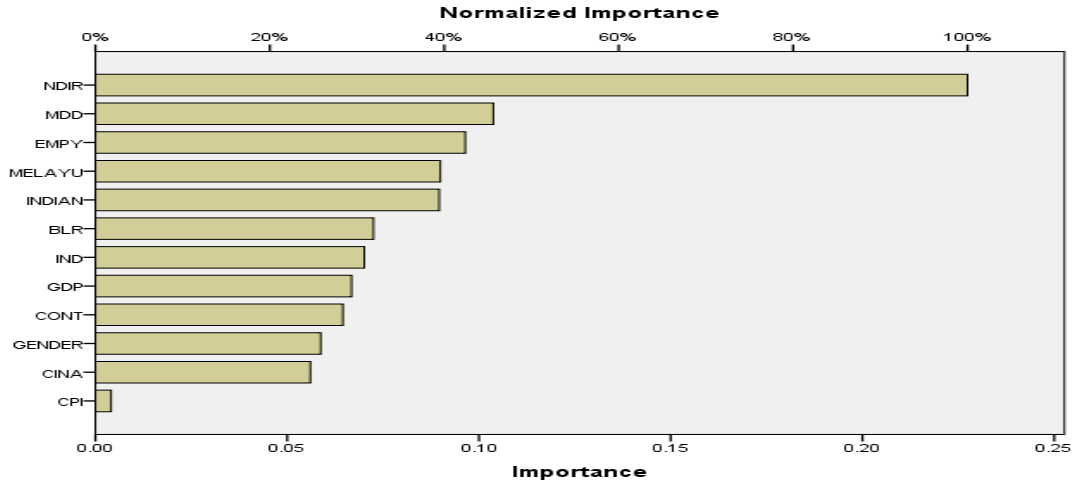
Classification

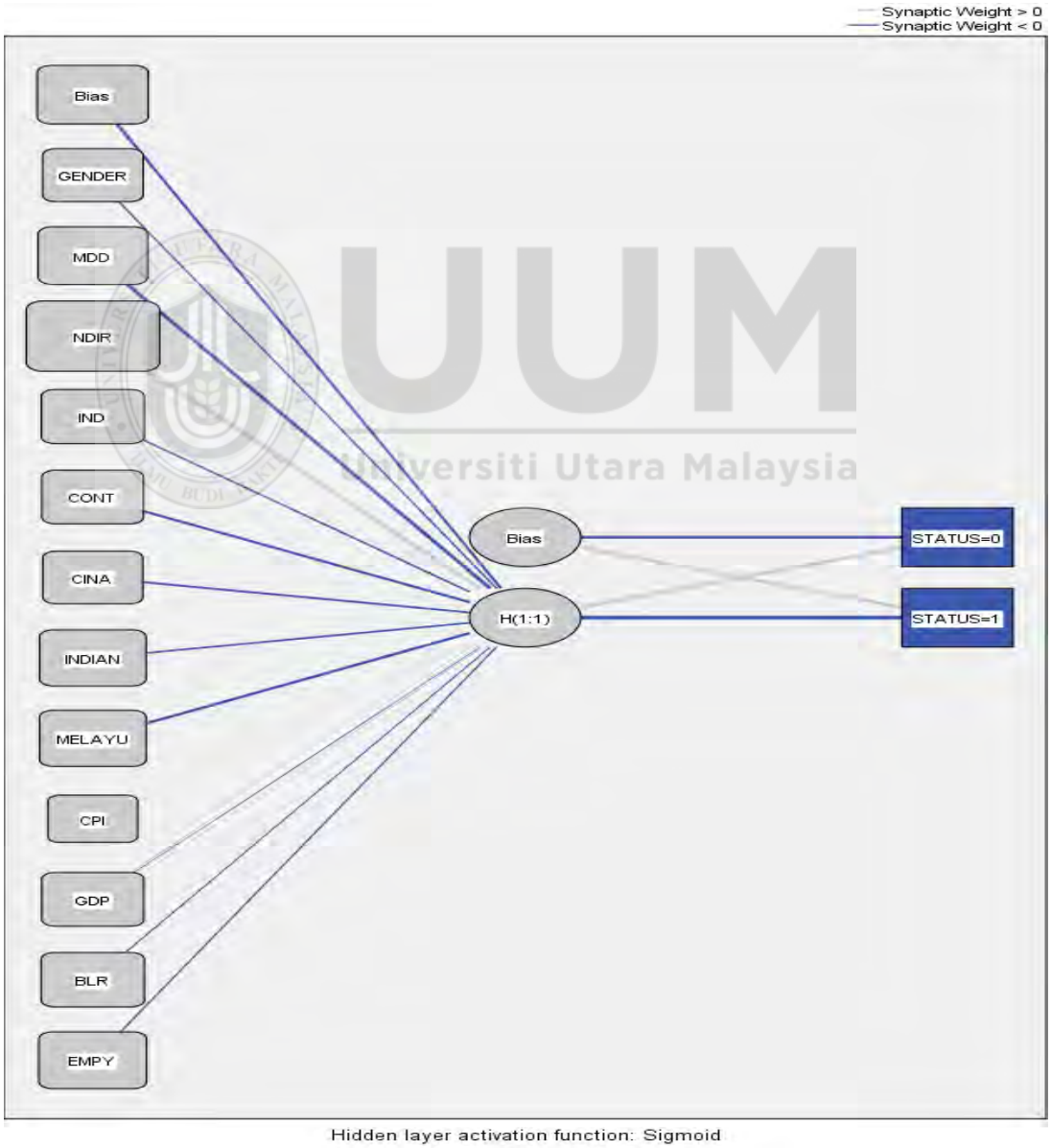
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	138	38	78.4%
	Failed	27	132	83.0%
	Overall Percent	49.3%	50.7%	80.6%
Holdout	Non-Failed	22	12	64.7%
	Failed	15	35	70.0%
	Overall Percent	44.0%	56.0%	67.9%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.059	25.8%
MDD	.104	45.6%
NDIR	.227	100.0%
IND	.070	30.8%
CONT	.065	28.4%
CINA	.056	24.6%
INDIAN	.090	39.4%
MELAYU	.090	39.6%
CPI	.004	1.8%
GDP	.067	29.4%
BLR	.073	31.9%
EMPY	.096	42.4%





Hidden layer activation function: Sigmoid

Output layer activation function: Sigmoid

APPENDIX 3i: Model 3 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	13.084
	Percent Incorrect Predictions	4.0%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.08
Holdout	Percent Incorrect Predictions	18.3%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-2.452		
	GENDER	2.003		
	MDD	3.728		
	NDIR	-.864		
	IND	1.825		
	CONT	.183		
	CINA	1.473		
	INDIAN	2.689		
	MELAYU	2.867		
	CPI	-.228		
	GDP	1.449		
	BLR	-.006		
	EMPY	-.726		
	EBIT	-3.568		
	ROE	-7.464		
	TLA	1.697		
	LTA	.250		
	CTA	1.447		
	CLE	2.243		
	LQT	-7.673		
	WCT	-.158		
	NWC	-1.413		
	AST	-6.896		
	EXP	-3.158		
	LogTA	2.202		
	LogCAP	-.547		
	AGE	-4.346		
	BLC	.034		
Hidden Layer 1	(Bias)		4.564	-4.563
	H(1:1)		-9.493	9.493

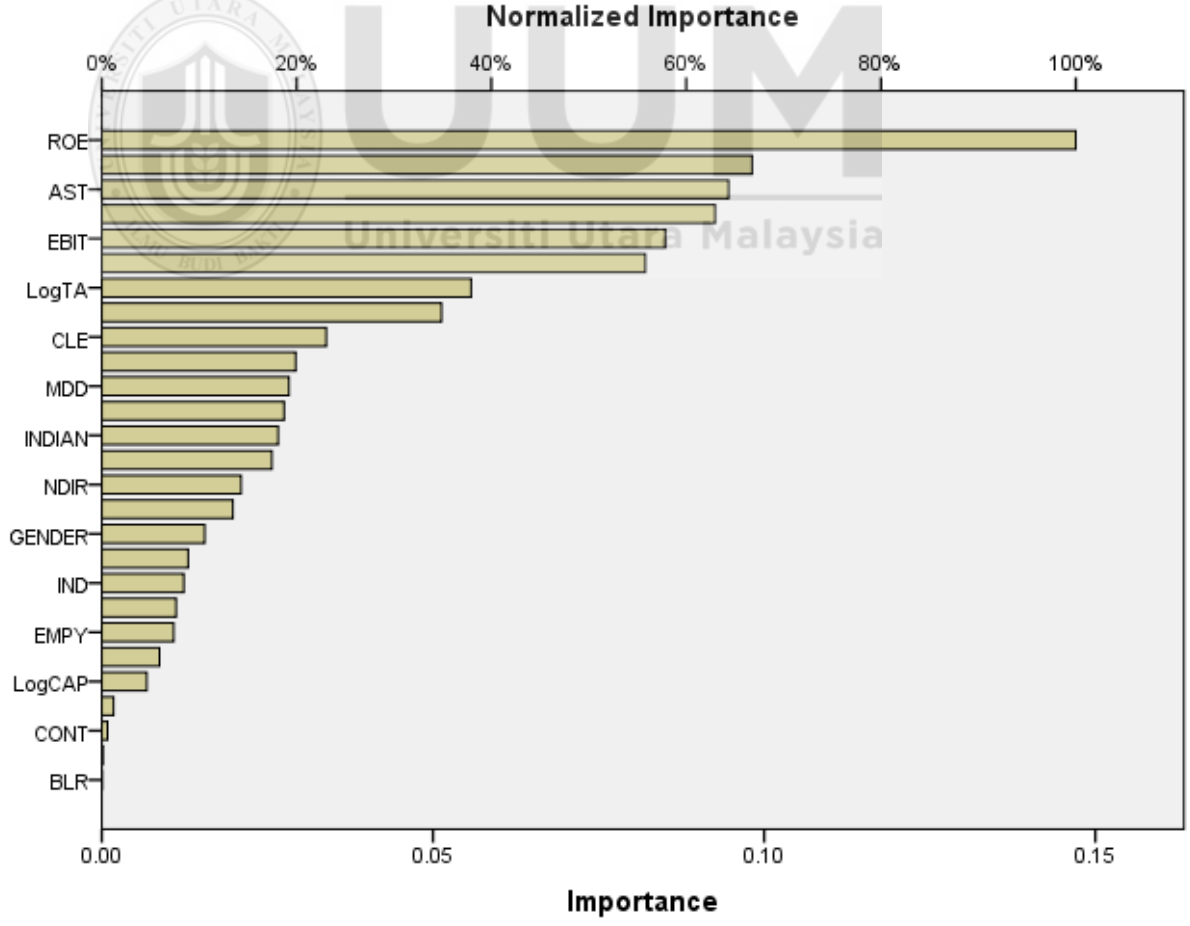
Classification

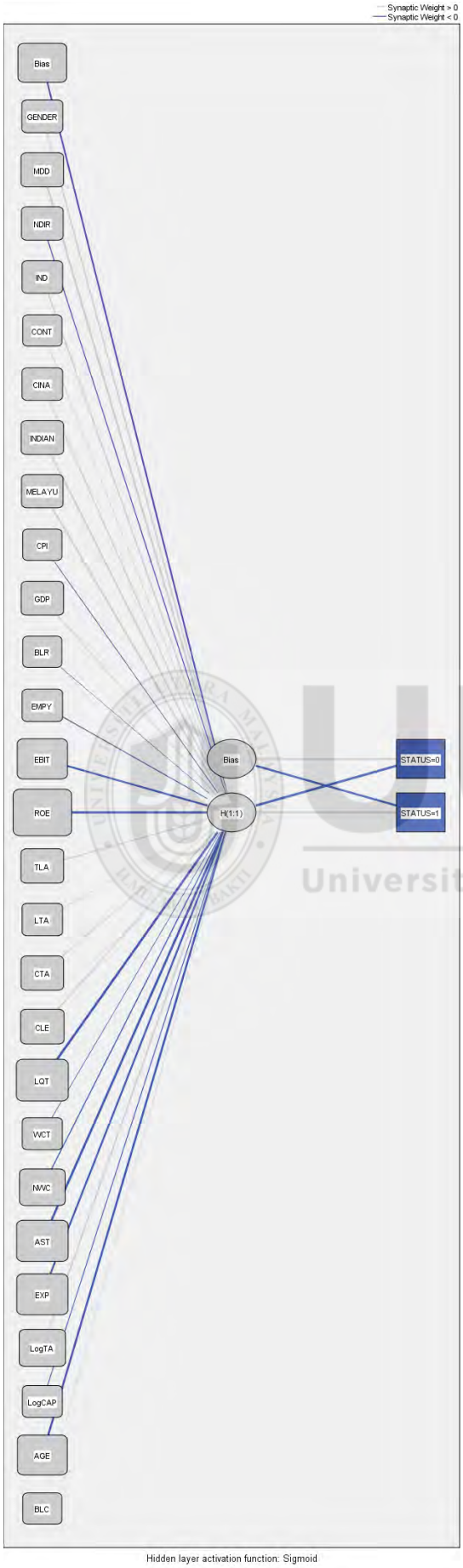
Sample	Observed	Predicted		
		Non-Failed	Failed	Percent Correct
Training	Non-Failed	153	7	95.6%
	Failed	6	160	96.4%
	Overall Percent	48.8%	51.2%	96.0%
Holdout	Non-Failed	40	10	80.0%
	Failed	7	36	83.7%
	Overall Percent	50.5%	49.5%	81.7%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GENDER	.016	10.6%
MDD	.028	19.2%
NDIR	.021	14.3%
IND	.012	8.4%
CONT	.001	0.6%
CINA	.013	8.9%
INDIAN	.027	18.1%
MELAYU	.020	13.5%
CPI	.002	1.2%
GDP	.026	17.5%
BLR	6.373E-005	0.0%
EMPY	.011	7.4%
EBIT	.085	57.8%
ROE	.147	100.0%
TLA	.029	19.9%
LTA	.011	7.6%
CTA	.028	18.7%
CLE	.034	23.0%
LQT	.098	66.8%
WCT	.009	5.9%
NWC	.051	34.9%
AST	.095	64.3%
EXP	.093	63.0%
LogTA	.056	37.9%
LogCAP	.007	4.6%
AGE	.082	55.8%
BLC	.000	0.1%





APPENDIX 4: Logistic Regression for Nigerian Sample

APPENDIX 4a: Model 1 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	102.141[a]	.663	.884

a. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.687	8	.989

Classification Table[a]

Observed			Predicted		
			Distress Status		Percentage Correct
			Non-Failed SME	Failed SME	
Step 1	Distress Status	Non-Failed SME	159	12	93.0
		Failed SME	10	162	94.2
	Overall Percentage				93.6

a. The cut value is .500

```
Logistic regression                               Number of obs   =        343
                                                  LR chi2(15)     =     371.56
                                                  Prob > chi2     =     0.0000
Log likelihood = -51.969243                       Pseudo R2       =     0.7814

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ebit |  -14.81477   2.893176    -5.12   0.000     -20.4853   -9.144254
         roe |  -9.343665   4.957645    -1.88   0.059    -19.06047    .3731406
         tla |   1.986666   .5651198     3.52   0.000     .8790516     3.09428
         lta |   4.288052   1.152826     3.72   0.000     2.028555    6.547549
         cla |  -.3375677   .5911981    -0.57   0.568    -1.496295    .8211594
         cle |   3.076276   1.585738     1.94   0.052    -.0317136    6.184265
         lqt |  -.7059954   .3133853    -2.25   0.024    -1.320219   -.0917714
         wct |   .5740134    .841813     0.68   0.495     -1.07591    2.223937
         nwc |  -.0003062   .0009288    -0.33   0.742    -.0021266    .0015142
         ast |   .1976007   .2588676     0.76   0.445    -.3097705    .7049719
         exp |   2.214325   1.062919     2.08   0.037     .1310423    4.297607
       logta |   .1076997   .2131937     0.51   0.613    -.3101523    .5255518
      logcap |  -.0718521   .1945108    -0.37   0.712    -.4530861     .309382
         age |  -.1168695   .0321734    -3.63   0.000    -.1799281   -.0538108
         blc |  -1.487742   .5663296    -2.63   0.009    -2.597727   -.3777561
       _cons |   37.68313   13.91575     2.71   0.007     10.40877    64.95749
------------------------------------------------------------------------------
Note: 2 failures and 14 successes completely determined.
linktest

Iteration 0:   log likelihood = -237.74803
Iteration 1:   log likelihood = -61.352034
Iteration 2:   log likelihood = -57.509867
Iteration 3:   log likelihood = -51.916262
```

```
Iteration 4:   log likelihood = -51.870609
Iteration 5:   log likelihood = -51.868046
Iteration 6:   log likelihood = -51.868023
Iteration 7:   log likelihood = -51.868023

Logistic regression                                     Number of obs   =        343
                                                        LR chi2(2)      =     371.76
                                                        Prob > chi2     =     0.0000
Log likelihood = -51.868023                             Pseudo R2       =     0.7818

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   .9952764   .1301521     7.65   0.000     .7401829     1.25037
      _hatsq |  -.0183098   .0382936    -0.48   0.633    -.0933639    .0567444
       _cons |   .0686489   .2959004     0.23   0.817    -.5113051     .648603
------------------------------------------------------------------------------
```

```
brier status var27

Mean probability of outcome   0.5015
                 of forecast  0.5015

Correlation                   0.9018
ROC area                      0.9872  p = 0.0000

Brier score                   0.0467
Spiegelhalter's z-statistic   0.3171  p = 0.3756
Sanders-modified Brier score  0.0484
Sanders resolution            0.0479
Outcome index variance        0.2500
Murphy resolution             0.2021
Reliability-in-the-small      0.0005
Forecast variance             0.2054
Excess forecast variance      0.0384
Minimum forecast variance     0.1671
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.4087
```


APPENDIX 4b: Model 2 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	339.858[a]	.329	.438

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	10.886	8	.208

Classification Table[a]

Observed			Predicted		
			Distress Status		Percentage Correct
			Non-Failed SME	Failed SME	
Step 1	Distress Status	Non-Failed SME	131	41	76.2
		Failed SME	34	138	80.2
	Overall Percentage				78.2

a. The cut value is .500

```
Logistic regression                                     Number of obs   =        344
                                                        LR chi2(12)     =     136.16
                                                        Prob > chi2     =     0.0000
Log likelihood = -170.36381                             Pseudo R2       =     0.2855

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |   .3000395   .3134749     0.96   0.338      -.31436    .9144391
         blr |  -.8913132   1.886339    -0.47   0.637    -4.588469    2.805842
         cpi |   .4021661   .3365866     1.19   0.232    -.2575315    1.061864
       empy |   44.08186   28.70929     1.54   0.125    -12.18731     100.351
      gender |   .6242187    .411914     1.52   0.130    -.1831178    1.431555
         mdd |   -.831607   .3161258    -2.63   0.009    -1.451202   -.2120119
        cont |   1.322251   .3486928     3.79   0.000      .638826    2.005677
        ndir |  -.5199817   .1040268    -5.00   0.000    -.7238705   -.3160929
         ind |  -2.008645   .6415269    -3.13   0.002    -3.266015   -.7512757
          e1 |  -.2257227    .392242    -0.58   0.565    -.9945029    .5430576
          e2 |  -.0665049   .3784845    -0.18   0.861    -.8083209     .675311
          e3 |   -.111312   .3798789    -0.29   0.770     -.855861    .6332369
       _cons |   1.265376   .6315595     2.00   0.045     .0275426     2.50321
------------------------------------------------------------------------------
linktest

Iteration 0:   log likelihood = -238.44263
Iteration 1:   log likelihood = -166.40485
Iteration 2:   log likelihood = -166.35454
Iteration 3:   log likelihood = -166.35451
Iteration 4:   log likelihood = -166.35451

Logistic regression                                     Number of obs   =        344
                                                        LR chi2(2)      =     144.18
                                                        Prob > chi2     =     0.0000
Log likelihood = -166.35451                             Pseudo R2       =     0.3023

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.144705   .1277547     8.96   0.000     .8943104      1.3951
      _hatsq |   .1476419   .0460715     3.20   0.001     .0573434    .2379403
       _cons |  -.2365349   .1575777    -1.50   0.133    -.5453815    .0723116
------------------------------------------------------------------------------

brier status var28

Mean probability of outcome   0.5000
                 of forecast  0.5000

Correlation                   0.6079
ROC area                      0.8492  p = 0.0000

Brier score                   0.1577
Spiegelhalter's z-statistic  -0.5798  p = 0.7190
Sanders-modified Brier score  0.1584
Sanders resolution            0.1535
Outcome index variance        0.2500
Murphy resolution             0.0965
Reliability-in-the-small      0.0049
Forecast variance             0.0864
```

```
Excess forecast variance      0.0545
Minimum forecast variance     0.0319
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.1787
```

APPENDIX 4c: Model 3 (3-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	73.339[a]	.690	.921

a. Estimation terminated at iteration number 12 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.302	8	.914

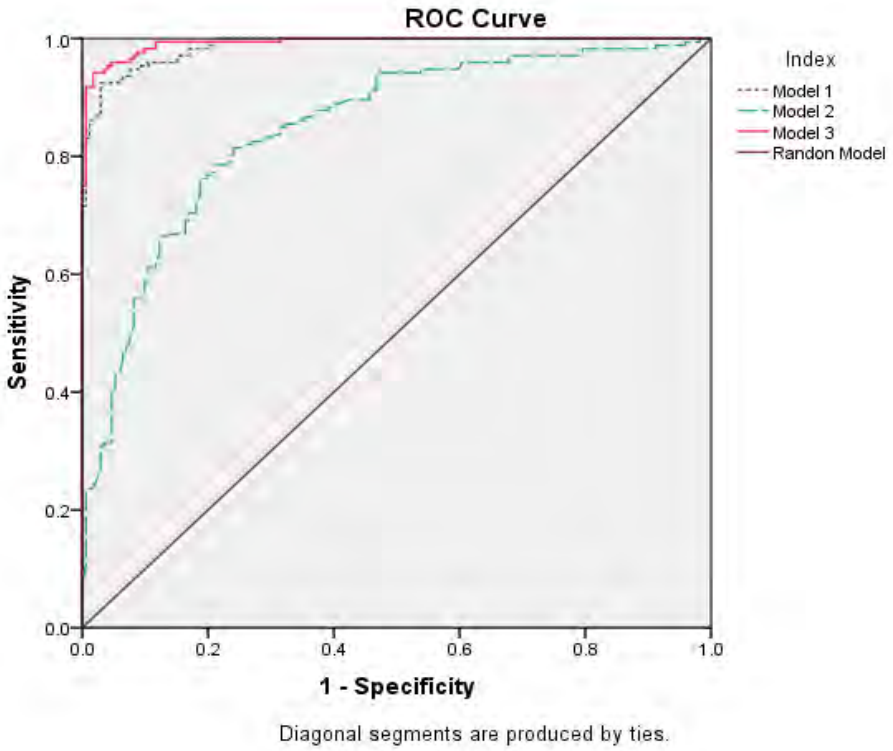
Classification Table[a]

Observed			Predicted		
			Distress Status		Percentage Correct
			Non-Failed SME	Failed SME	
Step 1	Distress Status	Non-Failed SME	165	6	96.5
		Failed SME	9	163	94.8
	Overall Percentage				95.6

a. The cut value is .500

```
Logistic regression                               Number of obs   =        343
                                                  LR chi2(27)     =     409.04
                                                  Prob > chi2     =     0.0000
Log likelihood = -33.228781                       Pseudo R2       =     0.8602

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |   .7781117   1.035236     0.75   0.452    -1.250914    2.807138
         blr |  -3.775473   6.597212    -0.57   0.567    -16.70577    9.154824
         cpi |   1.645049   1.417209     1.16   0.246     -1.13263    4.422727
       empy |   298.8987   115.6517     2.58   0.010     72.22542    525.5719
      gender |  -2.528492   1.317299    -1.92   0.055    -5.110351    .0533662
         mdd |   .8092365   .9169466     0.88   0.377    -.9879457    2.606419
        cont |   1.478152     1.0987     1.35   0.179    -.6752618    3.631565
        ndir |  -.6306661   .2539718    -2.48   0.013    -1.128442   -.1328906
         ind |  -5.518254   2.443208    -2.26   0.024    -10.30685   -.7296537
          e1 |   3.943827   1.759436     2.24   0.025     .4953953    7.392258
          e2 |   3.371608   1.555307     2.17   0.030     .3232629    6.419953
          e3 |   .7737331   1.144702     0.68   0.499    -1.469841    3.017307
         cla |  -1.454535   .9595861    -1.52   0.130    -3.335289    .4262192
        ebit |  -28.48281    7.02667    -4.05   0.000    -42.25483   -14.71079
         roe |  -22.07524   8.799247    -2.51   0.012    -39.32144   -4.829028
         tla |   3.845466   1.143543     3.36   0.001     1.604163     6.08677
         lta |   7.567882   2.243217     3.37   0.001     3.171258    11.96451
         cle |    8.16124   3.291742     2.48   0.013     1.709544    14.61294
         lqt |  -1.267447   .4777916    -2.65   0.008    -2.203902   -.3309929
         wct |   1.055695    1.66393     0.63   0.526    -2.205549    4.316939
         nwc |  -.0007598   .0010365    -0.73   0.464    -.0027913    .0012716
         ast |     .11924   .4428877     0.27   0.788     -.748804     .987284
         exp |   3.094696    1.76528     1.75   0.080    -.3651889    6.554581
       logta |  -.3953828   .3553073    -1.11   0.266    -1.091772    .3010067
      logcap |   .6995847   .3750572     1.87   0.062     -.035514    1.434683
         age |  -.1394117   .0488611    -2.85   0.004    -.2351778   -.0436457
         blc |   -3.50795   1.196626    -2.93   0.003    -5.853294   -1.162606
```

```
       _cons |   80.64021   26.99968     2.99   0.003     27.72182    133.5586
------------------------------------------------------------------------------
Note: 15 failures and 48 successes completely determined.


linktest

Iteration 0:   log likelihood = -237.74803
Iteration 1:   log likelihood = -48.660965
Iteration 2:   log likelihood = -36.128191
Iteration 3:   log likelihood =  -33.46796
Iteration 4:   log likelihood = -33.053255
Iteration 5:   log likelihood = -33.046501
Iteration 6:   log likelihood = -33.045804
Iteration 7:   log likelihood = -33.045792
Iteration 8:   log likelihood = -33.045792

Logistic regression                               Number of obs   =        343
                                                  LR chi2(2)      =     409.40
                                                  Prob > chi2     =     0.0000
Log likelihood = -33.045792                       Pseudo R2       =     0.8610

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _hat |   1.013617    .188226     5.39   0.000     .6447004    1.382533
     _hatsq |   .0100832   .0032866     3.07   0.249     .0036416    .0165247
      _cons |  -.0269479    .313085    -0.09   0.931    -.6405831    .5866873
------------------------------------------------------------------------------

brier status var29

Mean probability of outcome   0.5015
                of forecast   0.5015

Correlation                   0.9355
ROC area                      0.9927  p = 0.0000

Brier score                   0.0312
Spiegelhalter's z-statistic  -0.3218  p = 0.6262
Sanders-modified Brier score  0.0366
Sanders resolution            0.0363
Outcome index variance        0.2500
Murphy resolution             0.2137
Reliability-in-the-small      0.0003
Forecast variance             0.2170
Excess forecast variance      0.0271
Minimum forecast variance     0.1899
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.4358
```



Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.987	.004	.000	.979	.995
Model 2	.848	.021	.000	.808	.889
Model 3	.993	.003	.000	.987	.998

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.
a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5

APPENDIX 4d: Model 1 (2-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	111.384[a]	.522	.696

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	9.919	8	.271

Classification Table[a]

Observed			Predicted		
			Distress status		Percentage Correct
			Non-failed SME	Failed SME	
Step 1	Distress status	Non-failed SME	74	12	86.0
		Failed SME	13	73	84.9
	Overall Percentage				85.5

a. The cut value is .500

```
Logistic regression                                     Number of obs   =        172
                                                        LR chi2(15)     =     127.13
                                                        Prob > chi2     =     0.0000
Log likelihood = -55.654473                             Pseudo R2       =     0.5332

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |  -.2180605   .0469631    -4.64   0.000    -.3101065   -.1260144
         blc |  -1.227612   .5258931    -2.33   0.020    -2.258343   -.1968803
        lgta |   .3831998   .2457099     1.56   0.119    -.0983827    .8647823
       lgcap |   .4136951   .2182157     1.90   0.058    -.0139999      .84139
         tla |   .3580774   .1894363     1.89   0.059     -.013211    .7293658
         lta |  -1.236607   1.379089    -0.90   0.370    -3.939573    1.466358
         cla |    2.16186   1.655647     1.31   0.192    -1.083149     5.40687
         cle |   .4030159   .2791147     1.44   0.149    -.1440388    .9500707
         lqt |  -.0654955   .0737803    -0.89   0.375    -.2101023    .0791113
         exp |   .2913615   .2686249     1.08   0.278    -.2351335    .8178565
        ebit |  -10.04817   2.698211    -3.72   0.000    -15.33657   -4.759778
         roe |   .2336491   .2096197     1.11   0.265     -.177198    .6444963
         wct |  -1.431815   .6675135    -2.14   0.032    -2.740118   -.1235129
         nwc |  -.0007595   .0017066    -0.45   0.656    -.0041043    .0025853
         ast |  -.3127946   .2306252    -1.36   0.175    -.7648117    .1392225
       _cons |  -7.540194   5.671835    -1.33   0.184    -18.65679    3.576398
------------------------------------------------------------------------------
Note: 0 failures and 3 successes completely determined.


linktest

Iteration 0:   log likelihood = -119.22132
Iteration 1:   log likelihood = -57.016168
Iteration 2:   log likelihood = -56.328997
Iteration 3:   log likelihood = -55.352828
Iteration 4:   log likelihood = -54.417811
Iteration 5:   log likelihood = -54.403157
Iteration 6:   log likelihood = -54.403141
Iteration 7:   log likelihood = -54.403141

Logistic regression                                     Number of obs   =        172
                                                        LR chi2(2)      =     129.64
                                                        Prob > chi2     =     0.0000
Log likelihood = -54.403141                             Pseudo R2       =     0.5437

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.082075   .1777958     6.09   0.000     .7336018    1.430548
      _hatsq |   .0851371   .0478801     1.78   0.075    -.0087062    .1789803
       _cons |  -.1985104   .2701223    -0.73   0.462    -.7279403    .3309196
------------------------------------------------------------------------------


brier status var31

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.7759
ROC area                      0.9336  p = 0.0000

Brier score                   0.0995
```

```
Spiegelhalter's z-statistic  -0.1989  p = 0.5788
Sanders-modified Brier score  0.1045
Sanders resolution            0.1004
Outcome index variance        0.2500
Murphy resolution             0.1496
Reliability-in-the-small      0.0041
Forecast variance             0.1479
Excess forecast variance      0.0589
Minimum forecast variance     0.0890
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.2983
```

APPENDIX 4e: Model 2 (2-year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	91.068[a]	.575	.767

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	3.032	8	.932

Classification Table[a]

Observed			Predicted		
			Distress status		Percentage Correct
			Non-failed SME	Failed SME	
Step 1	Distress status	Non-failed SME	74	12	86.0
		Failed SME	8	78	90.7
	Overall Percentage				88.4

a. The cut value is .500

```
Logistic regression                                     Number of obs   =        172
                                                        LR chi2(12)     =     147.38
                                                        Prob > chi2     =     0.0000
Log likelihood = -45.533751                             Pseudo R2       =     0.6181

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |  -1.546551   1.174787    -1.32   0.188     -3.84909    .7559884
      gender |   2.716002   .8000033     3.39   0.001     1.148024    4.283979
        cont |   3.985585    .720986     5.53   0.000     2.572478    5.398691
        ndir |  -1.747891   .4231401    -4.13   0.000     -2.57723   -.9185511
         mdd |  -.8365568   .7251241    -1.15   0.249    -2.257774    .5846604
          e1 |   .8623743   .8555602     1.01   0.313    -.8144929    2.539242
          e2 |   .6941031   .7742187     0.90   0.370    -.8233377    2.211544
          e3 |  -.2987867   .8202987    -0.36   0.716    -1.906543    1.308969
         gdp |   .0181561   .6312158     0.03   0.977    -1.219004    1.255316
         blr |   5.879454   3.911953     1.50   0.133    -1.787834    13.54674
         cpi |   1.032575    .852981     1.21   0.226    -.6392368    2.704387
        empy |   153.7456   68.88561     2.23   0.026      18.7323    288.7589
       _cons |   .5637957   1.419655     0.40   0.691    -2.218676    3.346268
------------------------------------------------------------------------------
linktest

Iteration 0:   log likelihood = -119.22132
```

```
Iteration 1:   log likelihood = -46.378213
Iteration 2:   log likelihood = -45.726257
Iteration 3:   log likelihood = -45.545956
Iteration 4:   log likelihood = -45.532833
Iteration 5:   log likelihood =  -45.53278
Iteration 6:   log likelihood =  -45.53278

Logistic regression                                     Number of obs   =        172
                                                        LR chi2(2)      =     147.38
                                                        Prob > chi2     =     0.0000
Log likelihood =  -45.53278                             Pseudo R2       =     0.6181

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   .9992532   .1570982     6.36   0.000     .6913463     1.30716
      _hatsq |   .0027059   .0611054     0.04   0.965    -.1170584    .1224702
       _cons |  -.0080715   .3305977    -0.02   0.981     -.656031    .6398881
------------------------------------------------------------------------------

brier status var32

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.8125
ROC area                      0.9562  p = 0.0000

Brier score                   0.0850
Spiegelhalter's z-statistic   0.3307  p = 0.3704
Sanders-modified Brier score  0.0837
Sanders resolution            0.0826
Outcome index variance        0.2500
Murphy resolution             0.1674
Reliability-in-the-small      0.0011
Forecast variance             0.1693
Excess forecast variance      0.0575
Minimum forecast variance     0.1118
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.3343
```


APPENDIX 4f: Model 3 (2-year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	35.958[a]	.692	.922

a. Estimation terminated at iteration number 10 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.271	8	.996

Classification Table[a]

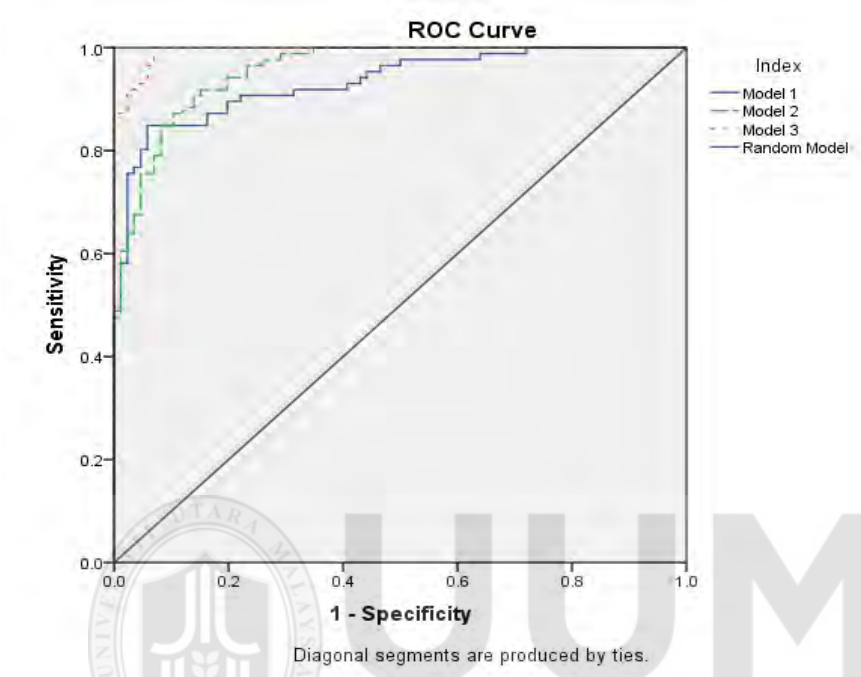
	Observed		Predicted		
			Distress status		Percentage Correct
			Non-failed SME	Failed SME	
Step 1	Distress status	Non-failed SME	81	5	94.2
		Failed SME	4	82	95.3

Overall Percentage			94.8

a. The cut value is .500

```
Logistic regression                                     Number of obs   =        172
                                                        LR chi2(20)     =     201.29
                                                        Prob > chi2     =     0.0000
Log likelihood = -18.574994                             Pseudo R2       =     0.8442

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |   3.430917   1.576678     2.18   0.030     .3406851     6.52115
        cont |   6.193857   2.009947     3.08   0.002     2.254433    10.13328
        ndir |  -1.212266   .5705787    -2.12   0.034     -2.33058   -.0939522
         cpi |   4.531204   2.368695     1.91   0.056    -.1113536    9.173761
        empy |   81.41484   199.9869     0.41   0.684    -310.5523    473.3819
         age |  -.3146806   .1222658    -2.57   0.010    -.5543172   -.0750441
         blc |  -4.332444   2.151373    -2.01   0.044    -8.549057   -.1158306
        lgta |   .6029914   .6350999     0.95   0.342    -.6417814    1.847764
       lgcap |   .9968369   .5051603     1.97   0.048      .006741    1.986933
         tla |   1.015187   .5443217     1.87   0.062    -.0516642    2.082038
         lta |  -2.709361   3.816789    -0.71   0.478    -10.19013    4.771408
         cla |   4.451715   5.872275     0.76   0.448    -7.057732    15.96116
         cle |   1.116134   .6379086     1.75   0.080    -.1341443    2.366411
         lqt |  -.1710179   .2182284    -0.78   0.433    -.5987376    .2567019
         exp |  -.3468902   .6013186    -0.58   0.564    -1.525453    .8316726
        ebit |  -17.79112    8.03998    -2.21   0.027    -33.54919   -2.033049
         roe |   .4927496    .483602     1.02   0.308    -.4550929    1.440592
         wct |  -3.311312    2.01632    -1.64   0.101    -7.263225    .6406021
         nwc |   .0001758    .003053     0.06   0.954    -.0058078    .0061595
         ast |   .1680873   .6261737     0.27   0.788    -1.059191    1.395365
       _cons |  -22.05732   15.86291    -1.39   0.164    -53.14804    9.033404
------------------------------------------------------------------------------
Note: 4 failures and 7 successes completely determined.


linktest

Iteration 0:   log likelihood = -119.22132
Iteration 1:   log likelihood = -30.562071
Iteration 2:   log likelihood =  -19.57892
Iteration 3:   log likelihood = -12.101918
Iteration 4:   log likelihood =  -11.35528
Iteration 5:   log likelihood = -11.320761
Iteration 6:   log likelihood = -11.320144
Iteration 7:   log likelihood = -11.319943
Iteration 8:   log likelihood = -11.319736
Iteration 9:   log likelihood = -11.319322
Iteration 10:  log likelihood = -11.319322

Logistic regression                                     Number of obs   =        172
                                                        LR chi2(2)      =     215.80
                                                        Prob > chi2     =     0.0000
Log likelihood = -11.319322                             Pseudo R2       =     0.9051

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _hat |   1.000229   .4415247     2.27   0.023     .1348568    1.865602
     _hatsq |   .0048077    .137785     0.03   0.972    -.2652459    .2748614
      _cons |  -.0068958   .5651181    -0.01   0.990    -1.114507    1.100715
------------------------------------------------------------------------------


brier status var33

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.9373
ROC area                      0.9950  p = 0.0000

Brier score                   0.0304
```

```
Spiegelhalter's z-statistic   0.3950  p = 0.3464
Sanders-modified Brier score  0.0438
Sanders resolution            0.0415
Outcome index variance        0.2500
Murphy resolution             0.2085
Reliability-in-the-small      0.0023
Forecast variance             0.2226
Excess forecast variance      0.0270
Minimum forecast variance     0.1955
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.4422
```



Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.934	.019	.000	.897	.970
Model 2	.956	.013	.000	.930	.982
Model 3	.994	.003	.000	.987	1.000

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.
a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5

APPENDIX 4g: Model 1 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	72.141[a]	.534	.713

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	3.932	8	.863

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed SME	
Step 1	STATUS	Non-Failed	51	7	87.9
		Failed SME	10	48	82.8
	Overall Percentage				85.3

a. The cut value is .500

```
Logistic regression                                     Number of obs   =        116
                                                        LR chi2(15)     =      88.57
                                                        Prob > chi2     =     0.0000
Log likelihood = -36.119583                             Pseudo R2       =     0.5508

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   -.2942693   .0725098    -4.06   0.000     -.436386   -.1521527
         blc |   -1.650828   .6699368    -2.46   0.014     -2.96388   -.3377755
        lgta |    .6612721   .3441357     1.92   0.055    -.0132216    1.335766
   lgcapital |   -.2558692   .2878073    -0.89   0.374    -.8199612    .3082227
         tla |    .4237849   .2314139     1.83   0.067     -.029778    .8773478
         lta |   -.0772941   1.038988    -0.07   0.941    -2.113673    1.959085
         cle |    2.323212    2.44723     0.95   0.342    -2.473271    7.119695
         lqt |   -.1729614   .0840469    -2.06   0.040    -.3376902   -.0082326
         cla |   -.4844375    .593958    -0.82   0.415    -1.648574    .6796988
        ebit |   -8.967879   3.224262    -2.78   0.005    -15.28732   -2.648442
         roe |   -.0724758    .208796    -0.35   0.729    -.4817085    .3367569
         wct |   -.3960157   .7083895    -0.56   0.576    -1.784434    .9924021
         nwc |   -.0022089   .0020675    -1.07   0.285    -.0062611    .0018432
         ast |   -1.093875   .4158403    -2.63   0.009    -1.908907   -.2788429
         exp |    5.016023   2.376801     2.11   0.035      .357579    9.674467
       _cons |   -2.417662   6.436262    -0.38   0.707     -15.0325    10.19718
------------------------------------------------------------------------------
Note: 0 failures and 1 success completely determined.


linktest

Iteration 0:   log likelihood = -80.405073
Iteration 1:   log likelihood = -36.801705
Iteration 2:   log likelihood = -36.147099
Iteration 3:   log likelihood = -35.540111
Iteration 4:   log likelihood = -35.367351
Iteration 5:   log likelihood = -35.361971
Iteration 6:   log likelihood = -35.361964
Iteration 7:   log likelihood = -35.361964

Logistic regression                                     Number of obs   =        116
                                                        LR chi2(2)      =      90.09
                                                        Prob > chi2     =     0.0000
Log likelihood = -35.361964                             Pseudo R2       =     0.5602

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.081144   .2299742     4.70   0.000     .6304032    1.531885
      _hatsq |   .0710064   .0452277     1.57   0.116    -.0176381     .159651
```

```
       _cons |  -.1416514   .3170945    -0.45   0.655    -.7631453    .4798424
------------------------------------------------------------------------------

brier status var27

Mean probability of outcome   0.5000
                 of forecast  0.5000

Correlation                   0.7745
ROC area                      0.9364  p = 0.0000

Brier score                   0.1000
Spiegelhalter's z-statistic   0.0440  p = 0.4824
Sanders-modified Brier score  0.1010
Sanders resolution            0.0964
Outcome index variance        0.2500
Murphy resolution             0.1536
Reliability-in-the-small      0.0046
Forecast variance             0.1506
Excess forecast variance      0.0603
Minimum forecast variance     0.0904
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.3006
```

APPENDIX 4h: Model 2 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	98.003[a]	.418	.557

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	5.650	8	.686

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed SME	
Step 1	STATUS	Non-Failed	42	16	72.4
		Failed SME	4	54	93.1
	Overall Percentage				82.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	-.968	.597	2.628	1	.105	.380
	IND	1.272	1.990	.408	1	.523	3.567
	CONT	3.918	.692	32.026	1	.000	50.283
	NDIR	-.075	.167	.203	1	.652	.927
	MDD	-.375	.641	.342	1	.559	.687
	Hausa	-1.413	.943	2.247	1	.134	.243
	Yaroba	-.667	.879	.576	1	.448	.513
	Igbo	-1.046	.916	1.303	1	.254	.352

	GDP	.253	.644	.155	1	.694	1.288
	BLR	-4.489	3.606	1.550	1	.213	.011
	CPI	-.323	.706	.210	1	.647	.724
	EMPY	13.731	60.937	.051	1	.822	918954.646
	Constant	-.914	1.025	.795	1	.373	.401

a. Variable(s) entered on step 1: SEX, IND, CONT, NDIR, DLTY, Hausa, Yaroba, Igbo, GDP, BLR, CPI, EMPY.

Log likelihood = -49.1247 Pseudo R2 = 0.3890

```
linktest

Iteration 0:   log likelihood = -80.405073
Iteration 1:   log likelihood = -49.362093
Iteration 2:   log likelihood = -49.112689
Iteration 3:   log likelihood = -49.110937
Iteration 4:   log likelihood = -49.110937

Logistic regression                               Number of obs   =        116
                                                  LR chi2(2)      =      62.59
                                                  Prob > chi2     =     0.0000
Log likelihood = -49.110937                       Pseudo R2       =     0.3892

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   .9859619   .1906251     5.17   0.000     .6123436     1.35958
      _hatsq |  -.0190123   .1142883    -0.17   0.868    -.2430132    .2049886
       _cons |   .0477352   .3873136     0.12   0.902    -.7113855    .8068558
------------------------------------------------------------------------------

brier status var28

Mean probability of outcome   0.5000
                 of forecast  0.5000

Correlation                   0.6835
ROC area                      0.8795  p = 0.0000

Brier score                   0.1332
Spiegelhalter's z-statistic  -0.0009  p = 0.5004
Sanders-modified Brier score  0.1345
Sanders resolution            0.1306
Outcome index variance        0.2500
Murphy resolution             0.1194
Reliability-in-the-small      0.0039
Forecast variance             0.1168
Excess forecast variance      0.0622
Minimum forecast variance     0.0546
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.2336
```

APPENDIX 4i: Model 3 (1-Year Prior Sub-sample)

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	29.115[a]	.679	.905

a. Estimation terminated at iteration number 12 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	1.273	8	.996

Classification Table[a]

Observed			Predicted		
			STATUS		Percentage Correct
			Non-Failed	Failed SME	
Step 1	STATUS	Non-Failed	54	4	93.1
		Failed SME	4	54	93.1
	Overall Percentage				93.1

a. The cut value is .500

Variables in the Equation

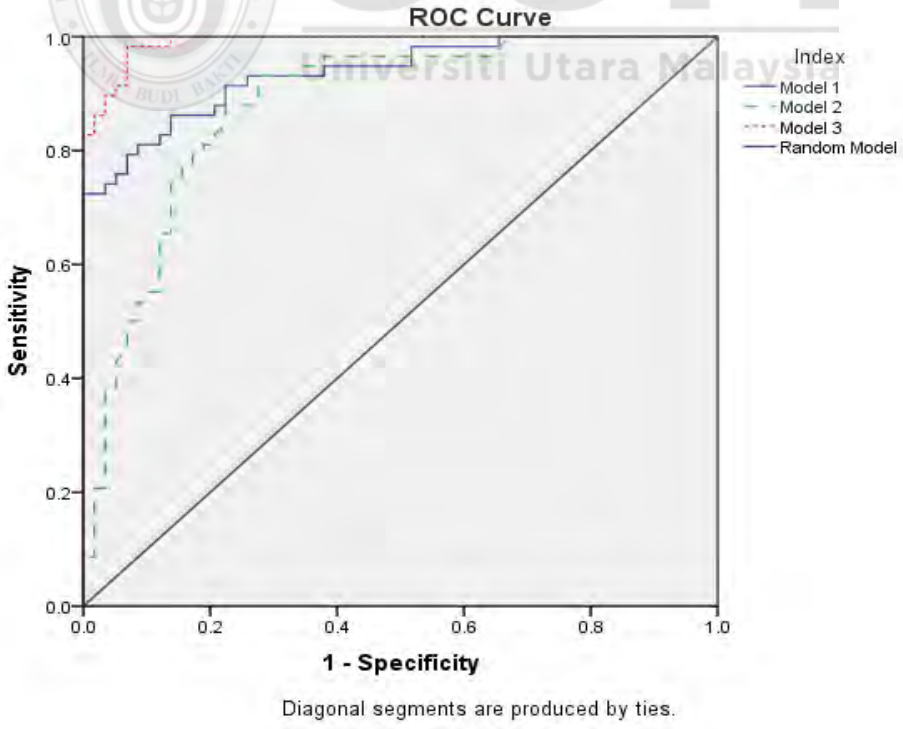
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	GENDER	.039	1.413	.001	1	.978	1.039
	CONT	15.630	7.647	4.178	1	.041	6137785.824
	NDIR	-.146	.466	.098	1	.754	.864
	MDD	.147	2.167	.005	1	.946	1.158
	BLR	-33.546	14.512	5.344	1	.021	.000
	CPI	-4.527	2.964	2.332	1	.127	.011
	EMPY	514.671	287.857	3.197	1	.074	.000
	Age	-.950	.412	5.328	1	.021	.387
	BLC	-8.567	4.067	4.438	1	.035	.000
	LogTA	-2.060	1.098	3.516	1	.061	7.845
	LogCAP	-1.273	.879	2.096	1	.148	.280
	TLA	2.581	1.401	3.391	1	.066	13.208
	LTA	.479	1.632	.086	1	.769	1.615
	CLE	5.377	5.667	.900	1	.343	216.398
	LQT	-.790	.389	4.120	1	.042	.454
	CLA	-.159	1.207	.017	1	.895	.853
	EBIT	-18.996	9.416	4.070	1	.044	.000
	ROE	-1.901	.969	3.850	1	.050	.149
	WCT	-3.418	2.686	1.619	1	.203	.033
	NWC	-.030	.016	3.382	1	.066	.971
	AST	-2.481	1.122	4.890	1	.027	.084
	EXP	15.011	9.968	2.268	1	.132	3304259.539
	Constant	44.586	31.467	2.008	1	.157	2308389475201 8070000.000

a. Variable(s) entered on step 1: SEX, CONT, NDIR, DLTY, BLR, CPI, EMPY, Age, BLC, lgTA, lgcapital, TLA, LTA, CLE, LQT, CLA, EBIT, ROE, WCT, NWC, AST, EXP.

Log likelihood = -13.93074 Pseudo R2 = 0.8267

```
linktest

Iteration 0:   log likelihood = -80.405073
Iteration 1:   log likelihood = -22.342667
Iteration 2:   log likelihood = -15.992228
Iteration 3:   log likelihood = -14.047035
Iteration 4:   log likelihood = -13.943579
Iteration 5:   log likelihood = -13.935092
Iteration 6:   log likelihood = -13.931661
Iteration 7:   log likelihood = -13.905427
Iteration 8:   log likelihood = -13.905339
Iteration 9:   log likelihood = -13.905339

Logistic regression                             Number of obs   =        116
```

```
                                                LR chi2(2)      =     133.00
                                                Prob > chi2     =     0.0000
Log likelihood = -13.905339                     Pseudo R2       =     0.8271

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.003761   .3335444     3.01   0.003     .3500263    1.657496
      _hatsq |  -.0097927   .0079039    -1.24   0.215    -.0252841    .0056986
       _cons |   .0202594   .4748968     0.04   0.966    -.9105211      .95104
------------------------------------------------------------------------------

brier status var29

Mean probability of outcome   0.5000
                of forecast   0.5000

Correlation                   0.9140
ROC area                      0.9902  p = 0.0000

Brier score                   0.0411
Spiegelhalter's z-statistic   0.0870  p = 0.4653
Sanders-modified Brier score  0.0464
Sanders resolution            0.0449
Outcome index variance        0.2500
Murphy resolution             0.2051
Reliability-in-the-small      0.0015
Forecast variance             0.2097
Excess forecast variance      0.0345
Minimum forecast variance     0.1752
Reliability-in-the-large      0.0000
2*Forecast-Outcome-Covar      0.4186
```



Diagonal segments are produced by ties.

Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Model 1	.936	.021	.000	.894	.978
Model 2	.879	.032	.000	.816	.943
Model 3	.990	.006	.000	.979	1.000

The test result variable(s): Model 2 has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.
a. Under the nonparametric assumption
b. Null hypothesis: true area = 0.5

APPENDIX 5a: 3-year Prior To bankruptcy sample endogeneity test

Model 2

NDIR

```
First-stage regressions
-----------------------

reg ndir gender mdd cont ind e2 e3 e4 gdp blr cpi empy l_ind_ndir

      Source |       SS       df       MS              Number of obs =     344
-------------+------------------------------           F( 12,   331) =   14.85
       Model |  554.753857    12  46.2294881            Prob > F      =  0.0000
    Residual |  1030.40603   331  3.11300914            R-squared     =  0.3500
-------------+------------------------------           Adj R-squared =  0.3264
       Total |  1585.15988   343  4.62145739            Root MSE      =  1.7644

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.2273915   .2928659    -0.78   0.438    -.8035046    .3487216
         mdd |  -.0950929   .2186479    -0.43   0.664    -.5252076    .3350217
        cont |  -1.194331   .2289077    -5.22   0.000    -1.644628   -.7440335
         ind |   4.019464   .3940009    10.20   0.000     3.244403    4.794526
          e2 |   .2276301    .280728     0.81   0.418    -.3246059    .7798661
          e3 |  -.1816774   .2916496    -0.62   0.534    -.7553979    .3920432
          e4 |  -.2119507   .2829846    -0.75   0.454    -.7686258    .3447244
         gdp |  -.0662231   .2063464    -0.32   0.748    -.4721388    .3396925
         blr |   .3867293   1.364292     0.28   0.777    -2.297047    3.070506
         cpi |  -.1756235   .2434041    -0.72   0.471    -.6544376    .3031906
        empy |   4.682483   19.64086     0.24   0.812    -33.95417    43.31913
  l_ind_ndir |   .5910019   .4650522     1.27   0.005    -.3238287    1.505833
       _cons |   3.205699     .80841     3.97   0.000      1.61543    4.795968
------------------------------------------------------------------------------

. predict ndirH
(option xb assumed; fitted values)

Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  21.5668  (p = 0.0000)
  Wu-Hausman F(1,330)             =  22.0729  (p = 0.0000)

. estat firststage, all
  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .170784  (p = 0.6794)
  Basmann chi2(1)        =  .163915  (p = 0.6856)
```

IND

```
First-stage regressions
-----------------------

. reg ind gender mdd cont ndir e2 e3 e4 gdp blr cpi empy l_ind_ind

      Source |       SS       df       MS              Number of obs =     344
-------------+------------------------------           F( 12,   331) =   11.26
       Model |   6.2360164    12  .519668034           Prob > F      =  0.0000
    Residual |  15.2822126   331  .046169827           R-squared     =  0.2898
-------------+------------------------------           Adj R-squared =  0.2641
       Total |   21.518229   343  .062735362           Root MSE      =  .21487

------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |    -.00271   .0351588    -0.08   0.939    -.0718729    .0664528
         mdd |  -.0044709   .0266245    -0.17   0.867    -.0568455    .0479038
        cont |   .0537389   .0286982     1.87   0.062    -.0027148    .1101927
        ndir |   .0598791   .0058255    10.28   0.000     .0484194    .0713388
          e2 |  -.0510017   .0340945    -1.50   0.136     -.118071    .0160675
          e3 |  -.0613808   .0354169    -1.73   0.084    -.1310514    .0082898
          e4 |  -.0484246   .0343739    -1.41   0.160    -.1160435    .0191943
         gdp |  -.0434368   .0249726    -1.74   0.083    -.0925619    .0056883
         blr |   .2246308   .1655838     1.36   0.176    -.1010986    .5503602
         cpi |  -.0224238   .0296366    -0.76   0.450    -.0807236    .0358761
        empy |  -2.161719   2.379299    -0.91   0.364    -6.842174    2.518736
   l_ind_ind |    .561148    .025504     0.24   0.015    -.0440556    .0562852
       _cons |   .0184235    .064514     0.29   0.775    -.1084857    .1453328
------------------------------------------------------------------------------

. predict indH
(option xb assumed; fitted values)

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  6.46892  (p = 0.0110)
  Wu-Hausman F(1,330)             =  6.32459  (p = 0.0124)


  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .052595  (p = 0.8186)
  Basmann chi2(1)        =  .050462  (p = 0.8223)
```

SECOND STAGE

```
. logit status gender mdd cont ndirH indH e2 e3 e4 gdp blr cpi empy

Iteration 0:   log likelihood = -238.44263
Iteration 1:   log likelihood = -168.95598
Iteration 2:   log likelihood = -167.79848
Iteration 3:   log likelihood = -167.79461
Iteration 4:   log likelihood = -167.79461

Logistic regression                             Number of obs   =        344
                                                LR chi2(12)     =     141.30
                                                Prob > chi2     =     0.0000
Log likelihood = -167.79461                     Pseudo R2       =     0.2963

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |   .4448144   .4181924     1.06   0.287    -.3748277    1.264457
         mdd |  -.9449865    .322773    -2.93   0.003     -1.57761   -.3123631
        cont |   1.097115   .3754541     2.92   0.003     .3612382    1.832991
       ndirH |  -.5841712   .1611154    -3.63   0.000    -.8999516   -.2683908
        indH |  -8.333817   1.747108    -4.77   0.000    -11.75809   -4.909549
          e2 |  -.1518455   .4100129    -0.37   0.011    -.9554559     .651765
```

```
          e3 |  -.5238061   .4406227    -1.19   0.035    -1.387411    .3397986
          e4 |   -.322022   .4076041    -0.79   0.430    -1.120911    .4768673
         gdp |  -.0948991    .330121    -0.29   0.774    -.7419244    .5521262
         blr |   1.334583   1.961944     0.68   0.496    -2.510756    5.179922
         cpi |   .1113812   .3416359     0.33   0.744    -.5582129    .7809752
       empy |   30.29977   29.23856     1.04   0.030    -27.00676     87.6063
       _cons |    3.50945   .9255976     3.79   0.000     1.695313    5.323588
------------------------------------------------------------------------------
```

MDD

First-stage regressions

```
                                                Number of obs   =       344
                                                F(  13,    330) =      6.37
                                                Prob > F        =    0.0000
                                                R-squared       =    0.2006
                                                Adj R-squared   =    0.1691
                                                Root MSE        =    0.4439
------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |  -.0192885   .0518449    -0.37   0.710    -.1212767    .0826997
         blr |   .3882816   .3420974     1.14   0.257     -.284685    1.061248
         cpi |   .0307711   .0614534     0.50   0.617    -.0901187     .151661
       empy |   2.524137   4.931704     0.51   0.609    -7.177405    12.22568
      gender |   .0149425   .0723754     0.21   0.837    -.1274329    .1573178
        ndir |  -.0056834   .0138638    -0.41   0.682    -.0329559    .0215892
        cont |   .3895723   .0558588     6.97   0.000     .2796881    .4994565
         ind |  -.0214638    .113737    -0.19   0.850    -.2452047    .2022771
          e2 |   .0909489   .0705026     1.29   0.198    -.0477424    .2296401
          e3 |   .1488045   .0729722     2.04   0.042     .0052551    .2923539
          e4 |   .2291819   .0701024     3.27   0.001      .091278    .3670858
    l_dirown |   .0108643   .0410176     0.26   0.791    -.0698247    .0915533
  l_tngasset |  -.0209786   .0328485    -0.64   0.523    -.0855976    .0436403
       _cons |   .0036528    .124719     0.03   0.977    -.2416917    .2489974
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression        Number of obs =       344
                                                Wald chi2(12) =    141.45
                                                Prob > chi2   =    0.0000
                                                R-squared     =    0.2423
                                                Root MSE      =    .43522
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -.4717455   1.418465    -0.33   0.739    -3.251886    2.308395
         gdp |   .0452101    .056963     0.79   0.427    -.0664354    .1568557
         blr |   -.026021   .6390218    -0.04   0.968    -1.278481    1.226439
         cpi |   .0819587   .0766677     1.07   0.285    -.0683072    .2322246
       empy |   8.022226   6.207113     1.29   0.196    -4.143492    20.18794
      gender |   .1366262   .0737174     1.85   0.064    -.0078573    .2811096
        ndir |  -.0750445   .0156381    -4.80   0.000    -.1056945   -.0443945
        cont |   .3724887   .5510883     0.68   0.499    -.7076244    1.452602
         ind |  -.4006331   .1145586    -3.50   0.000    -.6251638   -.1761024
          e2 |   .0531664   .1442959     0.37   0.713    -.2296483    .3359812
          e3 |   .0564716   .2203309     0.26   0.798    -.3753692    .4883123
          e4 |   .1204651   .3298481     0.37   0.715    -.5260253    .7669554
       _cons |    .630394   .1144642     5.51   0.000     .4060483    .8547396
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   gdp blr cpi empy gender ndir cont ind e2 e3 e4 l_dirown
               l_tngasset

  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .061822  (p = 0.8036)
  Wu-Hausman F(1,330)             =  .059317  (p = 0.8077)

  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .719866  (p = 0.3962)
  Basmann chi2(1)        =  .692017  (p = 0.4055)
```

Model 3

MDD

First-stage regressions

```
-----------------------
```

```
                                                Number of obs   =        343
                                                F(  28,    314) =       3.85
                                                Prob > F        =     0.0000
                                                R-squared       =     0.2555
                                                Adj R-squared   =     0.1891
                                                Root MSE        =     0.4388
```

mdd	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cla	.1061554	.0683406	1.55	0.121	-.0283079	.2406187
ebit	.0238591	.0889863	0.27	0.789	-.1512257	.1989438
roe	.0480052	.1262806	0.38	0.704	-.200458	.2964684
tla	-.01152	.0299201	-0.39	0.700	-.0703891	.0473492
lta	-.0956104	.0842899	-1.13	0.258	-.2614549	.0702341
cle	.039797	.0581189	0.68	0.494	-.0745546	.1541486
lqt	-.008266	.0299607	-0.28	0.783	-.067215	.050683
wct	.0247758	.0648587	0.38	0.703	-.1028368	.1523884
nwc	.000063	.0000955	0.66	0.510	-.0001249	.0002508
ast	-.0338455	.0241436	-1.40	0.162	-.0813492	.0136583
exp	-.0388815	.0806041	-0.48	0.630	-.197474	.119711
logta	-.0392129	.0146583	-2.68	0.008	-.0680538	-.0103719
logcap	-.0027969	.0163953	-0.17	0.865	-.0350553	.0294616
gdp	-.0260609	.0526108	-0.50	0.621	-.1295751	.0774533
blr	.2264298	.3539114	0.64	0.523	-.4699077	.9227673
cpi	.0251205	.0648467	0.39	0.699	-.1024685	.1527095
empy	4.165285	5.006432	0.83	0.406	-5.685109	14.01568
age	.0033163	.0026532	1.25	0.212	-.0019039	.0085365
blc	.0063685	.0547297	0.12	0.907	-.1013148	.1140518
gender	.0496073	.073815	0.67	0.502	-.0956273	.1948419
cont	.4431925	.0587843	7.54	0.000	.3275316	.5588535
ndir	-.0054946	.0157231	-0.35	0.727	-.0364306	.0254414
ind	-.0261734	.1170303	-0.22	0.823	-.2564362	.2040894
e2	.0790755	.0716408	1.10	0.271	-.0618812	.2200323
e3	.1511973	.0777647	1.94	0.053	-.0018084	.304203
e4	.2451817	.0738461	3.32	0.001	.0998859	.3904775
l_dirown	-.014562	.042699	-0.34	0.733	-.0985744	.0694503
l_tngasset	-.0069455	.0334377	-0.21	0.836	-.0727359	.0588449
_cons	.1106721	.4758526	0.23	0.816	-.8255906	1.046935

Instrumental variables (2SLS) regression

```
                                                Number of obs =     343
                                                Wald chi2(27) =  587.03
                                                Prob > chi2   =  0.0000
                                                R-squared     =  0.6051
                                                Root MSE      =  .31421
```

status	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
mdd	-.3427105	1.765452	-0.19	0.846	-3.802932	3.117511
cla	.0663045	.1968218	0.34	0.736	-.3194591	.4520681
ebit	-.321135	.0727688	-4.41	0.000	-.4637592	-.1785107
roe	.0088726	.1197605	0.07	0.941	-.2258536	.2435988
tla	.0827759	.0289819	2.86	0.004	.0259724	.1395793
lta	.1233243	.1801354	0.68	0.494	-.2297346	.4763831
cle	.0047463	.0808439	0.06	0.953	-.1537049	.1631975
lqt	-.0613949	.0251278	-2.44	0.015	-.1106445	-.0121453
wct	.0192236	.062721	0.31	0.759	-.1037072	.1421544
nwc	-.000038	.0001375	-0.28	0.783	-.0003075	.0002315
ast	-.0377875	.060654	-0.62	0.533	-.1566672	.0810923
exp	.0793345	.0874418	0.91	0.364	-.0920484	.2507173
logta	.0252247	.0692595	0.36	0.716	-.1105214	.1609709
logcap	-.0204159	.0130105	-1.57	0.117	-.045916	.0050842
gdp	.045658	.0597566	0.76	0.445	-.0714629	.1627788
blr	-.1027459	.4784619	-0.21	0.830	-1.040514	.8350222
cpi	-.0033909	.0622244	-0.05	0.957	-.1253486	.1185667
empy	4.866465	8.095973	0.60	0.548	-11.00135	20.73428
age	-.008055	.0061596	-1.31	0.191	-.0201276	.0040176
blc	-.1340191	.040663	-3.30	0.001	-.2137172	-.054321
gender	-.0003621	.1017181	-0.00	0.997	-.1997258	.1990016
cont	.2189233	.78314	0.28	0.780	-1.316003	1.75385
ndir	-.0280185	.015242	-1.84	0.066	-.0578922	.0018552

```
         ind |  -.2243005   .0965031    -2.32   0.020    -.4134431   -.0351578
          e1 |  -.0910449   .4373304    -0.21   0.835    -.9481966    .7661069
          e2 |  -.0479915   .2967578    -0.16   0.872    -.6296261     .533643
          e3 |  -.0707659   .1752634    -0.40   0.686    -.4142758     .272744
       _cons |   1.071437   .7448493     1.44   0.150    -.3884407    2.531315
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   cla ebit roe tla lta cle lqt wct nwc ast exp logta logcap gdp
               blr cpi empy age blc gender cont ndir ind e1 e2 e3 l_dirown
               l_tngasset

. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .039507  (p = 0.8424)
  Wu-Hausman F(1,314)             =  .036171  (p = 0.8493)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  1.67571  (p = 0.1955)
  Basmann chi2(1)        =  1.54156  (p = 0.2144)
```

NDIR

```
First-stage regressions
-----------------------
                                                Number of obs   =        343
                                                F(  28,    314) =      11.36
                                                Prob > F        =     0.0000
                                                R-squared       =     0.5032
                                                Adj R-squared   =     0.4589
                                                Root MSE        =     1.5747
------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         cla |   -.451347   .2457498    -1.84   0.067    -.9348715    .0321775
        ebit |   -.016558   .3191148    -0.05   0.959    -.6444316    .6113156
         roe |   1.046998   .4485919     2.33   0.020     .1643722    1.929624
         tla |  -.0111866   .1073245    -0.10   0.917    -.2223527    .1999796
         lta |  -.5937562    .302613    -1.96   0.051    -1.189162    .0016493
         cle |  -.5404065   .2064834    -2.62   0.009    -.9466725   -.1341406
         lqt |   -.077742   .1077475    -0.72   0.471    -.2897404    .1342564
         wct |   .2330514   .2343704     0.99   0.321    -.2280835    .6941863
         nwc |  -2.50e-06   .0003396    -0.01   0.994    -.0006707    .0006657
         ast |   .0693255    .086073     0.81   0.421    -.1000272    .2386783
         exp |  -.4827057    .285872    -1.69   0.092    -1.045173    .0797612
       logta |   .0718456   .0532058     1.35   0.178    -.0328393    .1765306
      logcap |    .225042   .0575575     3.91   0.000     .1117948    .3382892
         gdp |  -.0319098   .1890491    -0.17   0.866     -.403873    .3400535
         blr |   .4785262   1.270459     0.38   0.707    -2.021162    2.978215
         cpi |   .2230676    .231123     0.97   0.335    -.2316778    .6778131
       empy |   9.749929   18.05554     0.54   0.590     -25.7752    45.27506
         age |   .0150116   .0096014     1.56   0.119    -.0038795    .0339028
         blc |  -.4064404   .1945917    -2.09   0.038    -.7893088   -.0235719
      gender |  -.1299478    .268593    -0.48   0.629    -.6584175    .3985218
        cont |  -.7473261   .2253701    -3.32   0.001    -1.190753   -.3038998
         mdd |  -.0747816   .2025799    -0.37   0.712    -.4733673     .323804
         ind |   2.814986   .3886141     7.24   0.000     2.050369    3.579603
          e2 |  -.0528109   .2577591    -0.20   0.838    -.5599641    .4543424
          e3 |  -.5057584   .2798226    -1.81   0.072    -1.056323    .0448059
          e4 |   -.587649   .2675984    -2.20   0.029    -1.114162   -.0611363
  l_ind_ndir |   -.143827   .4425389    -0.33   0.745    -1.014543    .7268895
  l_tngasset |   .1281461   .1201506     1.07   0.287    -.1082559    .3645482
       _cons |   -1.79875   1.797332    -1.00   0.318    -5.335086    1.737585
------------------------------------------------------------------------------


Instrumental variables (2SLS) regression             Number of obs =     343
                                                     Wald chi2(27) =  629.49
                                                     Prob > chi2   =  0.0000
                                                     R-squared     =  0.6348
                                                     Root MSE      =  .30218
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ndir |   -.093649   .1756131    -0.53   0.594    -.4378444    .2505463
         cla |  -.0003469   .0963099    -0.00   0.997    -.1891109    .1884171
```

```
        ebit |  -.3274826   .0609676    -5.37   0.000    -.4469769   -.2079883
         roe |   .0650924   .2023858     0.32   0.748    -.3315765    .4617612
         tla |   .0861132    .020527     4.20   0.000      .045881    .1263453
         lta |   .1153399   .1157052     1.00   0.319    -.1114382     .342118
         cle |   -.043263   .1005567    -0.43   0.667    -.2403505    .1538245
         lqt |  -.0644407   .0249317    -2.58   0.010    -.1133059   -.0155754
         wct |   .0277236   .0611378     0.45   0.650    -.0921043    .1475515
         nwc |  -.0000601   .0000652    -0.92   0.357    -.0001878    .0000677
         ast |  -.0224309   .0208347    -1.08   0.282    -.0632663    .0184044
         exp |    .061037   .0957352     0.64   0.524    -.1266006    .2486746
       logta |   .0425302   .0164696     2.58   0.010     .0102504    .0748101
      logcap |  -.0040887   .0413329    -0.10   0.921    -.0850996    .0769222
         gdp |   .0514717   .0368287     1.40   0.162    -.0207111    .1236546
         blr |  -.1437725   .2575721    -0.56   0.577    -.6486045    .3610595
         cpi |   .0028662   .0569538     0.05   0.960    -.1087613    .1144937
       empy |   4.101027   3.714888     1.10   0.270     -3.18002    11.38207
         age |  -.0081127   .0031708    -2.56   0.011    -.0143274    -.001898
         blc |  -.1623765   .0777823    -2.09   0.037    -.3148269    -.009926
      gender |  -.0236613   .0546227    -0.43   0.665    -.1307199    .0833973
        cont |   .0284744    .136486     0.21   0.835    -.2390332    .2959821
         mdd |  -.0301597   .0410403    -0.73   0.462    -.1105972    .0502779
         ind |  -.0254151   .5006992    -0.05   0.960    -1.006767    .9559374
          e1 |   .0253442   .1119888     0.23   0.821    -.1941498    .2448382
          e2 |   .0403499   .1046038     0.39   0.700    -.1646697    .2453695
          e3 |  -.0346209   .0500783    -0.69   0.489    -.1327725    .0635307
       _cons |   .7615508   .5898005     1.29   0.197     -.394437    1.917539
------------------------------------------------------------------------------
Instrumented:  ndir
Instruments:   cla ebit roe tla lta cle lqt wct nwc ast exp logta logcap gdp
               blr cpi empy age blc gender cont mdd ind e1 e2 e3 l_ind_ndir
               l_tngasset
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .167234  (p = 0.6826)
  Wu-Hausman F(1,314)             =  .153169  (p = 0.6958)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  4.95137  (p = 0.0261)
  Basmann chi2(1)        =  4.59913  (p = 0.0320)
```


IND

```
First-stage regressions
-----------------------
                                                Number of obs   =       343
                                                F(  28,    314) =      5.72
                                                Prob > F        =    0.0000
                                                R-squared       =    0.3377
                                                Adj R-squared   =    0.2786
                                                Root MSE        =    0.2117
------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         cla |   .0432024   .0330805     1.31   0.193    -.0218851     .10829
        ebit |   .0440404   .0428138     1.03   0.304    -.0401978    .1282786
         roe |  -.0154838   .0609289    -0.25   0.800    -.1353643    .1043967
         tla |  -.0125377   .0143858    -0.87   0.384    -.0408424     .015767
         lta |   .0034211   .0407454     0.08   0.933    -.0767474    .0835896
         cle |   .0142081   .0280613     0.51   0.613    -.0410039    .0694201
         lqt |   .0015594   .0144626     0.11   0.914    -.0268966    .0300153
         wct |   .0199678   .0313734     0.64   0.525    -.0417608    .0816964
         nwc |  -.0000598   .0000455    -1.31   0.190    -.0001494    .0000298
         ast |  -.0055565    .011611    -0.48   0.633    -.0284016    .0172886
         exp |  -.0516221   .0384925    -1.34   0.181    -.1273579    .0241137
       logta |   .0029963   .0071543     0.42   0.676    -.0110801    .0170727
      logcap |   .0127348   .0078684     1.62   0.107    -.0027466    .0282162
         gdp |   -.041154   .0252801    -1.63   0.105    -.0908937    .0085858
         blr |   .2420704   .1703254     1.42   0.156     -.093053    .5771938
         cpi |   .0027836      .0311     0.09   0.929    -.0584071    .0639742
       empy |  -1.989313   2.410383    -0.83   0.410    -6.731857    2.753231
         age |    .001041   .0012838     0.81   0.418    -.0014849    .0035668
         blc |   .0642267   .0261096     2.46   0.014     .0128548    .1155986
      gender |  -.0031557    .035831    -0.09   0.930    -.0736549    .0673435
        cont |   .0456958   .0308166     1.48   0.139    -.0149373     .106329
```

```
         mdd |  -.0065295   .0272479    -0.24   0.811    -.0601411     .047082
        ndir |   .0508894   .0070283     7.24   0.000     .0370608     .064718
          e2 |  -.0408483   .0345064    -1.18   0.237    -.1087413    .0270447
          e3 |  -.0309227   .0378113    -0.82   0.414    -.1053182    .0434729
          e4 |  -.0340908   .0361786    -0.94   0.347    -.1052739    .0370924
   l_ind_ind |  -.0026873   .0261524    -0.10   0.918    -.0541433    .0487687
  l_tngasset |  -.0039854   .0161926    -0.25   0.806    -.0358452    .0278743
       _cons |  -.1468483   .2332402    -0.63   0.529    -.6057595    .3120628
------------------------------------------------------------------------------

Instrumental variables (2SLS) regression              Number of obs =     343
                                                      Wald chi2(27) =   14.48
                                                      Prob > chi2   =  0.9761
                                                      R-squared     =       .
                                                      Root MSE      =  1.9948
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |   9.532007    36.4113     0.26   0.793    -61.83282    80.89684
         cla |  -.3924942   1.615661    -0.24   0.808    -3.559132    2.774143
        ebit |   -.752189   1.636233    -0.46   0.646    -3.959147    2.454769
         roe |   .1503486   .8159133     0.18   0.854    -1.448812    1.749509
         tla |     .20992   .4811611     0.44   0.663    -.7331385    1.152978
         lta |   .1246544   .3986925     0.31   0.755    -.6567685    .9060772
         cle |  -.1427647     .56913    -0.25   0.802    -1.258239    .9727096
         lqt |  -.0766639    .151031    -0.51   0.612    -.3726792    .2193514
         wct |  -.1763055   .7611596    -0.23   0.817    -1.668151     1.31554
         nwc |   .0005218   .0022134     0.24   0.814    -.0038164      .00486
         ast |   .0287462   .2360973     0.12   0.903    -.4339961    .4914885
         exp |   .6050428   1.952539     0.31   0.757    -3.221863    4.431948
       logta |   .0075889   .1304779     0.06   0.954    -.2481432    .2633209
      logcap |  -.1428301   .4669783    -0.31   0.760    -1.058091    .7724305
         gdp |   .4542345   1.513868     0.30   0.764    -2.512892    3.421361
         blr |  -2.529422    8.93693    -0.28   0.777    -20.04548    14.98664
         cpi |  -.0432775    .316316    -0.14   0.891    -.6632454    .5766904
       empy |   22.57494   74.56149     0.30   0.762    -123.5629    168.7128
         age |  -.0191457   .0393878    -0.49   0.627    -.0963444    .0580529
         blc |  -.7557559    2.32746    -0.32   0.745    -5.317494    3.805983
      gender |   .0193071   .3607577     0.05   0.957     -.687765    .7263792
        cont |  -.3611382   1.666449    -0.22   0.828    -3.627317    2.905041
         mdd |   .0365137   .3445287     0.11   0.916    -.6387502    .7117777
        ndir |  -.5209426    1.84936    -0.28   0.778    -4.145622    3.103736
          e1 |  -.3524344   1.312889    -0.27   0.788    -2.925649     2.22078
          e2 |   .0674132   .3961546     0.17   0.865    -.7090356    .8438619
          e3 |   -.068972   .3322328    -0.21   0.836    -.7201363    .5821922
       _cons |   2.603183   6.524801     0.40   0.690    -10.18519    15.39156
------------------------------------------------------------------------------
Instrumented:  ind
Instruments:   cla ebit roe tla lta cle lqt wct nwc ast exp logta logcap gdp
               blr cpi empy age blc gender cont mdd ndir e1 e2 e3 l_ind_ind
               l_tngasset

  estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =   3.5244  (p = 0.1095)
  Wu-Hausman F(1,314)             =  3.25991  (p = 0.1120)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .050947  (p = 0.8214)
  Basmann chi2(1)        =  .046647  (p = 0.8290)
```

APPENDIX 5b: 2-year Prior To bankruptcy sample endogeneity test

Model 2

MDD

First-stage regressions

```
----------------------
```

```
                                                Number of obs   =       172
                                                F(  13,    158) =      2.36
                                                Prob > F        =    0.0067
                                                R-squared       =    0.1623
                                                Adj R-squared   =    0.0934
                                                Root MSE        =    0.4167
------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |   .0097721   .0706044     0.14   0.890    -.1296782    .1492223
         blr |   .7365044   .4621652     1.59   0.113    -.1763144    1.649323
         cpi |    .048355   .0873706     0.55   0.581    -.1242099    .2209199
        empy |   3.349354   6.929074     0.48   0.629    -10.33621    17.03491
      gender |  -.1352723   .0840858    -1.61   0.110    -.3013495     .030805
         ind |   .0922739   .1266218     0.73   0.467    -.1578159    .3423636
        cont |  -.1654235   .0767093    -2.16   0.033    -.3169315   -.0139156
        ndir |  -.0850186    .026336    -3.23   0.002    -.1370347   -.0330025
          e2 |   .2481014   .0969759     2.56   0.011     .0565651    .4396377
          e3 |  -.0300054   .0949799    -0.32   0.752    -.2175993    .1575886
          e4 |   .1486334    .092294     1.61   0.109    -.0336558    .3309226
    l_dirown |    .011732   .0522327     0.22   0.823    -.0914323    .1148964
  l_tngasset |  -.0382565   .0449202    -0.85   0.396    -.1269781    .0504651
       _cons |   .5495797   .1478422     3.72   0.000     .2575777    .8415817
------------------------------------------------------------------------------
```

```
Instrumental variables (2SLS) regression        Number of obs =     172
                                                Wald chi2(12) =   22.08
                                                Prob > chi2   =  0.0366
                                                R-squared     =       .
                                                Root MSE      =  1.0911
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -2.627536   2.942189    -0.89   0.372     -8.39412    3.139048
         gdp |   .0541579   .1900466     0.28   0.776    -.3183266    .4266424
         blr |    2.09693   2.321073     0.90   0.366    -2.452289    6.646149
         cpi |   .2111984   .2748685     0.77   0.442    -.3275339    .7499307
        empy |   14.36424   19.96558     0.72   0.472    -24.76758    53.49606
      gender |  -.1759258   .4709876    -0.37   0.709    -1.099045     .747193
         ind |   .0669044   .4206733     0.16   0.874    -.7576001    .8914089
        cont |   .0925386   .5091745     0.18   0.856    -.9054251    1.090502
        ndir |    -.33062   .2543639    -1.30   0.194    -.8291641     .167924
          e2 |   .6107458   .7569252     0.81   0.420    -.8728002    2.094292
          e3 |  -.1394651   .2667797    -0.52   0.601    -.6623438    .3834136
          e4 |   .2993123     .48687     0.61   0.539    -.6549354     1.25356
       _cons |   2.011746   1.743747     1.15   0.249    -1.405935    5.429428
------------------------------------------------------------------------------
```

```
Instrumented:  mdd
Instruments:   gdp blr cpi empy gender ind cont ndir e2 e3 e4 l_dirown
               l_tngasset
```

```
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  1.94121  (p = 0.3265)
  Wu-Hausman F(1,158)             =  1.56849  (p = 0.3438)

  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .235897  (p = 0.6272)
  Basmann chi2(1)        =  .216994  (p = 0.6413)
```

NDIR

```
First-stage regressions
----------------------

reg ndir cont gender ind mdd e2 e3 e4 gdp blr cpi empy l_ind_ndir
```

```
      Source |       SS       df       MS              Number of obs =     172
-------------+------------------------------           F( 12,   159) =    3.04
       Model |  54.1709096    12  4.51424247           Prob > F      =  0.0007
    Residual |  236.340718   159  1.48641961           R-squared     =  0.1865
-------------+------------------------------           Adj R-squared =  0.1251
       Total |  290.511628   171  1.69889841           Root MSE      =  1.2192

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        cont |  -.8040224   .2188231    -3.67   0.000    -1.236197   -.3718476
      gender |  -.3698434   .2427609    -1.52   0.130    -.8492952    .1096084
         ind |   .2393239   .3706654     0.65   0.519    -.4927387    .9713866
         mdd |  -.7240384    .225753    -3.21   0.002      -1.1699   -.2781772
          e2 |   .5714884   .2841636     2.01   0.046     .0102664     1.13271
          e3 |   .1682294   .2756152     0.61   0.542    -.3761095    .7125683
          e4 |   .3479462   .2677368     1.30   0.196    -.1808331    .8767254
         gdp |   .0210304    .207939     0.10   0.920    -.3896484    .4317091
         blr |   .6519877   1.345926     0.48   0.629     -2.00621    3.310186
         cpi |   .1548412   .2552135     0.61   0.545    -.3492045     .658887
        empy |   8.709397   20.25466     0.43   0.668    -31.29348    48.71227
  l_ind_ndir |   .2671658   .4723794     0.57   0.023    -.6657817    1.200113
       _cons |   3.140247   .6926561     4.53   0.000     1.772254     4.50824
------------------------------------------------------------------------------
```

Tests of endogeneity
Ho: variables are exogenous

Durbin (score) chi2(1) = 8.57894 (p = 0.0034)
Wu-Hausman F(1,158) = 8.29436 (p = 0.0045)

```
. estat overid
```

Tests of overidentifying restrictions:

Sargan (score) chi2(1) = .000064 (p = 0.9936)
Basmann chi2(1) = .000058 (p = 0.9939)
Tests of endogeneity
Ho: variables are exogenous

IND

```
First-stage regressions
-----------------------

. reg ind cont gender ndir mdd e2 e3 e4 gdp blr cpi empy l_ind_ind

      Source |       SS       df       MS              Number of obs =     172
-------------+------------------------------           F( 12,   159) =    1.43
       Model |  1.17559067    12  .097965889           Prob > F      =  0.1554
    Residual |  10.8594742   159   .06829858           R-squared     =  0.0977
-------------+------------------------------           Adj R-squared =  0.0296
       Total |  12.0350649   171  .070380496           Root MSE      =  .26134

------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        cont |   .0551221   .0483753     1.14   0.256     -.040419    .1506632
      gender |  -.1270183   .0515299    -2.46   0.015    -.2287897    -.025247
        ndir |    .011843   .0169565     0.70   0.486     -.021646    .0453321
         mdd |   .0356219     .04973     0.72   0.475    -.0625945    .1338384
          e2 |    .000949   .0618366     0.02   0.988    -.1211781    .1230762
          e3 |  -.0189224   .0600312    -0.32   0.753    -.1374837    .0996389
          e4 |   .0227783   .0586406     0.39   0.698    -.0930368    .1385933
         gdp |  -.0108077   .0440813    -0.25   0.807    -.0978682    .0762527
```

```
         blr |   .7048354   .2831441     2.49   0.014     .1456269    1.264044
         cpi |  -.0270544   .0546914    -0.49   0.622    -.1350698     .080961
       empy |  -2.194615   4.385827    -0.50   0.617    -10.85661    6.467377
   l_ind_ind |   .0201621   .0492435     0.41   0.000    -.0770935    .1174178
       _cons |   .3656011   .0959078     3.81   0.000     .1761835    .5550187
------------------------------------------------------------------------------

. predict indH
(option xb assumed; fitted values)

Durbin (score) chi2(1)          =  8.17634  (p = 0.0042)
  Wu-Hausman F(1,158)             =  7.88569  (p = 0.0056)


  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .019438  (p = 0.8891)
  Basmann chi2(1)        =  .017858  (p = 0.8937)
```

Second Stage

```
. logit status gender cont mdd ndirH indH e2 e3 e4 gdp blr cpi empy

Iteration 0:   log likelihood = -119.22132
Iteration 1:   log likelihood = -57.208871
Iteration 2:   log likelihood = -52.055693
Iteration 3:   log likelihood = -51.855127
Iteration 4:   log likelihood = -51.854895
Iteration 5:   log likelihood = -51.854895

Logistic regression                             Number of obs   =        172
                                                LR chi2(12)     =     134.73
                                                Prob > chi2     =     0.0000
Log likelihood = -51.854895                     Pseudo R2       =     0.5651

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -9.955021   2.832503    -3.51   0.000    -15.50663   -4.403418
        cont |   1.332529   2.748574     0.48   0.028    -4.054578    6.719636
         mdd |  -3.485556   2.423168    -1.44   0.150    -8.234878    1.263767
       ndirH |  -8.226973   3.359226    -2.45   0.014    -14.81093   -1.643012
        indH |  -75.03214     19.825    -3.78   0.000    -113.8884   -36.17586
          e2 |    4.00987   2.056739     1.95   0.051    -.0212646    8.041005
          e3 |  -1.438571   1.080763    -1.33   0.183    -3.556828    .6796861
          e4 |   3.179257   1.472229     2.16   0.031     .2937414    6.064773
         gdp |  -.6865821   .6713821    -1.02   0.306    -2.002467    .6293026
         blr |   63.48975   15.28074     4.15   0.000     33.54005    93.43944
         cpi |   .3545409   1.035092     0.34   0.732    -1.674202    2.383284
        empy |   46.90722   76.63331     0.61   0.540    -103.2913    197.1058
       _cons |   54.02247   14.56444     3.71   0.000     25.47669    82.56826
------------------------------------------------------------------------------
```

Model 3

NDIR

```
First-stage regressions
-----------------------

reg ndir ind gender cont mdd age blc lgta lgcap tla lta cla cle lqt exp ebit roe wct
nwc ast gdp blr cpi empy e2 e3 e4 l_ind_ndir

      Source |       SS       df       MS              Number of obs =     172
-------------+------------------------------           F( 27,   144) =    2.46
       Model |  91.7642712    27  3.39867671            Prob > F      =  0.0003
    Residual |  198.747357   144  1.38018998            R-squared     =  0.3159
```

```
-------------+------------------------------           Adj R-squared =  0.1876
       Total |  290.511628   171  1.69889841           Root MSE      =  1.1748

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |   .0473483   .3710926     0.13   0.899    -.6861442    .7808407
      gender |  -.2388174    .249503    -0.96   0.340    -.7319789     .254344
        cont |  -.6271469    .226581    -2.77   0.006    -1.075001   -.1792924
         mdd |  -.6170573   .2344296    -2.63   0.009    -1.080425   -.1536897
         age |   .0268051   .0152852     1.75   0.082    -.0034072    .0570175
         blc |  -.0126748   .2043863    -0.06   0.951    -.4166597    .3913101
        lgta |   .0854205   .0886315     0.96   0.337    -.0897663    .2606073
       lgcap |   .0308863   .0680157     0.45   0.650    -.1035518    .1653243
         tla |  -.0953145   .0701342    -1.36   0.176      -.23394    .0433109
         lta |   .2041858   .4405157     0.46   0.644    -.6665266    1.074898
         cla |  -1.659057   .6228268    -2.66   0.009    -2.890121   -.4279932
         cle |  -.1630802   .1509388    -1.08   0.282    -.4614221    .1352617
         lqt |   .0065634   .0209523     0.31   0.755    -.0348503    .0479772
         exp |  -.0412292   .1005141    -0.41   0.682    -.2399028    .1574444
        ebit |  -.0007055   .2686716    -0.00   0.998    -.5317551    .5303441
         roe |   .0715166   .0489082     1.46   0.146    -.0251542    .1681873
         wct |   .0228403   .1621174     0.14   0.888    -.2975969    .3432775
         nwc |   .0000871   .0004071     0.21   0.831    -.0007176    .0008918
         ast |   -.013072   .0857089    -0.15   0.879     -.182482    .1563381
         gdp |   .0181882   .2097413     0.09   0.931    -.3963812    .4327577
         blr |   1.287676   1.355932     0.95   0.344    -1.392427    3.967778
         cpi |   .0075111   .2600863     0.03   0.977     -.506569    .5215912
        empy |  -6.566368   20.69274    -0.32   0.751    -47.46713    34.33439
          e2 |   .5105374   .2927574     1.74   0.083    -.0681195    1.089194
          e3 |  -.0039722   .3037793    -0.01   0.990    -.6044148    .5964705
          e4 |   .2713244   .2779991     0.98   0.331    -.2781618    .8208105
  l_ind_ndir |   .1887263   .4718966     0.40   0.034    -.7440127    1.121465
       _cons |   2.377223   1.898844     1.25   0.213    -1.375984    6.130431
------------------------------------------------------------------------------

estat endog

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  6.74086  (p = 0.0094)
  Wu-Hausman F(1,143)             =  5.83291  (p = 0.0170)

. estat overid

  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  2.6e-06  (p = 0.9987)
  Basmann chi2(1)        =  2.2e-06  (p = 0.9988)
```

Second Stages

```
logit status ndirHH ind gender cont mdd age blc lgta lgcap tla lta cle lqt exp ebit
roe wct nwc ast cpi empy

Iteration 0:   log likelihood = -119.22132
Iteration 1:   log likelihood = -34.031566
Iteration 2:   log likelihood = -25.078524
Iteration 3:   log likelihood = -20.575117
Iteration 4:   log likelihood = -20.100203
Iteration 5:   log likelihood = -20.072204
Iteration 6:   log likelihood = -20.072156
Iteration 7:   log likelihood = -20.072156

Logistic regression                               Number of obs   =        172
                                                  LR chi2(21)     =     198.30
                                                  Prob > chi2     =     0.0000
Log likelihood = -20.072156                       Pseudo R2       =     0.8316

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
      ndirHH |  -3.376513   2.083294    -1.62   0.100    -7.459694    .7066684
         ind |  -4.522221   2.293727    -1.97   0.049    -9.017843   -.0265995
      gender |   1.449645   1.467242     0.99   0.323    -1.426097    4.325387
        cont |   5.883446   2.151083     2.74   0.006     1.667402    10.09949
         mdd |  -.8891331   1.576633    -0.56   0.573    -3.979276     2.20101
         age |   -.247277   .1190934    -2.08   0.038    -.4806958   -.0138581
         blc |  -5.609227   2.334131    -2.40   0.016    -10.18404   -1.034415
        lgta |   .7893906   .6274754     1.26   0.208    -.4404386     2.01922
       lgcap |   1.118271   .5203614     2.15   0.032      .098381     2.13816
         tla |   1.250951   .6125791     2.04   0.041     .0503178    2.451584
         lta |    -2.9094   3.729673    -0.78   0.435    -10.21942    4.400625
         cle |   .7342066   .6145549     1.19   0.232     -.470299    1.938712
         lqt |  -.1682998   .2453409    -0.69   0.493    -.6491592    .3125595
         exp |   .0967403   .5388151     0.18   0.858     -.959318    1.152799
        ebit |  -18.28706   7.257272    -2.52   0.012    -32.51105   -4.063064
         roe |   .5389129   .5281287     1.02   0.308    -.4962004    1.574026
         wct |  -4.026473   2.117478    -1.90   0.057    -8.176654    .1237083
         nwc |   .0012589   .0026746     0.47   0.638    -.0039832    .0065011
         ast |  -.3033151   .5803786    -0.52   0.601    -1.440836     .834206
         cpi |   3.416191   1.883828     1.81   0.020    -.2760431    7.108426
       empy |    154.109     186.94     0.82   0.410    -212.2867    520.5047
       _cons |  -16.08512   13.15313    -1.22   0.221    -41.86478    9.694532
------------------------------------------------------------------------------
Note: 7 failures and 10 successes completely determined.
```

MDD

```
First-stage regressions
-----------------------

                                                Number of obs   =        172
                                                F(  28,    143) =       1.80
                                                Prob > F        =     0.0137
                                                R-squared       =     0.2609
                                                Adj R-squared   =     0.1162
                                                Root MSE        =     0.4114
------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |   .1010247   .1302561     0.78   0.439    -.1564516     .358501
      gender |  -.0978729   .0882751    -1.11   0.269    -.2723655    .0766198
        cont |  -.0893554   .0814495    -1.10   0.274    -.2503561    .0716453
        ndir |  -.0746005    .028534    -2.61   0.010    -.1310034   -.0181975
         age |   .0044653   .0054108     0.83   0.411    -.0062301    .0151608
         blc |  -.0414909   .0713674    -0.58   0.562    -.1825622    .0995805
        lgta |  -.0721857   .0307905    -2.34   0.020    -.1330491   -.0113223
       lgcap |    .000608   .0239625     0.03   0.980    -.0467584    .0479745
         tla |  -.0644863   .0245443    -2.63   0.010    -.1130029   -.0159697
         lta |   .0328129   .1549287     0.21   0.833    -.2734335    .3390593
         cla |   .2498038   .2222571     1.12   0.263      -.18953    .6891376
         cle |    -.0139   .0541145    -0.26   0.798    -.1208676    .0930677
         lqt |  -.0114779    .007419    -1.55   0.124    -.0261431    .0031872
         exp |  -.0042897   .0348468    -0.12   0.902    -.0731712    .0645917
        ebit |   .1693781   .0944453     1.79   0.075    -.0173113    .3560675
         roe |   .0034294   .0173045     0.20   0.843    -.0307763    .0376351
         wct |  -.0181014   .0567446    -0.32   0.750     -.130268    .0940651
         nwc |  -.0000849   .0001429    -0.59   0.553    -.0003674    .0001976
         ast |    .001272   .0299499     0.04   0.966    -.0579297    .0604738
         gdp |  -.0022244   .0726013    -0.03   0.976    -.1457348    .1412861
         blr |   .4362881   .4777382     0.91   0.363    -.5080533    1.380629
         cpi |   .0237871   .0910759     0.26   0.794    -.1562419    .2038162
       empy |   .4903101    7.25809     0.07   0.946     -13.8567    14.83732
          e2 |   .1669287   .1029839     1.62   0.107    -.0366388    .3704963
          e3 |   -.102878   .1061893    -0.97   0.334    -.3127815    .1070255
          e4 |   .0664346   .0984987     0.67   0.501     -.128267    .2611363
   l_dirown |  -.0089146   .0556507    -0.16   0.873    -.1189189    .1010897
 l_tngasset |  -.0213923   .0471105    -0.45   0.650    -.1145154    .0717307
       _cons |   1.679307   .6200101     2.71   0.008     .4537382    2.904876
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression              Number of obs =     172
                                                      Wald chi2(27) =   50.73
                                                      Prob > chi2   =  0.0037
                                                      R-squared     =  0.2569
                                                      Root MSE      =  .78291
------------------------------------------------------------------------------
```

```
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -1.945721   3.918555    -0.50   0.620    -9.625947    5.734505
         ind |   .0854272   .4415706     0.19   0.847    -.7800352    .9508897
      gender |   -.092965   .4158497    -0.22   0.823    -.9080154    .7220854
        cont |   .2365894   .3611529     0.66   0.512    -.4712574    .9444361
        ndir |  -.2352999   .2950188    -0.80   0.425    -.8135262    .3429263
         age |  -.0030883   .0209499    -0.15   0.883    -.0441494    .0379727
         blc |  -.2201551   .2151987    -1.02   0.306    -.6419367    .2016266
        lgta |  -.1358195   .2831075    -0.48   0.631       -.6907     .419061
       lgcap |   .0579553   .0450171     1.29   0.198    -.0302767    .1461872
         tla |  -.0950491   .2524373    -0.38   0.707    -.5898172     .399719
         lta |   .0497606   .3171568     0.16   0.875    -.5718554    .6713765
         cla |   .5594781   1.071175     0.52   0.601    -1.539987    2.658943
         cle |  -.0031341   .1195831    -0.03   0.979    -.2375127    .2312444
         lqt |  -.0295681   .0470365    -0.63   0.530     -.121758    .0626218
         exp |  -.0037689    .067734    -0.06   0.956     -.136525    .1289873
        ebit |   .2664744   .7176209     0.37   0.710    -1.140037    1.672986
         roe |   .0040565   .0346543     0.12   0.907    -.0638647    .0719778
         wct |  -.1488222   .1328131    -1.12   0.262    -.4091311    .1114868
         nwc |  -.0002763   .0004458    -0.62   0.535    -.0011501    .0005974
         ast |  -.0253107   .0573751    -0.44   0.659    -.1377639    .0871425
         gdp |  -.0062562   .1376585    -0.05   0.964    -.2760619    .2635495
         blr |   .8041651    1.85947     0.43   0.665    -2.840329    4.448659
         cpi |   .1697783   .2018432     0.84   0.400     -.225827    .5653837
        empy |   10.09061   13.78795     0.73   0.464    -16.93328     37.1145
          e1 |  -.0411448   .3025889    -0.14   0.892    -.6342081    .5519185
          e2 |    .284352   .4371036     0.65   0.515    -.5723553    1.141059
          e3 |  -.2862358   .6813314    -0.42   0.674    -1.621621    1.049149
       _cons |    3.53919      7.016     0.50   0.614    -10.21192     17.2903
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   ind gender cont ndir age blc lgta lgcap tla lta cla cle lqt
               exp ebit roe wct nwc ast gdp blr cpi empy e1 e2 e3 l_dirown
               l_tngasset
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  2.19898  (p = 0.1381)
  Wu-Hausman F(1,143)             =   1.8519  (p = 0.1757)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  .508042  (p = 0.4760)
  Basmann chi2(1)        =  .423635  (p = 0.5151)
```

IND

```
First-stage regressions
-----------------------
                                                Number of obs   =       172
                                                F(  28,    143) =      1.08
                                                Prob > F        =    0.3757
                                                R-squared       =    0.1740
                                                Adj R-squared   =    0.0123
                                                Root MSE        =    0.2637
------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |   .0404274   .0535431     0.76   0.451    -.0654108    .1462655
      gender |  -.1049927    .055628    -1.89   0.061    -.2149521    .0049667
        cont |   .0677344   .0524623     1.29   0.199    -.0359675    .1714362
        ndir |   .0041088   .0187095     0.22   0.826    -.0328742    .0410918
         age |   .0010545   .0035554     0.30   0.767    -.0059735    .0080825
         blc |  -.0512604   .0456113    -1.12   0.263    -.1414198    .0388991
        lgta |   .0276601   .0199132     1.39   0.167    -.0117021    .0670223
       lgcap |  -.0220207   .0151286    -1.46   0.148    -.0519252    .0078838
         tla |   .0192702   .0157585     1.22   0.223    -.0118795     .05042
         lta |  -.0260849   .0995964    -0.26   0.794    -.2229562    .1707865
         cla |  -.1027113   .1427346    -0.72   0.473    -.3848536     .179431
         cle |  -.0651359   .0347703    -1.87   0.063     -.133866    .0035942
         lqt |    .002298   .0047029     0.49   0.626    -.0069983    .0115942
         exp |  -.0091775   .0223436    -0.41   0.682     -.053344     .034989
        ebit |   .0368338   .0613166     0.60   0.549    -.0843702    .1580378
         roe |  -.0063248   .0111953    -0.56   0.573    -.0284545    .0158048
         wct |   -.003906   .0362267    -0.11   0.914    -.0755151     .067703
         nwc |   .0000593   .0000917     0.65   0.519    -.0001219    .0002405
```

```
         ast |   .0132371   .0191593     0.69   0.491     -.024635    .0511092
         gdp |  -.0153723   .0464707    -0.33   0.741    -.1072306    .0764861
         blr |    .716959   .3012271     2.38   0.019     .1215258    1.312392
         cpi |  -.0402727   .0580406    -0.69   0.489    -.1550011    .0744556
       empy |  -2.283117    4.74495    -0.48   0.631    -11.66242    7.096188
          e2 |  -.0132028   .0670738    -0.20   0.844    -.1457871    .1193815
          e3 |  -.0456779   .0691759    -0.66   0.510    -.1824174    .0910617
          e4 |    .006893    .063753     0.11   0.914    -.1191271    .1329131
  l_ind_ind |   -.016106   .0541104    -0.30   0.766    -.1230657    .0908537
 l_tngasset |   .0415161   .0300154     1.38   0.169    -.0178151    .1008472
      _cons |   .2377752     .40836     0.58   0.561    -.5694268    1.044977
------------------------------------------------------------------------------

Instrumental variables (2SLS) regression              Number of obs =     172
                                                      Wald chi2(27) =  185.75
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.3313
                                                      Root MSE      =  .40886
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |   1.189222   1.100959     1.08   0.280    -.9686192    3.347062
         mdd |  -.0331153   .0933004    -0.35   0.723    -.2159808    .1497502
      gender |   .2302976   .1421773     1.62   0.105    -.0483648      .50896
        cont |   .3238139   .1033481     3.13   0.002     .1212554    .5263725
        ndir |  -.0938767   .0291669    -3.22   0.001    -.1510428   -.0367106
         age |  -.0135431   .0054886    -2.47   0.014    -.0243006   -.0027856
         blc |  -.0714583   .0896913    -0.80   0.426    -.2472501    .1043334
        lgta |   -.028081   .0405461    -0.69   0.489      -.10755    .0513879
       lgcap |   .0840787   .0323136     2.60   0.009     .0207453    .1474122
         tla |   .0056794   .0316608     0.18   0.858    -.0563747    .0677335
         lta |   .0190166    .155385     0.12   0.903    -.2855324    .3235656
         cla |   .2053829   .2510817     0.82   0.413    -.2867282     .697494
         cle |   .1020087   .0813623     1.25   0.210    -.0574585    .2614759
         lqt |  -.0106115    .007886    -1.35   0.178    -.0260677    .0048448
         exp |   .0153704   .0360022     0.43   0.669    -.0551927    .0859335
        ebit |  -.109345   .0963571    -1.13   0.256    -.2982015    .0795115
         roe |   .0045045   .0178876     0.25   0.801    -.0305545    .0395635
         wct |  -.1071141   .0561826    -1.91   0.057      -.21723    .0030018
         nwc |  -.0001828   .0001585    -1.15   0.249    -.0004936    .0001279
         ast |  -.0442931    .032408    -1.37   0.172    -.1078116    .0192254
         gdp |      .0203   .0752027     0.27   0.787    -.1270945    .1676946
         blr |  -1.009204   .9717856    -1.04   0.299    -2.913869    .8954603
         cpi |   .1737802   .1020849     1.70   0.089    -.0263025    .3738629
        empy |   12.37767   7.540765     1.64   0.101    -2.401954     27.1573
          e1 |   .1011328   .0989458     1.02   0.307    -.0927974    .2950629
          e2 |   .1119132   .0958875     1.17   0.243    -.0760227    .2998492
          e3 |   .1136358   .1096933     1.04   0.300    -.1013592    .3286309
       _cons |  -.2448581   .6732858    -0.36   0.716    -1.564474    1.074758
------------------------------------------------------------------------------
Instrumented:  ind
Instruments:   mdd gender cont ndir age blc lgta lgcap tla lta cla cle lqt
               exp ebit roe wct nwc ast gdp blr cpi empy e1 e2 e3 l_ind_ind
               l_tngasset

. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .310872  (p = 0.2689)
  Wu-Hausman F(1,143)             =  .802481  (p = 0.3962)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) cshi2(1) =  .938744  (p = 0.3326)
  Basmann chi2(1)         =   .78475  (p = 0.3757)
```

APPENDIX 5c: 1-year Prior To bankruptcy sample endogeneity test

Model 2

IND

```
First-stage regressions
-----------------------

reg ind gender cont ndir mdd e2 e3 e4 gdp blr cpi empy l_ind_ind

      Source |       SS       df       MS              Number of obs =     116
-------------+------------------------------           F( 12,   103) =    1.38
       Model |  .611620437    12   .05096837           Prob > F      =  0.0867
    Residual |  3.79994687   103  .036892688           R-squared     =  0.1386
-------------+------------------------------           Adj R-squared =  0.0383
       Total |  4.41156731   115  .038361455           Root MSE      =  .19207

------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |    .052607   .0384917     1.37   0.175    -.0237322    .1289462
        cont |  -.0983861   .0376646    -2.61   0.010     -.173085   -.0236871
        ndir |   .0069716   .0120259     0.58   0.563    -.0168789    .0308222
         mdd |   .0433233   .0432661     1.00   0.319    -.0424848    .1291314
          e2 |   -.059064   .0582041    -1.01   0.313    -.1744981     .05637
          e3 |  -.0248656   .0583472    -0.43   0.671    -.1405836    .0908524
          e4 |   .0193123   .0547479     0.35   0.725    -.0892672    .1278918
         gdp |   .0422714    .041376     1.02   0.309    -.0397881    .1243309
         blr |  -.1123004   .2587739    -0.43   0.665    -.6255174    .4009167
         cpi |  -.0330065   .0494763    -0.67   0.506    -.1311312    .0651181
        empy |  -1.015733   4.014616    -0.25   0.801    -8.977777    6.946311
   l_ind_ind |  -.0236813   .0428667    -0.55   0.023    -.1086972    .0613347
       _cons |   .1254608    .084187     1.49   0.139    -.0415043    .2924259
------------------------------------------------------------------------------

. predict indH
(option xb assumed; fitted values)

  Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  7.62069  (p = 0.0058)
  Wu-Hausman F(1,102)             =  7.17213  (p = 0.0086)


  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .067177  (p = 0.7955)
  Basmann chi2(1)        =  .059103  (p = 0.8079)
```

Second Stage

```
. logit status gender cont ndir mdd indH e2 e3 e4 gdp blr cpi empy

Iteration 0:   log likelihood = -80.405073
Iteration 1:   log likelihood = -47.064531
Iteration 2:   log likelihood = -46.288978
Iteration 3:   log likelihood = -46.280264
Iteration 4:   log likelihood = -46.280264

Logistic regression                               Number of obs   =        116
                                                  LR chi2(12)     =      68.25
                                                  Prob > chi2     =     0.0000
Log likelihood = -46.280264                       Pseudo R2       =     0.4244

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |   2.307739   1.552673     1.49   0.137    -.7354432    5.350921
        cont |   2.475622   2.612993     0.78   0.074    -7.168933     3.07381
```

```
       ndir |   .3856178   .2616875     1.47   0.141    -.1272802    .8985158
        mdd |   2.336772   1.297455     1.80   0.072    -.2061931    4.879737
      indH  |  -63.49421   28.02215    -2.27   0.023    -118.4166   -8.571804
         e2 |  -5.038569   1.873074    -2.69   0.007    -8.709727   -1.367411
         e3 |  -2.868532   1.220033    -2.35   0.019    -5.259753   -.4773109
         e4 |   .4892466   1.032585     0.47   0.636    -1.534583    2.513076
        gdp |   3.174249   1.471493     2.16   0.031     .2901757    6.058323
        blr |   -12.5264   5.171344    -2.42   0.015    -22.66204   -2.390747
        cpi |   2.62769    1.26995      2.07   0.039    -5.116714    .9386032
      empy  |  -62.83271   72.69987    -0.86   0.387    -205.3218    79.65642
      _cons |   8.584488   4.284035     2.00   0.045     .1879336    16.98104
------------------------------------------------------------------------------
```

MDD

First-stage regressions

```
                                                Number of obs   =       116
                                                F(  13,    102) =      1.06
                                                Prob > F        =    0.4005
                                                R-squared       =    0.1192
                                                Adj R-squared   =    0.0069
                                                Root MSE        =    0.4334
------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |  -.0845366   .0954509    -0.89   0.378    -.2738631    .1047898
         blr |   .1963917    .597428     0.33   0.743    -.9886039    1.381387
         cpi |  -.1072783   .1099019    -0.98   0.331    -.3252681    .1107116
       empy  |   16.38798   8.949738     1.83   0.070    -1.363784    34.13974
      gender |  -.0440854   .0871488    -0.51   0.614    -.2169446    .1287739
         ind |    .209702   .2219317     0.94   0.347    -.2304985    .6499024
        cont |  -.0888901   .0873916    -1.02   0.311     -.262231    .0844507
        ndir |  -.0531273   .0267266    -1.99   0.050    -.1061393   -.0001153
          e2 |   .0900317   .1319877     0.68   0.497    -.1717654    .3518287
          e3 |   .0067556   .1327609     0.05   0.960     -.256575    .2700861
          e4 |   .1075268   .1234819     0.87   0.386    -.1373989    .3524525
    l_dirown |  -.0187631   .0743932    -0.25   0.801    -.1663217    .1287954
  l_tngasset |  -.0809765   .0527826    -1.53   0.128    -.1856705    .0237176
       _cons |   .3540646   .1687998     2.10   0.038      .019251    .6888783
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression        Number of obs =       116
                                                Wald chi2(12) =     52.22
                                                Prob > chi2   =    0.0000
                                                R-squared     =         .
                                                Root MSE      =    .51233
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -.9110013   .7662657    -1.19   0.234    -2.412854    .5908518
         gdp |  -.0173285   .1202393    -0.14   0.885    -.2529932    .2183362
         blr |  -.4503257   .6980963    -0.65   0.519    -1.818569     .917918
         cpi |  -.1262342   .1519515    -0.83   0.406    -.4240536    .1715853
       empy  |   15.09175   16.38975     0.92   0.357    -17.03156    47.21506
      gender |  -.1607749   .1087097    -1.48   0.139     -.373842    .0522921
         ind |   .1793088   .3089786     0.58   0.562    -.4262782    .7848958
        cont |   .6087867   .1215885     5.01   0.000     .3704777    .8470958
        ndir |  -.0563027   .0504272    -1.12   0.264    -.1551383    .0425328
          e2 |  -.0840931   .1715624    -0.49   0.624    -.4203493    .2521631
          e3 |  -.0897151   .1578406    -0.57   0.570    -.3990769    .2196467
          e4 |   .0253144   .1665752     0.15   0.879     -.301167    .3517958
       _cons |   .6739125   .3842961     1.75   0.079    -.0792941    1.427119
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   gdp blr cpi empy gender ind cont ndir e2 e3 e4 l_dirown
               l_tngasset

  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  2.56603  (p = 0.1092)
  Wu-Hausman F(1,102)             =  2.30738  (p = 0.1319)

  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  3.21276  (p = 0.0731)
  Basmann chi2(1)        =  2.90548  (p = 0.0883)
```

NDIR

```
First-stage regressions
-----------------------
                                                Number of obs   =       116
                                                F(  13,    102) =      0.82
                                                Prob > F        =    0.6397
                                                R-squared       =    0.0945
                                                Adj R-squared   =   -0.0210
                                                Root MSE        =    1.5770
------------------------------------------------------------------------------
       ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
        gdp |   .2456004   .3420155     0.72   0.474    -.4327858    .9239866
        blr |  -1.912558   2.118362    -0.90   0.369    -6.114319    2.289204
        cpi |  -.0827139    .404793    -0.20   0.838     -.885619    .7201911
      empy |   14.36693   33.11625     0.43   0.665      -51.319    80.05286
     gender |  -.4698601    .314269    -1.50   0.138    -1.093211    .1534909
        ind |    .489395   .8073207     0.61   0.546    -1.111922    2.090712
       cont |   -.096006   .3244943    -0.30   0.768    -.7396389     .547627
        mdd |  -.7007466   .3535314    -1.98   0.050    -1.401974    .0004811
         e2 |   .6358385   .4768434     1.33   0.185    -.3099782    1.581655
         e3 |   .3770728   .4810949     0.78   0.435    -.5771767    1.331322
         e4 |   .6637716   .4494448     1.48   0.143       -.2277    1.555243
 l_ind_ndir |  -.2077155   .7170974    -0.29   0.773    -1.630075    1.214644
 l_tngasset |  -.1252414   .1936673    -0.65   0.519    -.5093796    .2588968
      _cons |   3.618492   1.052104     3.44   0.001     1.531649    5.705335
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression              Number of obs =     116
                                                      Wald chi2(12) =   54.78
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.0214
                                                      Root MSE      =  .49462
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
        ndir |   -.235297   .4487692    -0.52   0.600    -1.114869    .6442745
         gdp |   .0980629   .1613866     0.61   0.543     -.218249    .4143748
         blr |  -1.036275   1.110946    -0.93   0.351    -3.213689    1.141138
         cpi |  -.0564218   .1319299    -0.43   0.669    -.3149997    .2021562
        empy |   4.369425   12.53669     0.35   0.727    -20.20204    28.94089
      gender |   -.227745   .2350379    -0.97   0.333    -.6884109    .2329208
         ind |   .1016523   .3350525     0.30   0.762    -.5550385    .7583431
        cont |   .6661252    .104861     6.35   0.000     .4606013     .871649
         mdd |  -.1909436   .3191123    -0.60   0.550    -.8163921     .434505
          e2 |  -.0235486    .322794    -0.07   0.942    -.6562132    .6091159
          e3 |  -.0297295   .2421955    -0.12   0.902     -.504424    .4449649
          e4 |   .0778444   .3215312     0.24   0.809    -.5523452    .7080339
       _cons |   1.064334   1.561898     0.68   0.496     -1.99693    4.125599
------------------------------------------------------------------------------
Instrumented:  ndir
Instruments:   gdp blr cpi empy gender ind cont mdd e2 e3 e4 l_ind_ndir
               l_tngasset

  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .453053  (p = 0.5009)
  Wu-Hausman F(1,102)             =  .399936  (p = 0.5285)

  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  6.09191  (p = 0.0136)
  Basmann chi2(1)        =  5.65359  (p = 0.0174)
```

Model 3

NDIR

```
First-stage regressions
-----------------------

reg ndir gender ind cont mdd age blc lgta lgcapital tla lta cle lqt cla ebit roe wct
nwc ast exp gdp blr cpi empy e2 e3 e4 l_ind_ndir
```

```
      Source |       SS       df       MS              Number of obs =     116
-------------+------------------------------           F( 27,    88) =    1.06
       Model |  68.5343198    27  2.53830814           Prob > F      =  0.4094
    Residual |  211.603611    88  2.40458649           R-squared     =  0.2446
-------------+------------------------------           Adj R-squared =  0.0129
       Total |  280.137931   115  2.43598201           Root MSE      =  1.5507

------------------------------------------------------------------------------
        ndir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.6357494   .3425962    -1.86   0.067    -1.316587    .0450885
         ind |   .1359598   .8217554     0.17   0.869    -1.497106    1.769026
        cont |  -.0942691    .366686    -0.26   0.798    -.8229805    .6344423
         mdd |  -.3037342   .3678283    -0.83   0.411    -1.034716    .4272472
         age |   .0108367   .0241622     0.45   0.655    -.0371807     .058854
         blc |   .2311211   .3239249     0.71   0.477    -.4126115    .8748536
        lgta |   .2475904   .1604611     1.54   0.126    -.0712924    .5664731
   lgcapital |   .0982441   .1384112     0.71   0.480    -.1768192    .3733073
         tla |  -.0435097    .104557    -0.42   0.678    -.2512947    .1642752
         lta |   1.001782   .5596076     1.79   0.077    -.1103202    2.113885
         cle |  -1.132785   1.022678    -1.11   0.271    -3.165144    .8995732
         lqt |   .0455478   .0430745     1.06   0.293    -.0400536    .1311492
         cla |   .0787031    .258358     0.30   0.761    -.4347292    .5921353
        ebit |  -.7786222   .4787815    -1.63   0.101      -1.7301    .1728555
         roe |   .0409927   .0734146     0.56   0.578    -.1049034    .1868888
         wct |  -.2089897   .2332404    -0.90   0.373    -.6725059    .2545265
         nwc |   .0006313   .0006468     0.98   0.332    -.0006541    .0019167
         ast |  -.1374788    .132115    -1.04   0.301    -.4000297     .125072
         exp |   .4125854   .9989039     0.41   0.681    -1.572526    2.397697
         gdp |   .1630788   .3575339     0.46   0.649    -.5474447    .8736024
         blr |   -1.81447   2.286544    -0.79   0.430    -6.358497    2.729556
         cpi |   -.155004   .4233401    -0.37   0.715    -.9963035    .6862956
        empy |   46.86882   35.39728     1.32   0.189    -23.47584    117.2135
          e2 |   .0611438   .5325864     0.11   0.909    -.9972598    1.119547
          e3 |   .0303083   .5415591     0.06   0.955    -1.045927    1.106543
          e4 |    .314313   .5036135     0.62   0.534     -.686513    1.315139
  l_ind_ndir |   .3101816    .811465     0.38   0.003    -1.302434    1.922798
       _cons |  -3.113258   2.981156    -1.04   0.299     -9.03768    2.811163
------------------------------------------------------------------------------


Tests of endogeneity
  Ho: variables are exogenous

  Durbin (score) chi2(1)          =  5.61249  (p = 0.0178)
  Wu-Hausman F(1,87)              =  4.42339  (p = 0.0383)

. estat overid

  Tests of overidentifying restrictions:

  Sargan (score) chi2(1) =  .928021  (p = 0.3354)
  Basmann chi2(1)        =  .701629  (p = 0.4022)
```


Second Stage

```
Logistic regression                               Number of obs   =        116
                                                  LR chi2(20)     =     130.42
                                                  Prob > chi2     =     0.0000
Log likelihood = -15.195303                       Pseudo R2       =     0.8110

------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       ndirH |  -1.213811   1.579589    -0.77   0.042    -4.309749    1.882127
      gender |  -1.110872   1.534877    -0.72   0.469    -4.119175    1.897431
        cont |   14.47361   6.690193     2.16   0.031     1.361069    27.58614
         mdd |   .2452074   2.035821     0.12   0.904    -3.744928    4.235343
         age |  -.8358893   .3536472    -2.36   0.018    -1.529025   -.1427536
```

```
         blc |  -8.108983   3.902156    -2.08   0.038    -15.75707    -.460897
        lgta |   2.302975     1.2888     1.79   0.074    -.2230257    4.828977
   lgcapital |  -1.041706   .7674764    -1.36   0.175    -2.545932    .4625204
         tla |   2.547683   1.340989     1.90   0.057    -.0806079    5.175974
         lqt |  -.6739061    .336672    -2.00   0.045    -1.333771   -.0140412
         cla |   .1744553   .9288821     0.19   0.851     -1.64612    1.995031
        ebit |  -16.43113   7.384253    -2.23   0.026      -30.904   -1.958262
         roe |  -1.786803   .9208714    -1.94   0.052    -3.591678    .0180716
         wct |  -3.368214   2.678033    -1.26   0.208    -8.617062    1.880634
         nwc |  -.0269876   .0152066    -1.77   0.076    -.0567921    .0028168
         ast |  -2.467838   1.068499    -2.31   0.021    -4.562057   -.3736184
         exp |   18.28988   11.09374     1.65   0.099    -3.453459    40.03321
         blr |  -32.75384   14.41797    -2.27   0.023    -61.01254   -4.495149
         cpi |  -4.249208   2.949196    -1.44   0.150    -10.02953    1.531109
        empy |   439.7038    257.756     1.71   0.088    -944.8964    65.48875
       _cons |    35.6282   28.86962     1.23   0.217    -20.95521    92.21162
------------------------------------------------------------------------------
Note: 20 failures and 16 successes completely determined.
```

IND

First-stage regressions

```
-----------------------
                                                Number of obs   =       116
                                                F(  28,     87) =      0.75
                                                Prob > F        =    0.8061
                                                R-squared       =    0.1940
                                                Adj R-squared   =   -0.0654
                                                Root MSE        =    0.2022
------------------------------------------------------------------------------
         ind |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |   .0535417   .0455932     1.17   0.243    -.0370798    .1441631
        cont |  -.0968542   .0476753    -2.03   0.045    -.1916139   -.0020944
        ndir |   .0027387   .0140051     0.20   0.845    -.0250979    .0305753
         mdd |   .0445518   .0483703     0.92   0.360    -.0515895    .1406931
         age |   .0022512   .0032391     0.70   0.489    -.0041869    .0086892
         blc |  -.0013857   .0431724    -0.03   0.974    -.0871956    .0844241
        lgta |   .0057656   .0211594     0.27   0.786    -.0362909    .0478221
   lgcapital |  -.0000816   .0174255    -0.00   0.996    -.0347166    .0345535
         tla |  -.0060618   .0138747    -0.44   0.663    -.0336393    .0215156
         lta |   .0096394   .0783901     0.12   0.902    -.1461695    .1654482
         cle |   .0037475   .1351895     0.03   0.978    -.2649564    .2724513
         lqt |   .0001567   .0056652     0.03   0.978    -.0111034    .0114169
         cla |   .0563876   .0328411     1.72   0.090    -.0088877    .1216629
        ebit |   .0314125   .0617362     0.51   0.612     -.091295      .15412
         roe |   .0009525   .0097552     0.10   0.922    -.0184371    .0203421
         wct |  -.0108563   .0312388    -0.35   0.729    -.0729469    .0512343
         nwc |   .0000235   .0000856     0.27   0.784    -.0001465    .0001936
         ast |  -.0269262   .0172576    -1.56   0.122    -.0612274    .0073751
         exp |   -.030595   .1287425    -0.24   0.813    -.2864846    .2252946
         gdp |   .0393608     .04704     0.84   0.405    -.0541364    .1328579
         blr |  -.0248698   .2954789    -0.08   0.933     -.612166    .5624264
         cpi |  -.0588128   .0551687    -1.07   0.289    -.1684666    .0508411
        empy |   .1820952   4.607113     0.04   0.969    -8.975041    9.339232
          e2 |  -.1015917   .0686539    -1.48   0.143    -.2380488    .0348655
          e3 |   -.061209   .0720561    -0.85   0.398    -.2044283    .0820103
          e4 |  -.0105905   .0655633    -0.16   0.872    -.1409047    .1197237
   l_ind_ind |  -.0180912   .0518247    -0.35   0.728    -.1210984     .084916
  l_tngasset |   .0024791   .0277087     0.09   0.929     -.052595    .0575532
       _cons |  -.0146915   .3527185    -0.04   0.967    -.7157578    .6863747
------------------------------------------------------------------------------
```

```
Instrumental variables (2SLS) regression              Number of obs =     116
                                                      Wald chi2(27) =  134.63
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.4541
                                                      Root MSE      =  .36944
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ind |   -1.20112   5.185126    -0.23   0.817    -11.36378    8.961541
      gender |  -.0522348   .2774828    -0.19   0.851    -.5960911    .4916215
```

```
        cont |   .3392865   .4904354     0.69   0.489    -.6219492    1.300522
        ndir |  -.0140267   .0282001    -0.50   0.619    -.0692979    .0412444
         mdd |    .054119   .2367752     0.23   0.819    -.4099518    .5181898
         age |  -.0142474    .014366    -0.99   0.321    -.0424043    .0139095
         blc |  -.1487266   .0775492    -1.92   0.055    -.3007201     .003267
        lgta |    .046387    .047808     0.97   0.332     -.047315     .140089
   lgcapital |  -.0181785   .0316325    -0.57   0.566     -.080177    .0438199
         tla |   .0267617   .0430256     0.62   0.534     -.057567    .1110904
         lta |   .0669384   .1624884     0.41   0.680     -.251533    .3854099
         cle |   .1583117   .2453699     0.65   0.519    -.3226044    .6392278
         lqt |  -.0005724   .0103851    -0.06   0.956    -.0209269    .0197821
         cla |   .0208638   .2968607     0.07   0.944    -.5609725    .6027001
        ebit |  -.1149734   .1994246    -0.58   0.564    -.5058383    .2758916
         roe |  -.0244939   .0192546    -1.27   0.203    -.0622322    .0132444
         wct |  -.0763802   .0880105    -0.87   0.385    -.2488776    .0961172
         nwc |  -.0000769   .0002105    -0.37   0.715    -.0004895    .0003357
         ast |  -.1062115    .142548    -0.75   0.456    -.3856004    .1731773
         exp |   .2915477   .2745339     1.06   0.288    -.2465287    .8296242
         gdp |   .0729835   .2287212     0.32   0.750    -.3753018    .5212689
         blr |  -1.132654   .5675472    -2.00   0.046    -2.245026    -.020282
         cpi |  -.0741979   .3372174    -0.22   0.826     -.735132    .5867361
        empy |  -4.905484   8.428631    -0.58   0.561     -21.4253    11.61433
          e1 |   .0774528   .1339166     0.58   0.563    -.1850188    .3399244
          e2 |   -.118869   .4846573    -0.25   0.806     -1.06878    .8310419
          e3 |  -.0512641   .3032167    -0.17   0.866     -.645558    .5430297
       _cons |   .1260714   .6440738     0.20   0.845     -1.13629    1.388433
------------------------------------------------------------------------------
Instrumented:  ind
Instruments:   gender cont ndir mdd age blc lgta lgcapital tla lta cle lqt
               cla ebit roe wct nwc ast exp gdp blr cpi empy e1 e2 e3
               l_ind_ind l_tngasset
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  .081012  (p = 0.7759)
  Wu-Hausman F(1,87)              =  .060802  (p = 0.8058)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  1.89482  (p = 0.1687)
  Basmann chi2(1)        =  1.44471  (p = 0.2294)
```


MDD

```
First-stage regressions
-----------------------
                                                Number of obs   =       116
                                                F(  28,     87) =      0.76
                                                Prob > F        =    0.7958
                                                R-squared       =    0.1959
                                                Adj R-squared   =   -0.0629
                                                Root MSE        =    0.4484
------------------------------------------------------------------------------
         mdd |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      gender |  -.0578125   .1005403    -0.58   0.567    -.2576471    .1420222
        cont |  -.0441192   .1050796    -0.42   0.676    -.2529762    .1647379
        ndir |   -.030315   .0308476    -0.98   0.328    -.0916279    .0309978
         ind |   .2185759   .2379243     0.92   0.361    -.2543245    .6914763
         age |   .0002106   .0069711     0.03   0.976    -.0136453    .0140665
         blc |   .0032318   .0945094     0.03   0.973    -.1846159    .1910794
        lgta |  -.0326605   .0468036    -0.70   0.487    -.1256876    .0603667
   lgcapital |   -.015308   .0387962    -0.39   0.694    -.0924196    .0618037
         tla |  -.0359811   .0301792    -1.19   0.236    -.0959654    .0240033
         lta |  -.0957918   .1692568    -0.57   0.573     -.432208    .2406244
         cle |   .3949557   .2960926     1.33   0.186    -.1935604    .9834717
         lqt |   -.004468   .0124984    -0.36   0.722      -.02931     .020374
         cla |  -.0530292   .0741042    -0.72   0.476    -.2003193     .094261
        ebit |   .1754179   .1358589     1.29   0.200    -.0946164    .4454522
         roe |   .0034256   .0213699     0.16   0.873    -.0390494    .0459006
         wct |  -.0380566    .068025    -0.56   0.577    -.1732636    .0971503
         nwc |  -.0001485   .0001895    -0.78   0.436    -.0005251    .0002282
         ast |   .0176949   .0394772     0.45   0.655    -.0607703      .09616
         exp |   .1608252    .287528     0.56   0.577    -.4106679    .7323183
         gdp |  -.0296986   .1053439    -0.28   0.779    -.2390811    .1796839
         blr |   .0975361   .6769805     0.14   0.886    -1.248036    1.443108
```

```
         cpi |  -.0583615   .1212031    -0.48   0.631    -.2992658    .1825428
        empy |   10.67821   10.27385     1.04   0.302    -9.742185    31.09861
          e2 |   .0989095   .1542589     0.64   0.523    -.2076968    .4055159
          e3 |  -.0092013   .1572552    -0.06   0.953     -.321763    .3033604
          e4 |   .0326236   .1458431     0.22   0.824    -.2572555    .3225026
    l_dirown |   -.026791   .0823631    -0.33   0.746    -.1904966    .1369146
  l_tngasset |  -.0709502   .0605815    -1.17   0.245    -.1913624    .0494621
       _cons |    1.01756   .7746231     1.31   0.192    -.5220878    2.557207
------------------------------------------------------------------------------
Instrumental variables (2SLS) regression              Number of obs =     116
                                                      Wald chi2(27) =  125.12
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.4093
                                                      Root MSE      =  .38429
------------------------------------------------------------------------------
      status |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mdd |  -.6015413    .697744    -0.86   0.389    -1.969094    .7660117
      gender |  -.1474573   .0944126    -1.56   0.118    -.3325025     .037588
        cont |   .4309405   .0929413     4.64   0.000     .2487789    .6131021
         ind |   .1356175   .2510197     0.54   0.589    -.3563721     .627607
        ndir |  -.0330023   .0321967    -1.03   0.305    -.0961068    .0301021
         age |  -.0168631   .0059436    -2.84   0.005    -.0285123   -.0052139
         blc |  -.1567403   .0807034    -1.94   0.052    -.3149161    .0014354
        lgta |   .0200792   .0461096     0.44   0.663    -.0702939    .1104523
   lgcapital |  -.0303992   .0355024    -0.86   0.392    -.0999826    .0391841
         tla |    .010661   .0380098     0.28   0.779    -.0638369    .0851588
         lta |  -.0340867   .1683697    -0.20   0.840    -.3640853    .2959119
         cle |   .4161746   .3892377     1.07   0.285    -.3467173    1.179067
         lqt |  -.0027806   .0108682    -0.26   0.798    -.0240819    .0185208
         cla |  -.0748452   .0707108    -1.06   0.290    -.2134358    .0637454
        ebit |  -.0436043   .1719762    -0.25   0.800    -.3806714    .2934628
         roe |  -.0259281   .0182243    -1.42   0.155    -.0616471    .0097909
         wct |  -.0792514   .0617891    -1.28   0.200    -.2003558    .0418531
         nwc |  -.0001852   .0001819    -1.02   0.309    -.0005417    .0001713
         ast |  -.0607398   .0361698    -1.68   0.093    -.1316314    .0101517
         exp |   .4090522    .261289     1.57   0.117    -.1030649    .9211693
         gdp |   .0200858   .0881808     0.23   0.820    -.1527453     .192917
         blr |  -1.049883   .5606085    -1.87   0.061    -2.148655    .0488897
         cpi |  -.0379229   .1129434    -0.34   0.737    -.2592879     .183442
        empy |   1.219944   11.30466     0.11   0.914    -20.93678    23.37666
          e1 |   .0477747    .125787     0.38   0.704    -.1987632    .2943126
          e2 |   .0323806   .1155437     0.28   0.779    -.1940809     .258842
          e3 |   .0048175   .1074521     0.04   0.964    -.2057847    .2154198
       _cons |   .8258158   1.017096     0.81   0.417    -1.167656    2.819287
------------------------------------------------------------------------------
Instrumented:  mdd
Instruments:   gender cont ind ndir age blc lgta lgcapital tla lta cle lqt
               cla ebit roe wct nwc ast exp gdp blr cpi empy e1 e2 e3
               l_dirown l_tngasset
. estat endog
  Tests of endogeneity
  Ho: variables are exogenous
  Durbin (score) chi2(1)          =  1.22974  (p = 0.2675)
  Wu-Hausman F(1,87)              =  .932186  (p = 0.3370)

. estat overid
  Tests of overidentifying restrictions:
  Sargan (score) chi2(1) =  2.69229  (p = 0.1008)
  Basmann chi2(1)        =   2.0672  (p = 0.1505)
```

APPENDIX 6: Artificial Neural Network for Nigerian Sample

APPENDIX 6a: Model 1 (3-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	11.575
	Percent Incorrect Predictions	4.0%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.07
Holdout	Percent Incorrect Predictions	8.6%

Dependent Variable: Distress Status

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	2.418		
	EBIT	-5.298		
	ROE	.389		
	TLA	4.405		
	LTA	3.372		
	CLE	1.788		
	CLA	.412		
	LQT	-1.298		
	WCT	-.930		
	NWC	-.121		
	AST	-.140		
	EXP	.675		
	LogTA	-1.387		
	LogCAP	.134		
	AGE	-1.926		
	BLC	-1.038		
Hidden Layer 1	(Bias)		1.082	-1.091
	H(1:1)		-5.434	5.529

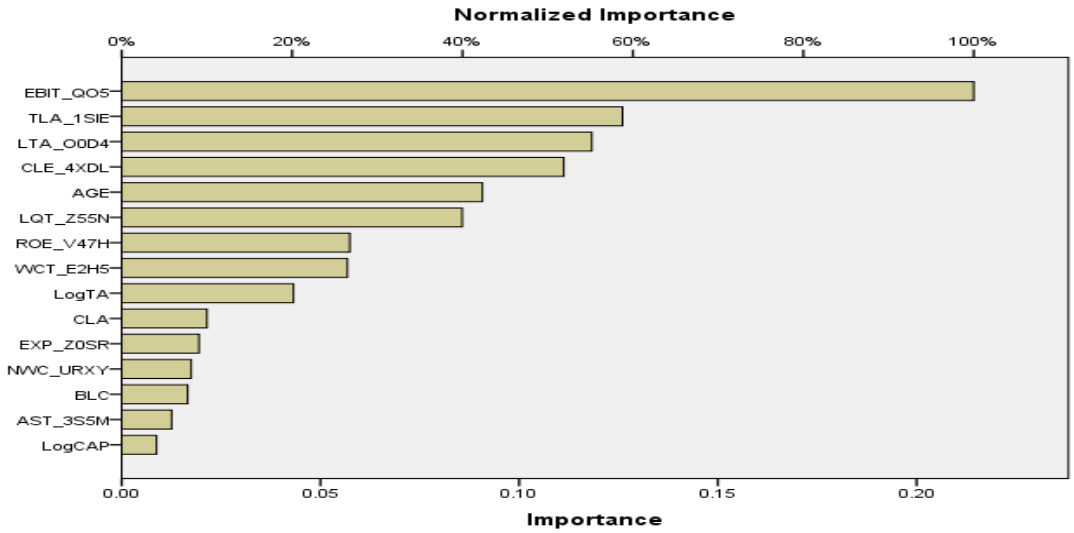
Classification

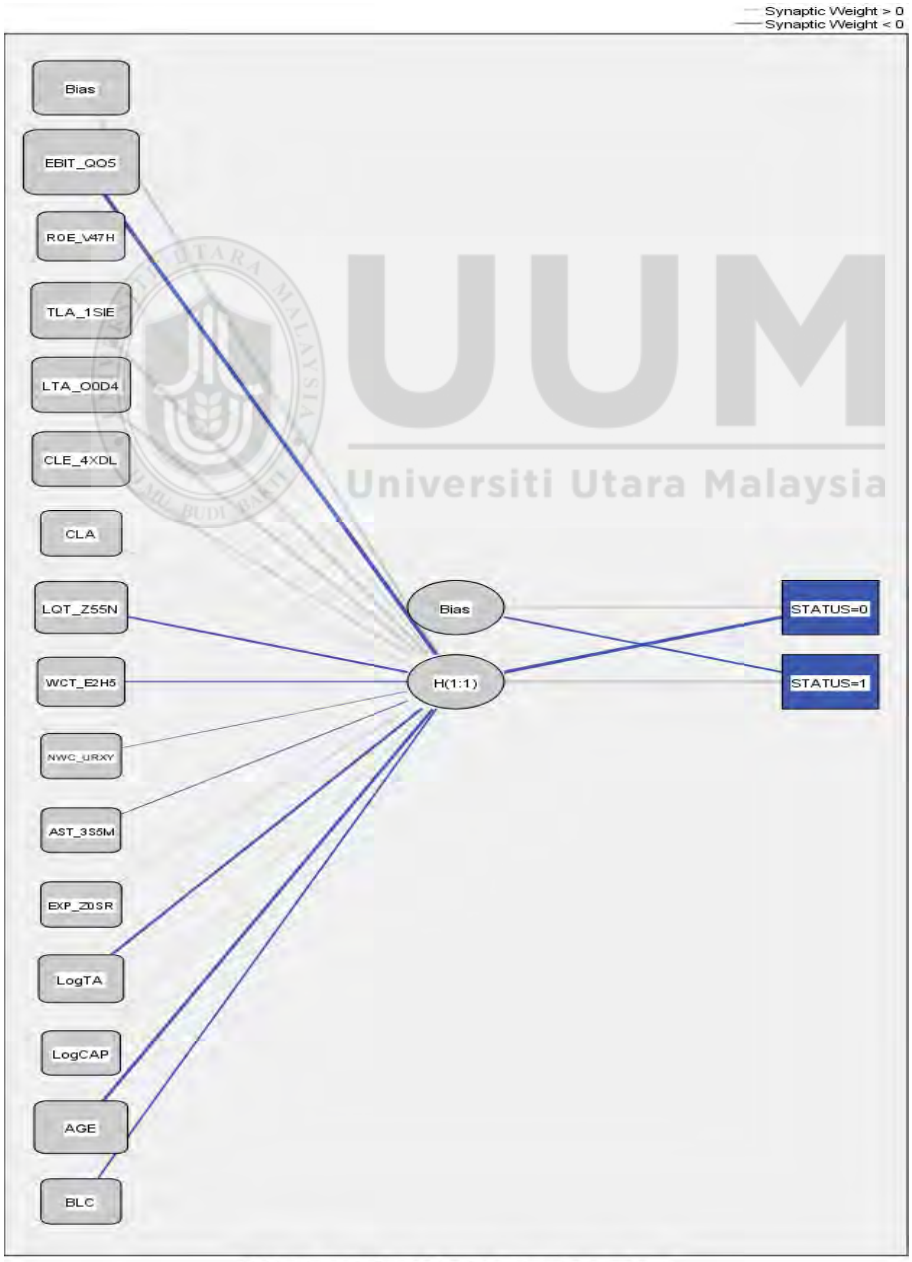
Sample	Observed	Predicted		
		Non-Failed SME	Failed SME	Percent Correct
Training	Non-Failed SME	128	8	94.1%
	Failed SME	3	134	97.8%
	Overall Percent	48.0%	52.0%	96.0%
Holdout	Non-Failed SME	30	5	85.7%
	Failed SME	1	34	97.1%
	Overall Percent	44.3%	55.7%	91.4%

Dependent Variable: Distress Status

Independent Variable Importance

	Importance	Normalized Importance
EBIT	.214	100.0%
ROE	.057	26.8%
TLA	.126	58.8%
LTA	.118	55.2%
CLE	.111	51.9%
CLA	.021	10.0%
LQT	.086	40.0%
WCT	.057	26.5%
NWC	.017	8.2%
AST	.013	5.9%
EXP	.019	9.1%
LogTA	.043	20.2%
LogCAP	.009	4.1%
AGE	.091	42.3%
BLC	.017	7.8%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

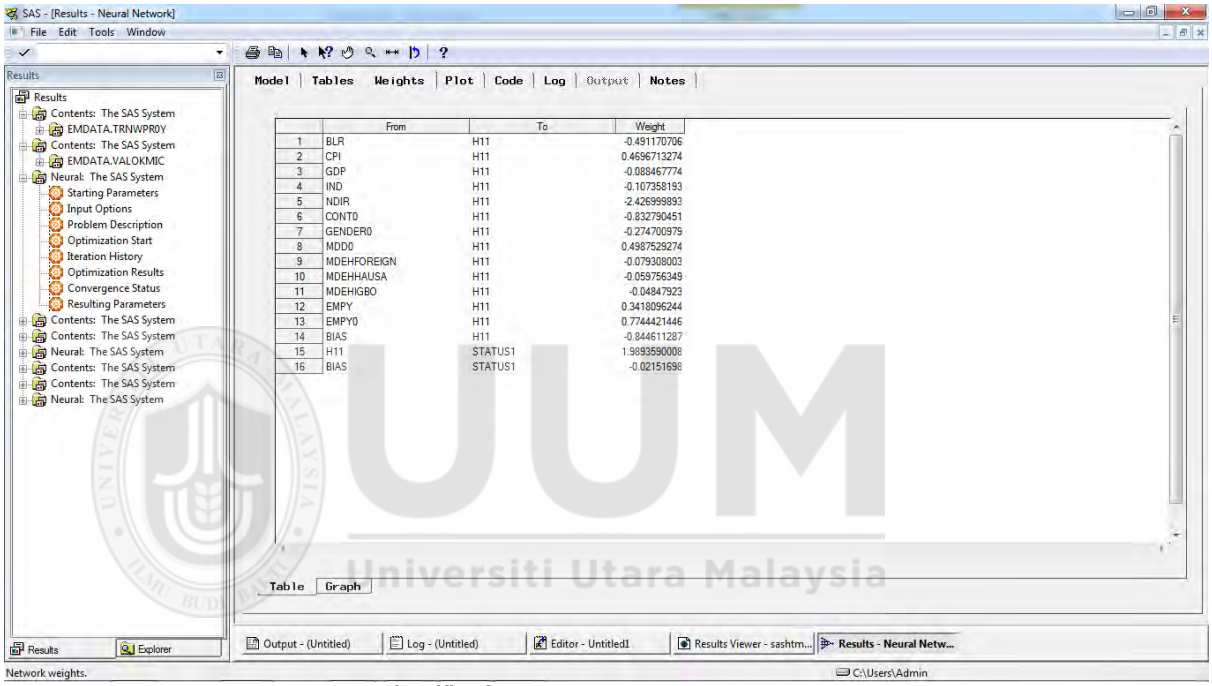
APPENDIX 6b: Model 2 (3-year Prior to bankruptcy sample)

Model Summary

Training	Sum of Squares Error	40.910
	Percent Incorrect Predictions	19.0%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.09
Holdout	Percent Incorrect Predictions	21.3%

Dependent Variable: Distress Status

Parameter Estimates



	From	To	Weight
1	BLR	H11	-0.491170706
2	CPI	H11	0.4696713274
3	GDP	H11	-0.088467774
4	IND	H11	-0.107358193
5	NDIR	H11	-2.426999893
6	CONT0	H11	-0.832790451
7	GENDER0	H11	-0.274700975
8	MDD0	H11	0.4987529274
9	MDEHFOREIGN	H11	-0.079308003
10	MDEHHAUSA	H11	-0.059756349
11	MDEHIGBO	H11	-0.04847923
12	EMPY	H11	0.3418096244
13	EMPY0	H11	0.7744421446
14	BIAS	H11	-0.844611287
15	H11	STATUS1	1.9893590008
16	BIAS	STATUS1	-0.02151698

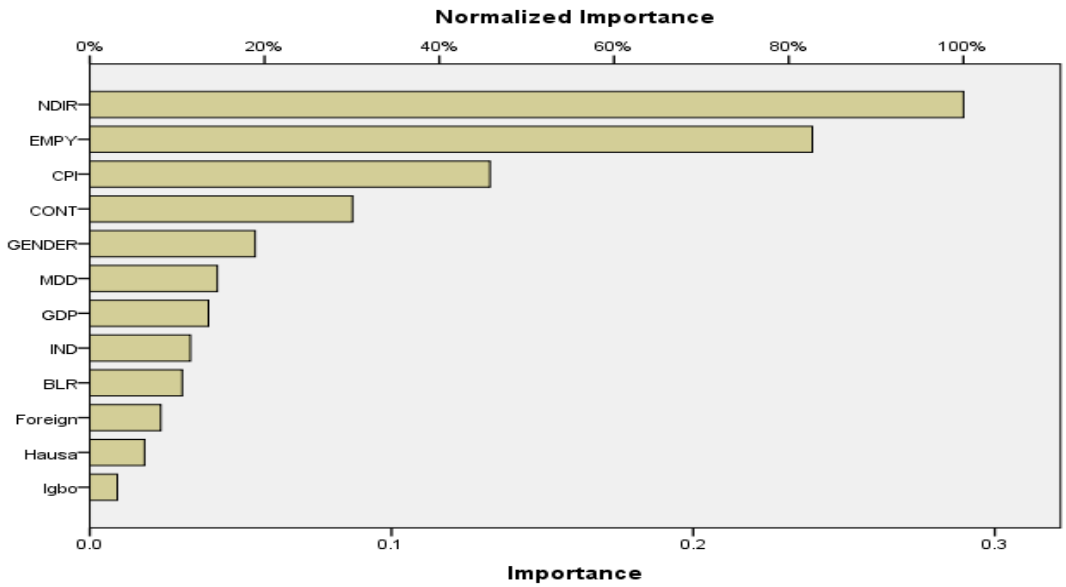
Classification

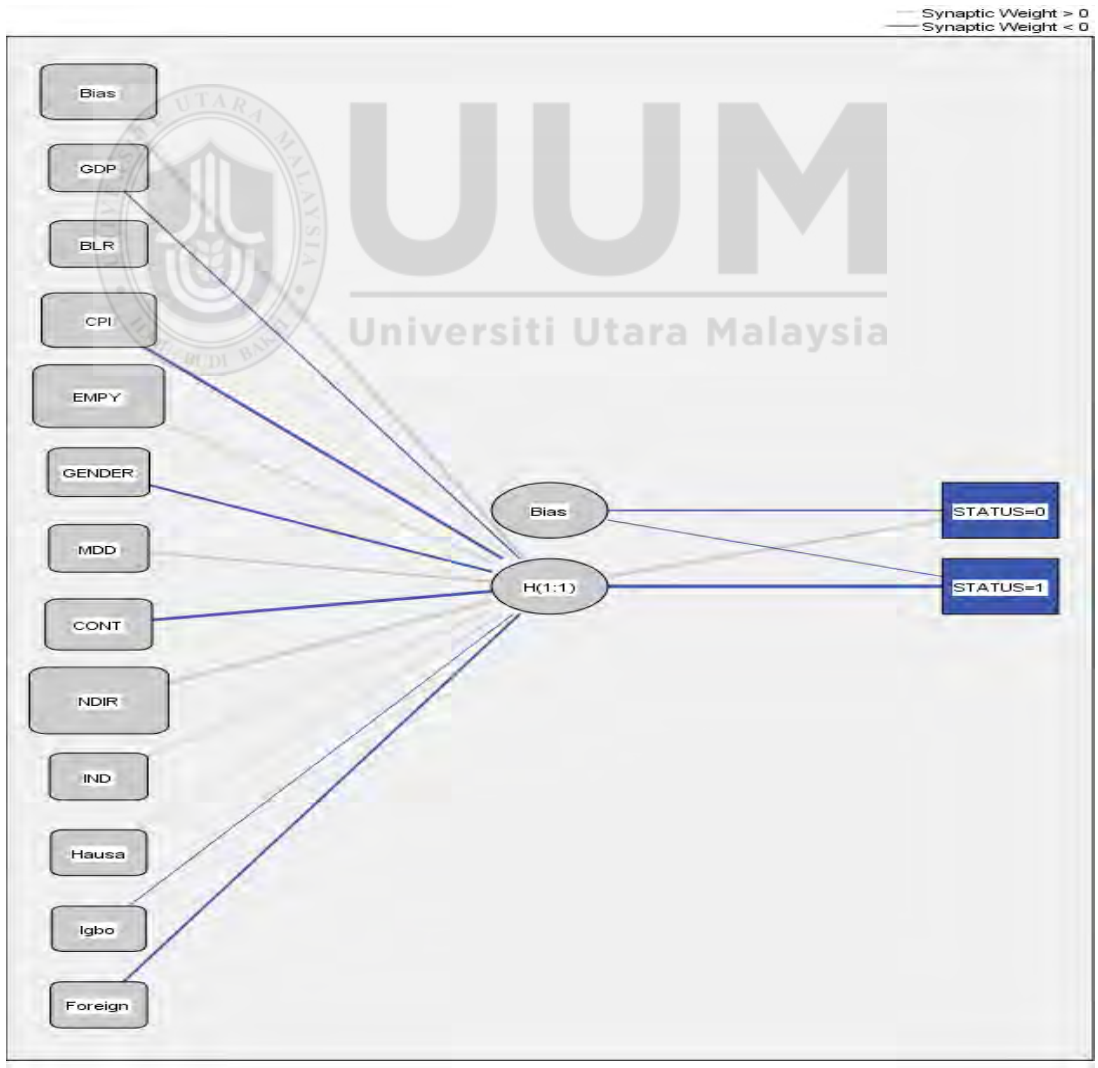
Sample	Observed	Predicted		
		Non-Failed SME	Failed SME	Percent Correct
Training	Non-Failed SME	109	32	77.3%
	Failed SME	19	109	85.2%
	Overall Percent	47.6%	52.4%	81.0%
Holdout	Non-Failed SME	25	6	80.6%
	Failed SME	10	34	77.3%
	Overall Percent	46.7%	53.3%	78.7%

Dependent Variable: Distress Status

Independent Variable Importance

	Importance	Normalized Importance
GDP	.039	13.6%
BLR	.031	10.6%
CPI	.133	45.8%
EMPY	.240	82.7%
GENDER	.055	18.9%
MDD	.042	14.6%
CONT	.087	30.1%
NDIR	.290	100.0%
IND	.033	11.5%
Hausa	.018	6.3%
Igbo	.009	3.1%
Foreign	.023	8.1%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

APPENDIX 6c: Model 3 (3-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	9.881
	Percent Incorrect Predictions	3.6%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.12
Holdout	Percent Incorrect Predictions	11.8%

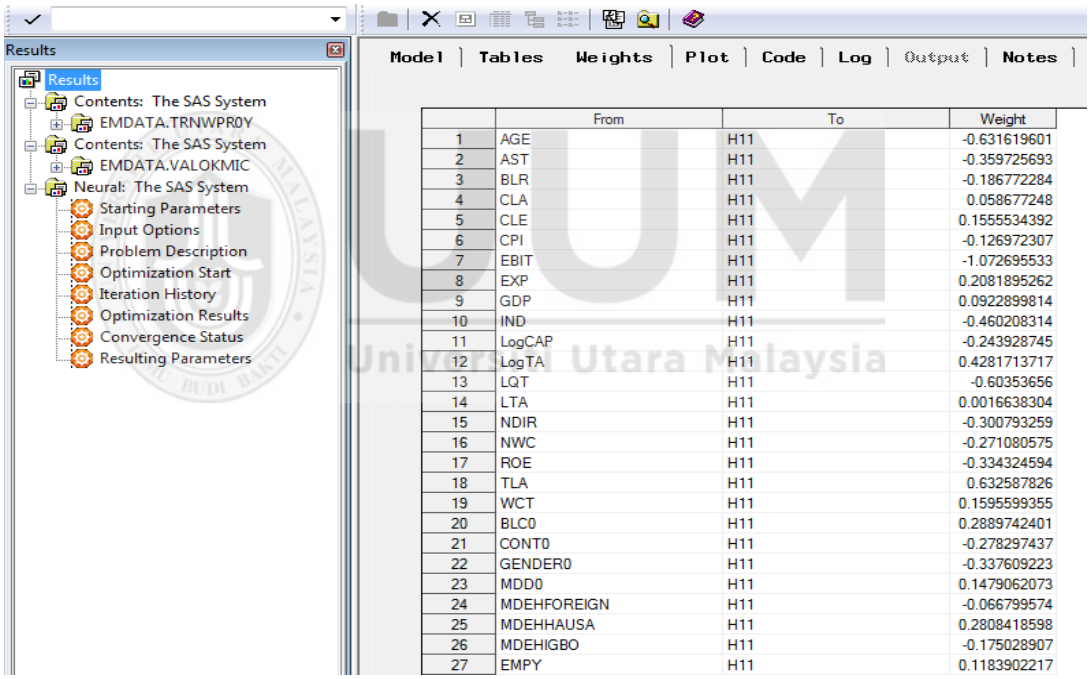
Dependent Variable: Distress Status

Classification

Sample	Observed	Predicted		
		Non-Failed SME	Failed SME	Percent Correct
Training	Non-Failed SME	127	3	97.7%
	Failed SME	4	136	97.1%
	Overall Percent	48.5%	51.5%	97.4%
Holdout	Non-Failed SME	37	4	90.2%
	Failed SME	3	29	90.6%
	Overall Percent	54.8%	45.2%	90.4%

Dependent Variable: Distress Status

Parameter Estimates

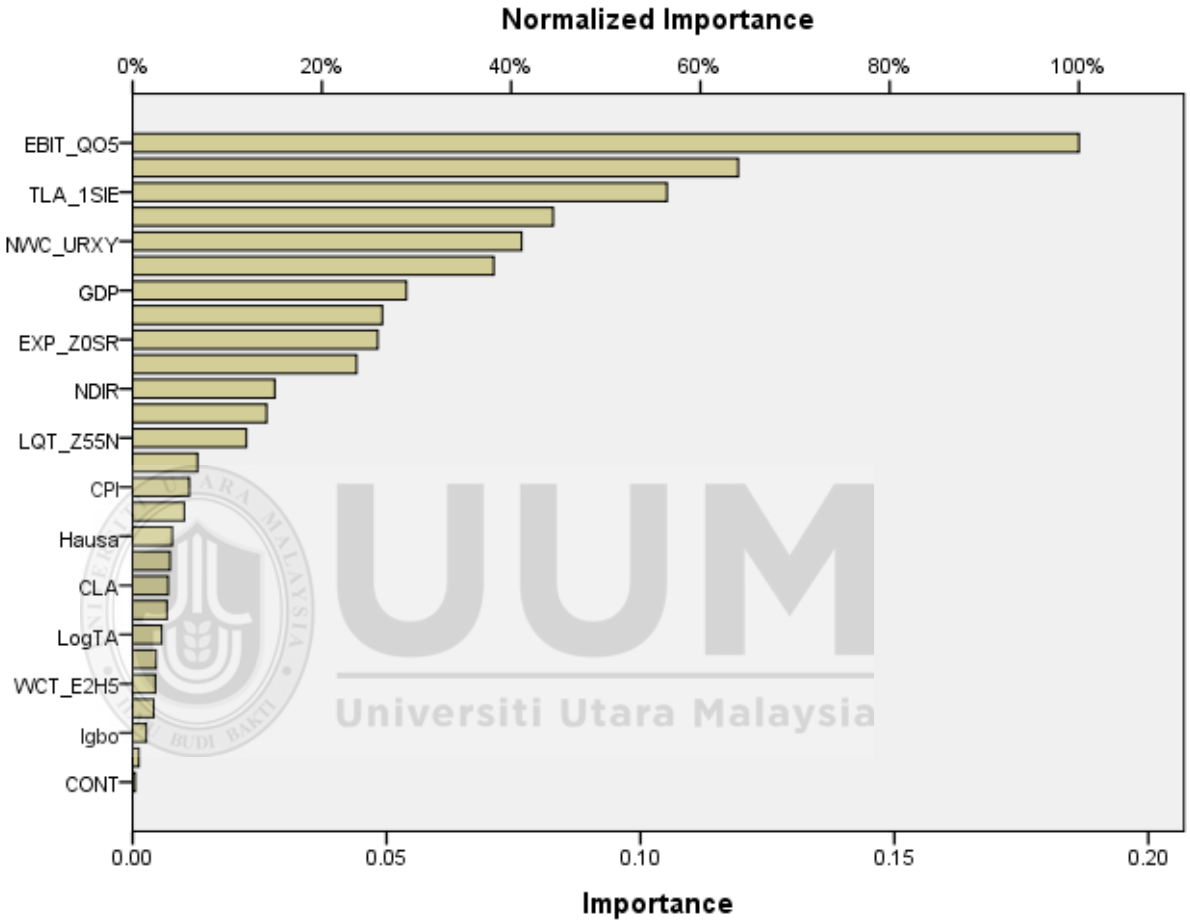


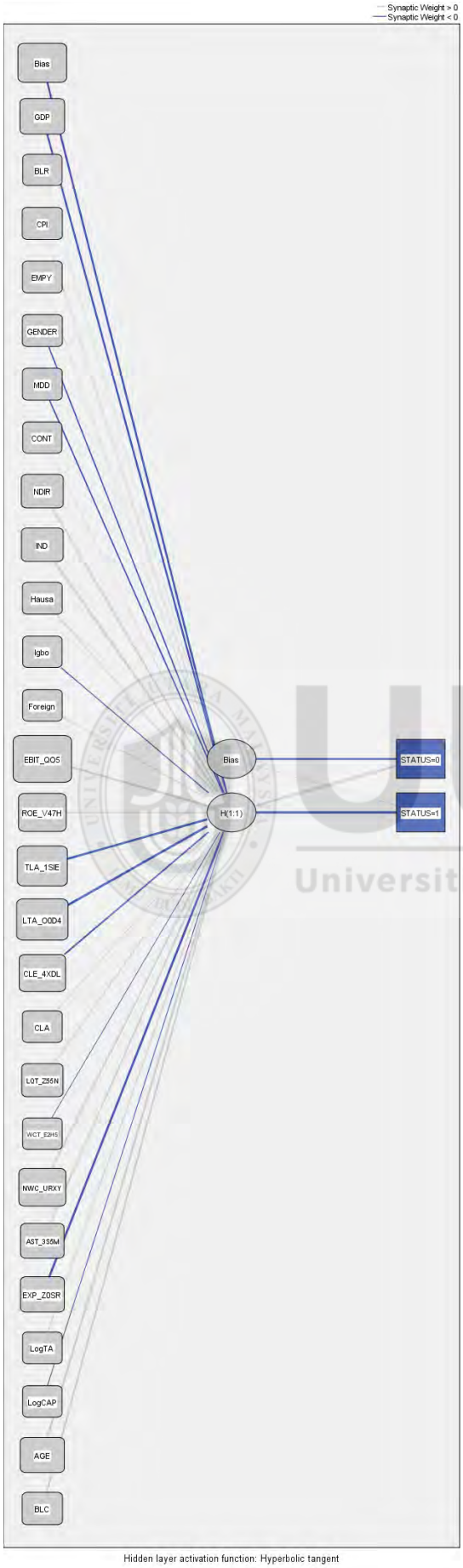
	From	To	Weight
1	AGE	H11	-0.631619601
2	AST	H11	-0.359725693
3	BLR	H11	-0.186772284
4	CLA	H11	0.058677248
5	CLE	H11	0.1555534392
6	CPI	H11	-0.126972307
7	EBIT	H11	-1.072695533
8	EXP	H11	0.2081895262
9	GDP	H11	0.0922899814
10	IND	H11	-0.460208314
11	LogCAP	H11	-0.243928745
12	LogTA	H11	0.4281713717
13	LQT	H11	-0.60353656
14	LTA	H11	0.0016638304
15	NDIR	H11	-0.300793259
16	NWC	H11	-0.271080575
17	ROE	H11	-0.334324594
18	TLA	H11	0.632587826
19	WCT	H11	0.1595599355
20	BLC0	H11	0.2889742401
21	CONT0	H11	-0.278297437
22	GENDER0	H11	-0.337609223
23	MDD0	H11	0.1479062073
24	MDEHFOREIGN	H11	-0.066799574
25	MDEHHAUSA	H11	0.2808418598
26	MDEHIGBO	H11	-0.175028907
27	EMPY	H11	0.1183902217

Independent Variable Importance

	Importance	Normalized Importance
GDP	.054	28.9%
BLR	.001	0.7%
CPI	.011	6.0%
EMPY	.007	3.6%
GENDER	.010	5.4%
MDD	.007	4.0%
CONT	.001	0.3%
NDIR	.028	15.0%
IND	.026	14.1%
Hausa	.008	4.2%
Igbo	.003	1.4%
Foreign	.005	2.5%
EBIT	.186	100.0%
ROE	.083	44.4%
TLA	.105	56.5%
LTA	.119	64.0%

CLE	.071	38.2%
CLA	.007	3.8%
LQT	.022	12.0%
WCT	.005	2.4%
NWC	.077	41.1%
AST	.044	23.7%
EXP	.048	25.9%
LogTA	.006	3.1%
LogCAP	.004	2.2%
AGE	.049	26.4%
BLC	.013	6.9%





APPENDIX 6d: Model 1 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	11.221
	Percent Incorrect Predictions	8.5%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.09
Holdout	Percent Incorrect Predictions	22.6%

Dependent Variable: Distress status

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	.388		
	Age	3.773		
	BLC	.808		
	lgTA	-2.179		
	lgCAP	-.677		
	TLA	-1.371		
	LTA	.461		
	CLA	-.885		
	CLE	-.509		
	LQT	1.745		
	EXP	-.725		
	EBIT	4.108		
	ROE	1.163		
	WCT	1.639		
	NWC	-.174		
	AST	2.413		
Hidden Layer 1	(Bias)		-.615	.609
	H(1:1)		2.915	-2.907

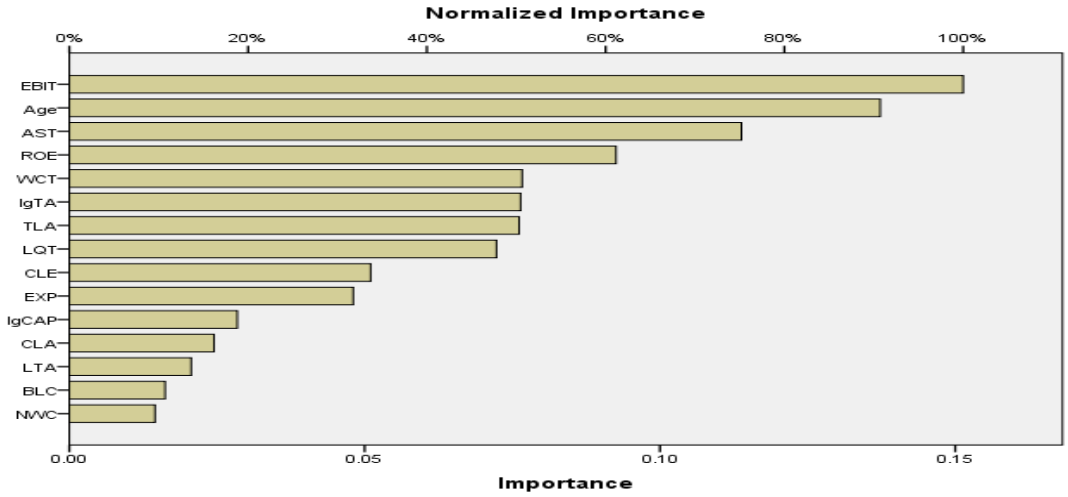
Classification

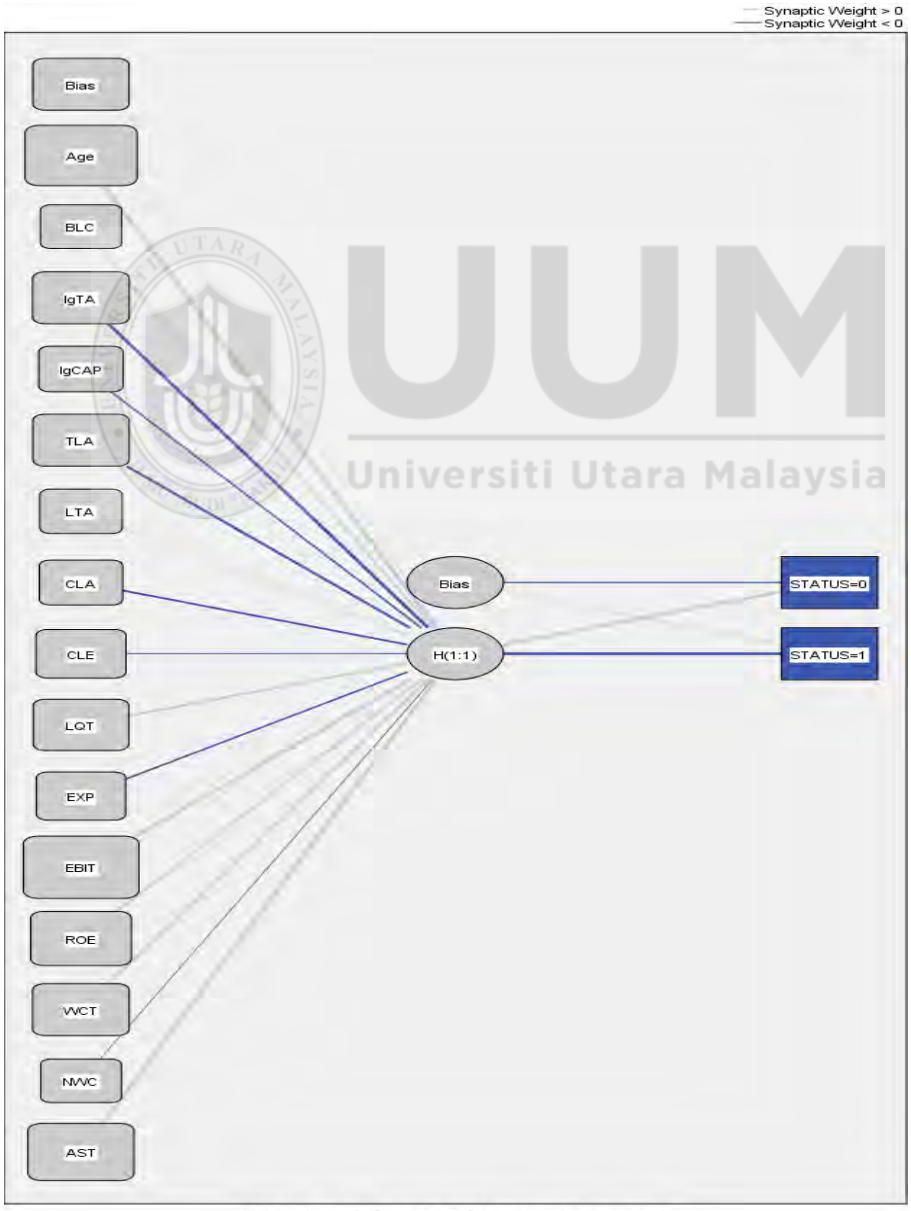
Sample	Observed	Predicted		
		Non-failed SME	Failed SME	Percent Correct
Training	Non-failed SME	67	4	94.4%
	Failed SME	8	62	88.6%
	Overall Percent	53.2%	46.8%	91.5%
Holdout	Non-failed SME	12	3	80.0%
	Failed SME	4	12	75.0%
	Overall Percent	51.6%	48.4%	77.4%

Dependent Variable: Distress status

Independent Variable Importance

	Importance	Normalized Importance
Age	.137	90.7%
Business location	.016	10.7%
lgTA	.076	50.5%
lgCAP	.028	18.8%
TLA	.076	50.3%
LTA	.021	13.6%
CLA	.025	16.2%
CLE	.051	33.7%
LQT	.072	47.8%
EXP	.048	31.8%
EBIT	.151	100.0%
ROE	.093	61.2%
WCT	.077	50.7%
NWC	.014	9.6%
AST	.114	75.2%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

APPENDIX 6e: Model 2 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	7.504
	Percent Incorrect Predictions	5.8%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.08
Holdout	Percent Incorrect Predictions	17.6%

Dependent Variable: Distress status

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-2.545		
	GDP	-.469		
	BLR	.091		
	CPI	-.807		
	EMPY	1.228		
	Hausa	-.155		
	Igbo	.045		
	Foreign	-.249		
	IND	-1.186		
	GENDER	2.526		
	CONT	4.327		
	NDIR	-6.054		
	MDD	.083		
Hidden Layer 1	(Bias)		1.072	-1.133
	H(1:1)		-4.960	4.947

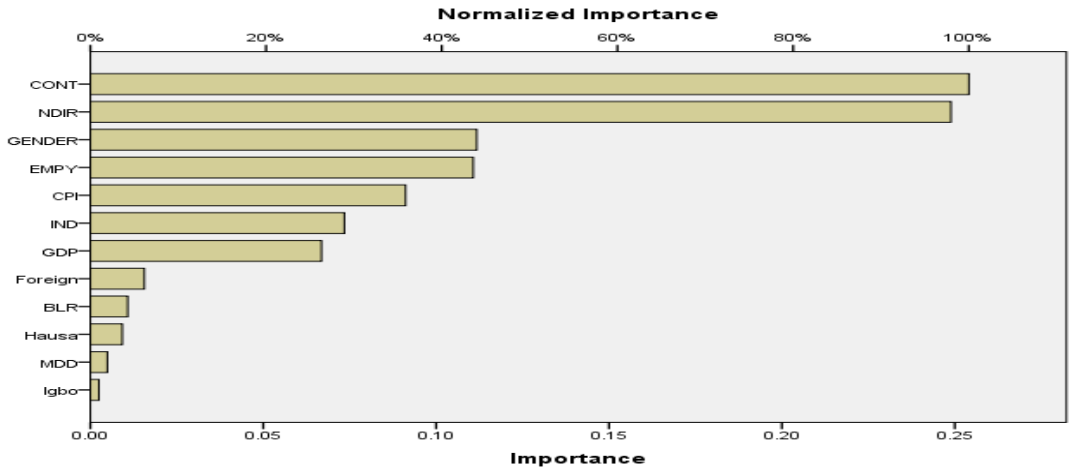
Classification

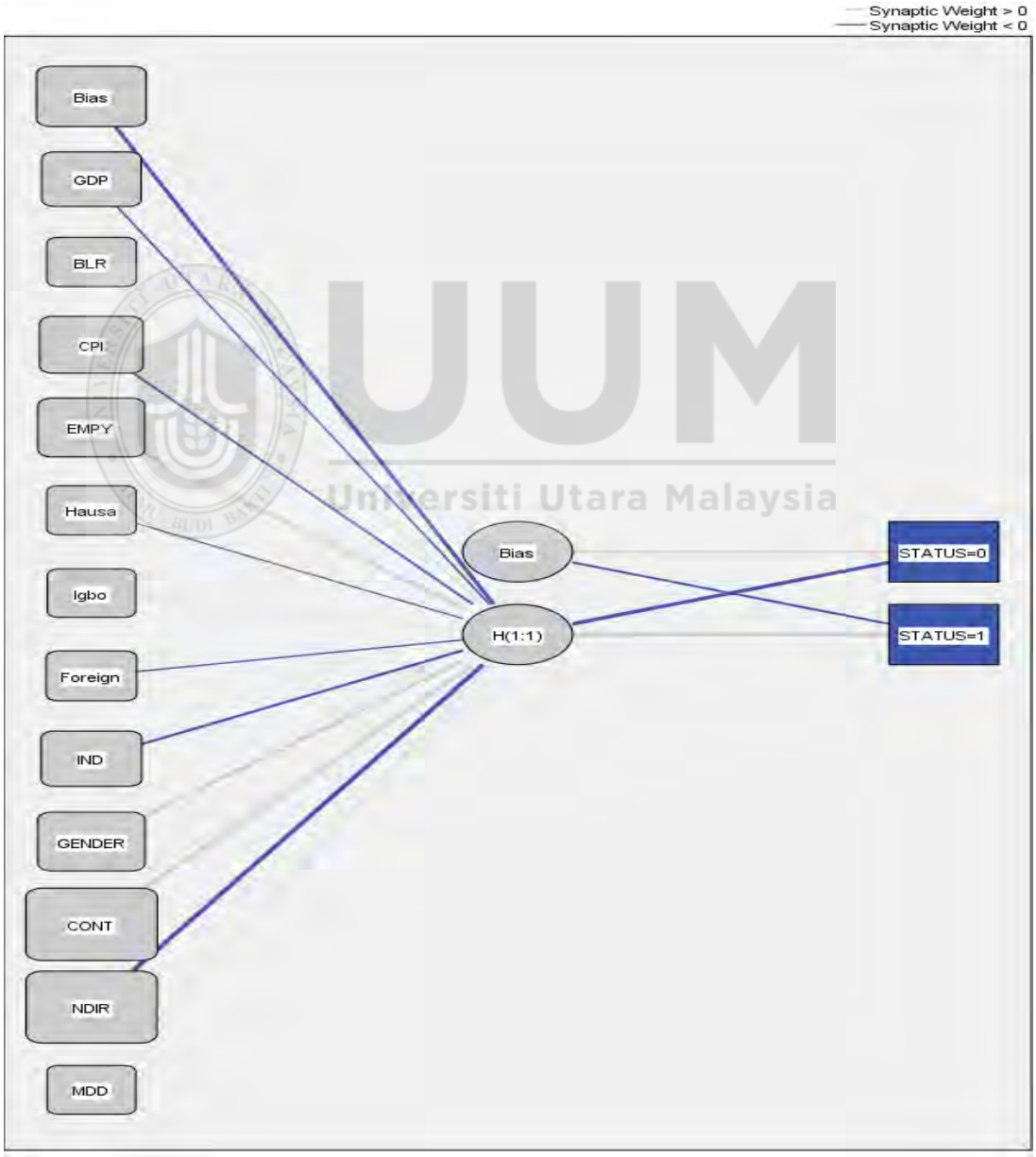
Sample	Observed	Predicted		
		Non-failed SME	Failed SME	Percent Correct
Training	Non-failed SME	68	5	93.2%
	Failed SME	3	62	95.4%
	Overall Percent	51.4%	48.6%	94.2%
Holdout	Non-failed SME	10	3	76.9%
	Failed SME	3	18	85.7%
	Overall Percent	38.2%	61.8%	82.4%

Dependent Variable: Distress status

Independent Variable Importance

	Importance	Normalized Importance
GDP	.067	26.3%
BLR	.011	4.3%
CPI	.091	35.9%
EMPY	.111	43.6%
Hausa	.009	3.6%
Igbo	.002	1.0%
Foreign	.016	6.2%
IND	.073	28.9%
GENDER	.112	44.0%
CONT	.254	100.0%
NDIR	.249	98.0%
MDD	.005	1.9%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

APPENDIX 6f: Model 3 (2-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	2.890
	Percent Incorrect Predictions	2.2%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.03
Holdout	Percent Incorrect Predictions	13.9%

Dependent Variable: Distress status

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	.909		
	CPI	1.422		
	EMPY	.803		
	GENDER	2.377		
	CONT	4.159		
	NDIR	-1.535		
	Age	-3.060		
	BLC	-1.256		
	LogTA	-1.122		
	LogCAP	.949		
	TLA	.492		
	LTA	-.169		
	CLA	1.172		
	CLE	.490		
	LQT	-1.321		
	EXP	-.306		
	EBIT	-2.057		
	ROE	-1.778		
	WCT	-.681		
	NWC	-.881		
	AST	.273		
Hidden Layer 1	(Bias)		1.421	-1.421
	H(1:1)		-4.609	4.609

Classification

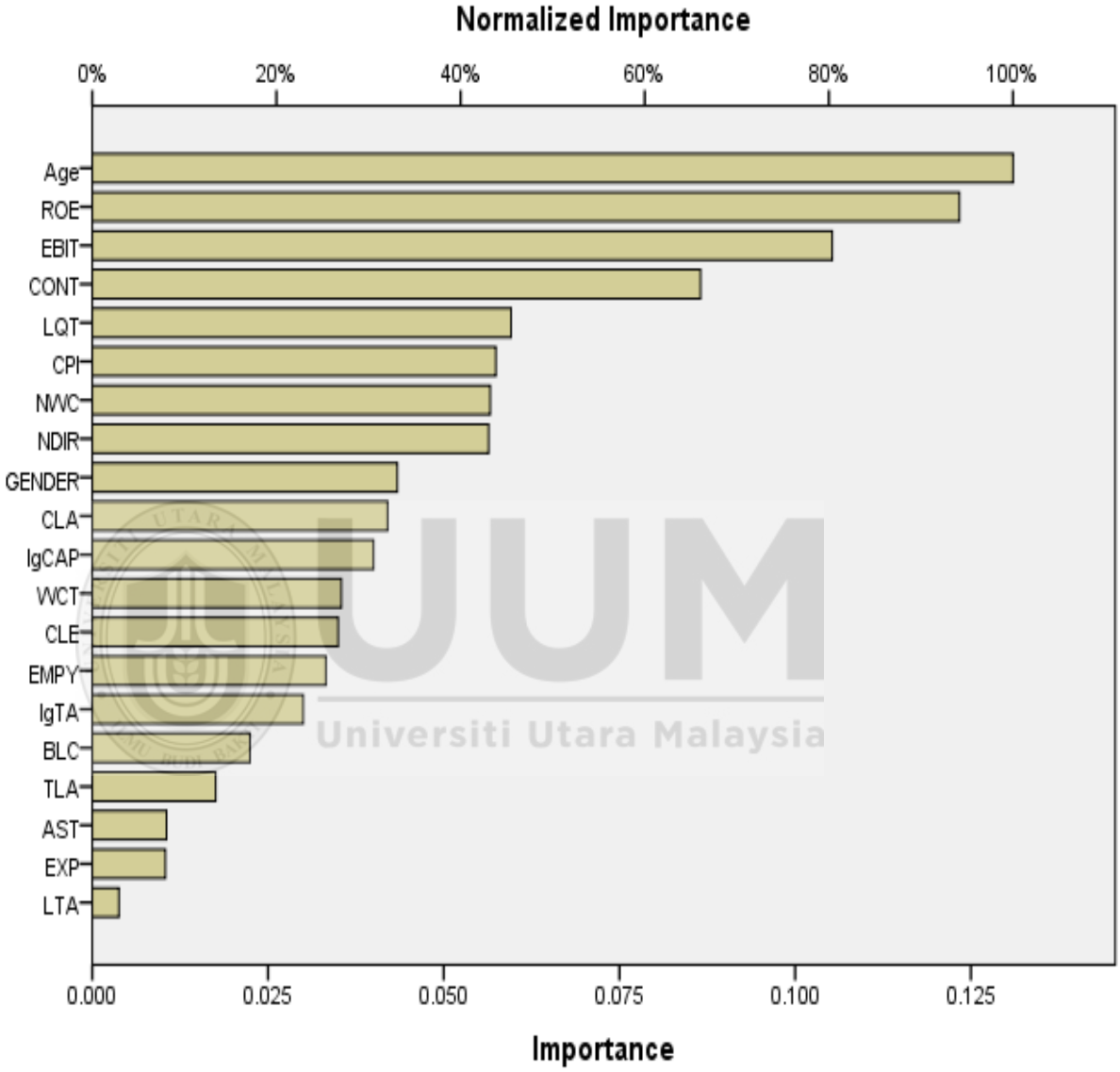
Sample	Observed	Predicted		
		Non-failed SME	Failed SME	Percent Correct
Training	Non-failed SME	65	3	95.6%
	Failed SME	0	68	100.0%
	Overall Percent	47.8%	52.2%	97.8%
Holdout	Non-failed SME	13	5	72.2%
	Failed SME	0	18	100.0%
	Overall Percent	36.1%	63.9%	86.1%

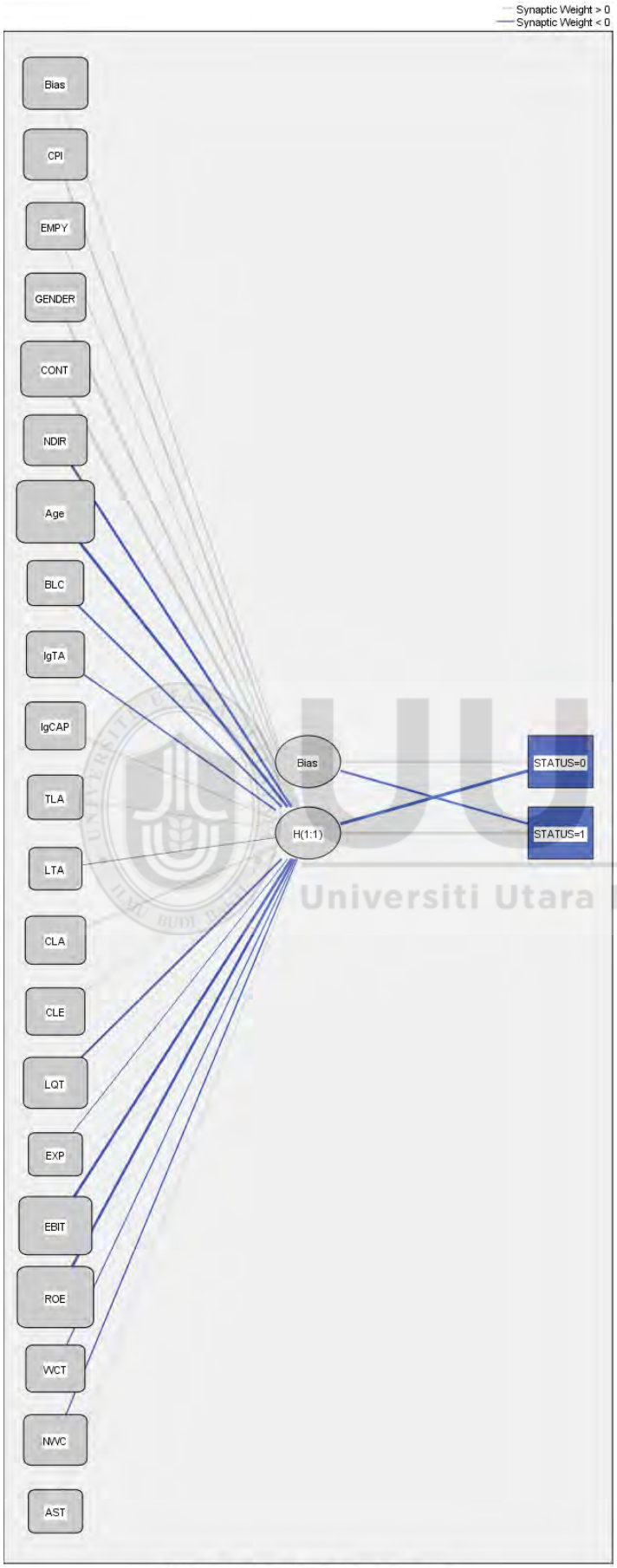
Dependent Variable: Distress status

Independent Variable Importance

	Importance	Normalized Importance
CPI	.057	43.8%
EMPY	.033	25.4%
GENDER	.043	33.1%
CONT	.087	66.1%
NDIR	.056	43.0%
AGE	.131	100.0%
BLC	.022	17.1%
LogTA	.030	22.9%
LogCAP	.040	30.5%
TLA	.018	13.4%
LTA	.004	2.9%
CLA	.042	32.1%

CLE	.035	26.7%
LQT	.060	45.5%
EXP	.010	7.9%
EBIT	.105	80.4%
ROE	.123	94.2%
WCT	.035	27.1%
NWC	.057	43.2%
AST	.011	8.1%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

APPENDIX 6g: Model 1 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	7.288
	Percent Incorrect Predictions	9.0%
	Stopping Rule Used	Relative change in training error criterion (.0001) achieved
	Training Time	0:00:00.05
Holdout	Percent Incorrect Predictions	18.5%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	1.666		
	AGE	-8.678		
	BLC	-.355		
	LogTA	-3.382		
	LogCAP	4.122		
	TLA	11.343		
	LTA	-1.246		
	CLE	1.288		
	LQT	-.118		
	CLA	1.273		
	EBIT	-3.554		
	ROE	-3.744		
	WCT	-2.375		
	NWC	-.417		
	AST	-6.143		
	EXP	4.596		
Hidden Layer 1	(Bias)		.060	-.063
	H(1:1)		-2.316	2.320

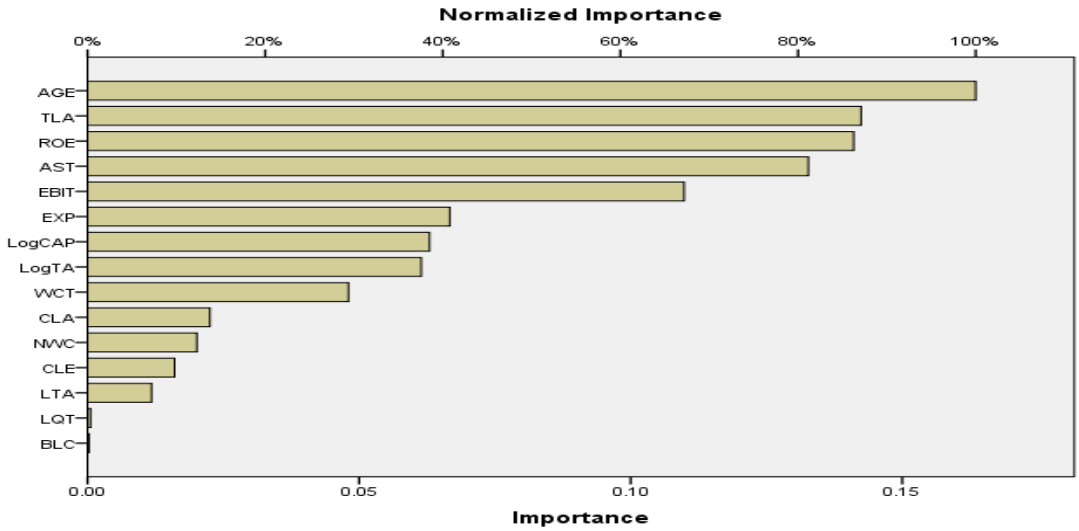
Classification

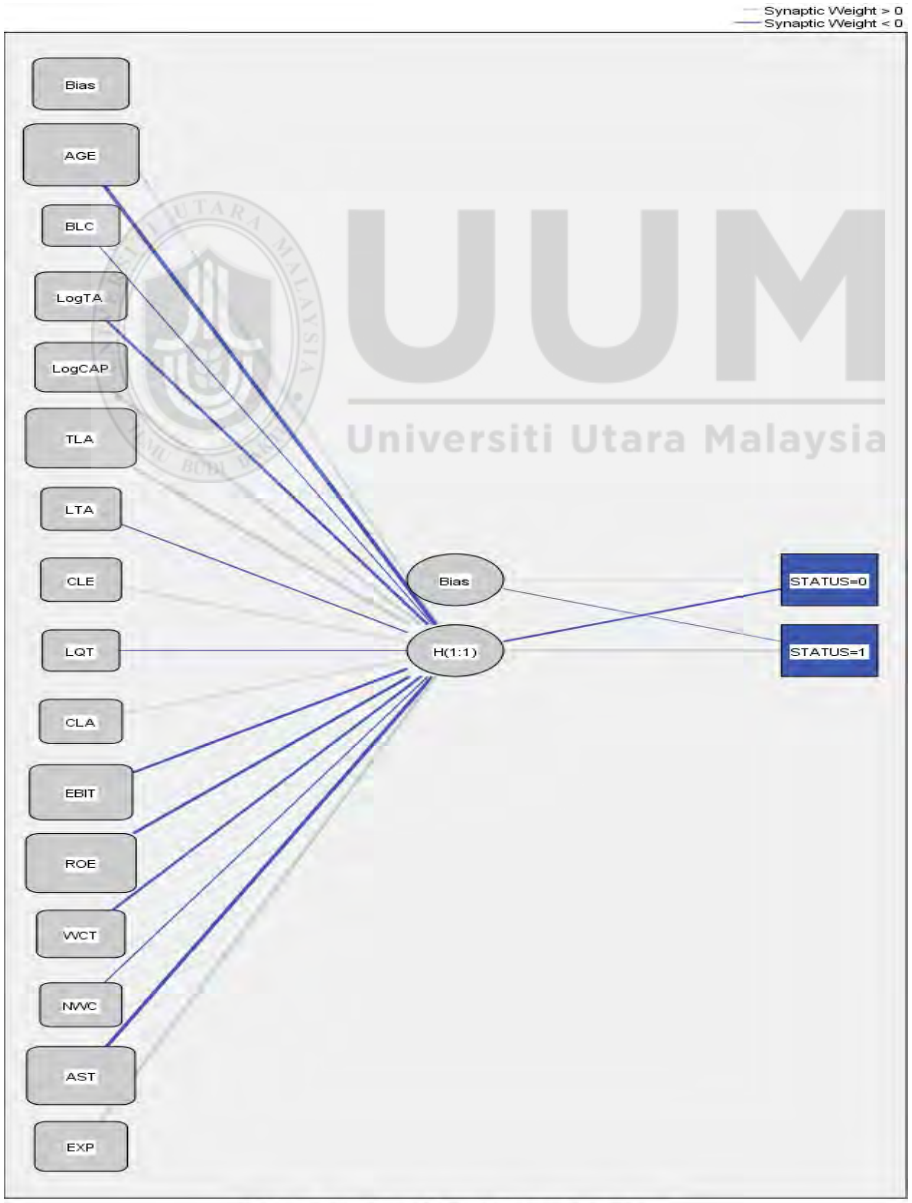
Sample	Observed	Predicted		
		Non-Failed	Failed SME	Percent Correct
Training	Non-Failed	43	4	91.5%
	Failed SME	4	38	90.5%
	Overall Percent	52.8%	47.2%	91.0%
Holdout	Non-Failed	9	2	81.8%
	Failed SME	3	13	81.2%
	Overall Percent	44.4%	55.6%	81.5%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
AGE	.164	100.0%
BLC	.000	0.2%
LogTA	.061	37.6%
LogCAP	.063	38.5%
TLA	.142	87.1%
LTA	.012	7.2%
CLE	.016	9.8%
LQT	.001	0.3%
CLA	.023	13.8%
EBIT	.110	67.2%
ROE	.141	86.3%
WCT	.048	29.4%
NWC	.020	12.3%
AST	.133	81.2%
EXP	.067	40.8%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

APPENDIX 6h: Model 2 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	11.167
	Percent Incorrect Predictions	13.4%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.05
Holdout	Percent Incorrect Predictions	21.1%

Dependent Variable: STATUS

Parameter Estimates

Predictor		Predicted		
		Hidden Layer 1	Output Layer	
		H(1:1)	[STATUS=0]	[STATUS=1]
Input Layer	(Bias)	-.325		
	GDP	.937		
	BLR	2.002		
	CPI	.854		
	EMPY	.562		
	Hausa	-2.030		
	Igbo	-2.436		
	Foreign	1.193		
	GENDER	-.281		
	IND	.873		
	CONT	8.958		
	NDIR	2.234		
	MDD	-2.340		
Hidden Layer 1	(Bias)		.371	-.395
	H(1:1)		-1.950	1.985

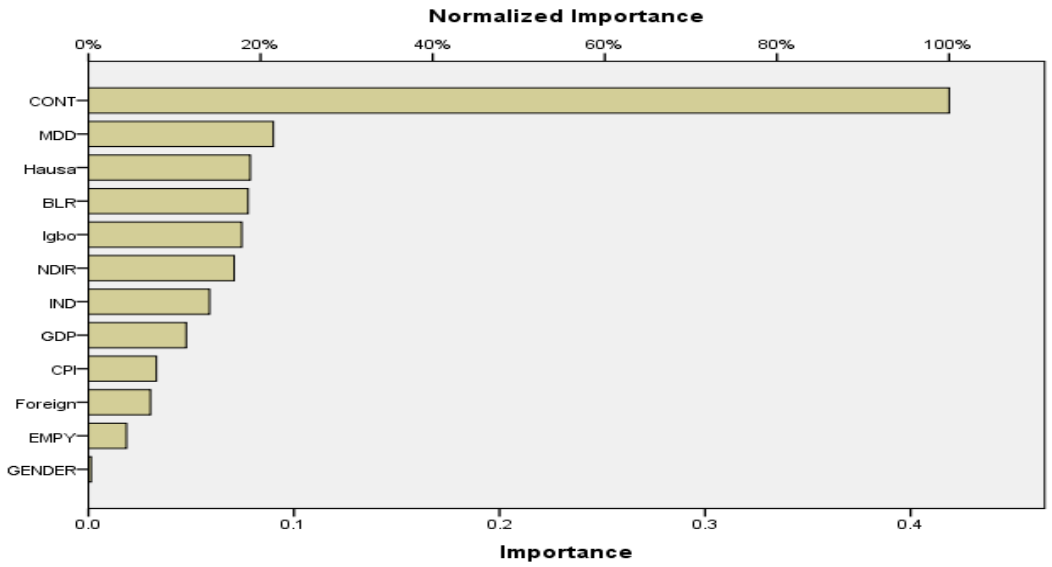
Classification

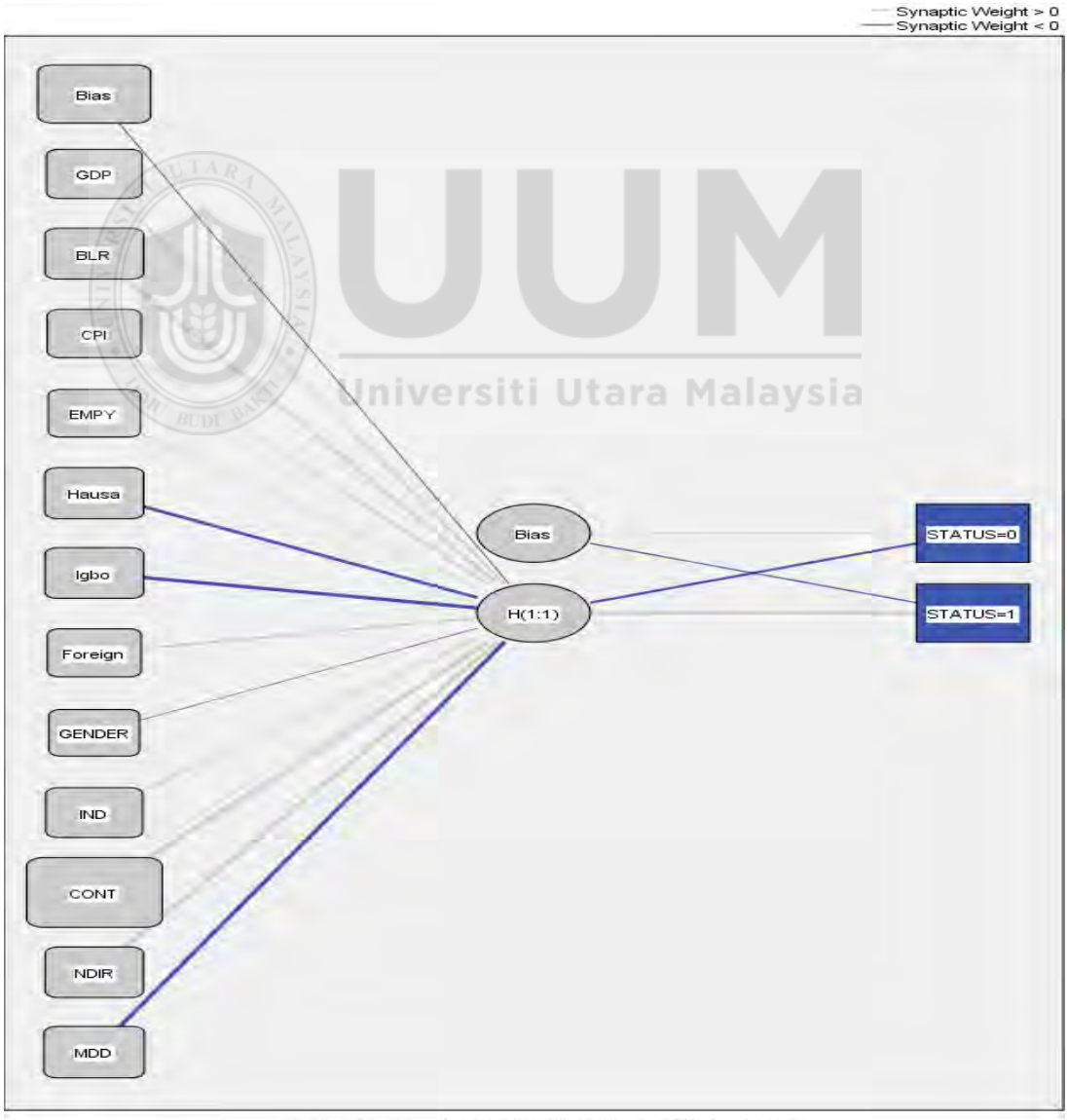
Sample	Observed	Predicted		
		Non-Failed	Failed SME	Percent Correct
Training	Non-Failed	39	9	81.2%
	Failed SME	4	45	91.8%
	Overall Percent	44.3%	55.7%	86.6%
Holdout	Non-Failed	6	4	60.0%
	Failed SME	0	9	100.0%
	Overall Percent	31.6%	68.4%	78.9%

Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
GDP	.048	11.4%
BLR	.078	18.5%
CPI	.033	7.9%
EMPY	.018	4.4%
Hausa	.079	18.8%
Igbo	.075	17.8%
Foreign	.030	7.2%
GENDER	.001	0.3%
IND	.059	14.1%
CONT	.419	100.0%
NDIR	.071	16.9%
MDD	.090	21.5%





Hidden layer activation function: Hyperbolic tangent

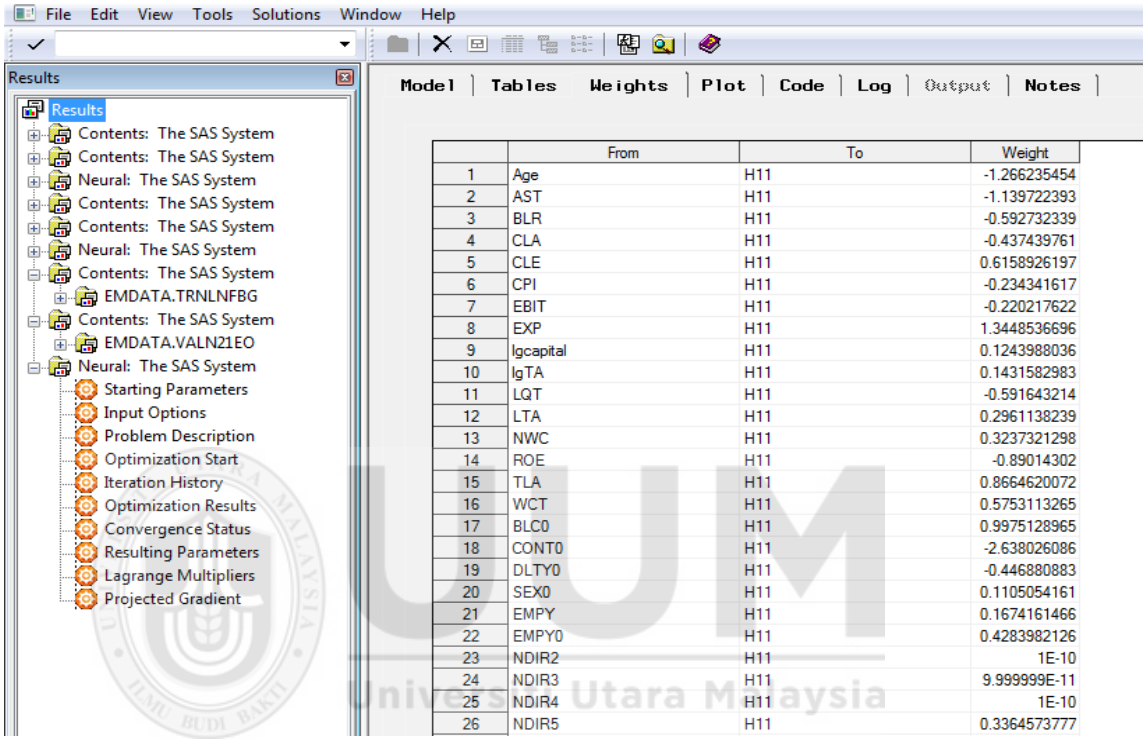
Output layer activation function: Sigmoid

APPENDIX 6i: Model 3 (1-year Prior To bankruptcy sample)

Model Summary

Training	Sum of Squares Error	2.068
	Percent Incorrect Predictions	2.1%
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	0:00:00.08
Holdout	Percent Incorrect Predictions	23.8%

Dependent Variable: STATUS



	From	To	Weight
1	Age	H11	-1.266235454
2	AST	H11	-1.139722393
3	BLR	H11	-0.592732339
4	CLA	H11	-0.437439761
5	CLE	H11	0.6158926197
6	CPI	H11	-0.234341617
7	EBIT	H11	-0.220217622
8	EXP	H11	1.3448536696
9	lgcapital	H11	0.1243988036
10	lgTA	H11	0.1431582983
11	LQT	H11	-0.591643214
12	LTA	H11	0.2961138239
13	NWC	H11	0.3237321298
14	ROE	H11	-0.89014302
15	TLA	H11	0.8664620072
16	WCT	H11	0.5753113265
17	BLC0	H11	0.9975128965
18	CONT0	H11	-2.638026086
19	DLTY0	H11	-0.446880883
20	SEX0	H11	0.1105054161
21	EMPY	H11	0.1674161466
22	EMPY0	H11	0.4283982126
23	NDIR2	H11	1E-10
24	NDIR3	H11	9.999999E-11
25	NDIR4	H11	1E-10
26	NDIR5	H11	0.3364573777

Classification

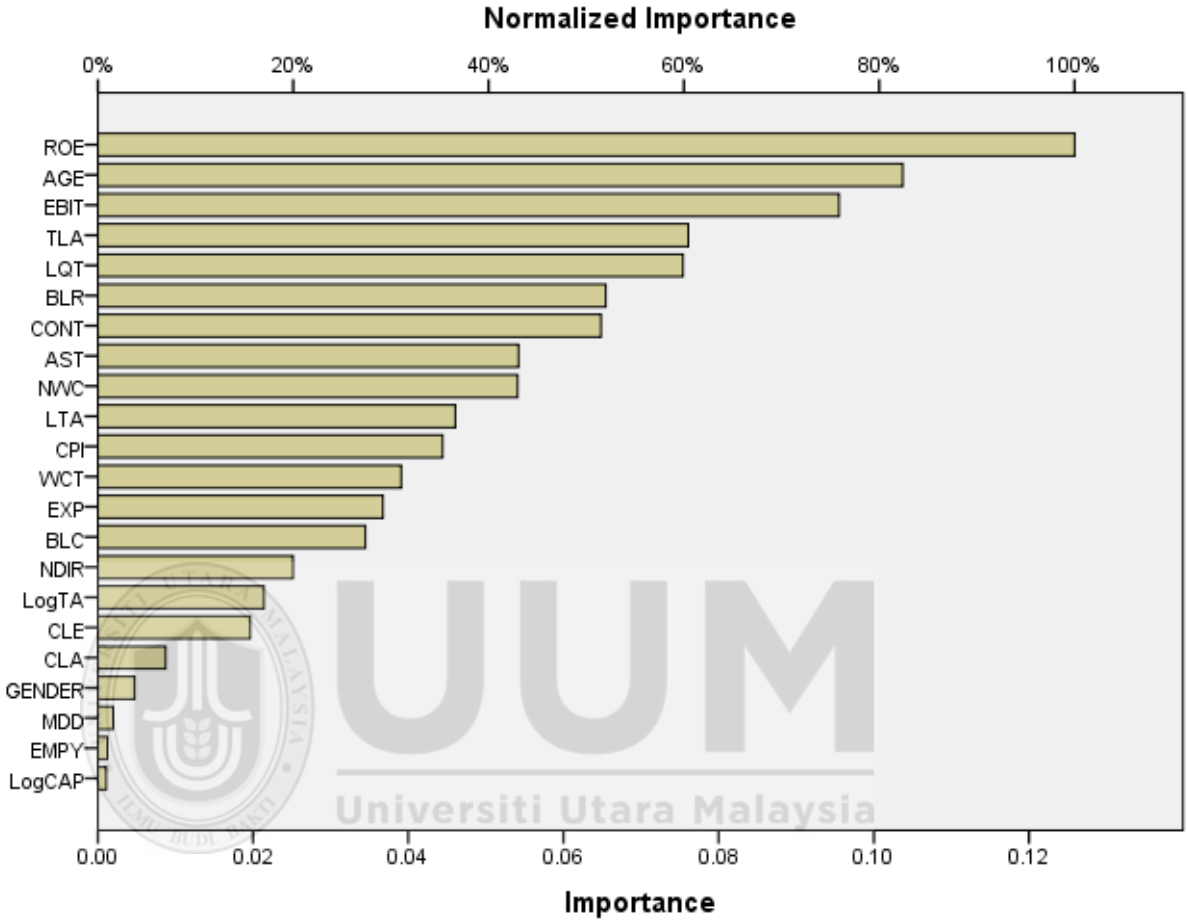
Sample	Observed	Predicted		
		Non-Failed	Failed SME	Percent Correct
Training	Non-Failed	46	1	97.9%
	Failed SME	1	47	97.9%
	Overall Percent	49.5%	50.5%	97.9%
Holdout	Non-Failed	8	3	72.7%
	Failed SME	2	8	80.0%
	Overall Percent	47.6%	52.4%	76.2%

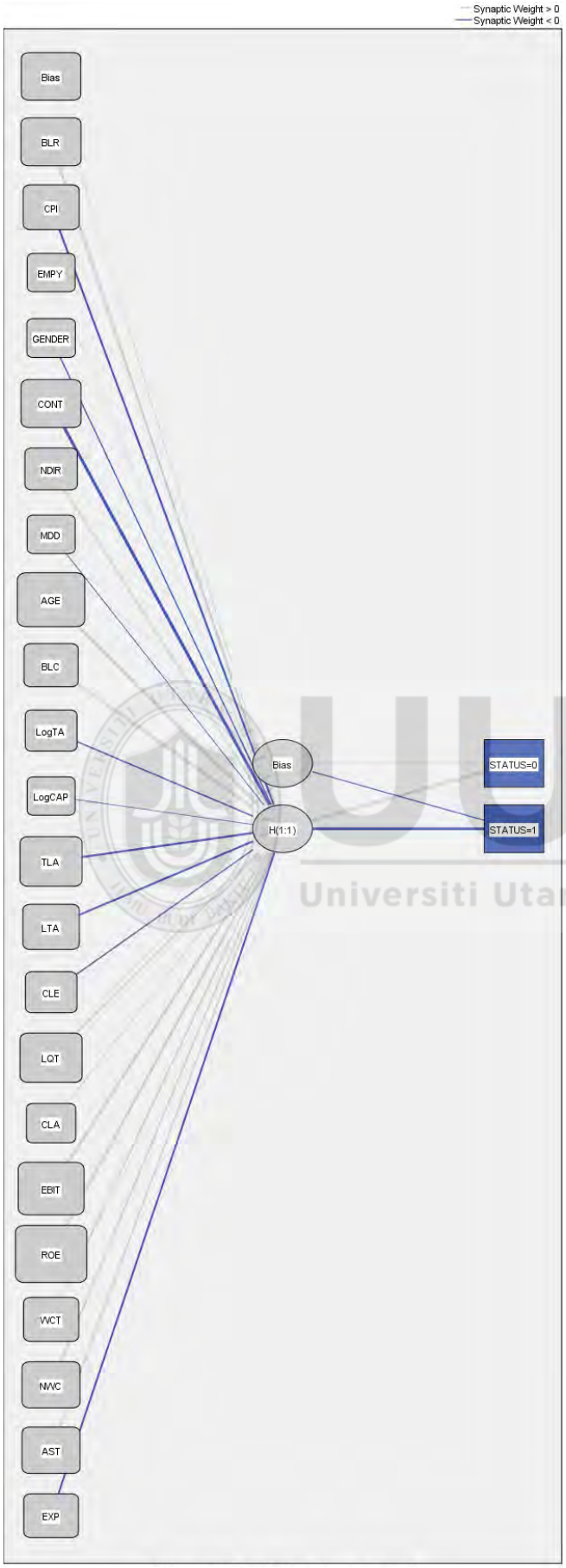
Dependent Variable: STATUS

Independent Variable Importance

	Importance	Normalized Importance
BLR	.065	52.0%
CPI	.044	35.3%
EMPY	.001	1.0%
GENDER	.005	3.8%
CONT	.065	51.5%
NDIR	.025	20.0%
MDD	.002	1.6%
AGE	.104	82.4%
BLC	.034	27.4%
LogTA	.021	17.0%
LogCAP	.001	0.9%
TLA	.076	60.5%
LTA	.046	36.6%
CLE	.020	15.6%
LQT	.075	59.9%

CLA	.009	6.9%
EBIT	.096	75.9%
ROE	.126	100.0%
WCT	.039	31.1%
NWC	.054	43.0%
AST	.054	43.1%
EXP	.037	29.2%





Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid