PREDICTING CORPORATE TURNAROUND USING LOGISTIC REGRESSION ANALYSIS: A RESEARCH ON BURSA MALAYSIA COMPANIES

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Abstract

There has been considerable research done by academicians and practitioners on corporate bankruptcy predictions, though in the field of corporate turnaround such research were somehow much lacking. Scholars argued that early acceptance of turnaround situation were important for successful recovery. Therefore early predictions on turnaround situation were much needed. This paper seeks to give an overview of corporate turnaround predictions. The samples were taken from the main board companies of Bursa Malaysia from the year 1997 to 2005. Data were taken from financial statement which being published in the Handbook of Annual Report. Several financial ratios were considered in the analysis to see whether a significant difference exists between Turnaround and Non-Turnaround firms. The research used Logistic Regression Analysis as statistical tool. The study found Financial Leverage Ratio (Total Debt/Total Asset), Sales/Total Asset, Receivables/Inventory and Total Tangible Asset to have statistical significant measure to differentiate between the two groups of companies. The study also found that those ratios could be use as significant predictor variables in measuring the probability of a particular company to fall under one of those categories. Hopefully the findings of the research would shed some light and give a better platform in predicting which company would enter the phase of turnaround situation.

Keywords: corporate turnaround, financial leverage, sales, receivables, inventory, asset

Abstrak

Para ahli berpendapat bahwa pengakuan keatas perlunya usaha-usaha penyehatan yang dilakukan sedini mungkin merupakan salah satu faktor penting dalam kesuksesan penyehatan perusahaan, sehingga peramalan tentang hal ini sangat diperlukan. Ini merupakan salah satu tujuan utama dari artikel ini. Sampel penelitian adalah perusahaan yang dikategorikan dalam papan utama Bursa Malaysia dari tahun 1997 hingga 2005. Data diambil dari laporan keuangan yang dipublikasikan dalam The Handbook of Annual Report. Beberapa jenis rasio keuangan diperhitungkan dalam analisis ini untuk menentukan perbedaan yang nyata diantara perusahaan yang bermasalah dengan yang sehat. Penelitian ini yang menggunakan *logistic* regresi sebagai alat analisis. Penelitian ini menemukan bahwa beberapa rasio keuangan diantaranya, rasio hutang (Hutang/ Asset), Omset/ Total Aset, Piutang/ Inventory dan Nilai Aset Nyata menunjukkan nilai statistik yang cukup signifikan membedakan antara perusahaan yang tidak sehat dan sehat. Penelitian ini juga menemukan bahwa rasio-rasio tersebut juga bisa digunakan sebagai variable peramal dalam menentukan probabilitas sebuah perusahaan tergolong dalam kategori sehat maupun tidak sehat.

Kata kunci: corporate turnaround, financial leverage, sales, receivables, inventory, asset

1. Research Background

The body of knowledge in the field of corporate turnaround has grown tremendously over the last few decades (Chowdury, 2002). Although the research were still quite scarce within the setting of developing countries, the focus of scholars within the field of corporate turnaround were somewhat started to shift toward this region especially in East Asia after the last economic crisis of 1998 (see for e.g. Bruton, Ahlstrom and Wan 2001, 2003). However, scholars agreed that corporate turnaround still produced very limited number of literature compared to other field of strategic management. The scarcity of the literature were argued due to the limited number of samples available, which is perhaps one of the reason for small number of samples (usually below 50) were generally accepted as sufficient in the research of corporate turnaround (see, for e.g. Barker III and Barr, 2002).

Due to this limitation, some researchers used secondary data analysis, such as through historical data of financial statements in order to add up the number of sample in the study and to gain additional information from the research. There were many researchers (see for e.g. Sudarsanam and Lai, 2001) who used financial ratios as measures to evaluate strategies taken by turning around companies. And since financial based performance measures such as Return on Sales (ROS), Return on Assets (ROA), Earning per Share (EPS) and Net Income, have been the dominant model in empirical strategy research (Venkatraman and Grant, 1986), its usage in the field of corporate turnaround has also been widely spread.

The fact on the growing number of researches in the field of corporate turnaround especially on corporate turnaround strategies, were not evenly spread on other branches of the field. Literature has shown that research on the predictions of turnaround companies were very scarce if not limited. The usage of financial ratios which were useful on many researches on corporate turnaround, which also were found to be abundantly applied in the research of corporate bankruptcy or corporate collapse, were found to be in a very limited application in this particular section of corporate turnaround.

1.1. Severeness and Early Detection

Sense of severity on turnaround situation was introduced by Hofer (1980) in the early 80s as one of the contextual factor that might influence the turnaround outcome. Hofer (1980) was also perhaps one of the earliest scholars in corporate turnaround who suggested the linkage between the severeness of turnaround situation and appropriate selection of turnaround strategies. In this sense Hofer (1980), which supported by Goodman (1982), argued that there was a definite urgency of realizing the fact that particular troubled companies were in-need-of turnaround as soon as possible to have better chances of turning around successfully. This proposition was supported by later scholars who argued that major denial in the existence of the crisis faced by troubled companies, remained as major obstacle towards recovery (Goodard, 1993; Slatter, 1984).

The above arguments lead to a suggestion that a timely acceptance of the fact that a company is in-need of turnaround effort was perhaps one of the few important ingredients for a successful recovery. The earlier a troubled company realizing the fact that it needs a turnaround, the better its chances of having successful recovery, since the problems that had to be tackled would not be so heavy and changes in the economy would arguably still be within the expected condition, hence a troubled company would have better time to prepare itself even if crisis were coming.

Review on the literature of corporate bankruptcy showed that there are characteristics that differentiate between bankrupt companies and healthy companies, which usually shown through few important measures of financial ratios (see for e.g. Beaver, 1966; Altman, 1968). These financial ratios which argued to depict the internal condition of companies could also be used as differentiating characteristics which categorized companies as in-need-of-turnaround and non-

turnaround few years earlier before the troubled companies really face turnaround situation. And if such signs do exist, it could also be used as predictors of turnaround situation and warn the expected companies of the impending crisis situation few years even before the troubled companies realized that they would face the troubled situation of in-need-of turn around.

1.2. The Objective

Earlier scholars in the field of corporate turnaround argued that the dominant factor which caused many companies to be in the situation of financial distress were generated internally (Bibeault, 1982; Slatter, 1984; Argenti, 1976; Schendel et al., 1976; Nueno, 1993; Gooddard, 1993; Goodman, 1982). Although many managers blamed the external condition such as economic crisis or unpredicted movement of commodity price (Slatter, 1984) as the triggering factor, scholars argued that financially distressed companies were already facing internal difficulties prior to the crisis. Those companies were simply did not feel it since the contraction of economy was not really being felt prior to the crisis. During this time, financially distressed companies usually experiencing a normal-happy time with moderate growth compared to other companies in the industry, since the economy was still booming and some industries were prospering.

In the event that crisis hit the economy and contraction to the economy was beginning to happen rapidly, these troubled companies would find themselves suddenly in the brink of bankruptcy. It was at this time that their covered-internal problems were revealed and the company found itself in a financially distressed situation (Bibeault, 1982). Therefore it is argued that if a turnaround company were already facing internal problems prior to the situation in which it needed a turnaround, those problems should have been projected in its key financial ratios. This means that its financial ratios should have shown some differences compared to a healthy non-distressed companies prior to the crisis stage.

It is the objective of the paper to see whether there are significant differences in the aspect of internal financial condition (depicted by several financial ratios) between in-need-of-turnaround companies and non-turnaround companies, which were listed on the Main Board of Bursa Malaysia from 1997 to 2005. The secondary objective of the paper is to investigate whether those financial ratios could be use as tools to predict whether a particular company would be experiencing turnaround situation in the near future.

This paper will be presented in five parts. Introduction and Literature Review will give an overview on the background of the study and overview of the research being done in the field of corporate bankruptcy. The section of Research Method will elaborate on samples and procedures used in the study. The Findings section will show the results from the statistical analysis. And finally the discussion and implication section will close the arguments presented in this paper.

2. Literature Review

Review from the literature suggested that the symptoms of decline has shown itself much in the early days of the downturn period, however management did not really see or purposely ignored it and did not do anything about it, which in turn caused the company to continue its deterioration from bad to worst (Bibeault, 1982; Slatter, 1984; Nueno, 1993). This management attitude of crisis denial as argued by Goddard (1993), prolong the deterioration faced by companies. There fore early detection and acceptance of the crisis is needed in troubled companies. This argument was further supported by Goodman (1982) who argued that one of the common things that turnaround winner had is the early recognition of the need for a turnaround posture.

Early recognition of the need of turnaround lead to the understanding that the problems are still not serious or severe enough so that the problematic company still can handle it with significant resources, in which at that time they would still had. Meaning to say, the turnaround

company would have a better chance of survival if that company detect its problems early and try to solve it immediately, while it still has the resources to do so. Literature suggested that decline of a company depicted in several different kinds of symptoms (Bibeault, 1982; Slatter, 1984; Nueno, 1993; Goodman, 1982). Basically, these symptoms of companies in trouble can be categorized into four types: (a). Symptoms from Financial Statement, This type of symptoms includes decreasing profitability (margins), decreasing sales volume at constant price, declining market share, increase in debt, decreasing liquidity, restricted dividend policy, delays in publishing annual report and also changes of auditors (see for e.g. Barker and Mone, 1994; Bruton, Ahlstrom and Wan, 2003; Chowdury and Lang, 1996). (b). Symptoms from Mathematical Forecasting Signals, This symptoms mostly in the form of ratio analysis that were used to predict banckruptcy, such as done by Altman (1968), Beaver (1966), Edmister (1972), Meyer and Pifer (1970), Tamari (1966), Trieschmann and Pinches (1973), Wilcox (1971), Pinches et al., (1975), Casey et al., (1986), Chen and Shimerda (1981), Moyer (1977), Lau (1987), Taffler and Tishaw (1977), Makeever (1984), Laitinen and Laitinen (2000), Hossari and Rahman (2005) and many others. (c).

This type of symptoms can be found in many forms, such as: rapid management turnover (loss of key managers), lack of planning/ strategic thinking, loss of productivity, little self-criticism (fear of top management), regularly missing plan, poor communication between functional divisions, meeting as an avoidance technique, little delegation and lack of bold action (Slatter, 1984; Goldstein, 1995). And (d) Symptoms from the Stakeholders, Such symptoms includes decline in quality or service for the customer, price cuts, tightening credit policy, increase in non-payer customer, outdated products, increasing complaints from the customer, reduced size of order to the supplier, experiencing unusual low inventory on stocks or materials, taking longer time to pay suppliers which caused reticence among them, greater resistance to increase pay to the employees, cuts in overtime, less generous treatment to the employee which eventually increased labour hostility, delays in capital expenditure authorization and resistance in the financial community (Slatter, 1984; Goldstein, 1995; Goddard, 1993).

Although these classifications of symptom are definitely not the cause of decline, it is through these symptoms that the management, investors or even stakeholders could see that there is definitely something wrong happening within the troubled company. And perhaps among these classifications of symptoms, the analyses of financial ratios were the most published in the literature since the information needed were the most publicly available through the companies' published financial report. Ratio analysis had undergone rigorous studies especially during 1970s. Many of those researchs were in favor of knowing the differences or characteristics that differentiate a particular group of companies to another. For example, the analysis of characteristics of merged firms (Stevens, 1973 and Simkowitz and Monroe, 1971), prediction of corporate bond rating (Horrigan, 1966; Pinches and Mingo, 1973; Pogue and Soldofsky, 1969; and West, 1970), and particularly in the field of corporate bankruptcy prediction (Altman, 1968; Beaver, 1966; Edmister, 1972; Meyer and Pifer, 1970; Tamari, 1966; Trieschmann and Pinches, 1973; Wilcox, 1971; Pinches et al., 1975; Casey et al., 1986; Chen and Shimerda, 1981; Moyer, 1977; Lau, 1987; Taffler and Tisshaw, 1977; Makeever, 1984; Hossari and Rahman, 2005; and many other studies). However most of the studies mentioned above which were mainly in the field of corporate bankruptcy prediction, focused on the difference of internal condition (as described by its ratio analysis) between bankrupt firms (or firms filing for bankruptcy) and healthy firms. It is very rare to find a research that compared the internal condition of turnaround and non-turnaround companies, one or two years before the turnaround firms entered a turnaround phase or undertaking turnaround efforts.

Over the years as much as 65 accounting ratios were used to predict corporate bankruptcy (Chen and Shimerda, 1981). There were more than 20 studies on corporate bankruptcy prediction and each study tend to produced its own ratio, which apparently about 40 of them were found to

be quite significant. Chen and Shimerda (1981) further argued that all of those 40 ratios cannot be equally important in multi ratio model, and further more too many ratios would confuse the user. Pinches et al., (1975) examined 48 ratios of 221 industrial firms and found that 92% of the common variation among those 48 financial ratios can be explained and grouped into seven classifications of financial ratios. Pinches et al., (1975) argued that by taking each ratio, which has high factor loading in each of the seven groups, can describe almost as good as all the 48 ratios combined. The seven classification of financial ratios found by Pinches et al., (1975) is shown on Table 1.

Table 1. Seven Major Classification of Financial Ratios

Group of Financial Ratios	Most closely depicted ratios for the group	Factor loading
Return on Investment	Total income/ total capital	0.97
	Net income/ net worth	0.96
Capital Turnover	Sales/ net plant	0.95
	Sales/ total asset	0.89
Inventory Turnover	Inventory/ sales	0.97
	Cost of goods sold/ inventory	-0.97
Financial Leverage	Debt/ total capital	0.99
	Debt/ total asset	0.97
Receivable Turnover	Recievables/ inventory	-0.99
	Receivables/ sales	-0.82
Short-term Liquidity	Current asset/ current liability	0.91
	Quick asset/ current liability	0.81
Cash Position	Cash/ total asset	0.91
	Cash/ fund expenditure	0.91

There were several other researchs synthesizing financial ratios as model for corporate bankruptcy. A research by Laitinen and Laitinen (2000) took a sample of 32 financial ratios based on its specific usefulness to develop a model on corporate collapse. Another recent article done by Hossari and Rahman (2005), collected 48 financial ratios out of 53 studies and ranked them according to their popularity. They found only five (which includes Net Income/Total Asset, Current Asset/Current Liability, Total Liability/Total Asset, Working Capital/Total Asset and Earning Before Interest and Taxes/Total Asset) out of those 48 ratios were found to be useful by more than 25% of the 53 studies.

In Malaysian context, only one research was found in regards to corporate bankruptcy prediction, which was done by Bidin (1988). The model was developed only for the evaluations of performance of the government owned companies. Bidin's model was developed based on widely cited and loosely used model developed earlier by Altman (1968). The weaknesses of Altman model, as Moyer (1977) argued, the model was sensitive to the time span that were used to develop the model and also to the size of the firm in the sample group. This limitation was also argued to limit the interpretation of the Bidin's findings, as it was quite old and might no longer applicable in the current business setting. The same limitation on using financial ratios as prediction tools on corporate bankruptcy, might also has some effect as well in the field of corporate turnaround. This consideration has to be taken into account especially during the interpretations of the results, as we would find in later section of the article.

3. Research Method

This article focused on 96 companies that were listed on the main board of Bursa Malaysia Stock Exchange. Previously Bursa Malaysia was known as Kuala Lumpur Stock Exchange until it changed its name at 2005. The list of companies was obtained from the Annual Report of Kuala Lumpur Stock Exchange volume 23, which was publicized by Bursa Malaysia. It contains compilation of limited financial statement data from all the companies which were listed in the

stock exchange. A turnaround company in this study is defined as companies who experienced massive decline in Earnings Before Interest and Taxes (EBIT) more than 80% in a single year. The extreme definition is applied to characterize the threat to organization's life-existence which differentiates corporate turnaround from other field of organizational change. This definition was previously also used by Bibeault (1982) to defined turnaround sample in his study. A company which fall under the above definition would then be marked as Turnaround Company, and the year of which its financial statement categorized it as Turnaround Company would then be used as the base year for the research. The data acquired for year -1 and year -2 were obtained from the previous reported financial statement data (reported financial statement 1-accounting period and 2-accounting period before) for the same company. The EBIT data were compiled from the year of 1997 to 2005, in order to include some external effects of financial crisis in 1998.

All of the sectors in the main board of Bursa Malaysia were included in the analysis except companies under trust and financial sector. These were omitted from the study since companies listed under these sectors had different financial structure. Since this research was developed as part of two studies, only companies whose financial statement were reported in the year of 1995 and 1996 on the handbook were considered to be in the population. This measure was also taken in the consideration to assure the availability of data year -1 and year -2, as well as to sterilize the sample group from the subsequent listing of additional companies in the stock exchange after the financial crisis of 1998. The financial crisis of 1998 is considered to be the external event that triggers the turnaround situation, which would act as the base argument that the turnaround companies would be financially different internally compared to the healthy companies even before the crisis struck in 1998. From the initial population of 385 companies, 48 companies were found to be in the turnaround (TA) group. The group of Non-Turnaround (NTA) companies was selected by using proportionate systematic random sampling, which produced another 48 companies to represent the group.

Several financial ratios, which proposed earlier by Pinches et al., (1975) were included in the analysis, such as Sales/Total Asset (S/TA), Inventory/Sales, Total Debt/Total Asset (TD/TA), Receivables/Inventory (R/Inv), Current Asset/Current Liability (CA/CL), and Cash/Total Asset (C/TA). The ratio of Total Net Income/Total Capital (ROI) was omitted due to unavailable data. A ratio proposed by Altman et al., (1977) in their Zeta Analysis, which is Size (Total Tangible Asset - TTA) was also included in the analysis. During data screening, the ratio of Inventory/Sales was found to be not normally distributed although few techniques of data transformation and deletion of outliers applied to the variable. Hence the variable was dropped from further analysis. In conclusion, the proposed model of logistic regression can be postulated in the equation below:

$$DV = \frac{e^{\alpha + \beta n\, IVn + \varepsilon}}{1 + e^{\alpha + \beta n\, IVn + \varepsilon}}, \text{ whereby}$$

DV: Dependent variable, the probability that the outcome of such observation would be in turnaround or non-turnaround

α : The constant-only model

IV : Independent Variable, Sales/Total Asset (STA, year -1 and -2), Total Debt/ Total Asset (TD/TA, year -1 and -2), Receivables/Inventory (R/Inv, year -1 and -2), Current Asset/ Current Liability (CA/CL, year -1 and -2), Cash/ Total Asset (C/TA, year -1 and -2), Total Tangible Asset (TTA, year -1 and -2)

There are basically four models which proposed to be tested:
   a. Constant-only Model ; whereby the equation consist only a constant variable
   b. Single Model : whereby each ratio will be treated separately as each individual model

c. Full Model : whereby all of the ratios will be treated in a single equation
d. Incomplete Model : whereby the equation consist of only several ratios (R/Inv -1, CA/CL -1, CA/CL -2, C/TA -1 and C/TA -2)
e. Adjusted Model : whereby the equation consist of Incomplete Model and several additional ratios (S/TA -1, S/TA -2 and TTA -2)

It is important to compare all of these models in the effort to find the best predictor variables within the model. As Tabachnick and Fiddel (2007) argued that one of the best way to find significant predictor in Logistic Regression is to find the variables which contribute significantly towards the difference of the tested model with the constant-only model.

It was hypothesized that the internal condition of Turnaround companies should be different compared to Non-Turnaround companies one or two years before TA companies were classified as in-need-of turnaround. Therefore the ratio analysis, which depicted the internal condition of the firm, should show some differences between the two groups. Furthermore it was argued that if such differences of financial ratios existed between TA and NTA group, those financial ratios might be used to predict the probability of such company fall into one of the two categories.

The appropriate statistical analyses for this kind of test are discriminant analysis and logistic regression. However logistic regression were chosen for the study as the appropriate technique due to its flexibility on the multivariate assumptions, which had to be met in full if the analysis of discriminant were being used (Hair et al., 1998). In logistic regression, variables of predictor do not have to be normally distributed, linearly related or having equal variance within each group (Tabachnik and Fidell, 2007). It is a technique which emphasizes the probability of a particular outcome for each case being tested.

4. Result and Discussion

A direct logistic regression analysis was performed on each financial ratio by treating them as individual variable. The result on Wald test (Table 2) shows statistical significance on variable TD/TA -1 and TTA -1, with value of Exp (B) of 2.655 and 0.711 respectively. However as Tabachnik and Fidell (2007) suggested that comparison of models with predictors and without predictors were considered to be much superior technique compared by only using the Wald test alone. Therefore comparisons of models with predictors of single variable against a constant-only model were also performed as shown in Table 3.

Table 2. Statistical Results on Each Financial Ratio Treated as Single Variable Showing Wald Statistic and Exponential Beta

Variable	Constant	B	S.E.	Wald	df	Sig	Exp(B)
S/TA -1	-0.457	-.0468	0.240	3.822	1	0.051	0.626
S/TA -2	-0.314	-0.337	0.240	1.971	1	0.160	0.714
TD/TA -1	0.856	0.977	0.394	6.158	1	0.013*	2.655*
TD/TA -2	0.651	0.648	0.348	3.457	1	0.063	1.911
R/Inv -1	0.027	-0.113	0.125	0.809	1	0.368	0.893
R/Inv -2	0.022	0.075	0.144	0.271	1	0.603	1.078
CA/CL -1	0.102	-0.441	0.292	2.281	1	0.131	0.644
CA/CL -2	0.135	-0.680	0.392	2.998	1	0.083	0.507
C/TA -1	-0.968	-0.325	0.170	3.662	1	0.056	0.723
C/TA -2	-0.863	-0.282	0.160	3.107	1	0.078	0.755
TTA -1	4.146	-0.340	0.170	4.006	1	0.045*	0.711*
TTA -2	2.617	-0.220	0.153	2.064	1	0.151	0.802

Notes: * Significant 5%

The findings based on the comparison of the single model with constant-only model are depicted in Table 3. There are several variables which produced significant results (supporting

the findings by using Wald test) such as S/TA -1 (p: 0.044), TTA -1 (p: 0.036), TD/TA -1 (p: 0.008) and TD/TA -2 (p: 0.047). However the variance accounted for each of these variables are small, as showed by the small value of Nagelkerke R^2 (0.055 for S/TA -1, 0.063 for TTA -1, 0.094 for TA/TD -1 and 0.054 for TA/TD -2).

Table 3. Statistical Results on Each Financial Ratio Treated as Single Variable by Using Model Comparison

Variable	Intercept -2 LL	Model -2LL	Model Coefficient			Cox and Snell R^2	Nagelkerke R^2
			Chi^2	df	Sig		
S/TA -1	133.084	129.014	4.07	1	0.044*	0.042	0.055
S/TA -2	130.269	128.220	2.05	1	0.152	0.022	0.029
TD/TA -1	133.084	126.028	7.06	1	0.008*	0.071	0.094
TD/TA -2	133.084	129.149	3.94	1	0.047*	0.040	0.054
R/Inv -1	128.915	128.089	0.826	1	0.364	0.009	0.012
R/Inv -2	128.915	128.642	0.272	1	0.602	0.003	0.004
CA/CL -1	133.084	130.684	2.4	1	0.121	0.025	0.033
CA/CL -2	127.496	124.293	3.20	1	0.074	0.034	0.046
C/TA -1	130.312	126.472	3.84	1	0.051	0.040	0.053
C/TA -2	131.687	128.433	3.25	1	0.071	0.034	0.045
TTA -1	125.878	121.504	4.37	1	0.036*	0.047	0.063
TTA -2	127.365	125.215	2.15	1	0.143	0.023	0.031

Notes: * Significant 5%

Table 4 shows the predicted accuracy of using single financial ratio as variable in predicting turnaround and non-turnaround firms. As shown in the table, the ratio of TD/TA -1 was found to be a better predictor of in-need-of turnaround companies as it shows 70.8% of correct predictions, which is much better compared to any other single variables. The data shown in table 2 also support these arguments, as the odds ratios which measured by Exp(B) also shows big effect (2.655 for TD/TA -1 and 1.911 for TD/TA -2) especially for the ratio of Total Debt/ Total Asset compared to other variables. This value explains that 1-point increase in the ratio of TD/TA, would increase the probability of a company to fall under the category of turnaround by 2.65 for TD/TA -1 and 1.91 for TD/TA -2 respectively.

Table 4. Statistical results on the Predictive Accuracy of Using Single Financial Ratios as Single Variable

Variable	Observed	Overall % of Correct Prediction	Predicted		
			NTA	TA	% Correct
S/TA -1	Non – Turnaround (NTA)	61.5	30	18	62.5
	Turnaround (TA)		19	29	60.4
S/TA -2	Non – Turnaround (NTA)	59.6	33	15	68.8
	Turnaround (TA)		23	23	50
TD/TA -1	Non – Turnaround (NTA)	61.5	25	23	52.1
	Turnaround (TA)		14	34	70.8
TD/TA -2	Non – Turnaround (NTA)	63.5	29	19	60.4
	Turnaround (TA)		16	32	66.7
R/Inv -1	Non – Turnaround (NTA)	50.5	18	28	39.1
	Turnaround (TA)		18	29	61.7
R/Inv -2	Non – Turnaround (NTA)	49.5	17	29	37
	Turnaround (TA)		18	29	61.7
CA/CL -1	Non – Turnaround (NTA)	59.4	27	21	56.3
	Turnaround (TA)		18	30	62.5
CA/CL -2	Non – Turnaround (NTA)	63	33	14	70.2
	Turnaround (TA)		20	25	55.6
C/TA -1	Non – Turnaround (NTA)	57.4	27	20	57.4
	Turnaround (TA)		20	27	57.4

Table 4, Continued...

C/TA -2	Non – Turnaround (NTA)	53.7	28	20	58.3
	Turnaround (TA)		24	23	48.9
TTA -1	Non – Turnaround (NTA)	58.2	20	23	46.5
	Turnaround (TA)		15	33	68.8
TTA -2	Non – Turnaround (NTA)	58.7	22	22	50
	Turnaround (TA)		**16**	**32**	**66.7**

A direct logistic regression was also performed with all predictor variables simultaneously in the full model as shown in Table 5. Although none of the variables seem to have significant statistical result as viewed from Wald test in Table 5, some variables however showed some kind of significant effect size from the value produced in Exp(B).

These variables include S/TA -2 (1.413), TD/TA -1 (6.553), TD/TA -2 (1.313), R/Inv -2 (1.590), and TTA -2 (2.543). To test further on whether these variables have a significant effect size toward the regression model, a separate model was developed to compare it with the full predictors' model. An incomplete model of logistic regression consisted of R/Inv -1, CA/CL -1, CA/CL -2, C/TA -1 and C/TA -2 as predictor variables were then tested and compared firstly with the constant-only model (see Table 6). The result showed that there is no significant improvement of the incomplete model compared to constant-only model (sig : .353 ; p>.05). Therefore the incomplete model can be said as having no differences with the constant-only model.

Table 5. Statistical Results of the Full Model with All Predictors

Variable	B	S.E.	Wald	df	Sig	Exp(B)
S/TA -1	-1.281	0.832	2.371	1	0.124	0.278*
S/TA -2	0.346	0.791	0.191	1	0.662	1.413*
TD/TA -1	1.880	1.272	2.186	1	0.139	6.553*
TD/TA -2	0.272	1.186	0.053	1	0.818	1.313*
R/Inv -1	-0.234	0.294	0.630	1	0.427	0.792
R/Inv -2	0.464	0.321	2.081	1	0.149	1.590*
CA/CL -1	0.172	0.737	0.054	1	0.816	1.187
CA/CL -2	0.160	0.847	0.036	1	0.850	1.174
C/TA -1	0.056	0.332	0.028	1	0.867	1.057
C/TA -2	-0.157	0.266	0.349	1	0.555	0.855
TTA -1	-1.257	0.787	2.549	1	0.110	0.284*
TTA -2	0.934	0.795	1.378	1	0.240	2.543*
Constant	**4.710**	**2.998**	**2.469**	**1**	**0.116**	**111.095**

The Incomplete Model then were added several predictor variable (S/TA -1, S/TA -2, TD/TA -1, TD/TA -2, R/Inv -2, TTA -1, TTA -2) individually and compared with the original Incomplete Model. The results (see Table 6) clearly showed that out of seven predictor variables which argued to have significant effect on the full model, only four (TD/TA -1, TD/TA -2, R/Inv -2 and TTA -1) have a clear significant effect towards enhancing the probability of the logistic regression function.

Another model which is called as the Adjusted Model, which consists of predictor variables initially included in the Incomplete Model plus three other predictor variables (S/TA -1, S/TA -2 and TTA -2) was tested and compared with the initial Incomplete Model. The result showed that there is no significant difference between these two models, which mean that the additional three predictor variables were failed to enhance the predictive power of the logistic regression. Even if the Adjusted Model were tested against the constant-only model, there is no significant difference between the two models (Chi^2: 10.6, df: 8, p> 0.05). Hence the predictive value of the Adjusted Model did not differ significantly compared to constant-only model.

Table 6. Statistical Results of the Model with Combination of Predictors

Model	Incomplete[a] Model -2 LL	Tested Model -2LL	Model Coefficient			Cox and Snell R^2	Nagelkerke R^2
			Chi^2	df	Sig		
Constant-only	115.048	120.596	5.55	5	0.353	0.062	0.082
S/TA -1	115.048	113.087	1.96	1	$p > 0.05$	0.083	0.110
S/TA -2	115.048	113.993	1.06	1	$p > 0.05$	0.073	0.097
TD/TA -1	115.048	108.091	6.96	1	$p < 0.01*$	0.134	0.179
TD/TA -2	115.048	108.627	6.42	1	$p < 0.05*$	0.129	0.171
R/Inv -2	115.048	110.274	4.77	1	$p < 0.05*$	0.112	0.149
TTA -1	115.048	110.267	4.78	1	$p < 0.05*$	0.085	0.113
TTA -2	115.048	112.772	2.28	1	$p > 0.05$	0.072	0.096
Adjusted M[b]	115.048	109.969	5.08	3	$p > 0.05$	0.102	0.136
Full Model	109.969	91.836	18.13	4	$p < 0.005*$	0.263	0.351

(a) Incomplete Model consist of R/Inv -1, CA/CL -1, CA/CL -2, C/TA -1 and C/TA -2 as predictor variables

(b) Adjusted Model consist of R/Inv -1, CA/CL -1, CA/CL -2, C/TA -1, C/TA -2, S/TA -1, S/TA -2 and TTA -2

However if a comparison was made between the Full Model and the Adjusted Model, there is a clear statistical significance between these models. There is a vivid contribution of the four predictor variables (TD/TA -1, TD/TA -2, R/Inv -2 and TTA -1) towards enhancing the overall probability model of logistic regression, as shown by the Exp (B) for each predictors' variables (see Table 5). The most extreme value of variable was produced by TD/TA -1, which showed an Exp(B) value of 6.553, which means that one value of increase in the variable would increase the odds of a company to fall under the category of turnaround as much as six times.

Table 7. Statistical Results of the Logistic Regression Model with Predictive Accuracy

Model	Observed	Predicted		
		NTA	TA	% Correct
Incomplete	Non – Turnaround (NTA)	26	18	59.1
	Turnaround (TA)	17	26	60.5
	Overall %			59.8
Adjusted	Non – Turnaround (NTA)	27	16	62.8
	Turnaround (TA)	17	26	60.5
	Overall %			61.6
Full	Non – Turnaround (NTA)	30	12	71.4
	Turnaround (TA)	11	32	74.4
	Overall %			**72.9**

However the variance accounted for the combination effect of all variables are still small (Nagelkerke R^2 0.351), although the figure were much improved compared to Nagelkerke R^2 of individual variable or even from the Adjusted Model (Nagelkerke R^2 0.136). The predictive accuracy of the full model was also increased by the inclusion of the four predictors' variables as shown in Table 7. The statement that predictive accuracy of the observed company would fall under turnaround category has improved almost as much as 15% in the full model compared to other models.

From the findings discussed above, it can be seen that there is a significant difference in the aspect of internal condition between Turnaround and Non-Turnaround firms. Although not all of the financial ratios showed a significant difference, several financial ratios (S/TA -1, TD/TA -1, TD/TA -2 and TTA -1) which have been tested individually, have showed that statistically significant difference exist between TA and NTA firms. Multiple/ simultaneous effect of financial ratios also showed almost similar result, where ratios such as TD/TA -1,

TD/TA -2, R/Inv -2 and TTA -1 showed significant differences between these two different group of companies.

Further analysis also shows that there is a predictive ability of these financial ratios to categorize between TA and NTA groups. In terms of individual ratio, financial leverage year -1 (TD/TA -1) produced quite outstanding result with p 0.008 and Exp(B) of 2.655 , although the variance accounted for this ratio is quite small (Nagelkerke R^2 0.094). In terms of multiple effects, the four ratios (S/TA -1, TD/TA -1, TD/TA -2 and TTA -1) produced significant enhancement of predictive ability towards the probability of logistic regression equation, with total prediction accuracy of 74.4%.

The dominant predictive value of Financial Leverage ratio (Total Debt/Total Asset) in the analysis was perhaps due to the heavy leverage capital structure which was adopted by many troubled companies in the sample, prior to the year of the crisis. During the golden years of economic development in the South East Asian region, debt financing has become one of the major sources of funding for companies in the region. The availability of cheap financial resources with nearly unlimited amount of money fueled the economy with funding for public and private companies for aggressive investments (Sim, 2009), which mainly through debt financing. There fore it would not be surprising to see the ratio of Financial Leverage to be one of the important factors in predicting such companies to be in Turnaround or Non-Turnaround group.

Studies by using financial ratios were mainly done in the field of corporate bankruptcy prediction. Studies using financial ratios in the literature of corporate turnaround were found to be quite rare especially in predicting corporate turnaround. There are several contributions that this study has managed to offer. Based on the time span of this research, this study showed that the internal conditions of the firm which involved in the study were somewhat different between turnaround and non-turnaround companies one year prior to the crisis year. This study also showed that the biggest differentiating factor between the two groups were the financial leverage ratios, which measured by the Total Debt/Total Asset. This ratio also acted as the most important variable since it produced the biggest predictive effect compared to other variables in the equation. This finding also suggest that perhaps the amount of debt that a company decided to handle, could be one of the decisive factor that might force a particular company to succumb into the region of turnaround.

This study researched on 96 companies which were listed in the main board of Bursa Malaysia between the periods of 1997 to 2005. The study tried to differentiate in the aspect of internal condition of the TA and NTA companies by using financial ratio analyses. The study also tried to use the financial ratios to predict the probability of an observed company to fall under one of these two groups. In the analysis of single variable, the ratio of Sales/Total Asset (year -1), Total Debt/Total Asset (year -1 and -2) and Total Tangible Asset (year -1) were found to be quite significant statistically, to differentiate between the two groups. In the analysis of multiple variables, the ratios of Total Debt/Total Asset (year -1 and -2), Receivables/Inventory (year -2) and Total Tangible Asset (year -1) were found to contribute significantly to predict the probability of the logistic regression equation.

However in light of future studies, whether such characteristics transcend to other companies listed in other Stock Exchange remains to be seen. In overall, these findings have strengthened the argument that the internal condition of a firm also played quite important roles in sending the company to the situation of turnaround, as previously argued by many scholars in the field. Thus the factor that caused the turnaround plunge does not necessarily come solely from the external factor as argued previously by many managers of troubled companies.

Although the findings of the research were quite enticing, researchers still have to take precautions in reading the results. Since the assumptions which usually hold multivariate analysis were much more flexible in logistic regression, the results should be read with caution

especially when the assumptions of normality were relaxed. As with other researches on financial ratios, the results were argued to be sensitive to the time span of the sample data (see Moyer, 1977) and also the sample size (Tabachnik and Fidell, 2007).

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