

CAN FINANCIAL RATIOS EXPLAIN THE OCCURRENCE OF FRAUDULENT FINANCIAL STATEMENTS?

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ABSTRACT

This paper examines financial ratios as a tool to discriminate fraudulent financial statements (FFS). The empirical analysis covers the period from 2003 to 2010. Using a sample of 122 fraud and non-fraud companies in Malaysia, the study tests eleven financial ratios based on Spathis (2002) and other studies that examined financial ratios indicative capabilities. This study also includes the classical Benneish (1991) ratios and control for distress factor using the Altman Z-Score (1968) model. The diagnostic tests were conducted using backward Wald binary logistic regression approach. The results show that all the financial ratios have significant relationships with FFS except for Gross Profit-to-Assets ratio, percentage of Inventory-to-Total Assets, Gross Margin Index and Z-Scores. This concludes that financial ratios have the ability to explain the occurrence of FFS.

Keywords: *Financial ratios, fraudulent financial statements.*

1. Introduction

Detection of fraudulent financial reporting becomes critical part on ensuring the quality of financial reporting and the ability to predict bankruptcy is significance issue for the users of financial statements. Financial ratios can detect fraud as many of previous study (Keige, 1991; Persons, 1995; Ward & Foster, 1997; Rick, 2001; Spathis, 2002; Macharia, 2003 and Kathleen, et. al, 2004) use the financial ratios in predicting fraudulent financial statements between fraud companies and non-fraud companies. Auditors concern on analytical procedure on their audit process for the purpose to assess the company's ability to continue as a going concern, indicate the presence of possible misstatements in the financial statements and reduction detailed audit tests.

Examination of Fraudulent financial statements (FFS) is important because the quality of financial reporting become the tremendous issues currently as there are many studies on fraudulent financial statements and how it will be detected as well as on prevent it. More efforts of previous study on financial ratios as prediction of fraudulent financial statements has been use for financial distress, such as the study conducted by Wan Ismail, Raja Ahmad, Kamarudin, & Yahaya (2009) on Corporate failure prediction to investigate PN4 companies, highlight the issues on whether the financial data can or cannot detect an early signal of financial distress. Previous studies use several techniques and methodologies, based on financial ratios relation with fraud or bankruptcy or performance detection and amongst their objectives are to examine business failure prediction using discriminant analysis (DA), Keige (1991).

Persons (1995) examines variables for estimating models of fraudulent financial reporting, and assessment of models predictive ability using logistic regression, Ward and Foster (1997), done an empirical test whether or not using the inability of a firm to pay debts when due (loan default), as response measure produce different results than using legal bankruptcy as response measure, Rick (2001) examines whether the addition of capitalized lease data increase the power of affected ratios for predicting bankruptcy using DA, Spathis (2002) demonstrate how financial ratios models function in detecting FFS using logistic regression, Macharia (2003), examines power of financial ratios in separating Cooperatives with performing loans from others with non-performing loans issued by the bank using DA and Kathleen et, al. (2004) examines whether financial ratios of fraudulent firms differ from financial ratios of non-fraudulent firms.

Spathis (2002) analysed the fraud by examines published data to develop a model for detecting fraudulent financial reports by Greek manufacturing companies. Ten independent financial ratios were selected which are Debt/ Equity, Sales/ Total Assets, Net Profit/ Sales, Receivables/ Sales, Net Profit/ Total Assets, Working Capital/ Total Assets, Gross Profit/ Total Assets, Inventory/ Total Assets, Total Debt/ Total Assets and Z-Score model as predictor of false financial statements. While Beneish (1991) on his study on detection of earnings management present a model to distinguish

manipulated from non-manipulated reporting and Altman (1968) has developed the prediction model name Z-score to measure distance on default of manufacturing companies. Five ratios have been selected to be Z-score model and to address the prediction ability of corporate bankruptcy.

In Malaysia environment, the 2007 survey by PWC indicates that corporate fraud would damage the brand name, staff morale, external business relations, relations with the regulators and the share value. The result shows that 66% of Malaysian companies surveyed reported a decline in financial performance. It is a result from the economic downturn that had occurred on that year. Even though, there are many studies on FFS in relation to the corporate governance, firms' characteristics and auditors on preventing fraud, the financial ratios cannot be avoided on detecting the fraudulent financial reporting, especially on the Malaysian Fraud cases.

Since 1997 on the Asian financial crisis, the large number of corporate failures in Malaysia provides opportunity to test the attributes of accounting numbers that are predictive and usefulness. Eleven accounting ratios and two bankruptcy prediction models Beneish (1991) and Altman (1968) are tested in this research to measure the prediction ability of these ratios and models in the Malaysian fraudulent financial cases. Thus, objective of this study is to examine the financial ratios in predicting the fraudulent financial reporting and to examine how well Beneish (1991) and Altman (1968) model on detection of fraudulent financial statements (FFS) found on their study fit to Malaysian Financial Fraudulent cases happened in Malaysia started from the year 2003 until 2010.

2. Hypothesis development

The previous researcher study on whether the financial ratios of fraudulent companies differ from non-fraudulent companies found that out of 21 ratios, 16 of them found to be significant, (Kathleen, et al., 2004). They found two ratios which are total liabilities/ total assets and working capital/ total assets were significant during the fraud year, while net income/ total assets and retained earnings/ total assets found to be significant during the second and third year after the fraud occurred. By using DA, misclassification of fraud companies as non-fraud ranged from 58% to 98%. In short, this study provides empirical evidence of the limited ability of accounting ratios to detect or predict fraudulent financial statements.

Kluger & Shields (1989) on the study of whether changing auditors is directly associated with FFS use several ratios for prediction of bankruptcy found that the net income to total assets ratio is the stronger in ability to detect FFS compared to other ratios of cash/ total assets, sales/ total assets and total debt/ total assets. Kathleen, et al. (2004) also stated that a key ratio useful for fraud detection is by using Altman (1968) Z-score.

Next, Persons (1995) conclude that by using stepwise logistic models, financial leverage, capital turnover which is Sales/ TA, asset composition and firm size have significant relationship on

fraudulent financial reporting. Previous researcher, also found that current ratio, fixed charge coverage, retained earnings/ total assets average collection period, return on net worth and sales/ total assets are critical ratios on determination of bankrupt from non- bankrupt companies in Kenya, Keige (1991).

Firms are financed by some combination of debt and equity. Investors look at this ratio to determine the ability of an organization to generate new funds from the capital markets. An organization with considerable debt is often thought to have little new-financing capacity. Nevertheless, given the threat of bankruptcy and the attendant costs, a very high debt-equity ratio may make future financing difficult. Management may manipulate financial statements, with the needs to meet certain debt covenants, Spathis, (2002). Average of the long term debt for fraud companies is significantly higher than the non –fraud firms, Nelson, S. P. (2010). Persons (1995), Spathis (2002), Kirkos, Spathis & Manolopoulos (2005) proven that higher level of debt may increase probability of FFS.

The ratios on Sales/ Total Assets measured the capital turnover, represents the sales generating power of firm's assets and measures management's ability to deal with competitive situations. Persons (1995) argued that management of fraud firms may be less competitive than management of non-fraud firms in using assets to generate sales. This may provide them opportunity to engage in FFS and sign of this ratio should be negative. Further, Summers & Sweeney (1998) indicate that fraudulent financial statements are detected by looking on the behaviour of the management who tend to reduce purchases on their common stocks to enhance sales. This study identified that the return on assets ratios and stocks over sales ratio are positively correlated with fraud.

GP/ TA ratio uses to measure a company's financial health and profitability. Gross profit should be positive and higher enough to cover all the expenses. It helps investors to predict the future performance stocks in the market. Positively, high gross profits to total assets indicate that the company is financially doing well and investors benefits on investing in that company. Gross profit represents the company's entire sales revenue minus the cost pays to manufacture the sales goods or cost of goods sold. Another issue examined in Spathis (2002), is whether the higher or lower margins are related to the issuing of FFS, and for that purpose the ratio of GP/TA is used. The result indicates that, out of ten ratios developed by the researcher, GP/TA is found not significance with the fraudulent financial statements.

In term of asset composition, Inv/ TA are one of the ratios that can be used. Persons (1995) stated that examinations of fraud firms' financial statements seem to indicate that currents assets of these firms consist mostly of receivables and inventories. They argued that sign of these variables, current assets/ total assets, receivables/ total assets and inventory/ total assets expected to be positive and the result found fraud firms have higher of all three variables than non-fraud firms. Similar with Persons (1995), Spathis (2002) argued that management may manipulate inventories. The company

may not match sales with corresponding cost of goods sold, thus increasing gross margin, net income and strengthening the balance sheet. In addition, manipulation of inventory is in term of reporting inventory at lower than cost or market value and company choose not to record the obsolete inventory.

3. Research Design

The study focuses on all Malaysian public listed firms from year 2003 to 2010. The objective of this study is to examine the financial ratios that have predictive ability on fraudulent financial reporting in Malaysia and to examine how well Beneish (M) and Altman model (1968) referred to Z-score on detection of fraudulent financial statements (FFS) found on their study fit to Malaysian financial fraudulent cases happened in Malaysia started from the year 2003 until 2010. Specifically, these study objectives are the following:

1. To identified the financial ratios that have predictive ability to assess the risk of Fraudulent Financial Statements (FFS) in Malaysia.
2. To examine the relationship between the ratios developed by Beneish (1991) and Altman (1968) Z-scores and the fraudulent financial reporting to all the Malaysian Fraudulent financial cases.

This study examines this issue by way of collection data from the annual report of the company identified. The annual reports of the companies are collected from the Bursa Malaysia (formerly known as Kuala Lumpur Stock Exchange, KLSE) announcements of listed companies. This study use secondary data in order to identify the value from the financial statements of the companies.

4. Findings

T-test on the means difference

Given the matched-pairs design, paired-sample t tests were conducted for each variable to determine if the mean of the fraud sample was significantly different than the mean of the non- fraud sample. Results of the t tests are reported in Table 4.1. From the result, four variables which are Sales/TA with the t-value of -2.777, GP/TA (t= -3.186) , TAcc (t= -2.467) and Z-scores (t= -3.552) are significant at 1% level, while two variables (DayRec t= 2.220 and GMar t= -2.093) are significant at 5% level and another two variables (Inv/TA t= -1.747, Beneish (M) t= -1.918) at 10% significant level. This indicates that out of thirteen ratios, eight variables stated above may be helpful in predicting the fraudulent financial statements (FFS) referred to fraudulent financial reporting.

Table 4.1: Tests for the differences in the means of each group

Variables	Non- Fraud firms		Fraud firms		T	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Debt/equity	0.818	1.815	1.413	2.381	1.554	.123
Sales/TA	0.897	0.666	0.591	0.545	-2.777***	.006
GP/TA	0.180	0.160	0.083	0.175	-3.186***	.002
Inv/TA	0.147	0.124	0.107	0.130	-1.747*	.083
DayRec	0.607	0.611	1.169	1.881	2.220**	.030
GMar	1.319	1.152	-0.646	7.241	-2.093**	.040
Aqua	2.606	2.272	3.323	3.528	1.336	.185
SGen	4.343	4.866	12.990	44.912	1.471	.147
DepI	2.057	3.658	7.891	45.526	0.998	.322
SGrow	1.115	2.090	0.695	1.303	-1.332	.186
TAcc	0.018	0.111	-0.250	0.840	-2.476***	.016
Beneish (M)	-2.461	2.612	-5.444	11.666	-1.918**	.060
Z-score	2.134	4.533	-0.797	4.581	-3.552***	.001

***/**/* represents the significance value at 1%/ 5%/ 10% level of significance

The low values of the Sales/ TA, GP/ TA and Inv/ TA for the fraud companies compared to the non-fraud companies indicates that companies facing difficulties of low returns in relation to total assets. (Spathis, 2002), while the lower value of Sales/ TA and Z-Score of fraud firms indicate that many firms issuing FFS were in financial distress, (Summer & Sweeney, 1998, Spathis, 2002). On the other hand, the Inv/TA shows that the firms with fraudulent financial reporting keep high inventories and cost of goods sold.

Logistic regression analysis

Table 4.2 below reports the result for logistic regression for all the independent variables. As shown in the table below, out of thirteen independent variables tested, six independent variables that entered into logistic regression model at 1% significance level are DayRec, Aqua, SGen, DepI, SGrow and Beneish (M). TAcc shows 5% significance level while Debt/ Equity and Sales/ TA ratios show 10% significance level.

Table 4.2: Logistic regression

Variables	B	Wald	Sig.
Constant	-14.348	7.490	.006
Debt/ equity	-0.287	3.210*	.073
Sales/ TA	-1.030	3.335*	.068
GP/ TA	1.612	0.400	.527
Inv/ TA	-2.724	1.226	.268
DayRec	2.665	8.234***	.004
GMar	0.965	2.534	.111
Aqua	1.206	8.706***	.003
SGen	-0.541	9.685***	.002
DepI	0.408	7.591***	.006
SGrow	2.564	8.846***	.003
TAcc	9.478	4.704**	.030
Beneish (M)	-2.942	9.251***	.002
Z-score	-0.118	0.617	.432
<i>Obs</i>	122		
<i>Nagelkerke R²</i>	0.461		
<i>Hosmer and Lemeshow</i>	0.785		

***/**/* represents significance at 1/5/10% level. Variable(s) entered on step 1: Debt/equity, Sales/TA, GP/TA, Inv/TA, DayRec, GMar, Aqua, SGen, DepI, SGrow, TAcc, Beneish M, and Z-score.

Surprisingly, result shows a negative association between debts to equity ratio with fraudulent financial reporting, thus the first hypothesis (H₁) is not supported. It indicates that the higher debt to equity ratio, the lower for the company to be involved on fraudulent financial reporting. Contradict with Spathis (2002) and Persons (1995) studies where the fraud firms significantly have association with higher debt/ equity ratio. From this result, it deduced that this is merely because of the strict debt's governance implemented by the lenders. The strict debt's governance makes the firms become more stringent on making any false financial statements.

Sales/ TA show a negative association with fraudulent financial reporting. This result means that the higher Sales/ TA, the lower the company associated with fraud. Thus, the second hypothesis (H₂) is supported. This result is consistent with study conducted by Spathis (2002).

Next, the result shows a positive coefficient between DayRec and fraudulent financial reporting. This result support Beneish (1991) study on earnings manipulation where it shown the significance level of 1% which is highly significance and indicating that, large increase in day's sales in receivables to be associated with a higher likelihood that revenues and earnings are overstated. Thus, H₅ is supported.

Assets quality index (AQua) shows a positive association with fraudulent financial reporting at the 1% highly significance level. The result indicates that, the assets quality index has association with FFS where this index measures that the fraud company with low asset quality means high asset realisation risk occurred and hypothesis H₇ is also supported. This result is consistent with study conducted by Beneish (1999).

Next, the variables for DepI, SGrow and TAcc show a significance positive relationship with fraudulent financial reporting with the coefficient value of 0.408, 2.504 and 9.478 respectively. This indicates that, H₉, H₁₀ and H₁₁ are accepted. These results are consistent with the study conducted by previous researcher, (Beneish, 1999). Beneish (M) shows a significance negative association with fraudulent financial reporting at 1% significance level (coefficient value -2.942). Beneish (1991) Beneish (1991) stated that a score greater than -2.22 indicates a strong likelihood of a firm being a manipulator. Thus, H₁₂ is supported.

This result (Table 4.6) also shows that H₃ (GP/TA), H₄ (Inv/ TA), H₆ (GMar), H₈ (SGen) and H₁₃ (Z-score) are not supported and have been rejected. To test how well the model is this study perform Hosmer and Lemeshow test for goodness of fit. The chi-square of Hosmer and Lemeshow is not significant (Sig = 0.785) which show that the logistic model fit very well. On the other hand, the association strength between the dependent and independent variables is R^2_L 0.461, indicating a medium-efficient strong relationship.

In addition of that, this study also conducted several test, the first one is test of normality before running the regression. From this, found that the variables are normal. Second, this study perform multicollinearity and correlation test and found that four variables which are Net profit/ Sales, Working capital/ Total assets, Net profit/ Total assets and Leverage index have high correlations more than 0.8. Thus, to overcome this problem, we drop these variables from our study.

Next, this study performs the logistic regression and found nine out of thirteen variables are significance. The variables are Debt/ Equity, Sales/ TA, DayRec, AQua, SGen, DepI, SGrow, TAcc and Beneish (M) as describe on previous section on empirical result. In relation with this, six hypotheses can be rejected and this study has enough evidence to reject these 6 hypotheses.

On top of that, this study also conducted additional test to see the sensitivity or robustness of the results. First test that has been conducted are this study control for year and industry effects. This study found the results are robust. Second, this study also examined the outliers' effect on the equation, since company that involve in fraud behaving abnormal. Reflection on that, this study uses studentized residuals and found three variables meet the criteria of outliers. So, what this study did is by exclude these cases from observations and regresses or re-estimates the logistic regression. The results are similar except for certain variables which are Debt/ Equity and Inv/TA. In short, the other

variables found in this study based on the results have significance relationship with the fraudulent financial reporting.

This study responds to the concerns of the public and the policy makers by identifying several financial statement ratios as being associated with fraudulent financial reporting. The main objectives of this study are to examine the relationship between the financial ratios in prediction of the fraudulent financial reporting in the Malaysian fraud cases. In addition of that, this study examine whether the Beneish (M) and Altman Z-score (1968) fit and have the association with the fraudulent financial statements in relation to the Malaysian fraud cases.

The results found that, Sales/ TA have significance negative relationship with fraudulent financial reporting. On the other hand, DayRec, AQua, DepI, SGrow and TAcc seem to have significance relationships with fraudulent financial reporting and this study have enough evidence to accept the hypotheses related to these variables. Beneish (M) model also show the significance negative association with fraudulent financial reporting and following the Beneish (1991) on the study stated that the coefficient value more than -2.22 shows that the firms are the manipulators. Thus, this result is supported.

On the other hand, the findings show that Debt/ Equity and SGen hypothesis are rejected as there is significance relationship between these variables and FFR but show negative association with FFR, while GP/ TA, Inv/ TA, GMar and Z-scores hypothesis are rejected and no evidence to show that these variables have significant relationships with the fraudulent financial reporting.

By using the sample of 61 companies with fraudulent financial statements match with the 61 companies that have non-fraudulent financial statements, this study provide good insight on the development of the fraudulent reporting area that come into consideration on today's environment. As there are many studies on the fraudulent financial reporting in term of corporate governance, in relation to the risks factors or red flags on detection of fraud as well as in the context of auditing, the quality of financial reporting become very important as the financial statements are relied by the shareholders as well as the stakeholders for them in making accurate decision making. Users of financial statement are currently concern on fraudulent financial reporting reported by Malaysian Securities Commission and also by media. From the results, the evidence suggests that accounting data are useful to identify fraudulent financial reporting.

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