

FACTORS OF FRAUD TRIANGLE AFFECTING THE LIKELIHOOD OF MATERIAL MISSTATEMENTS IN FINANCIAL STATEMENTS: AN EMPIRICAL STUDY

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Abstract

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This study aims to identify and examine the three components of the fraud triangle theory that affect the likelihood of material misstatements in financial statements. With a sample of 150 listed companies from two stock exchanges in Vietnam, Ho Chi Minh City (HOSE) and Hanoi Stock Exchange (HNX) in 2019, this study uses multinomial logistic regression analysis to examine the relationship among factors. This study shows the impact of using the elements of the fraud triangle theory in forecasting the likelihood of material misstatement (Cressey, 1953; Romney et al., 1980). The results indicate that the following factors affect the possibility of material misstatements in financial statements of companies: debt ratio, return on assets, independence of the board members, selection of an audit firm, auditor change in comparison with the previous year, and historical financial statements with material misstatements. These findings of the study can be utilized to develop strategies to help identify companies that are likely to have material misstatements in their financial statements.

Keywords: Financial Statements, Fraud, Fraud Triangle, Material Misstatements, Vietnam

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1. INTRODUCTION

The growth of the stock market has made it easier for publicly traded companies to raise capital, which is followed by the increasing demand for access to financial information, particularly the faithful representation of these companies' financial statements. The topic of fraudulent financial reporting of large global corporations like Enron and WorldCom in America and Parmalat, Ahold in Europe has been raising some concerns about the reliability of financial reporting (Dashtbayaz

et al., 2021). This necessitates the method of predicting and detecting material misstatements in financial statements. By applying the fraud triangle model, the board of directors, as well as other external users of the financial statements can easily predict and detect material misstatements, thereby enhancing the truth and fairness of financial information, contributing to the process of raising investment capital and maintaining the competitiveness among companies (Apostolou et al., 2001; Matoussi & Gharbi, 2011; Kagias et al., 2021). Applying the fraud triangle model to detect material

misstatements is an important, long-term, and difficult process that requires a significant investment of time, money, and human resources, as well as a clear roadmap. At the same time, the use of the fraud triangle model is dependent on many other elements that must be carefully considered before being implemented. Studies in the world have categorized three groups of factors of the fraud triangle affecting fraudulent financial reporting through analysis of financial ratios, mainly focusing on developed countries and several Asian countries (Skousen et al., 2009; Wuerges & Borba, 2010; Sihombing & Rahardjo, 2014; Putriasih et al., 2016; Budiyo & Arum, 2020; Fathmaningrum & Anggarani, 2021; Devi et al., 2021). As Vietnam is a developing country, there are currently few studies on this aspect and only Tân et al. (2015) studied this topic with 78 companies listed on the Ho Chi Minh City (HOSE) stock market. Therefore, the purpose of this research is to discuss material misstatements and the factors of the fraud triangle and to analyze and evaluate which factors have the most impact on the material misstatements in financial statements, as well as the level of influence of each factor on fraudulent financial reporting of listed companies on Vietnam stock market including Hanoi Stock Exchange (HNX) and HOSE. The papers give some suggestions for making appropriate recommendations to apply the fraud triangle model in predicting and detecting material misstatements in the financial statements of listed companies in Vietnam. To conduct this research, the theoretical framework is based on the fraud triangle theory of Cressey's theory and fraud indicators (red flags) to predict the likelihood of fraud in financial statements (Romney et al., 1980). From the research gap, the paper presents the following research questions:

RQ1: Does the debt ratio have a positive relationship with the probability of material misstatements in the financial statements of listed companies?

RQ2: Do the current ratio and return on assets have a negative relationship with the probability of material misstatements in the financial statements of companies?

RQ3: Does the less percentage of independence of board members have a higher probability of material misstatements in their financial statements of companies?

RQ4: Do companies audited by Non-Big 4 audit firms have a higher probability of material misstatements in their financial statements?

RQ5: Does the change audit firms in the current year has a higher probability of material misstatements in the companies' financial statements?

The remaining structure of the research is as follows. Section 2 reviews the relevant literature. Section 3 presents the methodology that has been used to conduct empirical research on factors of the fraud triangle affecting the likelihood of material misstatement in financial statements by using multinomial logistic regression analysis to examine the relationship between factors affecting fraudulent financial reporting. Section 4 analyses the research results followed by the discussion of the findings in Section 5. Section 6 concludes the paper and gives some limitations of this study.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The study by Romney et al. (1980) is considered the first study to use fraud indicators (red flags) to predict the likelihood of fraud in financial statements. Afterward, Albrecht et al. (1986) (as cited in Summers & Sweeney, 1998) used 87 indicators proposed by Romney et al. (1980) to study the financial statement fraud of companies. The result showed that up to one-third of the indicators can predict financial statement fraud and some other variables can predict the integrity of the board of directors.

Based on the previous studies, Apostolou et al. (2001) carried out a further study by creating a questionnaire that includes 25 risk factors presented in Statement on Auditing Standards (SAS) No. 82. The result showed that the attributes of the board of directors are the most important factors causing financial reporting errors (58,2%), followed by the stability of business operations and financial performance of the enterprise (27,4%), meanwhile, the industry's characteristics are not the factors that have a great influence on financial reporting errors (14,4%). In addition, these authors also built a fraud assessment model, referring to the combination of weighted fraud risk indicators. Based on the fraud triangle theory, Skousen et al. (2009) studied the effectiveness of Cressey's (1953) hypothesis included in SAS No. 99 in order to find and detect financial reporting errors. The authors developed variables to measure pressure, opportunity and rationalization. Consistent with the fraud triangle theory, the result of empirical analysis showed that pressure, opportunity, and rationalization always appear in cases of material misstatements.

Recently, Kagias et al.'s (2021) study provides a framework for fraud risk management incorporating cost/benefits considerations, practical considerations, and empirical evidence on fraud. This study provides valuable information to enable the manager, who has the primary responsibility to prevent and detect fraud, to disclaim responsibility by broadening their understanding of fraud theory. Based on the fraud triangle theory, Budiyo and Arum (2020) is the first study using multiple linear regression data panels to examine the effect of financial statement fraud with a number of variables from the fraud triangle. The results showed that the fraud triangle in the categories of financial stability, external pressure, financial targets, personal financial needs, opportunity, and rationalization simultaneously affect fraudulent financial statements. In Vietnam, Tân et al. (2015) developed factors related to the fraud triangle theory including motivation, opportunity, rationalization, arguments, and verification to make a fraud prediction model with a probability of over 83,3% of correct prediction.

This study seeks to empirically examine the applicability of Cressey's (1953) theory to financial statement fraud by testing the basic premise that:

$$FRAUD = f(\text{Pressure, Opportunity, Rationalization}) \quad (1)$$

where, *Pressure* is measured by the following indicators.

The first indicator is *Debt ratio*: Companies with extremely high debt are suspicious signals of the probability of illegal activity, according to studies by Wuerges and Borba (2010). Apriliana and Agustina (2017) succeeded in proving that financial stability, which is referred to as a high debt ratio, prompts managers to commit fraudulent financial reporting. In addition, studies that have proved that financial stability affects someone to commit fraud include Sihombing and Rahardjo (2014), Putriasih et al. (2016), and Devi et al. (2021). Moreover, many previous studies that analyse the relationship between debt ratios and material misstatements, such as Persons (1995), Spathis (2002), Amara et al. (2013), and Tân et al. (2015), all came up with the same conclusion: there is always a positive relationship between debt ratio and the probability of material misstatement. When corporations have high debt, they are under a lot of pressure to pay it back, and their capacity to raise capital from other sources, such as investment funds, banks, and so on, is limited. Because a high debt ratio has a strong association with debt payment, external parties will consider this ratio as a guarantee that the money they have invested or lent is safe. This puts pressure on the company's owners, perhaps leading to misstatements such as overstating profits. As a result, the first hypothesis is distributed as follows:

H1: The debt ratio has a positive correlation with the probability of material misstatements in the financial statements of companies.

The second indicator is the *Current ratio*: Current ratio can be a prime indicator of manipulation of accounts involved in detecting fraud, embezzlement will cause the ratio to decrease, but liability concealment will cause a more favorable ratio. Perols and Lougee (2011) and Kirkos et al. (2007) discovered in their study of material misstatements in financial statements that when a company's liquidity is poor, it has a higher risk of financial statement fraud. One sort of liquidity ratio is the current ratio, which assesses a company's capacity to pay off current liabilities (due within one year) with total current assets such as cash, accounts receivable, and inventories. A higher current ratio indicates that a company is more liquid and can cover its outstanding debts without having to raise additional capital. Investors and lenders will be able to recognize a company's liquidity by looking at its current ratios. A company's current ratio analysis will assist investors and lenders in recognizing the business's liquidity risk and deciding whether to invest or lend. As a result, owners may try to boost the value of current assets or receivables while reducing short-term liabilities in order to provide a positive picture of a company's financial health. As a result, the second hypothesis is developed as follows:

H2: The current ratio has a negative relationship with the probability of material misstatements in the financial statements of companies.

The third indicator is *Return on assets*: Return on assets (ROA) is a measure of a company's profitability in relation to its total assets. The higher ROA is, the better a company's assets are utilized in terms of profitability. Widarti (2015), Susianti and Yasa (2015), and Umarsono's (2016) research stated

that the financial targets by ROA have a significant effect on financial statement fraud. This is consistent with the results of the study by Zainudin and Hashim (2016) which indicates that financial targets measured by ROA affect fraudulent financial statements and in line with research by Reskino and Anshori (2016) and Manurung and Hadian (2013). Dechow et al. (2011), Okoye et al. (2009), and Summers and Sweeney (1998) stated in their studies that the probability of material misstatement and the return on assets are inversely related. In reality, if this ratio is low, it will encourage managers to engage in misbehavior in order to improve the company's overall performance through fraudulent financial reporting to enhance overall performance. Therefore, the third hypothesis is formulated as follows:

H3: Return on assets has a negative relationship with the probability of material misstatements in the financial statements of companies.

Opportunity is measured by 1) the independence of board members and 2) the size of audit firms.

For the independence of board members, the studies by Matoussi and Gharbi (2011), Peasnell et al. (2005), and Beasley et al. (2000) all concluded that having independent members on the board of directors minimizes the likelihood of fraud. The study by Sunardi and Amin (2018) showed that effective monitoring, measured by the proportion ratio of the board of commissioner (IND), had a significantly negative effect on the indication of the occurrence of financial statement fraud. Furthermore, previous research by Hasnan et al. (2008) and Skousen et al. (2009) found that if a company's board of directors has a low percentage of independent members, there is a higher risk of material misstatement in the financial statements. Most objective decisions are made by these independent members. The fewer the number of independent members, the more dependent members become the owner and administrators. As a result, the possibility of committing wrongdoings exists and is difficult to be detected. Therefore, the fourth hypothesis is formulated as follows:

H4: Companies that have less percentage of independence of board members have a higher probability of material misstatements in their financial statements.

The size of audit firms: Fathmaningrum et al. (2021), Carlin et al. (2015), Apriliana and Agustina (2017) all suggest a positive and significant relationship between audit firms' size and fraud detection. Also, Lennox and Pittman (2010) found that independent auditors from Big 4 audit firms are more likely to detect fraud than those from non-Big 4 firms in their audits. Due to the caution toward Big 4 auditors, as well as the fear of being detected, choosing an audit firm from the Big 4 will limit management's ability to make mistakes. Furthermore, in corporate governance frameworks such as the OECD's one, independent auditors are employed as an effective approach to supervising the board of directors. According to the findings of Farber (2005), poor corporate governance is associated with less use of Big 4 audit firms. Therefore, the fifth hypothesis is developed as follows:

H5: Companies audited by non-Big 4 audit firms have a higher probability of material misstatements in their financial statements.

Rationalization is measured by 1) auditor change in comparison with the previous year and 2) historical financial statement containing material misstatement.

For auditor change in comparison with the previous year: According to Yesiariyani and Rahayu (2017), with the change in auditors, the possibility of fraudulent financial reporting will increase. Putriasih et al. (2016) pointed out that change in auditor had a significant positive influence on fraudulent financial reporting. Thus, the more often the company changes auditors, the more likely it is that fraudulent financial reporting will occur. This result is once again proved by Husmawati et al. (2017) and Sari et al. (2020). However, Nanda et al. (2019) and Achmad et al. (2022) indicated that the change in auditors does not impact fraudulent financial reporting. When a misstatement occurs or the previous year's financial statements receive a qualified audit opinion, the company may change to a new audit firm in the hope of covering up the current year's problems. Changing the audit firm is unusual because if the company is a familiar client, the audit firm will have a lot of knowledge about business activities or organizational structure; then the audit work will be more efficient and effective. Accordingly, they will be able to detect mistakes more easily than a new audit firm. Therefore, changing the independent audit firms has an impact on the likelihood of a material misstatement in the financial statements. So the sixth hypothesis is formulated as follows:

H6: Companies that change audit firms in the current year have a higher probability of material misstatements in their financial statements.

Historical financial statements containing material misstatements: Wang and Wu (2011) concluded that companies with weak profitability tend to report poor financial statements and later restate them. Many of these firms manage their earnings mainly via below-the-line items to avoid

Model 1

$$\text{Log}(p_i/p_j) = \alpha_{ij} + \beta_{ij}DEBT + \beta_{ij}LIQ + \beta_{ij}ROA + \beta_{ij}IND + \beta_{ij}AUD + \beta_{ij}CHA + \beta_{ij}HMM + \varepsilon_{ij} \quad (2)$$

The variables are defined in Table 1 and explained in the next subsection.

3.2. Selection and measurement of variables

3.2.1. Measurement of material and immaterial misstatements in financial statements

This study was based on prior research by Beasley (1996), Skousen et al. (2009), Lou and Wang (2009),

$$\text{The percentage of profit difference} = 100\% \times (\text{Audited net profit} - \text{Unaudited net profit}) / \text{Audited net profit} \quad (3)$$

where, the *Unaudited net profit* is the net profit prior to the auditor's adjustments and the *Audited net profit* is the net profit after the auditor's adjustments.

For example, in a specific company A, the audited net profit is USD20,000,000 and the unaudited net profit is USD18,000,000. Therefore, the percentage of profit difference is:

losses and promote survival, rather than to support refinancing goals. These findings come to the end that financial restatement can be a suspicious sign of possible fraud. Historical financial restatement times according to research by Lou and Wang (2009) and Tân et al. (2015) have a great impact on the likelihood of material misstatement in financial statements. When fraud has been committed once, the person committing the fraud may self-advocate his behavior and claim that it is correct, entirely for the sake of the company. Companies that have committed fraud in the past are more likely to re-offend. This leads to the seventh hypothesis:

H7: Companies with material misstatements in the previous year's financial statements have a higher probability of material misstatements in the current year's financial statements.

3. METHODOLOGY

After reviewing the previous studies related to factors of the fraud triangle affecting the likelihood of material misstatements in financial statements, the authors pointed out three groups of factors having a significant impact on the likelihood of material misstatements in financial statements. These factors could be measured by both quantitative and qualitative research methods. However, in the article, the authors used the quantitative method.

3.1. Multinomial logistic regression model

This study utilizes the same logistic multinomial regression model as that of the authors Skousen et al. (2009), Lou and Wang (2009), and Tân et al. (2015) to show the relationship between material misstatements in the financial statements and related factors of fraud triangle model. The regression model is shown below:

and Tân et al. (2015) to evaluate whether a corporation has material misstatements. The profit difference is determined using the formula below:

$$100\% * (\text{USD}20,000,000 - \text{USD}18,000,000) / \text{USD}20,000,000 \text{ (which equals 10\%).}$$

The 5% mark is used in this study to distinguish between material and immaterial misstatements. The error is still regarded as material if the percentage of profit difference is not quantitatively material but it causes the profit to change in nature from loss to profit or vice versa. Therefore, material misstatements in the financial

statements of companies are coded *FRAUD* which is a dummy variable with the value “0” if the financial statements have no material misstatements, “1” if there is a material misstatement in direction of overstated profit, “2” if there is a material misstatement in direction of understated profit.

3.2.2. Measurement of independent variables and predicted direction for model

Definition, measurement of independent variables, and predicted direction are presented in Table 1.

Table 1. Definition, measurement of independent variables, and predicted direction

| Definition | Variable | Measurement | Pr. dir. | Prior studies |
|--|-------------|---|----------|--|
| Pressure | | | | |
| Debt ratio | <i>DEBT</i> | $LEV = \text{Total debt} / \text{Total assets} \times 100\%$ | + | Wuerges and Borba (2010), Kirkos et al. (2007), Apriliana and Agustina (2017), Sihombing and Rahardjo (2014), Putriasih et al. (2016), Person (1995), Spathis (2002), Amara et al. (2013), Tân et al. (2015), Devi et al. (2021) |
| Current ratio | <i>LIQ</i> | $LIQ = \text{Current assets} / \text{Current liabilities} \times 100\%$ | - | Perols and Lougee (2011), Kirkos et al. (2007) |
| Return on assets | <i>ROA</i> | $ROA = \text{Net income} / \text{Total assets} \times 100\%$ | - | Widarti (2015), Susianti and Yasa (2015), Umarsono (2016), Zainudin and Hashim (2016), Reskino and Anshori (2016), Manurung and Hadian (2013), Rachmania (2017), Dechow et al. (2011), Okoye (2009), Summers and Sweeney (1998) |
| Opportunity | | | | |
| Independence of board members | <i>IND</i> | $IND = \text{Number of independent board members} / \text{Total board members} \times 100\%$ | - | Matoussi and Gharbi (2011), Peasnell et al. (2005), Beasley et al. (2000), Sunardi and Amin (2018), Skousen et al. (2009) |
| Size of audit firms | <i>AUD</i> | A dummy variable: 1 if the auditee is audited by one of the Big 4; 0 otherwise. | - | Khaksar et al. (2022), Fathmaningrum and Anggarani (2021), Apriliana and Agustina (2017), Lennox and Pittman (2010), Tân et al. (2015) |
| Rationalization | | | | |
| Auditor change in comparison with the previous year | <i>CHA</i> | A dummy variable: 1 if there was a change in auditor in the previous year; 0 otherwise. | + | Yesiariani and Rahayu (2017), Husmawati et al. (2017), Putriasih et al. (2016), Stice (1991) |
| A historical financial statement containing material misstatements | <i>HMM</i> | A dummy variable: 1 if there were material misstatements in the previous year's financial statement; 0 otherwise. | + | Wang and Wu (2011), Lou and Wang (2009), Tân et al. (2015) |

Note: Pr. dir. — Predicted direction.

3.3. Sample and data selection

The research sample includes 150 publicly listed companies (exclusive of finance/trust companies) selected from two Vietnam stock exchanges: Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) in 2019, in which the number of companies from the HNX is 49, accounting for 32.6% of the sample size, the number of companies from the HOSE is 101, accounting for 67.4% of the study sample size.

Secondary data is gathered from the Vietnamese Stock Exchange's website: <https://finance.vietstock.vn/>. After eliminating the companies that could not find the necessary data, this study removed 2% of the companies with the values of the variables in the model too large or too small to avoid confounding the mean values of variables and regression models. The data was then entered into the SPSS Statistics 20 software, which was used to perform descriptive statistics on the variables and run the regression model.

Table 2. Sample selection

| Selection criteria | Total |
|---|-------|
| Number of HOSE and HNX listed companies selected | 172 |
| Fewer companies with incomplete financial data and unavailable annual reports | 20 |
| Fewer companies whose values are too large or too small | 2 |
| Total sample size | 150 |

4. RESULTS

4.1. Descriptive statistics

Table 3 provides detailed descriptive statistics of the dependent variable *FRAUD* based on the sample company.

The table shows that of 150 sampling companies, there are 97 non-fraud companies, and 12 companies possibly have misstatements in financial statements. And with the difference in net

profit before and after the audit is greater than 10%, according to “Rules of thumb”, the mistake is considered to be material in 41 companies, of which, 25 companies commit misstatements in the direction of overstated profit, accounting for 60%, and 16 companies that had misstatements in the direction of understated profit, accounted for 40%. Next, the descriptive statistics of the dependent variable and the independent qualitative variables are presented in Table 4 below.

Table 3. Descriptive statistics of the dependent variable

| <i>Profit difference</i> | | < 5% | 5%-10% | > 10% | <i>Sum</i> |
|--|-------|--------|--------|--------|------------|
| Non-fraud companies | Count | 97 | 0 | 0 | 97 |
| | Col% | 100% | 0% | 0% | 64.67% |
| | Row% | 100% | 0% | 0% | 100% |
| Misstatements in direction of overstated profit | Count | 0 | 5 | 25 | 30 |
| | Col% | 0% | 41.67% | 60% | 20% |
| | Row% | 0% | 16.67% | 84.33% | 100% |
| Misstatements in direction of understated profit | Count | 0 | 7 | 16 | 23 |
| | Col% | 0% | 58.33% | 40% | 15.33% |
| | Row% | 0% | 30.43% | 69.57% | 100% |
| Sum | Count | 97 | 12 | 41 | 150 |
| | Col% | 100% | 100% | 40% | 100% |
| | Row% | 64.67% | 8% | 27.33% | 100% |

Table 4. Descriptive statistics of the dependent variable and independent qualitative variables

| | <i>Size of audit firms (AUD)</i> | | <i>Auditor change in comparison with the previous year (CHA)</i> | | <i>Historical financial statements containing material misstatements (HMM)</i> | |
|-------|---|---------------------------------------|--|--|--|---|
| | <i>Selection of non-Big 4 audit firms</i> | <i>Selection of Big 4 audit firms</i> | <i>Audit firm unchanged in the previous year</i> | <i>Audit firm changed in the previous year</i> | <i>Historical financial statements containing material misstatements</i> | <i>Historical financial statement not containing material misstatements</i> |
| Total | 93 | 57 | 131 | 19 | 88 | 62 |
| % | 62% | 38% | 87.33% | 12.67% | 58.67% | 41.33% |

From the results in Table 4, there are 93 companies audited by non-Big 4 audit firms and 57 companies audited by Big 4 audit firms. In the case of auditor change in comparison with the previous year (*CHA*), up to 131 companies did not have a change in external audit firms compared to 19 companies in the observed sample that changed audit firms. Regarding historical financial statements containing material misstatement

variable (*HMM*), the number of companies with and without material misstatements in the previous year's financial statements is quite similar. Specifically, there were 62 companies that did not have material misstatements in their financial statements last year, accounting for 41.33%, which reflects a positive relationship with companies with material errors in this year's financial statements.

Table 5. Descriptive statistics of the independent quantitative variables

| <i>Variable</i> | <i>N</i> | <i>Minimum</i> | <i>Maximum</i> | <i>Mean</i> | <i>Std. deviation</i> |
|--|----------|----------------|----------------|-------------|-----------------------|
| Debt ratio (<i>DEBT</i>) | 150 | 0.007 | 0.9068 | 0.4976 | 0.2263 |
| Current ratio (<i>LIQ</i>) | 150 | 0.1846 | 1.8303 | 1.5098 | 0.7812 |
| Return on assets (<i>ROA</i>) | 150 | -0.2216 | 0.5047 | 0.0479 | 0.0821 |
| Independence of board members (<i>IND</i>) | 150 | 0 | 1 | 0.48 | 0.207 |
| Valid N (listwise) | 150 | | | | |

Table 5 shows that the debt ratio (*DEBT*) of 150 sampling listed companies ranges from 0.76% to 90.68% with an average value of 49.76%. The current ratio ranges from 0.1846 to 1.8303, the average value is 1.5098. Return on assets (*ROA*) ranges from -22.16% to 50.47% with an average value of approximately 4.79%. Descriptive statistics also show that the firms in this sample have a relatively high average proportion of independent members on the board of directors (*IND*, 39%).

4.2. Correlation analysis and test of standard normal distribution of variables

Table 6 shows that a strong correlation between the independent and dependent variables may biasedly estimate the coefficient of variation. To find

out this problem, the correlation matrix based on the Pearson test determines the degree of two correlations between the variables. Bearing the greatest value with the strongest correlation (0.316) is the relationship between *HMM* and *IND*. *ROA* and *IND*, *LIQ*, and *DEBT* also have a correlation relationship. But the absolute value of the correlation coefficient between 0 and 0.316 is not really high.

Table 6. Correlation matrix

| | <i>FRAUD</i> | <i>DEBT</i> | <i>LIQ</i> | <i>ROA</i> | <i>IND</i> | <i>AUD</i> | <i>CHA</i> | <i>HMM</i> |
|--------------|--------------|-------------|------------|------------|------------|------------|------------|------------|
| <i>FRAUD</i> | 1 | | | | | | | |
| <i>DEBT</i> | -0.056 | 1 | | | | | | |
| <i>LIQ</i> | 0.106 | -0.262** | 1 | | | | | |
| <i>ROA</i> | -0.232** | -0.109 | -0.055 | 1 | | | | |
| <i>IND</i> | 0.125 | -0.029 | -0.062 | -0.109 | 1 | | | |
| <i>AUD</i> | -0.200* | -0.016 | -0.083 | 0.089 | 0.071 | 1 | | |
| <i>CHA</i> | -0.017 | -0.003 | 0.054 | 0.063 | 0.049 | 0.032 | 1 | |
| <i>HMM</i> | -0.107 | -0.1620 | 0.248* | -0.096 | 0.316 | -0.055 | -0.30 | 1 |

Note: **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Table 7. Statistics of collinearity: Tolerance values and VIF

| <i>Model</i> | <i>Collinearity statistics</i> | |
|--------------|--------------------------------|------------|
| | <i>Tolerance</i> | <i>VIF</i> |
| <i>LIQ</i> | 0.908 | 1.101 |
| <i>AUD</i> | 0.981 | 1.02 |
| <i>DEBT</i> | 0.912 | 1.097 |
| <i>IND</i> | 0.976 | 1.025 |
| <i>ROA</i> | 0.953 | 1.05 |
| <i>CHA</i> | 0.919 | 1.01 |
| <i>HMM</i> | 0.902 | 1.460 |

The tolerance values are quite high, from 0.902 to 0.981, showing that the acceptability of variables is good and represents a good fit of the linear combination of the variables in the model. Moreover, VIF coefficients are all quite small and less than 10, indicating that there is no multicollinearity between the independent variables (Trọng & Ngọc, 2008).

Test of the standard normal distribution: To test the distribution of variables, the research team used the histogram plotting method. Based on the results

of histogram analysis, we find that 7 independent variables in the model, including *DEBT*, *LIQ*, *ROA*, *IND*, *AUD*, *CHA*, *HMM* are all normally distributed.

4.3. Polynomial logistic regression analysis

The study performed multinomial logistic regression based on the collected data of variables, the obtained results are as follows:

Table 8. Omnibus test of the model coefficients

| <i>Model</i> | <i>Model fitting criteria</i> | <i>Likelihood ratio tests</i> | | |
|----------------|-------------------------------|-------------------------------|-----------|-------------|
| | <i>-2 Log likelihood</i> | <i>Chi-square</i> | <i>df</i> | <i>Sig.</i> |
| Intercept only | 262.742 | | | |
| Final | 229.213 | 34.529 | 12 | 0.001 |

The relevance of the model (omnibus test) in Table 8 has Sig. value of < 0.05. It proves the correlation between the independent variables and the dependent ones, as well as the appropriation of the model. Furthermore, considering the value of -2

Log likelihood, the smaller this value is, the more suitable the model is. Here the value -2 Log likelihood has a value of 229,213, which indicates that the model is fairly appropriate.

Table 9. Test of model specification

| <i>Effect</i> | <i>Model fitting criteria</i> | <i>Likelihood ratio tests</i> | | |
|---------------|---|-------------------------------|-----------|-------------|
| | <i>-2 Log likelihood of the reduced model</i> | <i>Chi-square</i> | <i>df</i> | <i>Sig.</i> |
| Intercept | 223.527 | 0.000 | 0 | |
| <i>DEBT</i> | 231.392 | 7.865 | 2 | 0.020 |
| <i>LIQ</i> | 225.942 | 2.415 | 2 | 0.299 |
| <i>ROA</i> | 232.918 | 9.391 | 2 | 0.009 |
| <i>IND</i> | 223.992 | 0.465 | 2 | 0.793 |
| <i>AUD</i> | 236.173 | 12.646 | 2 | 0.002 |
| <i>CHA</i> | 228.982 | 5.455 | 2 | 0.065 |
| <i>HMM</i> | 221.158 | 6.745 | 2 | 0.0412 |

Table 9 shows the results from testing the degree of correlation through the Chi-square test between the independent variables and dependent variables. It can be seen that independent variables that have influences significantly on independent variables are *DEBT*, *ROA*, *AUD*, *CHA*, and *HMM*.

These variables have relatively high Chi-square values, with Chi-square coefficients of 7.865, 9.391, 12.646, and 6.745, respectively, showing that these variables have a high correlation with dependent variables. Going further into the analysis of the overall regression model, Table 10 is below:

Table 10. Parameter estimates

| FRAUD ^a | B | Std. error | Wald | df | Sig. | Exp(B) | FRAUD ^a | 95% confidence interval for Exp(B) | |
|--------------------|----------------|----------------|--------|--------|-------|--------|--------------------|------------------------------------|-------------|
| | | | | | | | | Lower bound | Upper bound |
| 1 | Intercept | -4.218 | 1.122 | 14.127 | 1 | 0.000 | | | |
| | DEBT | 2.392 | 1.135 | 4.445 | 1 | 0.035 | 10.934 | 1.183 | 101.047 |
| | LIQ | 0.023 | 0.019 | 1.395 | 1 | 0.238 | 1.023 | 0.985 | 1.062 |
| | ROA | -0.104 | 2.948 | 0.001 | 1 | 0.972 | 0.901 | 0.003 | 291.25 |
| | IND | 0.728 | 1.074 | 0.459 | 1 | 0.04 | 2.071 | 0.252 | 16.984 |
| | [AUD = 0] | -1.064 | 0.484 | 4.826 | 1 | 0.028 | 2.899 | 1.122 | 7.491 |
| | [AUD = 1] | 0 ^b | | | 0 | | | | |
| | [CHA = 0] | 1.108 | 0.498 | 4.95 | 1 | 0.026 | 3.029 | 1.141 | 8.039 |
| | [CHA = 1] | 0 ^b | | | 0 | | | | |
| | [HMM = 0] | -9.871 | 3.618 | 7.445 | 1 | 0.006 | 5.167E-005 | 4.305E-008 | 0.062 |
| [HMM = 1] | 0 ^b | | | 0 | | | | | |
| 2 | Intercept | -2.042 | 1.33 | 2.355 | 1 | 0.125 | | | |
| | DEBT | -1.369 | 1.234 | 1.231 | 1 | 0.267 | 0.254 | 0.023 | 2.855 |
| | LIQ | 0.004 | 0.023 | 0.032 | 1 | 0.858 | 1.004 | 0.961 | 1.05 |
| | ROA | - | 11.945 | 4.457 | 7.182 | 1 | 0.007 | 6.49E-06 | 1.04E-09 |
| | IND | 0.236 | 1.409 | 0.028 | 1 | 0.867 | 1.267 | 0.08 | 20.048 |
| | [AUD = 0] | -1.921 | 0.711 | 7.303 | 1 | 0.007 | 6.829 | 1.695 | 27.51 |
| | [AUD = 1] | 0 ^b | | | 0 | | | | |
| | [CHA = 0] | 0.163 | 0.558 | 0.086 | 1 | 0.77 | 1.177 | 0.395 | 3.512 |
| | [CHA = 1] | 0 ^b | | | 0 | | | | |
| | [HMM = 0] | -4.529 | 1.973 | 5.271 | 1 | 0.022 | 0.011 | 0.000 | 0.515 |
| [HMM = 1] | 0 ^b | | | 0 | | | | | |

Note: a. The reference category is 0; b. This parameter is set to zero because it is redundant.

According to Table 10, the results from Model 1 and Model 2 explain which factors affect the possibility of material misstatements existing in financial statements in the direction of both overstated and understated profit.

For the case of overstated profit, the factors that affect the possibility of material misstatements existing in the financial statements of listed companies are *DEBT*, *IND*, *AUD*, *CHA*, and *HMM* (Sig. < 0.05). For the case of understated profit, the factors that are significant for the model are *ROA*, *AUD*, and *HMM* (Sig. < 0.05).

The results of the multivariate regression model with each factor are statistically as follows.

Firstly, the debt ratio (*DEBT*) is significant with material misstatements in financial statements (Sig. < 0.05) in the case of overstated profit. Specifically, the higher the debt ratio is, the greater the ability to make fraudulent financial reporting occurs to attract more investment capital from banks and investors. It means that the results of this study support *H1*. Secondly, the current ratio (*LIQ*) is not significant with material misstatement on the financial statements (Sig. > 0.05) according to both the overstatement and understatement of profit. The current ratio does not have an influence on the decision of financial statement users; *H2* is rejected. Thirdly, return on assets (*ROA*) has a great influence on material misstatements in the direction of understatement of profit (Sig. < 0.05). However, *ROA* is not significant for the case of overstating profit (Sig. > 0.05). For the case of understated profit in the financial statements, the research results are completely consistent with the initial hypothesis about the negative relationship between the return on assets and the degree of understated profit in the financial statements of listed companies. The higher the return on assets ratio, the lower the likelihood that the financial statements will contain material misstatements in the case of understated profit. Fourthly, the independence of board members (*IND*) has a strong influence on material misstatement in financial statements (Sig. < 0.05) in the direction of overstatement of profit. That means the higher the percentage of

independent members of the board of directors, the fewer material misstatements in the financial statements in the direction of overstated profit. Fifthly, the size of an audit firm (*AUD*) shows that the quality of the audit firm is significant for the model, which is shown to be the influence on both errors in the direction of overstatement and understatement of profit (Sig. < 0.05). The type of audit firm has a negative effect on material misstatement. Specifically, the selection of audits by a company that is not a Big 4 is more likely to occur for enterprises that have material errors in the financial statements. Sixthly, the change of audit firm (*CHA*) presents that changing auditors have an impact on the presence of material misstatements on the financial statements in the direction of overstated profit (Sig. < 0.05). However, the changing auditors do not affect the understated profit (Sig. > 0.05) on the financial statements. Finally, the history of financial statements of material misstatement (*HMM*) has a significant influence on material misstatement on the financial statements in both directions of understatement and understatement of profit (Sig. < 0.05), which supports *H7*.

5. DISCUSSION

From the perspective of three factors of the fraud triangle, including *Pressure*, *Opportunity*, and *Rationalization*, they have different influences on fraudulent financial reporting. The research results reveal that:

5.1. Pressure

The first variable related to Pressure is the debt ratio (*DEBT*) which has an impact on businesses that have a profit-loss situation. Specifically, it has a positive effect on the risk of fraud. The higher the debt ratio is, the greater the risk of overstated profits. This is completely reasonable because when a company's financial situation is bad, it is harder to attract investment capital, and the managers tend to

overstate profits and other items in order to make financial statements look better. This finding is completely consistent with the study by Dechow et al. (2011). The second variable regarding Pressure is the current ratio (*LIQ*) which has no effect on making a material misstatement in both directions of overstated and understated profit. This is due to the fact that the current ratio has little impact on the psychology of financial statement users, so corporate managers are not pressured by this indicator. This result is different from previous studies by Perols and Lougee (2011) and Kirkos et al. (2007). The third variable is *ROA*. This factor causes pressure to declare understated profit on businesses with a positive financial situation, specifically the opposite effect. This result is completely consistent with previous research results of Dechow et al. (2011), Okoye (2009), and Summers and Sweeney (1998). The explanation for this is that with the incentive to reduce the tax liability, managers tend to reduce profits, then the *ROA* value also decreases. Meanwhile, the *ROA* factor has no influence on the incentives of declaring overstated profit. This can be explained that this business currently has no goal of attracting investment capital, borrowing money, or expanding its operation. Therefore, they are not pressured by the deteriorating financial situation to the point where profit is overstated and make a good impression of financial statements.

5.2. Opportunity

According to the research results, the higher the number of independence of board members is, the less likely the rate of profit is overstated on the financial statements. In other words, when the number of independent members is reduced, the state of false declaration will be considered for implementation. This is because when the percentage of independent members is high, they will increase close supervision over the behavior of business owners and give more objective opinions. This result is similar to the study done by Beasley (1996), Hasnan et al. (2008), Skousen et al. (2009), and Amara et al. (2013) who all concluded that the presence of independent members on the board of directors reduces the frequency of frauds. However, this factor has no significant impact related to the understated profit.

In addition, the size of audit firms (*AUD*) also has an impact on both the direction of understated and overstated profit. This conclusion is similar to the results of previous studies by Spathis (2002), Skousen et al. (2009), Dalnial et al. (2014), and Tân et al. (2015). This study shows that the financial statements of companies that are audited by the Big 4 group have more misstatements. This can be explained by the fact that Big 4 audit firms have a better ability to detect material misstatements, not to prevent misconduct.

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5.3. Rationalization

The study shows that the first variable related to rationalization which is auditor change in comparison with the previous year (*CHA*) has a clear impact on the tendency of overstated profits, but it has no effect on the tendency of understated profits. Pierre and Andreson (1984) and Stice (1991) argue that the possibility of misstatement increases as soon as an entity changes auditors. It can be seen that the change of auditing companies is an unusual sign that can affect both directions of understated and overstated profit on financial statements. The second variable regarding rationalization is the historical financial statements, which has a significant influence on material misstatements in both the understated and overstated profit directions. This result is completely similar to the study by Lou and Wang (2009). That means companies that have made material misstatements in the past are likely to repeat the same mistake this year. Because they have committed a misstatement once, they will become familiar with it the next time.

6. CONCLUSION

With the research results, the paper has provided a more theoretical and practical basis for the application of the fraudulent triangle model to the study by detecting material misstatements on the financial statements of listed companies on the Vietnam Stock Exchange. The results indicate that the following factors affect the possibility of material misstatements in financial statements of companies: debt ratio, return on assets, independence of the board members, selection of an audit firm, auditor change in comparison with the previous year, historical financial statements with material misstatements. The study of influencing factors in Vietnam contributes to helping businesses in Vietnam better understand the benefits as well as promoting the application of the fraudulent triangle model in detecting errors in financial statements.

However, the study does have some limitations. Firstly, the article only focuses on 6 factors classified into 3 groups of the fraud triangle. In fact, there are many other factors that should be mentioned in the research such as the effects of external pressures, change in director, ineffective monitoring, etc. Secondly, these elements may include tradition, religion, social norms, political events, and security. Further studies can add more elements to make the research more comprehensive. Thirdly, the study selects a sample of 150 listed companies on the Vietnam stock market. In the future research, the research team would like to expand the sample size by selecting companies from unlisted public companies and over the counter markets.

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