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Macroeconomic Determinants of Corporate Failures in Malaysia

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Abstract

This research investigates the long-run dynamic linkages between the corporate failures in Malaysia and selected macroeconomic variables by employing the Autoregressive Distributed Lag (ARDL) bound test, a robust and recent time series technique which is applicable irrespective of whether the regressors are I(0) or I(1). Corporate failure rate is the ex-ante variable in a linear function model with five explanatory macroeconomic variables. A dummy variable to decipher the corporate failure rates during the Asian financial crisis was also included. The results show that corporate failure rates in Malaysia are significantly and positively associated with the average lending rate, inflation rate and, gross domestic product (GDP) in the long-run.

Keywords: Corporate failures, Macroeconomic, Bound test

1. Introduction

Over the past four decades, economics and finance researchers have shown consistent effort to investigate the causes of corporate failures. Initial studies tend to concentrate on analyzing company ratios in order to discriminate failed firms from non-failed firms. Beaver (1966) started off by performing univariate analysis on 30 selected financial ratios, and found that cash flow to total debt ratio is the best single ratio predictor for corporate failures.

Since then, other researchers have refined the methodologies thus resulted in the multi-discriminant analysis (MDA) (Altman, 1968; Taffler, 1983), logit regression techniques (Ohlson, 1980), and multi-logit models (Keasey & Short, 1990). In addition to improving the statistical methods, recent works have extended this area of study to the definitions of bankruptcy (Gilbert et al., 1990; Poston, et al., 1994) and cover a variety of explanatory variables. Researchers have also incorporated non-financial variables such as management behaviors, age of company and number of directors (Keasey & Watson, 1987), qualified opinion of the auditors (Hopwood et al., 1989; Flagg et al., 1991) and funds flow measures (Gentry et al., 1987) in order to find out the causes of corporate failure. In Malaysia, similar studies have been carried out by Shamsher et al. (2001); Zulkarnain et al. (2001); Mohamed et al. (2001); and Abdullah and Ahmad (2005). Shamsher et al. (2001) found that liquidity, profitability and cash flows of the failed firms showed a gradual deterioration, while the leverage of the companies showed a gradual increased. Zulkarnain et al. (2001) focused their study on Malaysian industrial sector companies. By using stepwise multi-discriminant analysis, the findings show that the model accurately and significantly classified 91.1 percent and 89.3 percent of the failed and non-failed companies respectively. In addition, Mohamed et al. (2001) conducted a study by incorporating logistic regression techniques to predict corporate failures. Abdullah and Ahmad's (2005) study was concerned with the comparison of the logistic regression analysis and multi-discriminant analysis by

using Malaysian corporate failure as a sample, and they found that logistic regression techniques were superior to multi-discriminant analysis.

All of these studies concentrated on cross-sectional analysis; therefore they did not take into account the actual changes in the variables of interest over time. Furthermore, the construction of these models centered on microeconomic analysis, therefore they disregard the important general macroeconomic framework in which the companies are operating, and that this may significantly influence the companies' financial health (Liu, 2004).

Many studies have incorporated macroeconomic variables such as interest rate (Desai & Montes, 1982; Hudson, 1986; Turner et al., 1992; Liu & Wilson, 2002), profit (Hudson, 1986; Turner et al., 1992; Cuthbertson & Hudson, 1996), growth of money stock (Desai & Montes, 1982), inflation (Wadhwani, 1986), exchange rate (Goudie & Meeks, 1991), income gearing (Cuthbertson & Hudson, 1996) and legislation (Liu & Wilson, 2002). Although these studies utilized dynamic models to investigate the causes of corporate failures, they are restricted to the description of the short-run relationships among the variables. Therefore, it is quite difficult to separately interpret the long-run and short-run behaviors of corporate failures in relations to macroeconomic activities (Liu, 2004).

To overcome the limitations and shortcomings of these studies, Liu (2004) examined the long-run relationship between corporate failures and macroeconomic variables in the equilibrium while incorporating short-run dynamics. The researcher's main objectives were to explore the determinants of UK corporate failures and also to identify the potential policy variable, which can then be adopted by the relevant policymakers to reduce the incidence of corporate failures. Overall, the econometric results show that corporate failure rates are responsive to the changes in the nominal interest rates, price level, real credit and corporate birth rates over the sample period.

Despite a persistently low inflation rate and an average annual economic growth of 5.5 percent, corporate failure rates in Malaysia fluctuated substantially over the period of 1991Q1 to 2005Q2, although there was a small fluctuation from 1991Q1 to 1997Q2 (see Figure 1). However, the corporate failure rate increased dramatically after that and maintained the high fluctuation. This could be attributed to the Asian financial crisis in 1997. Furthermore, the increase in the failure rate was exacerbated by the mismatch between the substantial increments in the number of insolvent companies against the decrease in the total number of registered companies. In addition, for the period 1997Q2 until 2005Q2, the high fluctuation of the corporate failure rates was reflected mainly by a substantial increase in the total number of insolvent companies. To understand the reason behind this tremendous change, this paper examines the macroeconomic factors that may influence and cointegrate with the variability of corporate failure rates. (See Figure 1)

This study is based mainly on Liu and Wilson (2002) and Liu (2004), whereby it is designed to investigate the macroeconomic determinants of corporate failures in Malaysia. Specifically, the objective of this study is to use the Autoregressive Distributed Lag (ARDL thereafter) modeling approach in examining several macroeconomic variables selected from prior studies that are hypothesized to determine corporate failures in Malaysia.

We expect this research to be of interest to both financial academicians and practitioners. The finding of the study is expected to assist policymakers understand the short-run and long-run behaviors of corporate failure rates as far as the macroeconomic variables are concerned. For example, it will answer questions such as: "Do high interest-rate regimes consistently cause more corporate failures?" This, in turn, may shed some light into the effectiveness of our monetary policy. Furthermore, the analysis of structural breaks (if any) will reveal if certain incidents (such as the 1997 Asian financial crisis) have any significant role in either mitigating or exacerbating the overall level of corporate failures.

We employ quarterly data over the period 1991:1 to 2005:4 by using a robust and recently developed ARDL cointegration method which is applicable whether the regressors are I(1) or I(0). This paper is organized as follows: Section 2 reports the data and the ARDL cointegration methodology. The empirical results are presented in Section 3, and Section 4 concludes the paper.

2. Data and Methodology

2.1 Data

Over the past decade or so, several efforts have been made to ferret out the possible factors that may influence firms' performance. Competition in the global capitalist economy becomes stiffer and it poses huge risks to firms. Based on previous studies, there is an abundant amount of literature which has attempted to determine the factors that may influence corporate failures. However, most of the studies focused only on the micro point of view or firm level analysis. To the best of our knowledge, there is no study in Malaysia which presents the macroeconomic explanations of corporate failures and at the same time incorporates the ARDL methodology, a robust and recent time series cointegration technique. Therefore, in this empirical study, a linear function model is estimated by

employing ARDL methodology to determine the long-run dynamic linkages between the macroeconomics variables and the corporate failures. In addition, a dummy variable of the 1997 Asian Financial Crisis has been included in the model to represent the unstable condition period during the crisis.

The hypothesis of this study is to test whether the corporate failure in Malaysia could be explained by the movement of macroeconomic variables that consist of credit liquidity condition, inflation, income and competition. In this study domestic credit represents credit liquidity and Gross Domestic Product (GDP) has been chosen as a proxy of income as well as economic growth condition in Malaysia. Consumer Price Index (CPI) signifies purchasing power by the consumers and the uncertainty in the cost of borrowing is represented by the average lending rate. Furthermore, corporate birth rate could represent the competition that occurs among the firms to achieve the ultimate goal (profit) in the market.

In this study, a linear function model is estimated by employing explanatory variables to determine the long-run dynamic linkages.

Corporate failure =*f* (Credit liquidity, Uncertainty, Income, Competition, Asian Financial Crisis)

$$Ln\ (CFR_t) = \alpha_0 + \beta_1 Ln\ (DCR)_t + \beta_2 Ln\ (ALR)_t + \beta_3 Ln\ (CPI)_t + \beta_4 Ln\ (GDP)_t + \beta_5 Ln\ (CBR) + \beta_6 (Dummy) + e_t$$

where CFR is the natural log of corporate failure rate; DCR is the natural log of domestic credit aggregate; ALR is the natural log of average lending rate; CPI is the natural log of consumer pricing index; GDP is the natural log of real gross domestic product; CBR is the natural log of corporate birth rate; and Dummy represents the Asian Financial Crisis, which started in 1997:Q3 and continued until 1998:Q3 when the recovery process is suggested to have begun. It is still questionable when the financial crisis was over, or even whether it really has ended.

However, according to a study on exchange rate volatility by Kawai and Shinji (2001), the values of East Asian currencies began to show relative stability from November 1998, which indicates the end of the East Asian turmoil. The parameter of α_0 is the intercept and $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are coefficients of the variables; e_t is the error term. The data span used in this study is from 1991:Q1 to 2005:Q4. Data were collected from *International Financial Statistics* Data Stream published by International Monetary Fund (IMF) and *Thomson* Data Stream. Since the observations are on a quarterly basis, we choose lags of 4 to represent the maximum order of the lags in the ARDL model.

2.2 Econometric Model

The ARDL bound test (Pesaran et al., 2001) is being employed for cointegration analysis since it can be applied irrespective of whether the regressors are purely I(0), purely I(1), or mutually cointegrated. Moreover, the order of integration of the underlying regressors is not required to be ascertained prior to testing the existence of a level relationship between two variables (Pesaran et al., 2001). Moreover, the bounds testing procedure (Pesaran et al., 2001) employed in this study is robust for a small sample study (Pattichis, 1999; Mah, 2000; Tang & Nair, 2002) and is possible even when the explanatory variables are endogenous (Alam & Quazi, 2003). The ARDL cointegration test assumed that only one long-run relationship exists between the dependent variable and the exogenous variables (Pesaran et al., 2001). Following Pesaran et al. (2001), the ARDL model can be presented as below:

$$\phi\ (L, p)\ y_t = \sum_{i=1}^{k} \beta_i (L, q_i)\ x_{it} + \delta' w_t + \mu_t$$

where

$$\phi (L, p) = 1 - \phi_1 L - \phi_2 L^2 - \ldots - \phi_p L^p$$

$$\beta_i (L, q_i) = 1 - \beta_{i1} L - \beta_{i2} L^2 \ldots - \beta_{iq} L^{qi}, i = 1,2 \ldots, k.$$

L is a lag operator of $Ly_t = y_{t-1}$, and w_t is a $s \times 1$ vector of deterministic variables, such as the intercept term, seasonal dummies, time trends or exogenous variables with fixed lags. All possible values of p = 0, 1, 2,…,m; i = 1, 2,…,k with a total of $(m+1)^{k+1}$. ARDL models can be estimated by using the Ordinary Least Square (OLS). The long-run coefficients for the response of y_t to a unit change in x_{it} are estimated by:

$$\hat{\theta}_i = \frac{\hat{\beta}_i\left(1, \hat{q}_i\right)}{\hat{\phi}\left(1, \hat{p}\right)} = \frac{\hat{\beta}_{i0} + \hat{\beta}_{i1} + \ldots + \hat{\beta}_{i\hat{q}_i}}{1 - \hat{\phi}_1 - \hat{\phi}_2 \ldots - \hat{\phi}_{\hat{p}}}, \; i = 1, 2, \ldots, k.$$

where $\hat{p}$ and $\hat{q}_i$, i = 1, 2, …, k are the estimated values of p and q_i, i = 1, 2, …,k. The related unrestricted error correction model is given by:

$$\Delta y_t = -\phi(1, \hat{p}) EC_{t-1} + \sum_{i=1}^{k} \beta_{i0} \Delta x_{it} + \delta' \Delta w_t - \sum_{j=1}^{\hat{p}-1} \phi_j^* \Delta y_{t-j} - \sum_{i=1}^{k} \sum_{j=1}^{\hat{q}_i - 1} \beta_{ij}^* \Delta x_{i,t-j} + \mu_t \text{ where}$$

$$EC_t = y_t - \sum_{i=1}^{k} \hat{\theta}_i x_{it} - \hat{\Psi}' w_t$$

Basically, the bound test developed by Pesaran et al. (2001) is the Wald test (F-statistic version of the bound testing approaches) for the lagged level variables in the right-hand side of unrestricted error correction models. That is, we test the null hypothesis of non-cointegrating relation (Ho: $\delta_1 = \delta_2 = \delta_3 = \ldots = \delta n = 0$) by performing a joint significance test on the lagged level variables. The asymptotic distribution of the F-statistic is non-standard under the null hypothesis of no cointegrating relation between the examined variables, irrespective of whether the explanatory variables are purely I(0) or I(1).

Under the conventionally used level of significance such as 10 percent, 5 percent and 1 percent, if the statistic from the Wald test falls outside the critical bounds value (lower and upper values), a conclusive inference can be made without considering the order of integration of the explanatory variables. If the F-statistic exceeds the upper critical bound, then the null hypothesis of no cointegrating relation can be rejected. If the test statistic (F-statistic) falls below the lower critical bound, we cannot reject the null of non- cointegration. In the case of the F-statistic falling between the upper and lower bounds, a conclusive inference cannot be made. Here, the order of integration I(d) for the explanatory variables must be known before any conclusion can be drawn (Pesaran et al., 2001).

The second stage of ARDL approach is to estimate the coefficients of the long-run cointegrating relationship and the corresponding Error Correction Model (ECM). Since the data are quarterly, we choose four for the maximum order of the lags in ARDL model. A specification of unrestricted error correction version of the ARDL is given by:

$$\Delta Ln(CFR)_t = \alpha_0 + \sum_{i=1}^{4} a_i \Delta Ln(CFR)_{t-i} + \sum_{i=1}^{4} b_i \Delta Ln(DCR)_{t-i} +$$

$$\sum_{i=1}^{4} c_i \Delta Ln(ALR)_{t-i} + \sum_{i=1}^{4} d_i \Delta Ln(CPI)_{t-i} + \sum_{i=1}^{4} e_i \Delta Ln(GDP)_{t-i} +$$

$$\sum_{i=1}^{4} f_i \Delta Ln(CBR)_{t-i} + \delta_1 Ln(CFR)_{t-1} + \delta_2 Ln(DCR)_{t-1} + \delta_3 Ln(ALR)_{t-1} +$$

$$\delta_4 Ln(CPI)_{t-1} + \delta_5 Ln(GDP)_{t-1} + \delta_6 Ln(CBR)_{t-1} + \alpha Dummy + e_t$$

The lagged error correction term (e_{t-1}) derived from the Error Correction Model (ECM) is an important element in the dynamic of cointegrated system as it allows for adjustment back to the long-term equilibrium relationship given a deviation in the last quarter.

3. Results and Discussion

Table 1 show that the computed F-statistics value of 4.903 exceeds the critical bound (2.476 – 3.646) at 5 percent significance level when the lag order of 4 is imposed. This implies that the null hypothesis of no cointegrating long-run relationship can be rejected. Thus, these results reveal the existence of a long-run relationship between macroeconomic variables and corporate failures in Malaysia. The error correction model representation for the ARDL model is selected using the AIC.

Table 2 provides the estimates of the ARDL long-run coefficient for the model; and results of the estimated optimal ARDL model based on the AIC are reported in Table 3. Of the three macroeconomics variables, the average lending rate and gross domestic product are found to be statistically significant at 10 percent critical levels with the expected signs, while the rate of inflation is significant at 5 percent. The result implies that any movement in the average lending rate, gross domestic product and the rate of inflation are found to be cointegrated or co-moving with the changes in corporate failure rates. Furthermore, our results also revealed that the recent Asian Financial Crisis makes a significant contribution to the corporate failure rates in Malaysia.

Gross domestic product (GDP) significantly influenced the corporate failure rates in a negative direction. The opposite relationship between GDP and corporate failures can be explained as follows: the increasing GDP indicates the higher profitability of the firms in the economy with the assumption of *ceteris paribus*, which in turn lowers the rate of corporate failures. As expected, an increase in the average lending rate increased the numbers of corporate failure since it contributed to the higher cost of borrowing which indirectly affected the company's profitability (Liu, 2004). Higher cost of borrowing may lower the degree of profitability of the company and thus put it under financial pressure which consequently may increase the possibility of the company going into bankruptcy. The findings also demonstrate that an increase in the rate of inflation will cause a rise in the corporate failures in our model. One plausible reason for this relationship is that, as the inflation rate is increasing, the purchasing power is decreasing. Hence, the ability of the consumers to buy goods or services that are supplied by the company is declining and it may give negative impact to the company's revenue as well as to the total turnover. (See Table 1 and Table 2)

The error correction term estimated at -0.646 (0.00) is statistically significant and has the correct sign, making certain that the long-run equilibrium is attainable. Thus, ECT_{t-1} coefficient of -0.646 suggests that corporate failure rate is adjusting rapidly to the changes in the explanatory variables before reaching its equilibrium. The regression for the underlying ARDL equation fits very well with $R^2 = 85\%$ and passes the diagnostic tests against the serial correlation, non-normality errors and functional form misspecification of the model (Table 4). Nevertheless, it failed the heteroscedasticity test at 5 percent level. According to Shrestha and Chowdhury (2005), since the ARDL equation is potentially of mixed order of integration, i.e. I(0) and I(1), it is natural to detect heteroscedasticity. (See Table 3 and Table 4)

4. Concluding Remarks

Initial studies on determinants of corporate failures tend to investigate this behavior from the micro point of view. Therefore, this paper is believed to be the first study on the corporate failures for the case of Malaysia from the macro standpoint. In this study, we employ a robust and recent time series cointegration ARDL method to determine the long-run dynamic linkages between the macroeconomics variables and the corporate failures. The period of analysis is from 1991Q1 to 2005Q4. The results of bound test reveal a long-run relationship between average lending rate and inflation rate with the corporate failure in Malaysia. These findings have important implications for the efficient conduct of monetary policy management with regard to the survival of the firms in financially distressed and financially driven business cycles.

Acting as one of the monetary policy's mechanisms, interest rate is used by the Central Bank to control the fluctuation in the economy. Base lending rate (BLR), which is set by the Central Bank, is a benchmark for the commercial banks and financial institutions to determine their lending and saving rates, after taking into account their profit margin.

It is noted that any movement in the lending rate by the commercial banks and financial institutions are based on the BLR. Since any movement in lending rate by commercial banks and financial institutions is associated with corporate failure, it is suggested that the Central Bank should take into consideration this positive relationship before deciding to increase the BLR. In addition, commercial banks and financial institutions should also be cautious when fixing their margin. If the margin is too high, it tends to increase the lending rate and consequently may increase the possibility of a company incurring higher cost of borrowing, and it will increase the probability of the company defaulting on its debt repayment. Eventually, it will increase the Non Performing Loan (NPL) held by the banks.

References

Abdullah, N. A. H., & Ahmad, A. H. (2005). Detecting Financial Distress. *International Journal of Management Studies, 12* (1), 77-95.

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

Alam, M. I., & Quazi, R. M. (2003). Determinant of Capital Flight: An Econometric Case Study of Bangladesh. *International Review of Applied Economics, 17*, 85-103.

Beaver, W. (1966). Financial Ratios as Predictors of Failures in *Empirical Research in Accounting, Selected Studies*, 1966 in supplement to the *Journal of Accounting Research*.

Central Bank of Malaysia. (2005). Central Bank of Malaysia (Annual Report). Malaysia.

Cuthbertson, K., & Hudson, J. (1996). The Determinants of Compulsory Liquidations in the UK. *The Manchester School of Economic and Social Studies, LXIV* (3), 298-308.

Desai, M., & Montes, A. (1982). A Macroeconomic Model of Bankruptcies in the British Economy. *British Review of Economic Issues, 4*, 1-14.

Engle, R. F., & Granger, C. W. J. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica, 55*, 251-276.

Flagg, J. C., Giroux, G. A., & Wiggins, C. E. Jr. (1991). Predicting Corporate Bankruptcy Using Failure Firms. *Review of Financial Economics, 1*, 67-78.

Gentry, J. A., Newbold, P., & Whitford, D. T. (1987). Funds Flow Components, Financial Ratios and Bankruptcy. *Journal of Business Finance and Accounting, 14*, 595 – 606.

Gilbert, L. R., Krishnagopal, M., & Schwartz, K. B. (1990). Predicting Corporate Bankruptcy Using Failing Firms. *Journal of Business Finance and Accounting, 17*, 161-171.

Goudie, A. W., & Meeks, G. (1991). The Exchange Rate and Company Failure in A Macro-Micro Model of the UK Company Sector. *The Economic Journal, 101*, 444-457.

Hopwood, W., McKeown, J. C., & Mutchler, J. F. (1989). A Test of the Incremental Explanatory Power of Opinions Qualified for Consistency and Uncertainty. *The Accounting Review, 66*, 28-48.

Hudson, J. (1986). An Analysis of Company Liquidations. *Applied Economics, 18*, 219-235.

Kawai, M., & Shinji, T. (2001). Proposed Strategy for A Regional Exchange Rate Arrangement In Post – Crisis East Asia, Manuscript: World Bank.

Keasey, K., & Short, H. (1990). The Accounting Burdens Facing Small Firms: An Empirical Research Note, Imprint, University of Leeds, School of Business and Economic Studies.

Keasey, K., & Watson, R. (1986). The Prediction of Small Company Failure: Some Behavioural Evidence. *Accounting and Business Research, 17* (65), 49-50.

Liu, J., & Wilson, N. (2002). Corporate Failure Rates and the Impact of the 1986 Insolvency Act: An Econometric Analysis. *Managerial Finance, 28*, 61-71.

Liu, J. (2004). Macroeconomic Determinants of Corporate Failures: Evidence from the UK. *Applied Economics, 36*, 939-945.

Mah, J. S. (2000). An Empirical Examination of the Disaggregated Import Demand of Korea - The case of Information Technology Product. *Journal of Asian Economic, 11*, 237-244.

McKenna, C. J., & Rees, R. (1992). *Economics: A Mathematical Introduction*. New York: Oxford University Press.

Mohamed, S., Ang, J., & Ahmadu, U. S. (2001). Predicting Corporate Failure in Malaysia: An Application of the Logit Model to Financial Ratio Analysis. *Asian Academy of Management Journal, 6* (1), 99-118.

Ohlson, J. A. (1980). Risk, Return, Security - Valuation, and the Stochastic Behavior of Accounting. *Journal of Financial and Quantitative Analysis, 14*, 317-336.

Pattichis, C. A. (1999). Price and Income Elasticities of Disaggregated Import Demand: Results from UECMs and Application. *Journal of Applied Econometrics, 31*, 1061-1071.

Pesaran, M. H., & Pesaran, B. (1997). *Working with Microfit 4.0: Interactive Econom*teric *Analysis*. London: Oxford University Press.

Pesaran, M. H., Shin, Y., & Smith, R. (2001). Bound Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16*, 289-326.

Poston, K. M., Harmon, W. K., & Gramlich, J. D. (1994). A Test of Financial Ratios As Predictors of Turnaround Versus Failure Among Financially Distressed Firms. *Journal of Applied Business Research, 10*, 41-56.

Shamsher, M., Zulkarnain, M. S., & Mohamad Ali, A. H. (2001). Why Companies Fail? An Analysis of Corporate Failures. *Akauntan Nasional*, 5-8.

Shrestha, M. B. & Chowdhury, K. (2005). *ARDL modeling approach to testing the financial liberalization hypothesis. Economics Working Paper Series 2005*, Univeristy of Wollongong.

Taffler, R. J. (1983). The Assessment of Company Solvency and Performance Using A Statistical Model: A Comparative UK Study. *Accounting and Business Research, 13* (52), 295-307.

Tang, T. C., & Nair, M. (2002). A Cointegration Analysis of Malaysian Import Demand Function: Reassessment from the Bound Test. *Applied Economics Letter, 9*, 293-296.

Turner, P., Cotts, A., & Bowden, S. (1992). The Effect of the Thatcher Government on Company Liquidation: An Econometric Study. *Applied Economics, 23*, 935-943.

Wadhwani, S. B. (1986). Inflation Bankruptcy, Default Premia and the Stock Market. *Economic Journal, 96*, 120-138.

Zulkarnain M.S., Mohamad Ali A.H., Annuar M.N., and Zainal Abidin M. (2001). Forecasting Corporate Failure in Malaysian Industrial Sector Firms. *Asian Academy of Management Journal, 6* (1), 15-30.

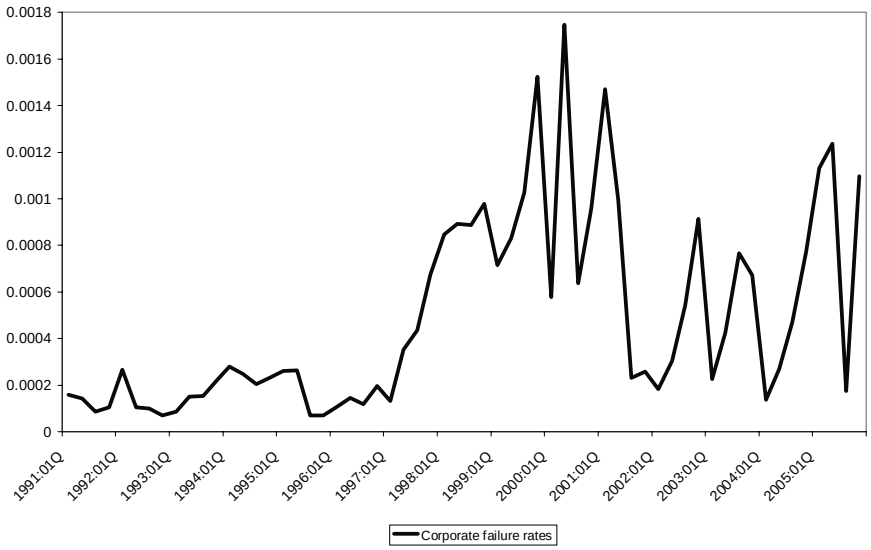

Figure 1. Malaysia's corporate failure rates

Table 1. F-Statistics for testing the existence of long-run relationship

Lag Order	2	3	4	5	6
Computed F-Statistic	3.391	2.569	4.903*	1.858	1.626
Critical Values at 5 percent level	*Lower; upper*				
	2.476; 3.646				

The critical values are taken from Pesaran et al. (2001), unrestricted intercept and no trend with six regressors. * denotes rejecting the null at 5 percent level. The range of the critical value at 1 percent and 10 percent are 3.267 – 4.540 and 2.141 – 3.250 respectively.

Table 2. Estimated long-run coefficients based on Akaike Information Criterion (AIC)

ARDL (1,1,1,4,1,1,0) selected based on AIC. Dependent variable is corporate failure rates.			
Independent Variable	*Coefficient*	*Standard Error*	*T-Statistics*
CBR	0.210	1.288	0.163
DCR	-3.635	2.669	-1.362
GDP	-8.379	4.933	-1.699*
ALR	55.603	31.724	1.753*
CPI	46.569	19.584	2.378**
DUMMY	1.364	0.780	1.748*
INTERCEPT	-137.716	67.055	-2.054**

Note: **,* denotes significant at 5 percent and 10 percent respectively. CBR is the natural log of corporate birth rate; DCR is the natural log of domestic credit aggregate; GDP is the natural log of real gross domestic product; ALR is the natural log of average lending rate; CPI is the natural log of consumer pricing index; and Dummy represents the Asian Financial Crisis, starting from 1997:Q3 to 1998:Q3.

Table 3. Error correction model for the selected ARDL model

ARDL (1,1,1,4,1,1,0) selected based on AIC. Dependent variable is corporate failure rates.			
Independent Variable	*Coefficient*	*Standard Error*	*T-Statistics*
ΔCBR_t	-2.863	0.997	-2.873**
ΔDCR_t	1.376	1.738	0.792
ΔGDP_t	7.984	4.206	1.898*
ΔGDP_{t-1}	1.344	3.683	0.365
ΔGDP_{t-2}	11.688	3.393	3.445**
ΔGDP_{t-3}	7.312	3.807	1.921*
ΔALR_t	-29.677	30.303	-0.979
ΔCPI_t	-8.318	24.181	-0.344
$\Delta DUMMY_t$	0.881	0.524	1.683*
INTERCEPT	-88.972	39.554	-2.249**
Ecm(-1)	-0.646	0.132	-4.890**

Note: **,* denotes significant at 5 percent and 10 percent respectively. CBR is the natural log of corporate birth rate; DCR is the natural log of domestic credit aggregate; GDP is the natural log of real gross domestic product; ALR is the natural log of average lending rate; CPI is the natural log of consumer pricing index; and Dummy represents the Asian Financial Crisis, starting from 1997:Q3 to 1998:Q3.

Table 4. ARDL-VECM model diagnostic tests

LM Test Statistics	
Serial Correlation χ^2 (4) = 7.396[0.116]	Normality χ^2 (2) = 1.283[0.527]
Functional Form χ^2 (1) = 0.258[0.611]	Heteroscedasticity χ^2 (1) = 3.741[0.053]