Financial Ratio Analysis as a Tool For Fraud Detection: a Study of Non-Financial Firms in Indonesia

by Andrian Budi Prasetyo

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Research Article

Financial Ratio Analysis as a Tool for Fraud Detection: A Study of Non-Financial Firms in Indonesia

[1]Andrian Budi Prasetyo, [2]Aditya Septiani, [3]Adi Firman Ramadhan, [4]Alka Kirani Fauziah
[1,2,3,4]Department of Accounting, Faculty of Economics and Business, Universitas Diponegoro, Semarang, Indonesia.

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***Abstract**: This study's main goal is to investigate how financial ratios can help identify fraud in business financial reporting. Leverage, profitability, asset composition, liquidity, and capital turnover are among the ratios that are examined in the study. Using a quantitative method, annual reports of firms listed on the Indonesia Stock Exchange (BEI) and secondary data from the Financial Services Authority's (OJK) list of sanctioned cases were used. The population of the study consisted of BEI-listed companies, and a sample of non-financial companies with available data was chosen via purposive sampling. Based on industry and asset size, fraudulent and non-fraudulent businesses were linked. Due to the existence of a dummy dependent variable and a mixture of metric and non-metric independent variables, logistic regression analysis was used. The results show that the capital turnover ratio has a negative impact on financial reporting fraud whereas the leverage ratio has a positive impact. Profitability, asset composition, liquidity ratios, and financial reporting fraud, however, did not appear to be significantly correlated. This study has practical ramifications for accountants, academics, auditors, and fraud investigators, and it offers useful information to investors in their decision-making. Moreover, it offers guidance to management in mitigating fraud and misconduct within their organizations. Nevertheless, the study is subject to limitations concerning sample size and data availability from the BEI. The manual data collection process may have constrained access to additional pertinent information, and the limited availability of information on violations restricted the number of fraudulent company samples.*

***Keywords:** Asset Composition Ratio, Capital Turnover Ratio, Financial Ratio, Fraud Detection, Leverage Ratio.*

I. INTRODUCTION

The dissemination of financial information through financial reporting plays a vital role in organizations and companies. Financial statements offer insights into the company's financial position, operational performance, and cash flow. Decisions made by different stakeholders, including business owners, investors, creditors, and governmental bodies, are based on these statements (Kanapickienė and Grundienė, 2015). Supplying relevant information for financial, economic, and commercial decision-making via financial statements is an essential requirement for attracting investors and creditors (Wang *et al*., 2017).

Fraud is a contributing factor that undermines the credibility of financial reporting (Segal, 2016). It is a significant concern for institutions (Khajavi and Ebrahimi, 2018). Companies and corporations pay heightened attention to fraudulent activities, as they draw scrutiny from stakeholders, regulators, auditors, and the general public. Detecting fraud poses challenges due to its covert nature, necessitating extensive expertise to unveil deceptive practices (Kassem and Higson, 2012).

As business globalization progresses, competition intensifies. In recent years, industry experts maintain the belief that the prevalence of accounting fraud and irregularities is on the rise (Modugu, 2012). A thorough investigation by Price water house Cooper into 95 nations and accounting fraud indicated a significant rise of more than 40% since 2001.

In Indonesia, there have been several cases of financial reporting fraud. One of them is the case of PT Kereta Api Indonesia (KAI), which is suspected of manipulating financial reports in 2005. Another company suspected of manipulating financial reports is PT Bank Lippo Tbk., which is suspected of manipulating financial reports in 2002 by issuing three different financial reports: a financial report submitted through a newspaper, a financial report reported on the Jakarta Stock Exchange (which has now merged with the Surabaya Stock Exchange to become the Indonesia Stock Exchange), and a financial report reported to the company's management.

The growing number of fraudulent incidents each year highlights the urgency for additional investigation in this domain. Therefore, it is essential to provide effective methods for the identification and prevention of potential fraud (Segal, 2016). In order to assess the likelihood of fraudulent activities, several tools have been created to aid users in scrutinizing financial statements. Among these techniques, ratio analysis stands out as a widely employed approach for financial analysis (Dalnial et al., 2014).

The application of financial ratio analysis is widely recognized as a simple and efficient method for identifying fraudulent activities (Kanapickienė and Grundienė, 2015). Leverage, profitability, asset composition, liquidity, and capital turnover are just a few of the measures that have been proposed in prior studies to evaluate financial statements (Dalnial et al., 2014). Through a thorough case study, the goal of this research is to build a fraud detection model based on financial ratios, primarily concentrating on businesses listed on the Indonesia Stock Exchange (BEI).

II. LITERATURE REVIEW

Fraud in financial reporting, financial corruption, and asset misuse are three common types of fraud. According to Statement of Auditing Standards 99, financial reporting fraud is the intentional misrepresentation or omission of facts in financial statements with the goal to deceive the users of those statements. Financial reporting fraud has serious repercussions, including negative outcomes like decreasing investor trust, harm to the company's brand, potential fines, legal action, lower profitability, and overall losses. Fraud can have widespread effects on both the public and commercial sectors in both established and developing countries, with reverberating socioeconomic effects (Udeh and Ugwu, 2018).

Agency theory is one of the many ideas that attempt to explain the idea of financial reporting fraud (Jensen and Meckling, 1976). The nexus of contracts between resource owners (principals) and managers (agents), who oversee the use and control of these resources, constitutes a firm in accordance with agency theory. According to the agency theory, it is the duty of directors and managers to make sure that the financial statements are accurate, reasonable, and provide useful information. This will show how well-rounded their services to the company are. In this situation, financial reporting fraud is used to mask the failure of board members to uphold their duties. By altering the figures presented in financial statements and neglecting to disclose actual company activities to shareholders, agents perpetrate financial reporting fraud with the intention of concealing poor, negligent, or dishonest performance (Mohamed and Handley-Schachler, 2015). Manipulating financial outcomes represents a high-risk approach employed to enhance a company's financial performance (Fung, 2015).

Multiple techniques have been developed to identify instances of financial reporting fraud. Among these approaches, financial ratio analysis stands out as a widely adopted and effective method for detecting potential fraud (Persons, 1995; Dalnial et al., 2014). Many measures, including those used in this study, have been proposed in the literature, including the leverage ratio, profitability ratio, asset composition, liquidity, and capital turnover ratios. These ratios are used to assess how well their use will help find instances of financial reporting fraud (Persons, 1995; Dalnial et al., 2014; Somayyeh, 2015).

The leverage ratio is a metric employed to assess a company's capacity to utilize borrowed funds. Typically, a lower leverage ratio indicates a higher level of financing obtained from shareholders and offers greater protection in the event of losses. Companies that carry a significant debt burden are more prone to engaging in revenue manipulation (Dechow, Sloan and Sweeney, 1996). Moreover, companies with high leverage ratios are generally associated with an increased risk of bankruptcy (Somayyeh, 2015). In order to fulfill specific obligations outlined in debt agreements, company management may resort to manipulating financial statements.

H1: Leverage ratio has a positive influence on financial reporting fraud

The profitability ratio is a commonly used metric by organizations to compare their net profit with company revenue. It serves as an indicator of managerial success, as management aims to enhance shareholder welfare In situations where companies fail to meet their actual performance, management may resort to manipulating the financial statements (Omoye and Eragbhe, 2014). This manipulation is done with the objective of maintaining a positive reputation among shareholders and creditors. According to Spathis (2002), financial reporting fraud is more likely to occur when a company has a lower profitability ratio. In order to optimize shareholder benefits, company executives may engage in manipulating profitability ratios, leading to the production of fraudulent financial statements (Zainudin and Hashim, 2016). The aim is to maximize profits for shareholders, and this drive may result in the manipulation of profitability ratios, ultimately leading to fraudulent reporting in financial statements (Devale and Kulkarni, 2012).

H2: Profitability ratio has a positive influence on financial reporting fraud

The asset composition ratio is utilized to determine the proportion of current assets in relation to total assets. It serves as a significant tool in evaluating the risk associated with a company's capital structure. False transactions are frequently created in order to manipulate accounts like sales and receivables (Widyanti and Nuryatno, 2018). Receivables and inventories make up a sizable amount of a company's assets, according to other research looking at financial statement fraud. Subjective assessments of uncollectible accounts and absolute inventory levels have an impact on these receivables and inventory values. As a result, management can take advantage of this weakness to alter financial figures (Spathis, 2002).

H3: The asset composition ratio has a positive effect on financial statement fraud

The ability of a business to pay its short-term financial obligations is referred to as liquidity. It is a vital element that gives investors the confidence they need to hold onto their investments (Hill and Jones, 1992). According to a study by

Kreutzfeldt and Wallace from 1996, quoted by Zainudin and Hashim (2016), businesses with poor liquidity had a higher frequency of financial statement fraud than businesses with adequate liquidity. In general, a higher liquidity ratio implies a greater safety margin for the company to fulfill its short-term debts. Conversely, lower liquidity levels can incentivize managers to resort to financial statement fraud (Omoye and Eragbhe, 2014). This suggests that as a company's liquidity decreases, the likelihood of managers engaging in financial statement fraud increases.

H4: Liquidity ratio has a negative effect on financial statement fraud

The capital turnover ratio reflects a company's ability to effectively manage and compete in terms of sales. When company managers engage in financial statement manipulation, it indicates a lack of competitiveness in comparison to non-fraudulent management in utilizing company assets to generate sales (Persons, 1995). In line with other research findings, companies facing challenges with sales tend to resort to financial statement manipulation (Dalnial et al., 2014).

H5: Capital turnover ratio has a negative effect on financial statement fraud

III. METHODOLOGY

Secondary data from audited yearly reports was used in this study. The annual reports of the companies were acquired from Bloomberg or the Indonesia Stock Exchange (BEI) website. Data pertaining to the list of cases was obtained from the Financial Services Authority (OJK), the authorized entity responsible for issuing the list.

All businesses listed on the Indonesia Stock Exchange between 2008 and 2015 were the subject of the study. A purposive sampling strategy was used during the sample selection phase. Based on the list of cases provided by the Financial Services Authority (OJK) during the aforementioned period, a total of 59 companies were identified as being involved in financial reporting-related cases. However, certain criteria were applied to the sample selection. Specifically, three companies were from the financial industry, six had inaccessible financial reports, four reported their financials in US dollars, one was delisted, four used US dollars, and thirteen had missing research data. Consequently, these companies were excluded from the research sample.

Additionally, the samples were matched between businesses that committed financial reporting fraud and those that did not, provided that they had comparable industrial sectors and asset sizes.

The following are the measurement of research variables and their operational definitions:

$$KPK=\beta0+\beta1(LEV\ 1)+\beta2(LEV\ 2)+\beta3(PROF)+\beta4(AC\ 1)+\beta5(AC\ 2)+\beta6(AC\ 3)+\beta7(LIQ)+\beta8(CAPT)$$

Table 1: The Measurement of Research Variables

Research Variables	Formula		Symbol
Fraudulent Financial Reporting	1 if fraud is committed, and 0 otherwise (obtained from a list of cases sanctioned by the Financial Services Authority (OJK) under warning category VIII.G.7 regarding financial statement presentation from 2008-2015)		KPK
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
	Inventory/Total assets	INV/TA	AC3
Liquidity	Working capital/Total assets	WC/TA	LIQ
Capital Turnover	Revenue/Total assets	REV/TA	CAPT

IV. RESULTS AND DISCUSSION

In descriptive statistical calculations, the dependent variable used in this study is financial reporting fraud, which is measured on a nominal scale as a dummy variable. The independent variables in this study are leverage, consisting of lev1 and lev2; company profitability (PROF); asset composition, consisting of AC1, AC2, and AC3; liquidity (LIQ); and capital turnover (CAPT).

Table 2: Descriptive Statistic

Variables	Fraud Company					Non-Fraud Company				
	N	Min	Max	Mean	Std. Deviation	N	Min	Max	Mean	Std. Deviation
LEV1	32	-1,81	4,95	1,0569	1,17954	32	0,05	3,78	1,0495	1,04407
LEV2	32	0,02	2,73	0,5584	0,47079	32	0,07	1,76	0,4613	0,31447
PROF	32	-6,37	1,17	-0,25	1,1648	32	-5,19	0,31	-0,143	0,94448
AC1	32	0,03	1,36	0,5481	0,30696	32	0,18	1,36	0,5943	0,27499
AC2	32	0,01	4,87	0,4688	0,96325	32	0,02	4,86	0,4732	1,0627
AC3	32	0	1	0,2165	0,21275	32	0	1	0,2381	0,20882
LIQ	32	-2,17	1	0,1769	0,45766	32	-0,31	1	0,2916	0,29228
CAPT	32	0	3,77	0,6854	0,77282	32	0,01	3,77	0,8759	0,85438

The R coefficient test is used to determine how much of the variance in the dependent variable can be accounted for by independent variables. Table 3 shows that the R square values for Cox and Snell and Nagelkerke are both 0,277 and 0,369. These values indicate that the independent variables can explain approximately 36,9% of the variability in the dependent variable. However, it is worth noting that there are other factors, approximately 64,31% outside the model, that can also contribute to explaining the dependent variable.

Table 3: Cox & Snell's R Square and Nagelkerke's R Square

-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
67,994	0,277	0,369

Hypothesis testing was performed using logistic regression analysis to examine the impact of independent variables, including leverage (LEV1 and LEV2), profitability (PROF), asset composition (AC1, AC2, and AC3), and capital turnover (CAPT), on financial reporting fraud. The outcomes of the hypothesis testing, which consisted of partial tests, are presented below.

Table 4: Wald Test of Logistic Regression

Variables	B	S.E.	Wald	Sig	Exp (B)
LEV1	-0,148	0,338	0,191	0,662	0,863
LEV2	3,826	1,916	3,988	0,046	45,871
PROF	-0,036	0,256	0,02	0,888	0,965
AC1	3,835	2,704	2,011	0,156	46,285
AC2	-0,06	0,339	0,031	0,861	0,942
AC3	-3,783	2,318	2,665	0,103	0,023
LIQ	-2,293	2,225	1,062	0,303	0,101
CAPT	-2,711	0,933	8,44	0,004	0,066
Constant	-0,913	0,846	1,164	0,281	0,401

Based on the table, the equation of the regression model is as follows:

$$\text{LN}\ \frac{\text{p}}{1-\text{p}} = -0{,}913 - 0{,}148\ \text{LEV1} + 3{,}826\ \text{LEV2} - 0{,}036\ \text{PROF} + 3{,}835\ \text{AC1} - 0{,}060\ \text{AC2} - 3{,}783\ \text{AC3} - 2{,}293\ \text{LIQ} - 2{,}711\ \text{CAPT}$$

Based on the logistic regression test that has been conducted, the following is a summary of the regression coefficient test results:

Table 5: Regression Coefficient Test Results

Independent Variables	Coefficient	Sig.
LEV1	-0,148	0,662
LEV2	3,826	0,046**
PROF	-0,036	0,888
AC1	3,835	0,156
AC2	-0,06	0,861
AC3	-3,783	0,103
LIQ	-2,293	0,303
CAPT	-2,711	0,004***

* Significant at 0,01

** Significant at 0,05
*** Significant at 0,1

The outcomes for the logistic regression model are shown in Table 5. The results of the study show that not all ratios are useful in predicting financial reporting fraud. While CAPT is significant at 1%, LEV2 is significant at a level of 5%.

According to the findings of the logistic regression, corporate leverage has a favourable impact on financial reporting fraud. The LEV2 variable's beta coefficient of 3,826 and significance value of 0.046 serve as proof of this. Since the significance level of 0,046 is less than 0,05, it may be concluded that the LEV2 variable significantly increases fraud. By moving the risk from equity owners and managers to lenders, a high debt structure might enhance the chance of financial reporting fraud (Spathis, 2002). This result is in line with the research by Zainudin & Hashim (2016).

The study's findings indicate that the profitability variable has a significance value of 0.888 and a beta coefficient of -0,036. The variable is not statistically positively connected to fraud, according to the significance value of 0,888, which is more than 0,10. This result is consistent with the findings of a research by Persons (1995), which concluded that profitability has no bearing on the prevalence of financial reporting fraud. Additionally, it is in line with the study by Amara, Ben Amar, and Jarboui (2013) that found financial reporting fraud is not caused by poor company performance. This study is also consistent with Listyawati's (2016) study, which discovered that financial reporting fraud is unaffected by ROA as a proxy for profitability.

There is no evidence that the variable asset composition, which consists of the three proxies AC1, AC2, and AC3, significantly affects financial reporting fraud. The study by Zainudin & Hashim (2016), which discovered evidence that asset composition had a large favourable effect on financial reporting fraud, is not supported by this finding. Since the liquidity ratio has a beta coefficient of -2,293 and a significance value of 0,103, the regression test conducted demonstrates that the liquidity ratio is not significantly connected to financial reporting fraud.

According to the study's findings, the capital turnover ratio has a beta coefficient of -2,711 and a significance level of 0,004. The variable is not statistically positively connected to fraud, according to the significance value of 0,004, which is more than 0,10. Capital turnover gauges management's adaptability to changing market conditions. When using business resources to drive sales, managers who commit fraud may be less competitive than non-fraudulent managers (Persons, 1995). Financial auditors should be aware of huge increases from one period to the next since they could be an indication of income tied to fraud. In general, a larger working capital is a reasonable price.

IV. CONCLUSION

The purpose of this study was to evaluate how well financial ratios can be used to spot fraud. Financial leverage, profitability, asset composition, liquidity, and capital turnover were among the financial ratios that were chosen. The findings indicate that the LEV2 and CAPT ratios serve as significant indicators for identifying financial reporting fraud. Several fraud investigators have suggested the effectiveness of financial ratios for fraud detection (Dalnial *et al*., 2014). This research provides a practical guide for practitioners and scholars in detecting fraud and misconduct in financial reporting, thereby enhancing the assessment of fraud risks.

The results of the study also provide useful information about how financial ratios might be used to identify financial reporting fraud. The findings have applications for academics, auditors, fraud investigators, and accounting professionals. Additionally, the findings are beneficial to investors in making informed investment decisions. For company management, this research offers guidance in preventing fraud and misconduct within their organizations. Nonetheless, certain limitations exist, including the sample size and the availability of information from the Indonesian Stock Exchange (BEI). The manual collection of data may restrict the inclusion of other pertinent information sources. Furthermore, the limited availability of information on violations contributed to the restricted number of fraudulent company samples.

Interest Conflicts
The authors affirm that the publication of this paper does not involve any conflicts of interest.s

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