Detecting fraudulent financial reporting using financial ratio

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Abstract

Purpose – The main aim of this study is to analyse the financial ratio (i.e. financial leverage, profitability, asset composition, liquidity and capital turnover ratio) in detecting fraudulent financial reporting (FFR).

Design/methodology/approach – The logit model was used to identify firms that are related to FFR. The sample firms that engage in fraudulent reporting were obtained from the media centre of Bursa Malaysia. The firms were selected based on their contravention of the Listing Requirements of Bursa Malaysia Securities Berhad. The data cover a period of seven years from 2007 to 2013.

Findings – The results suggest that financial leverage, asset composition, profitability and capital turnover were significant predictors of FFR.

Practical implications – The findings of this study may assist investors in making decision for their investments.

Originality/value – This study describes firms that breach the Listing Requirements of Bursa Malaysia Securities Berhad using the financial ratio.

Keywords Malaysia, Fraud, Financial statement analysis, Public listed company

Paper type Research paper

1. Introduction

In a firm or corporation, fraud receives greater attention from stakeholders, regulators, auditors and members of the public (Higson, 2012). According to Ruankaew (2013), white-collar crime and fraud is one of the top threats to American business. In fact, a number of highly publicised scandals related to fraud cases were reported in the past few decades and involved big companies, such as Enron, WorldCom, Cendant, Adelphia, Parmalat, Royal Ahold, Vivendi and SK Global (Albrecht *et al.*, 2008). Fraud is not easy to discover and the detection requires knowledge about the nature of fraud and how it can be committed under concealment (Higson, 2012).

The issue of accounting fraud in corporate reporting in Malaysia, such as those involving Transmile Group Berhad and Sime Darby Berhad, caused a great deal of concern with respect to financial statement reliability. Market sentiment and the confidence of investors were dampened by the exposure of these issues. In addition, based on survey data presented by the KPMG Malaysia Fraud, Bribery and Corruption Survey 2013, 89 per cent of the respondents felt that the number of fraud cases increased recently in Malaysia; 94 per cent of respondents also believed that fraud has become

more sophisticated; and 85 per cent of the respondents suggested that fraud is increasingly becoming industry-aligned and more targeted to certain business processes. Furthermore, 80 per cent of the survey's respondents felt that the incidents of bribery and corruption increased in the past three years.

A study conducted by PricewaterhouseCooper involving 95 countries also reported an increase of more than 40 per cent in accounting fraud since 2001. Fraud continues to be a major concern for organisations of all sizes, across all regions and in virtually every business sector. Accounting fraud was consistently listed as a major crime, a crime which comes in many varieties, each with its own characteristics, threats and strategic consequences (PwC's Global Economic Crime Survey, 2014).

Capital market players have high expectations with respect to the integrity, transparency and quality of financial information. The reliability, transparency and integrity of the financial reporting process allow investors to make good decisions. Prior studies suggest that top-level management is usually involved in falsifying financial statements, and their action impacts the financial performance and results of a company (Rezaee, 2005). During the past several years, fraudulent financial reporting (FFR) has cost market participants, including investors, creditors, pensioners and employees. In the globalisation of business, competition becomes more intense. With this situation, it is highly possible that the ethical foundation of a company can be compromised in the face of pressure (Forcade *et al.*, 2006). For the past few years, professionals continue to believe that the trend in accounting fraud and accounting irregularities is likely to continue to rise (Modugu *et al.*, 2012). The relative increase in fraud cases each year indicates a strong need for further research in this area, especially in identifying effective ways and methods for detecting potential fraud.

This study contributes to the extant literature in two ways. First, this study adds to the recent literature by showing the relationship between financial ratios and FFR in a different institutional setting, specifically from a developing country. One of the effective ways to detect fraud is to apply the financial ratio analysis (Persons, 1995). Therefore, using the firms that contravene the Listing Requirements of Bursa Malaysia Securities Berhad, this study attempts to reconfirm extant studies by using financial ratio as a means to detect FFR. As the frontline regulator of the Malaysian capital market, Bursa Malaysia takes a very strict view of breaches to its Business Rules and Listing Requirements. Every year, Bursa Malaysia carries out enforcement proceedings and actions in relation to recognised contravention of its Rules and Listing Requirements. The information regarding the common breaches of Bursa Malaysia's Rules and the companies involved are posted on the Bursa Malaysia website. It aims to instil market confidence and to ensure the transparency of Bursa Malaysia's enforcement action.

Second, this study may provide a guideline to regulators in their effort to combat corporate fraud and may assist investors in making investment decisions. According to Kirkos *et al.* (2007), fraud detection by examining financial statements was always in the limelight. Evidence from this study suggests that financial leverage, asset composition, profitability and capital turnover ratios were among the significant predictors for FFR. Therefore, the ratios can serve as a tool for the regulator in knowing about the level of compliance with Listing Requirements of Bursa Malaysia Securities Berhad. Furthermore, the investors can get a better grip on what is going on with a company in

which they entrusted their money by analysing the appropriate ratios from the company's financial statement.

To argue the merits of using financial ratio to detect fraud, this paper is organised as follows. The next section reviews the literature regarding the FFR. This is followed by a discussion concerning the research method and the discussion on data analysis and findings. The last section concludes.

2. Literature review

In general, fraud is described as any act that intentionally deceives or misrepresents in some way to others. Wrongful acts may be distinguished and defined in various ways; it depends on the class of offenders. As stated by Mugala (2013), the legal meaning of fraud is that it is:

A generic term, embracing all miscellaneous means that human skill can devise, and forced by an individual to get a gain over another by false recommendations by destruct of truth and includes all surprise, trick, scheming, misleading, and any unfair way by which other cheated.

In addition, the Serious Fraud Office defined fraud as an abuse of position, or false representation, or prejudicing someone's right for personal gain. Consequently, fraud may be defined as a deliberate act meant to encourage others to give up something of value or to surrender a legal right. It is a deliberate falsification or concealment of information to deceive or mislead.

FFR, with the intention to deceive or mislead investors, is potentially disastrous to firm value. Past studies suggest that managers may have incentives to manipulate financial statements to meet specific goals, both internal and external. For instance, a study by Ettredge *et al.* (2010) found evidence that managers manipulate their financial statements to meet a specific accounting target. Furthermore, an exploratory study by Patelli and Pedrini (2015), on the association between financial reporting aggressiveness and five thematic indicators capturing different traits of ethical leadership, shows that the role of the top management is related with financial reporting aggressiveness. According to Fung (2015), manipulating financial results is a risky way to improve a firm's financial appearance. Therefore, Khanna *et al.* (2015) suggest that regulators, investors and governance experts pay particular attention to the appointment of the Chief Executive Officer that will potentially increase/decrease the likelihood of fraud activity.

To evaluate the possibility of fraud, a variety of tools are designed to help users in analysing financial statements. One of the most common methods for financial analysis is ratio analysis (Dalnial *et al.*, 2014). Many ratios are proposed in the literature, such as leverage, profitability, asset composition, liquidity and capital turnover, to analyse the financial statements (Persons, 1992; Dalnial *et al.*, 2014; Nia, 2015).

2.1 Leverage

The definition of financial leverage is the extent to which an investor or business uses borrowed money. The companies that are highly leveraged may be at risk of bankruptcy if they are unable to pay their debts (Spathis, 2002). A high-debt structure may increase the likelihood of FFR because it shifts the risk from the equity owner and manager to the debt owners (Spathis, 2002). Research suggests that the potential for wealth transfers from the debt holder to the manager increases as the leverage increases (Chow and Rice, 1982). A company's management may manipulate its financial statement if there is a

need to meet certain debt covenants. A study by Dechow *et al.* (1996) argued that firms with high debt leverage have motivation to manipulate their income. Furthermore, higher leverage is usually associated with a higher potential for violation of the loan agreement and a reduced ability to obtain additional capital through loans (Nia, 2015). Thus, this suggests that a higher level of debt may increase the probability of FFR.

2.2 Profitability
Profitability is used as a valuation technique to assess a company's ability to generate income (Nia, 2015). Firms with lower profit may provide management the incentive to overstate revenue or expenses such as having significant errors in their financial statement (Kreutzfeldt and Wallace, 1996). For the managers of the company, increasing the level of well-being of the shareholders is an important indicator of managerial success. To maximise the benefit of their shareholders, company executives may manipulate the profitability ratio, which results in fraudulent reporting in the financial report (Kulkarni and Devale, 2012).

2.3 Asset composition
Certain statements are more likely to be manipulated by the management, such as sales, account receivables, allowances for doubtful accounts and inventory (Schilit, 1993; Green, 1991; Loebbecke *et al.*, 1989). Green (1991) and Feroz *et al.* (1991) suggest that the management may manipulate the account receivables by recording sales before they are earned so that it shows as additional account receivables. Several research efforts tested this variable by considering the ratio of account receivables to sales (Fanning and Cogger, 1998; Green, 1991; Daroca and Holder, 1985). On an examination of FFR by firms, Persons (1992) indicates that the current assets of firms consist mostly of receivables and inventory. These account receivables and inventory are dependent on the subjective judgement in estimating an uncollected account and absolute inventory (Vanasco, 1998; Persons, 1995; Schilit, 1993). Therefore, because subjective judgement is involved in determining the value of these accounts, management may use them as tools for financial statement manipulation (Spathis, 2002).

2.4 Liquidity
Liquidity is used to determine a company's ability to pay off its short-term debts. Lower liquidity can provide an incentive for managers to engage in FFR (Omoye and Eragbhe, 2014). A study by Kreutzfeldt and Wallace (1996) found that firms with liquidity problems had more fraud in their financial statements as compared with firms without liquidity issues.

Generally, the higher the value of the liquidity ratio, the larger the margin of safety that the company possesses to cover short-term debts. Firms with low working capital to total assets ratio indicate that they cannot meet their obligations. Dalnial *et al.* (2014) suggest that the lower the liquidity of the firm, the more likely it is for the managers to engage in FFR.

2.5 Capital turnover
The capital turnover ratio represents the sales-generating power of a firm's assets. It also measures the management's ability to deal with competitive situations. According to Persons (1992), the manager of firms engaging in fraud may be less competitive than the management of the non-fraud firms in using a firm's assets to generate sales. This

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may give them an opportunity to engage in FFR (Dani *et al.*, 2013). Furthermore, they suggest that inability of the firm to compete successfully may also create a possible incentive for managers to engage in FFR (Nia, 2015).

3. Research methodology

3.1 Sample selection
The sample of firms that engage in fraudulent reporting was obtained from the media centre of Bursa Malaysia. This study used 30 samples consisting of 15 samples for fraudulent firms and 15 samples for non-fraudulent firms. This list summarises the firms based on their contravention of the Listing Requirements of Bursa Malaysia Securities Berhad, for which most of the companies were reporting material misstatement. The data cover a period of seven years, from 2007 to 2013.

The selection of non-fraudulent firms was based on the size and time period. The samples were obtained from the same time period as those of the fraudulent firms to control for the probability of a firm being involved in fraud. The matching process was used in an effort to enhance the discriminatory power of the models. Table AI (in Appendix) shows the list of sample.

3.2 Data collection method
This study used secondary data from the published audited financial statements from the corporate annual reports to the main source. The financial data were hand-collected.

3.3 Measurement of dependent variables and independent variables
For the purpose of this study, the dependent variables are fraudulent firms and non-fraudulent firms. This paper investigates the significant differences between the financial ratio among the fraudulent and non-fraudulent publicly listed firms in Malaysia. In this study, fraudulent firms are firms that are listed under the contravention of the Listing Requirements of Bursa Malaysia. These firms are selected based on their breaching of the Main Market Listing Requirements and for which action against these companies was taken. Conversely, the non-fraudulent firms are defined because those are firms that are not included under the contravention of the Listing Requirements of Bursa Malaysia for that time period.

This study used data from company financial statements, namely, the balance sheet and income statement, in calculating the financial ratios. Prior studies (Fanning and Cogger, 1998; Stice, 1991; Loebbecke *et al.*, 1989; Kinney and McDaniel, 1989) suggest that financial problems may provide incentives for fraud management. Pioneer work by Altman (1968) also used ratios in estimating the financial problems. Table I represents the five independent variables a firm's financial ratio for this study.

Financial leverage is measured by total debt to total equity and total debt to total assets. Higher leverage is usually associated with a higher potential for violation of the loan agreement and less ability to obtain additional capital through loans. It is the relationship that exists between the liabilities and assets of the firm that is the amount of debt used to finance the firm's assets. Leverage is also used to measure the firm's ability to repay its financial obligations as they mature.

Profitability ratio is measured by net profit to revenue. This ratio measures the company ability to generate returns on its resources. It based on the expectation that the management will be able to maintain or increase the level of profitability. If these

expectations are not met by actual performance, then it will provide a motivation for
FFR (Omoye and Eragbhe, 2014).

The asset composition is measured by current assets to total assets, receivables to
total assets and inventories to total assets. Examination of financial statements for firms
that engaged in fraud indicate that the current asset of the firm consists mostly of
receivables and inventory (Persons, 1995). Manipulation of inventory occurred when the
company chose not to record the obsolete inventory (Nia, 2015).

Liquidity is measured by working capital to total assets. It measures the company's
ability to repay their short-term liabilities. The higher the ratio, the stronger the
company's ability to pay its liabilities payable, and the lower the risk of default (Persons,
1992).

Capital turnover is measured by revenue to total assets. Turnover represents the
power of revenue-generating assets of the firm. It also measures the ability of
management to handle competitive situations (Nia, 2015).

3.4 Regression model
Based on the data set of FFR and non-FFR from the Bursa Malaysia, the logit model was
used to identify firms that are related to FFR:

$$FFR = b_0 + b_1(LEV1) + b_2(LEV2) + b_3(PROF) + b_4(AC1) + b_5(AC2)$$
$$+ b_6(AC3) + b_7(LIQ) + b_8(CAPT)$$

Where

FFR = A dummy variable taking the value of one (1) if firms listed under the
contravention of the Listing Requirements of Bursa Malaysia; otherwise
coded zero (0).
LEV1 = Total debt/Total equity
LEV2 = Total debt/Total assets
PROF = Net profit/Revenue
AC1 = Current assets/Total assets
AC2 = Receivables/Revenue
AC3 = Inventory/Total assets
LIQ = Working capital/Total assets
CAPT = Revenue/Total assets

Independent variables	Formula	Symbol	Acronym	
Financial leverage	Total debt/Total equity	TD/TE	LEV1	
	Total debt/Total assets	TD/TA	LEV2	
Profitability	Net profit/Revenue	NP/REV	PROF	
Asset composition	Current assets/Total assets	CA/TA	AC1	
	Receivables/Revenue	REC/REV	AC2	**Table I.**
	Inventory/Total assets	INV/TA	AC3	Measurement of
Liquidity	Working capital/Total assets	WC/TA	LIQ	independent
Capital turnover	Revenue/Total assets	REV/TA	CAPT	variables

4. Finding and discussion

4.1 Test of normality

Table II shows the normality of data using skewness and kurtosis to be the main indicators to determine the normality of data. LgAC1 was expressed to be log transformation. Seven ratios – LEV1, LEV2, PROF, AC2, AC3, LIQ and CAPT– were used in their original form because the normality of the ratio did not improve.

Based on the central limit theorem, a bigger sample distribution (more than 30) tends to be normal regardless of the population distribution, and it is more evident as the sample count increases. Thus, the LEV1, LEV2, PROF, AC2, AC3, LIQ and CAPT are retained for further analysis.

4.2 Pearson's correlation

To determine the direction and association between two variables, Pearson's correlation was used. Table III shows the analysis of Pearson's correlation between the ratios. From the results, it is indicated that all the variables have an association with each other. As illustrated in Table III, LEV1, CAPT and LG AC1 are significantly related to FFR ($p < 0.01$). AC2 also significant related to FFR ($p < 0.05$). For the financial leverage ratio, it is found to be correlated negatively with PROF ($p < 0.05$) and LIQ ($p < 0.01$), and positively correlated with CAPT ($p < 0.05$) and LG

	N Statistic	Mean Statistic	SD Statistic	Skewness Statistic	SE	Kurtosis Statistic	SE
LEV1	30	−0.2713	3.62172	−1.552	0.427	7.912	0.833
LEV2	30	1.0123	1.76689	3.13	0.427	9.724	0.833
PROF	30	−0.3263	1.52024	−2.632	0.427	8.885	0.833
LGAC1	30	−0.3764	0.38698	0.169	0.427	2.699	0.833
AC2	30	0.3907	0.44803	2.077	0.427	4.665	0.833
AC3	30	0.0907	0.14304	2.898	0.427	10.262	0.833
LIQ	30	−0.2517	1.53653	−3.784	0.427	15.796	0.833
CAPT	30	0.7907	0.8453	2.575	0.427	7.483	0.833
FFR	30	2.0993	6.14379	1.999	0.427	11.958	0.833

Table II. Normality of data

	FFR	LEV1	LEV2	PROF	AC2	AC3	LIQ	CAPT	LGAC1
FFR	1								
LEV1	0.885**	1							
LEV2	0.241	0.115	1						
PROF	0.319	0.149	−0.462*	1					
AC2	0.422*	0.238	0.183	0.134	1				
AC3	−0.118	−0.208	−0.205	0.109	−0.24	1			
LIQ	0.314	0.257	−0.768**	0.515**	0.122	0.193	1		
CAPT	0.609**	0.404*	0.660**	−0.12	0.126	−0.041	−0.235	1	
LG AC1	0.483**	0.33	0.385*	−0.289	0.447*	0.1	0.074	0.480**	1

Table III. Pearson's correlation

Notes: **Correlation is significant at the 0.01 level (two-tailed); *Correlation is significant at the 0.05 level (two-tailed)

AC1 ($p < 0.05$). Besides this, a significant positive correlation is found between profitability ratios and LIQ ($p < 0.01$). Finally, LG AC1 is found to have a significant correlation with the capital turnover ratio ($p < 0.01$). Pertaining to correlation among variables, the correlation matrix tested in the study confirms that no multicollinearity exists between the variables because none of the variables correlates above 0.90 (Hair *et al.*, 2010).

4.3 Regression results
Table IV reports the results for the stepwise logistic regression model. According to the results, the overall percentage of correct classification was 73.33 per cent. This means that 11 (73.33 per cent) out of the 15 fraudulent and non-fraudulent firms were classified correctly. The results also indicate that eight ratios are significant in predicting FFR. All the ratios (LEV1, LEV2, PROF, AC2, AC3, LIQ and CAPT) are significant at 1 per cent level, except LG AC1, which is significant at 5 per cent level. The significant results of this study are supported by prior studies. Higher leverage is typically associated with a higher potential for the violation of a loan agreement and less ability to obtain additional capital through borrowing. Prior studies report that leverage, which is positively correlated with income-enhancing accounting policies, is not sufficient to avoid a violation of debt covenants (Christie, 1990). High-debt structure can increase the likelihood of financial statement fraud because it shifted risk equity owners and managers to owners of debt (Spathis, 2002).

Capital turnover also measures the management's ability to deal with competitive situations. The management of fraudulent firms may be less competitive than the management of non-fraudulent firms in using the firm's assets to generate sales (Persons, 1992). In general, the greater working capital is reasonable priced, so a financial examiner should pay attention to the significant

Independent variable	Unstandardised Coefficients	SE	Significance
LEV1	1.001	0.011	0.000***
LEV2	1.879	0.056	0.000***
PROF	1.022	0.029	0.000***
LG AC1	0.341	0.139	0.023**
AC2	0.954	0.094	0.000***
AC3	0.773	0.256	0.007***
LIQ	1.862	0.054	0.000***
CAPT	0.986	0.065	0.000***
(Constant)	0.177	0.116	0.142
Chi-square	6.180		0.627
R^2_L	0.482		
N	30		
Correctly predicted:			
Non-Fraud	73.33%		
Fraud	73.33%		
Overall	73.33%		

Notes: *** and ** coefficients are significant at 1 and 5% levels, respectively

Table IV.
Regression result

improvement that occurred from one period to another because they can be signs of fraud-related revenue (Mantona, 2013).

A lower profit may give management an incentive to overstate revenue or understate expenses. Firms with a profitability problem have significantly more errors in their financial statements than other firms (Kreutzfeldt and Wallace, 1996). Over half of the fraud cases reported involved the overstating of revenues with record revenue prematurely or fictitiously (Spathis, 2002).

An examination of FFR seems to indicate that the current assets of the firm consist mostly of receivables and inventory. This finding is consistent with Spathis (2002) who found that an overstatement of receivables and current assets represents about three-fourths of the SEC enforcement cases. The company may choose not to record the right amount of obsolete inventory (Spathis, 2002).

Lower liquidity may provide an incentive for the manager to engage in FFR (Persons, 1992). This argument is supported by Kreutzfeldt and Wallace (1996). Perols and Lougee (2011) and Kirkos *et al.* (2007) found that when firms have low liquidity, the company was involved in fraud in their financial statements. Therefore, to give a good overview of the state of the company, management overestimates the value of the asset.

5. Implication and limitation

This study has some practical implications for accounting practitioners, internal auditors and fraud examiners. It provides information on fraud detection ratio. The findings of this study may assist investors in making investment decisions. Accounting practitioners and managers also may consider the ratio to avoid costly fraud in their organisations, especially in FFR.

There are some limitations of this study. For example, the sample size was small because some the information from Bursa Malaysia was not available. In addition, this study only used financial data that were hand-collected, limiting other sources of information that might be useful in detecting FFR. Furthermore, this study only examined a sample of companies for which fraud was discovered and reported by Bursa Malaysia. Furthermore, because this study's scope simply covers the company listed under contravention of the Listing Requirements of Bursa Malaysia and excludes the corporations listed in other violations such as the public reprimand announcement, the applicability of the other models may need to be investigated further.

6. Conclusion

The main objective of this study is to analyse the usefulness of the financial ratio (i.e. financial leverage, profitability, asset composition, liquidity and capital turnover ratio) in detecting FFR. The results of this study show that eight ratios – LEV1, LEV2, PROF, LGAC1, AC2, AC3, LIQ and CAPT – are significant indicators for fraud analysis. Many fraud investigators propose financial ratios to be an effective tool to detect fraud (Dalnial *et al.*, 2014). To avoid more serious FFR, the management of a company is responsible for the preparation of financial statements and reporting process. The auditor should consider the results of financial ratio in identifying FFR (AICPA, 2002). Therefore, this study can be used as a guideline to detect FFR.

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Appendix

No.	Fraudulent firms	Non-fraudulent firms
1	Wimems Corporation Berhad	V.S Industry Berhad
2	Faber Group Berhad	LFE Corporation Berhad
3	Lebtech Berhad	Coastal Contracts Bhd
4	Eden Inc. Berhad	KBB Resources Berhad
5	Alam Maritim Resources Berhad	London Biscuits Berhad
6	Progressive Impact Corporation Berhad	Ekovest Berhad
7	Petrol One Resources Berhad	Tiger Synergy Berhad
8	Destini Berhad	INS Bioscience Berhad
9	D.B.E. Gurney Resources Berhad	Sanichi Technology Berhad
10	Malaysia Pacific Corporation Berhad	Grand Hoover Berhad
11	D'nonce Technology Bhd	SKB Shutters Corporation Berhad
12	Eti Tech Corporation Berhad	FCW Holdings Berhad
13	Vintage Berhad	Takaso Resource Berhad
14	Petrol One Resources Berhad	Greenyield Berhad
15	Timberwell Berhad	Padini Holding Berhad

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