

**DETERMINANTS OF CASH FLOWS TOWARDS FINANCIAL
DISTRESS PREDICTION AMONG MANUFACTURING COMPANIES
IN MALAYSIA**

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ABSTRACT

This study is conducted to evaluate the relationship between liquidity (WCTA, CACL), leverage (TDTA, CLNW), profitability (EBTA, ROE, ROA), BTMV, sales growth, and cash flow (CFFTL, CFITL, CFOTL) and the corporate financial distress among listed manufacturing firms in Malaysia. This study uses a sample from 2001 to 2014. Logistic regression is used to evaluate the relationship between the variables in the three models. In Model 1, the result shows that the WCTA, TDTA, EBTA, ROA, BTMV, and CFOTL have a significant relationship with corporate financial distress. In Model 2 when only cash flows variables are included, the results show that CFITL and CFOTL are negatively significant with financial distress. In Model 3 when all variables are included in the analysis, the results remain similar as in Model 1. In Model 4 when the stepwise logit regression is used, the results are similar to in Model 1.

Keywords: Logistic Regression, Financial Distress, Cash Flow

1.0 INTRODUCTION

Bankruptcy is a circumstance when companies are unable to meet or have difficulty paying pecuniary obligations to creditors. "Bankruptcy", "insolvency", "default", and "failure" are other terms that are usually used to describe the situation where firms face financial difficulties. Chances to be in financial difficulties increase when firms have high fixed costs, illiquid assets or their income becomes sensitive to the economic downturn. Malaysia used to have a strong economic fundamental before the Asian financial crisis struck in mid-1997. However, after the crisis, many Malaysian companies were restructured as most of them were affected and fell into bankruptcy (Ferri et al., 1998). During the period of this crisis, the Malaysian ringgit was devalued at an almost 50 percent rate. Malaysian stock market had also shown a 54 per cent decrement for the six months ended December 31, 1997. This situation had indeed created a serious impact on the nation's economy (Hasan, 2003).

Hence, this study aims to evaluate the relationship between liquidity using Working Capital to Total Assets (WCTA) and Current Assets to Current Liabilities (CACL); leverage using Total Debts to Total Assets (TDTA) and Current Liabilities to Net Worth (CLNW);

profitability using Earnings Before Tax to Total Assets (EBTA), Return on Equity (ROE) and Return on Assets (ROA); Book to Market Value (BTMV); sales growth; cash flow using Cash Flow from Financing to Total Liabilities (CFFTL), Cash Flow from Investing to Total Liabilities (CFITL) and Cash Flow from Operating to Total Liabilities (CFOTL); and corporate financial distress among listed manufacturing firms in Malaysia. Other than using traditional ratios to predict bankruptcy, this study also makes use of three cash flows, which are CFFF, CFFI and CFFO. As such, this study will be able to demonstrate whether cash flow is an important factor that contributes to the failure of manufacturing firms in Malaysia.

This paper is structured as follows: Section 2 discusses on previous studies that had examined on bankruptcy predictions; Section 3 highlights the research methodology used in this study, while Section 4 discussed on results of the current study. Finally, the concluding remarks are drawn in Section 5.

2.0 LITERATURE REVIEW

Many previous studies had attempted to predict financial distress using operating cash flow. They found that operating cash flow is an important variable in financial distress prediction (Gombola and Ketz, 1983; Libby, 1975; Beaver, 1966; Altman, 2000; Charitou et al., 2004; Deakin, 1972; Gilbert, 1990; Charitou and Venieris, 1990; and Sharma and Iselin, 2000).

Sulaiman and Sanda (2001) used the logit model to predict corporate failure in Malaysia. Their study had used data obtained from Kuala Lumpur Stock Exchange Companies Annual Handbook. Bankrupt companies that were selected in their research included those that have both requested and not requested for court protection. Findings from this study had shown that liquidity has a negative significant relationship with corporate failure. This result is similar to previous studies, even though a different model was used in the study.

Nyamboga, Omwario, Muriuki, Gongera (2014) had used the debt service coverage ratio (DSCR) as their proxy for financial distress. Their sample consisted of 38 non-financial public firms listed in the National Stock Exchange, where data was collected from financial statements of the selected companies, ranging from 2007 to 2010. Altman Z-score was used to determine the financial distress of companies. From this study, they found that liquidity has no significant effect on corporate financial distress.

A study to determine the relationship between financial performance and financial distress during the financial crisis was carried out by Tan (2012), where the results confirmed that firms that have a low level of leverage tend to perform better than firms with a higher amount of leverage. In addition, a negative relationship was found when crises augment financial difficulties and financial performance. This simply shows that high leverage is a bad experience during any financial crisis. This result was consistent with Andrade and Kaplan (1998). Using financial ratios, Malik (2013) evaluated the financial difficulties of Pakistanis firms that are listed in the Karachi Stock Exchange (KSE). Non-financial companies from 2003 to 2010 were used as samples and analysis was done using Altman Z-score. Results from this study showed that leverage is positively significant towards financial distress, suggesting that a higher leverage level contributes to bankruptcy.

Bhunia, Khan and Mukhuti (2011) used companies that were listed on the Indian Stock Exchange as a sample. Data were collected from the selected companies' annual reports. A matched sample design method was then applied in their analysis. Each failed company has a non-failed "partner" in the sample. Paired samples of failed and non-failed companies from the year 2001 to 2010 were utilized in their analysis. Their result is quite different from previous studies, where they find that profitability is not significantly related to financial distress. This result might occur because the proxy used to measure liquidity in this study was different from what was used in previous studies.

Another measure of growth that was used by previous authors is operating income. At early stages of financial distress, operating income falls below the industry average, and this shows that it is positively significant with financial distress (Whitaker, 1999). A study conducted by Altman (2003) had used financial ratios to predict the occurrence of bankruptcy. Using several financial ratios, this study was able to correctly predict 94 percent of bankruptcy one year before it occurs, and 72 per cent of bankruptcy was predicted two years before the actual event. The book-to-market ratio was found to be positively significant towards bankruptcy prediction.

Ward (2011) used Cash Flow from Operations (CFFO), Cash Flows from Investing (CFFI), and Cash Flow from Financing (CFFF), scaling them by total liabilities in mining, oil, and gas firms. The study had also used logistic regression prediction models, where it was found that CFFO is an important indicator to predict financially distressed companies in the industry. Meanwhile, CFFI is the most important variable to predict financial distress in mining, oil, and gas firms. However, CFFF was found to not be a significant variable towards financial distress. Hence, this study analyses the relationship between cash flow variables and financial distress.

3.0 RESEARCH METHOD

This study uses a dummy variable as the dependent variable. It is coded as 1 for the bankrupt firms and 0 for healthy firms. Twelve financial variables are used as the independent variables in this study. They are WCTA, CACL, TDTA, CLNW, EBTA, ROE, ROA, Sales growth, BTMV, CFFTL, CFITL, and CFOTL. The ratios are chosen based on findings from the previous study and they were commonly used in studies related to corporate bankruptcy (Paranowo, 2010; Titman and Opler 1994; Kiragu 1993; Dichev 1998; Ward 2011).

This study selects Malaysian firms that are listed in Bursa Malaysia, also delisted companies from Bursa Malaysia's Practice Note 17/2005 (PN17) list. This data has only focused on the manufacturing sector. Companies with missing data or companies that were closed due to reasons that were not because of financial distress are excluded from the study sample. The name of companies which are listed under Bursa Malaysia's Practice Note 4 (PN4) and PN17 were collected from the library of Bursa Malaysia, while data related to the company's accounting information was taken from Thomson Reuters Datastream for a period between the years of 2001 to 2014.

After going through the sampling process, 84 delisted companies as described in Appendix A throughout that period were selected for analysis. However, some of the companies were found to have been delisted due to other reasons. Therefore, those companies were excluded

from the overall sample. Non-distressed listed companies and distressed companies are matched based on their total assets and industry. For each distressed company, a non-distressed company is matched and chosen. This sampling technique is called a one-to-one basis.

Logit analysis by Statistical Package for Social Sciences (SPSS) is used in this study to overcome the limitations in the Multivariate Discriminant Analysis (MDA), which are multivariate normality and equality in the distribution matrix among groups. Logit analysis provides a likelihood ratio which is explained by dichotomous dependent variable or by independent variables coefficients. Prediction from the logit model is estimated by a maximum likelihood ratio. In this study, dependent variables are coded as one if the firms are in financial distress and zero if they are healthy. This model was previously used by Ohlson (1980) and Gujarati (1995). The model is described as follows:

$$y = \alpha_0 + \alpha_1 WCTA_{it} + \alpha_2 CACL_{it} + \alpha_3 TDTA_{it} + \alpha_4 CLNW_{it} + \alpha_5 EBTA_{it} + \alpha_6 ROE_{it} + \alpha_7 ROA_{it} + \alpha_8 SG_{it} + \alpha_9 BTMV_{it} + \alpha_{10} CFITL_{it} + \alpha_{11} CFFTL_{it} + \alpha_{12} CFOTL_{it} + \epsilon_{it}$$

Where,

y = Dummy variable, 1 is for distressed companies, and 0 is for non-distressed companies

$WCTA_{it}$ = Working Capital / Total Asset

$CACL_{it}$ = Current Asset / Current Liabilities

$TDTA_{it}$ = Total Debt / Total Asset

$CLNW_{it}$ = Current Liabilities/Working Capital

$EBTA_{it}$ = Earnings before Interest Taxes / Total Assets

ROE_{it} = Return on Equity

ROA_{it} = Return on Assets

SG_{it} = Sales Growth

$BTMV_{it}$ = Book-to-Market Value

$CFITL_{it}$ = Cash Flow from Investing / Total Liabilities

$CFFTL_{it}$ = Cash Flow from Financing / Total Liabilities

$CFOTL_{it}$ = Cash Flow from Operating / Total Liabilities

Also, the subscription of i is the company, and t refer to the year. The dependent variable is a dummy variable, where 0 is for the healthy company and 1 is for a distressed company. Further, six hypotheses were developed for this study.

- H1:** There is a relationship between financial distress and liquidity of the firms.
- H2:** There is a relationship between corporate financial distress and leverage.
- H3:** There is a relationship between profitability and firms' financial distress.
- H4:** There is a relationship between sales growth and firms' financial distress.
- H5:** There is a relationship between corporate financial distress and market-to- book value.
- H6:** There is a relationship between cash flow from activities with firms 'financial distress.

Further, twelve variables are used in this study, as shown in Table 1. All the selected variables have been found to be significant by previous researchers.

Table 1.Variables used in this study.

Variables	Formula
WCTA	Working Capital/Total Assets
CACL	Current Assets/Current Liabilities
TDTA	Total Debt/Total Assets
CLNW	Current Liabilities/Working Capital
EBTA	EBIT/Total Assets
ROE	Net Income/Total Equity
ROA	Net Income/Total Assets
BTMV	Book Value of Equity / Total Liabilities
SALES	(Salest – Salest-1) / Salest-1
CFFTL	Cash from Financing/Total Liabilities
CFITL	Cash from Investing/Total Liabilities
CFOTL	Cash from Operating /Total Liabilities

4.0 RESULTS AND ANALYSIS

4.1 Descriptive Statistics Analysis

Table 2 shows the result of descriptive statistics for each of the independent variables. The table of descriptive statistics shows the minimum, maximum, mean, and standard deviation of all twelve variables.

Descriptive statistics of variables related to liquidity are shown in Table 2. The minimum value for WCTA is -23.06 per cent, while its maximum value is 1.30 per cent. Meanwhile, CACL value goes between 0.02 per cent and 252.74 per cent, which are higher than WCTA. The standard deviation for WCTA is 1.52, while for CACL it is 8.43.

For leverage variables, this study uses a measurement of TDTA and CLNW ratios as its proxy. The value for TDTA ratio is between 0 per cent and 10.27 per cent, while the value for CLNW is between - 253.12 per cent and 105.61 per cent. This result shows that the value of

CLNW is higher than TDTA ratio. Similarly, the standard deviation of CLNW is much higher than TDTA.

Table 2. Descriptive statistics for non-distressed and distressed companies

DISTRESS			NON-DISTRESS		
	Mean	Std. Deviation		Mean	Std. Deviation
WCTA	-0.420	2.091	WCTA	0.196	0.230
CACL	1.911	11.584	CACL	2.521	2.780
TDTA	0.647	1.059	TDTA	0.238	0.167
CLNW	-0.298	15.662	CLNW	-1.433	18.698
NITA	-0.140	0.595	NITA	0.006	0.085
ROE	-0.216	1.580	ROE	-0.002	0.207
ROA	0.036	0.097	ROA	0.021	0.080
BTMV	14.443	94.525	BTMV	0.930	0.850
SALESGROWT H	82.852	1573.967	SALESGROWT H	28.638	450.661
CFFTL	0.039	0.212	CFFTL	0.012	0.992
CFITL	0.024	0.224	CFITL	0.126	0.591
CFOTL	-0.012	0.159	CFOTL	0.146	0.830

Descriptive statistics of variables related to liquidity are shown in Table 2. The mean value for WCTA is -0.42 for distressed companies and 0.19 for non-distressed companies, which shows that working capital for distressed companies is lower, hence leading them to bankruptcy.

TDTA ratio is further shown in Table 2. The mean value for distressed companies is 0.65 and 0.24 for non-distressed companies. This shows that companies with higher debts tend to go bankrupt. Descriptive statistics for profitability are measured by EBTA, ROE and ROA. Table 2 shows that the mean value for EBTA ratio for distressed companies is -0.06 and non-distressed companies are 0.03, ROE is -0.22 for distressed companies and -0.002 for non-distressed companies. ROA’s mean value is 0.04 for distressed companies and 0.02 for non-distressed companies. This shows that higher profitability will reduce the probability of bankruptcy.

Results for the book-to-market variable were found to be 14.4 for distressed companies and 0.93 for non-distressed companies. Variable of firms’ growth is measured by sales growth. The mean value is 82.8 for distressed companies and 28.6 for non-distressed companies. Further, variables used to measure cash flows are cash flow from financing, investing, and operating activities. Descriptive statistics show that the mean value of CFFTL is 0.04 for distressed companies and 0.012 for non-distressed companies. CFITL is 0.02 for distressed companies and 0.13 for non-distressed companies, while CFOTL values are -0.0122 for distressed companies and 0.15 for non-distressed companies.

4.2 Correlation Analysis

Correlation analysis shows the relationship between variables. A higher correlation shows a higher level of association between variables, while a lower correlation indicates a lower

level of association. The result from this study shows that all variables are not highly correlated, as described in Table 3.

Table 3. Pearson Correlation Coefficients

	WCT A	CAC L	TDT A	CLNW	EBTA	ROE	ROA	BTMV	SALE SGROWTH	CFFT L	CFITL	CFOT L
WCT A	1	0.089	-0.671	0.020	0.173	0.046	0.040	-0.011	0.003	0.035	0.179	0.150
		(0.005)**	(0.000)**	(0.525)	(0.000)**	(0.148)	(0.200)	(0.723)	(0.921)	(0.263)	(0.000)**	(0.000)**
CAC L		1	-0.040	0.014	0.086	0.052	0.147	-0.020	-0.007	0.084	0.107	0.020
			(0.205)	(0.660)	(0.006)**	(0.099)	(0.000)**	(0.520)	(0.834)	(0.008)**	(0.001)**	(0.521)
TDT A			1	-0.014	-0.408	-0.075	-0.056	0.012	-0.011	-0.001	-0.088	-0.131
				(0.657)	(0.000)**	(0.018)**	(0.078)	(0.710)	(0.720)	(0.982)	(0.005)**	(0.000)**
CLN W				1	0.033	0.029	0.091**	-0.008	0.012	0.006	0.011	0.010
					(0.292)	(0.363)	(0.004)	(0.811)	(0.707)	(0.859)	(0.734)	(0.746)
EBT A					1	0.191	0.246**	0.003	0.014	0.000	0.041	0.073
						(0.000)**	(0.000)	(0.914)	(0.647)	(0.997)	(0.192)	(0.021)**
ROE						1	0.208**	-0.030	0.011	0.003	0.010	0.023
							(0.000)	(0.348)	(0.729)	(0.934)	(0.752)	(0.459)
ROA							1	0.037	0.023	-0.061	-0.036	0.146
								(0.245)	(0.468)	(0.054)	(0.259)	(0.000)**
BTM V								1	-0.003	-0.003	-0.009	-0.007
									(0.936)	(0.936)	(0.780)	(0.823)
SAL ESGROWTH									1	-0.002	-0.002	0.002
										(0.945)	(0.944)	(0.941)
CFFT L										1	0.518	-0.623
											(0.000)**	(0.000)**
CFIT L											1	0.145
												(0.000)**
CFO TL												1

Note: **Significant at 5% level
***Significant at 1% level

Logistic Regression Analysis

Table 4. Logit regression results

Independent Variables	Model 1	Model 2	Model 3	Model 4
WCTA	-0.782	-	-0.746	-0.871
	(0.001)***		(0.003)***	(0.001)***
CACL	-0.004	-	-0.002	
	(0.783)		(0.893)	
TDTA	3.479	-	3.266	3.321
	(0.000)***		(0.000)***	(0.000)***
CLNW	0.007	-	0.007	
	(0.131)		(0.145)	
EBTA	-2.945	-	-2.933	-3.308
	(0.001)***		(0.001)***	(0.000)***
ROE	-0.078	-	-0.111	
	(0.414)		(0.260)	
ROA	9.198	-	10.092	10.387
	(0.000)***		(0.000)***	(0.000)***
BTMV	0.195	-	0.183	
	(0.018)**		(0.027)**	
SALESGROWT H	0.000	-	0.000	
	(0.399)		(0.419)	
CFFTL	-	0.294	0.046	
		(0.403)	(0.898)	
CFITL	-	-1.160	0.358	
		(0.001)***	(0.334)	
CFOTL	-	-1.158	-0.595	-0.652
		(0.000)***	(0.000)***	(0.017)**
CONSTANT	-1.509	0.153	-1.395	-1.224
	(0.000)	(0.027)	(0.000)	(0.000)
-2 Log likelihood	1106.29	1344.324	1095.148	1113.615
Nagelkerke R Square	0.334	0.068	0.345	0.327
Percentage Correct	70.1	68.1	71.7	70.5
<i>Note: **Significant at 5% level ***Significant at 1% level</i>				

Table 4 shows that in Model 1, the significant variables to measure financial distress include WCTA, TDTA, EBTA, ROA, and BTMV. WCTA, which is a measure of liquidity, is negatively significant. This shows that the higher the liquidity of a company, the lower would be its probability to go towards bankruptcy. This finding is similar to Kassama (1996), Begley (1996) and Deakin (1972).

TDTA, which measures leverage, shows a positively significant relationship towards financial distress. This indicates that the higher the debt of the company, the higher the probability for the company to be in financial distress. This finding is similar to Altman (2000), Theodossiou et al. (1996), Hasabullah and Zulkarnain (2009), Paranowo (2010), Halim et al. (2008), Asquith et al. (1994), Kaplan and Stein (1993), Whitaker (1999), and Wruck (1990). EBTA, which is a measure of profitability, is found to be negatively significant to financial distress. This is consistent with previous studies that suggest that a higher amount of profitability will reduce the probability of bankruptcy. This finding is similar to Altman (1968 and 2000), Altman et al. (1977), Bhunia and Sarkar (2011), Odipo and Sitati (2009), and Paranowo (2010).

ROA, which is another measure of profitability, shows a positively significant relationship with financial distress. This shows that as the return on assets increases, the probability of bankruptcy increases. This finding is similar to Gombola (2014), Paranowo (2010). BTMV has a positively significant relationship to financial distress. This shows that assets of a company decline in value before liabilities exceed the assets, hence the firm tends to go into bankruptcy. This finding is similar to Dichev (1998), Chen and Zhang (1998), Giroux and Wiggins (1984), Opler and Titman (1994), Plat (1990), and Shumway (2001).

In Model 2, only cash flow variables are included in the analysis. The results show that CFOTL and CFITL have a negative and significant relationship with financial distress. The negative relationship suggests that cash flows that arise from operating, and investment of the company has a tendency to reduce the probability of bankruptcy. This finding is similar to Ward (2011).

Model 3 shows that when all items are included in the analysis, the results remain to be the same as Model 1. For cash flow, only CFOTL is found to be negatively significant to financial distress. This result suggests that the higher the operating cash flow, the lower will be the probability of bankruptcy.

In Model 4, stepwise regression confirms that WCTA, TDTA, EBTA, ROA, and CFOTL are important variables to determine financial distress in Malaysia. Comparing the percentages of correctly predicted ratios, table 4.3 shows that Model 1 has correctly predicted 70.1 per cent of the companies, while Model 2 has correctly predicted 68.1 per cent, Model 3 has correctly predicted 71.7 per cent, while Model 4 has correctly predicted 70.5 per cent.

5.0 CONCLUSION

Results from Model 1 had shown that cash flow variables were excluded from the analysis. This result shows that WCTA has a negative significant relationship towards financial distress, which suggests that the higher the liquidity, the lower will be the probability of distress. CACL was found to be not significant with financial distress. Furthermore, this finding shows that a higher amount of leverage will lead to bankruptcy. This was reflected in the relationship between TDTA and financial distress, which is negatively related. In terms of profitability, the results show that EBTA is negatively significant, while ROA is positively significant to corporate financial distress. Results of ROA was quite confusing as it shows that the higher the profitability, the higher would be the financial distress. This contradicts the results from previous studies. In addition, BTMV ratio was found to have a positive

significant relationship to bankruptcy while sales growth has no significant relationship to corporate financial distress.

In order to see the importance of cash flow, Model 2 was carried out where only cash-flow variables are included in the analysis. The results confirm that CFOTL is still an important factor for financial distress. In addition, the model had also shown that CFITL is also significant to corporate financial distress.

When all variables are included in the analysis, as described in Model 3, the results remained to be similar to Model 1. Regarding cash flow variables, Model 3 had shown that only CFOTL has a negatively significant relationship to financial distress. This finding showed the importance of operating cash flow in reducing firms' financial distress. Model 3 also showed that cash flow from investing and cash flow from financing are not important in determining financial distress in Malaysia. There are several opportunities for future investigation in this area. First, a larger sample size might be used to get better results from this study. Future researchers can also conduct an analysis by looking at all sectors in Malaysia.

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