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Research on Misstatements in Financial Statements: The Case of Listed Firms on Ho Chi Minh City Stock Exchange

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ABSTRACT

This research is conducted to investigate the current situations of material misstatements including frauds and errors in financial statements of listed firms on Ho Chi Minh City Stock Exchange (HOSE). The study is based upon research model of Beneish (1999) with additional control variables such as return on asset (ROA), company size (SIZE) and financial leverage (LV). The research data included 208 listed firms during the period from 2014 to 2016 with 624 observations. The results showed that 3 variables being gross margin index (GMI), depreciation index (DEPI) and selling and general & administrative expenses index (SGAI) affect the possibility of frauds and errors on financial statements. Aside from that, other control variables added in the models all have impacts with statistical meaning. The prediction ability of existing frauds and errors in financial statements of this model is 78.21%.

Keywords: Financial statements, Fraud & error, Forecast ability, M-Score.

1. INTRODUCTION

In a market economy, financial information plays an essential role in business decision-making. Inaccurate and imbalanced information leads to mistakes in decision making and losses to financial statement users. Thus, ensuring the transparency and honesty of financial information has always been top priority of stakeholders. Detection of fraudulent and material misstatements within financial statements has always been challeging, and there is yet to present an optimal solution even for those in audit profession and related parties. Moreover, there is an increasing trend in the frequency of material misstatements including fraud and errors through highly meticulous methods. The evidences lie in the series of headline-grabbing scandals uncovered in business with fraudulent accounting ledgers all over the world.

A typical example is the bankruptcy of Enron by the end of 2001 that created a huge shock upon the US economy.

In Vietnam, there have been many uncovered scandals related to fraudulent financial statements in recent years. The latest is probably the series of serious wrongdoings in petroleum firms uncovered by state auditors. Those are great challenges not only for the society in general but also for auditors specifically to figure out the fraudulent and material misstatements within financial statements. This topic has garnered increasing interest in related researches. There are previous studies focusing on the possibility to use financial and non-financial information of listed firms on stock market to predict the financial statements with fraudulent and misstated information. Some other studies focused on analyzing elements that help to identify the risk of fraudulent and misstated information on financial statements. It is important to build approaches for predicting the risk of fraudulent and misstated information on financial statements.

Companies often present audited financial statements to ensure the information is transparent, reasonable, and verified by a professional auditor. However, this method exposes a big challenge for financial statement users. This method is difficult for investors and third parties to approach, and requires critical analysis which might be challenging even for auditors.

The earliest studies on identification of material misstatements including frauds and errors in financial statements are researches using discretionary accruals models. The pioneers in this group are first DeAngelo (1986), then Friedlan (1994), Kealy (1985), Jones (1991) to further complete the model. Another group of researches using statistical techniques to identify frauds and errors within financial statements became increasingly popular thanks to its high level of accuracy. Outstanding researches on this group include Beneish (1997, 1999) and Dechow et. al., (2011).

In Vietnam there are several related researches such as research of Phan (2013) which analyzed the differences in profit after tax during the period from 2010 to 2012. However, the study results stopped at descriptive statistic and have not been able to identify the correlation among factors leading to the differences between profit after tax and profit after audit. Ha (2014) has studied 132 listed firms and used Chi-squared test on data collected during 2011-2012 and ANOVA test on the factors affecting the differences between net profit after tax and net profit after audit. Researches conducted by Nguyen & Nguyen (2014), Tran et. al., (2015), Hoang & Tran (2015) using Beneish model to predict the possibility of critical errors originated from frauds and errors on financial statements of listed firms on Vietnam Stock Exchange. However, the weakness of these researches lied within the small number of observations making it difficult to apply results to the every firm listed on the stock market. At the same time, using unsuitable regression methods led to ineffectiveness of estimation results and decreased the accuracy of prediction.

This research aims to consider the effectiveness of Beneish model (1999) in application to Vietnam stock market and withdraw solid suggestion to use a more effective tool to uncover frauds and errors on financial statements. The results from this research give some recommendations for investors to select appropriate stock portfolio to invest and maximize their return on investment. The research also helps creditors to make correct lending decision. Moreover, through this research market managing authorities and policy makers can have a more accurate view on listed firms and protecting investors as well as the health of Vietnam stock markets.

2. LITERATURE REVIEW

2.1. International Publications

2.1.1. Researches by Association of Certified Fraud Examiners (ACFE)

The world's first association specialized on study of fraud – ACFE was established in 1988. Since establishment, ACFE has been conducting large-scale studies through the years to publish statistical data of fraud based on criteria such as: types of fraud, perpetrators conducting fraud, damages due to fraud, frauds by organizational types and scale, methods for prevention and detection of fraud.

The results from case studies according to ACFE reports on 2016 together with constant researches during a long period starting 1993 until now have helped ACFE to have more in-depth views into fraud and to uncover realistic evidences on what called frauds. ACFE has revealed extremely specific numbers for each criterion relating to fraud.

According to ACFE, fraudulent behaviors are committed by 3 main perpetrators: employees, board of directors and owners. Results in 2016 showed that employees caused majority of fraudulent activities at 40.9%, while owners caused the lowest at only 18.9%. However, the level of damages resulted from owners' frauds was 11 times higher than what caused by employees. This clearly showed that individuals with more power, more understanding firm insights and financial environment have the ability to cause more damages with their fraudulent acts. Many previous researches have focused on analysis of earning management which reflects the acts of administrators using accounting methods for personal purposes or for increasing the firms' market value. There are various explaining motives for these behaviors such as short-term bonuses. Or, in other cases, shareholders of future selling shares would exaggerate the profit to increase virtual value of firms. Or, a financial statement with stable finance and profit could bring contracts from suppliers, related organizations or loans from financial institutions. It was such behavior affects the true and fair financial statements.

Table 1
Statistics of Fraud Perpetrators

Perpetrators	*Year 2012*		*Year 2014*		*Year 2016*	
	Ratio %	*Damage ($)*	*Ratio %*	*Damage ($)*	*Ratio %*	*Damage ($)*
Owners	17.6%	$573,000	18.6%	$500,000	18.9%	$730,000
Board of Directors	37.5%	$182,000	36.2%	$130,000	36.8%	$173,000
Employees	41.6%	$60,000	42%	$75,000	40.9%	$65,000
Others	3.3%	$250,000	3.2%	$100,000	3.4%	$104,000

Source: Summarized from Fraud reports of ACFE for 2012, 2014, and 2016.

ACFE has classified frauds into three specific types as presented on the classification above – including embezzlement, corruption and fraudulent financial statements. On the behavior of creating fraudulent financial statements, the related items including revenue, profit or asset are often exaggerated to present a healthy financial situation. Meanwhile, items related to cost, debts, losses are often lowered to show off the increase in asset and capital value. Study results showed embezzlement fraud accounted for 83.5% of total cases researched, yet the damages were valued at the least amount compared to the other two behaviors.

On the other hand, with a low ratio of approximately 9.6%, fraudulent financial statements caused the highest level of economic damages.

Table 2
Statistics of Types of Fraud

Types of Fraud	*Year 2012*		*Year 2014*		*Year 2016*	
	Ratio %	*Damage ($)*	*Ratio %*	*Damage ($)*	*Ratio %*	*Damages($)*
Asset Misappropriation	86.7%	$120,000	85.4%	$130,000	83.5%	$125,000
Corruption	33.4%	$250,000	36.8%	$200,000	35.4%	$200,000
Fraudulent Financial Statement	7.6%	$1,000,000	9%	$1,000,000	9.6%	$975,000

Source: Summarized from Fraud reports of ACFE for 2012, 2014, and 2016.

2.1.2. Other International Publications

First, researches on the use of financial information to predict frauds on financial statements: Financial metrics are criteria that can be presented as currency unit or financial indexes calculated from monetary criteria. Several highly interested criteria include total assets, revenue, profit, dividends, and retaied earnings.

Beneish (1997) has conducted analysis of 363 observations and discovered 49 firms with violations. Furthermore, he uncovered 15 other firms with suspicious accounting system due to press information from 1987 to 1993. Combined with the use of Jones (1991) discretionary accrual model, Benish (1997) concluded the growth in revenue, debt balance and total accounting estimate on total assets are quite useful in discovering fraudulent firms as well as firms eagerly taking advantage of accrual expenses to modify revenue. Benish's research in 1999 has combined two sets of samples for fraudulent and non-fraudulent firms based on equivalent sampling of the same industry and fiscal year that financial statement data was used in available model. Benish (1999) has shown that the higher the value of financial indexes, the higher the probability of profit being exaggerated. To be more specific, those financial indexes are related to receivables per revenue, profit margin, asset quality, and revenue growth and accrued expenses.

Persons (1995) also proved within his study the hypothesis of financial leverage, return on investment, asset structure and firm scale affecting the possibility of fraud. The study used logit regression analysis between two groups of random samples collected including 103 fraudulent firms and 103 non-fraudulent firms. These two opposite sets of samples are collected from the same industry and fiscal period. Pearsons (1995) selected 10 variables in which 8 variables are financial indexes input to develop two logistic regression models for fraudulent year and the previous year in order to increase the credibility of prediction results.

Similarly to the remarks of Pearsons (1995), the study by Dechow et. al., (1996) also presented that the higher financial leverages and secured debts in one company are, the stronger its motives for fraudulent activities are. Moreover, the ability to self-provide capital of firms largely affects its demand for outside capital. Thus, firms with high ability to self-provide necessary capital are less likely to conduct fraudulent acts.

Lou & Wang (2011) studied the relation between the three components of the fraud triangle and the possibility of fraudulent financial statements. Samples are selected from public listing firms in Taiwan

including those listed on centralized and decentralized stock exchange. SEC discovered 123 firms that violated accounting and auditing regulations during the period from 1996 to 2006. After omitting ineligible firms, the remaining samples are 97 listed firms. This number was then combined with 467 non-fraudulent samples based on the equivalence of scale, industry, and total asset comparing to the fraudulent samples. Lou & Wang (2011) based on previous researches to find relevant variables toward fraudulent activities representing pressures, opportunities and attitude. By using logit regression method, Lou & Wang (2011) concluded that financial leverage has meaningful relation with the possibility of fraudulent financial statements together with other factors such as auditor changes, financial statement modifications, and the ratio of stock owned by Board of Managers and Directors being mortgaged.

Second, researches on the use of non-financial information to predict frauds on financial statements: Non-financial metrics are information presenting or calculating in non-monetary units. The outstanding advantage of non-financial metrics is its ability to explain issues not presented in financial statements such as competitive advantage, market share… These metrics also have the ability to accurately and objectively reflect all aspects of firms. Therefore, a great deal of previous studies on fraud has pointed out that not only financial metrics, but also non-financial metrics take part in effectively predicting fraudulent financial statements. Such studies include Beasley (1996), Dechow et. al., (1996), and Peasnell et. al., (2000).

These researches built models to identify fraudulent financial statements based on internal administration factors such as ownership structure, characteristics of Board of Directors. Beasley (1996) classified frauds into two types being purposely stating wrong information for financial statement readers and embezzling and corrupting behaviors. This study was conducted on samples of 75 fraudulent listed firms and opposite 75 non-fraudulent firms of the same scale and industry. Practical results from logit regression model showed companies with majorly higher ratio of outside members within the Board of Directors were less likely to commit fraudulent acts. Moreover, Beasley (1996) proved that the presence of Audit Committee did not have considerable positive effect in decreasing the probability of fraud. The hypothesis in which the level of independence of members of Board of Directors affects the probability of fraud has also been proved in a study of Dechow et. al., (1996). The research studied 92 firms violating general accounting principles as investigated by the SEC within the 10-year period from 1982 to 1992. Dechow et. al., (1996) found that one of the important motives for fraudulent activities on financial statements were to attract outside investment at low expenses and to reduce financial pressures. The study focused on three aspects of fraudulent behaviors being choice of accounting method, sum of accrual accounts, and unreasonable estimate of accrual accounts.

Peasnell et. al., (2000) used the model detecting profit-modified behaviors of Dechow et. al., (1996) – namely Modified Jones model – on the samples of 1,271 listed firms in the UK during the period from 1993 to 1995. The study showed that the increase in outside members within Board of Directors would decrease the profit administration behaviors and the presence of an Audit Committee would support the monitoring function of Board of Directors.

Third, researches on the building of models to predict frauds on financial statements

+ ***M-score model.*** M-score model built by Beneish (1999) has created an effective way to prevent risk and help auditors as well as investors identify whether a company has fraudulent possibility. Baneish (1999) stated that any action in financial statements is acted upon the increase of profit. Selected indexes to

include in the model focused on two groups being leverage index, inventory index, day's receivables index, gross profit index, asset quality index, revenue growth index, depreciation index, operating costs. Results showed that there is a statistical relation between possibility of fraud and variables on financial statements. Baneish (1999) used samples of 74 firms with affected profit in the period from 1982 to 1992 with weighted exogenous sample maximum likelihood probit model and unweighted probit model. According to Beneish (1999), M-score of a company exceeding -2.22 indicates signal of behaviors that affected profit.

+ ***Altman Z-score model.*** Z-score model was designedby Alman (1968) to predict the probability of companies going bankrupt within the next two years. This model, at the same time, can be a tool to test financial health of firms. There were a number of studies on fraud such as Loebbecke et. al., (1989), Persons (1995), and Summer & Sweeny (1998) observing that financial exhaustion is one of the motives for fraudulent financial statements. Alman (1968) studied samples of 66 firms divided into two groups. Bankruptcy group included firms having submitted request for bankrupt, and opposite group being other firms of similar scale and industry. Alman (1968) collected 22 variables representing 5 groups including liquidation indexes, profit indexes, leverage indexes, liquidation indexes and operating indexes. Then, Z-score index was adjusted with some characteristics in 1993 with the prediction accuracy of 66% bankrupt companies and 78% non-bankrupt firms in previous year.

+ ***P-score model.*** P-score model was further developed by Pustylnick (2011) based on the Z-score model formula. The calculation formula for P-score is similar to Z-score with one change in replacing gross income and working capital with revenue and owner's equity. Pustylnick (2011) has studied 29 firms with published fraudulent history. In general, the new model by Pustylnick (2011) has shown more practical changes. From the studies in 1998 where 50% of fraudulent cases occurred at the time of revenue record and asset fraud, Pustylnick (2011) added flexible changes into indexes within Z-score model to improve the effectiveness of detecting fraudulent information on financial statements. However, this study mainly focused on analyzing the fluctuation trends which required data to be collected in years of observation. This is also a shortcoming of this research model since collecting old data within a long period of time is not an easy task. Besides, there were only 29 samples studies, which was a small number and not possible to make a general conclusion.

+ **F-score model.** F-score model was constructed as an initial experiment to help auditors and investors evaluate the risks of financial statements having misstated information. The F-score coefficient does not guarantee the presence of errors, but it is the warning signal to help auditors and investors focus more on the risks. Dechow et. al., (2011) has investigated 2,191 financial statements of firms issued from 1982 to 2005 on SEC. Results showed 680 firms suspected for having quarterly and annually financial statements with errors. Statistical results indicated that over 55% of fraudulent cases are related to revenue, then inventories, cost of goods sold, and 10% related to provisions.

2.2. Researches in Vietnam

Nguyen & Nguyen (2014) used Beneish model (1999) to predict the probability of serious misstatements in financial statements of listed firms on Vietnam stock market. After applying Beneish model, results showed 53.33% fraudulent detection rate on the samples of 30 selected firms. The author also stated that M-score model of Beneish could be used to early detect listed firms with possibility to commit fraudulent acts on financial statements in Vietnam market. However, the study stopped at directly applying the original

Beneish model (1999) on small number of samples and at one specific time. Despite its shortcoming, this was among earliest study using statistical techniques, specifically the M-score model of fraud prediction in Vietnam, thus its biggest contribution was opening the path for M-score development in Vietnam.

Hoang & Tran (2015) applied researches from DeAngelo (1994), Friedlan (1994), and Beneish (1999) to build the model of detecting possibility of misstatements within financial statements of construction firms listed on Vietnam stock market. In this research, the authors used two models: the original with 8 variables of Beneish and the 10-variable model developed with two variables being discretionary accruals (DA) and company scale (Size). The accuracy rates of these two models are 63.41% and 68.29% in respective order, according to independent audit results. With model (2), after the addition of DA variable, a higher result was shown regarding the prediction ability of misstated financial statements comparing to the original study of Beneish (1999).

Tran et. al., (2014) evaluated the efficiency of fraud triangle according to the guidelines of Vietnam Accounting Standards in detection and reporting of frauds in listed firms on Vietnam stock exchange. Research results showed that the probability of fraud had significant relation with the 3 factors of motives/ pressure, with 1 factor of opportunities and with 2 factors of attitude. The model used the above mentioned variables has the prediction accuracy rate of 83.33% for firms among the samples and 80% for firms outside of studied samples. The shortcomings of this research are low quantity of samples with only 78 observations and short study period of 1 year, thus it can hardly ensure the effective estimation of prediction ability and generalization ability.

Another research from Nguyen & Nguyen (2016) applied the M-score coefficient to identify the profit administration of 229 non-financial companies during the period of 2013 – 2014. Results showed 48.4% of firms having committed profit adjustment (M-score > -2.22). However, this research stopped at calculating the M-score coefficient based on Beneish model (1999) without evaluating the model fit for Vietnam market.

3. RESEARCH MODEL AND METHODOLOGY

3.1. Research Model

Based on literature review above and Beneish model (1999), we proposed two quantitative models for predicting and detecting material misstatements including frauds &errors in financial statements as followed:

Research model 1: This is based on Beneish model (1999) to apply to collected samples. Model 1 consists of 8 independent variables AQI, SGI, DEPI, SGAI, DRSI, GMI, LVGI and TATA. The variables are measured and explained in details on Table 3.

$$\text{Ln}[\text{Prob}(M = 1)/(1 - \text{Prob}(M = 1)] = \beta_0 + \beta_1 DSRI + \beta_2 MI + \beta_3 SGI + \beta_4 AQI + \beta_5 DEPI + \beta_5 SGAI + \beta_7 LVGI + \beta_8 TATA + \varepsilon \quad (1)$$

Research model 2: Beneish model (1999) was applied to collected samples with an additional of 3 control variables being ROA, Size and LV (see Table 3).

$$\text{Ln}[\text{Prob}(M = 1)/(1 - \text{Prob}(M = 1)] = \beta_0 + \beta_1 DSRI + \beta_2 MI + \beta_3 SGI + \beta_4 AQI + \beta_5 DEPI + \beta_5 SGAI + \beta_7 LVGI + \beta_8 TATA + \beta_9 ROA + \beta_{10} SIZE + \beta_{11} LV + \varepsilon \quad (2)$$

The addition of 3 control variables on model 2 is to evaluate the impact of these variables on the model's ability to detect frauds and errors on financial statements.

- Return on asset ROA: Summers & Sweeney (1998) showed that the return of asset ratio largely differs among listed firms with and without misstatements on financial statements. Similarly, the research of Skousen et. al., (2009) used ROA as control variable with the hypothesis that this factor has negative relationship with frauds and errors of financial statements.
- Company scale based on gross revenue (SIZE): There were previous researches testing the fraud and error behaviors in strong correlation with firms' scale such as Beasley et. al., (1999), Bonner et. al., (1998), and Lou & Wang (2011). Similarly, we used firm scale (SIZE) as control variable under the hypothesis that firm scale has negative relationship with frauds and errors of financial statements.
- Financial leverage (LV): Dechow et. al., (1996) concluded that listed firms with high financial leverages and secured debt provisions have higher motives to manipulate the income. The higher the debt, the more likely firms will exaggerate their profit via accounting estimates according to DeAngelo et. al., (1994) and DeFond & Jiambalvo (1991). Thus, financial leverage (LV) can be used as control variable to evaluate its positive relationship with frauds and errors on financial statements.

3.2. Research Data

To conduct this study, we collected data from listed firms on HOSE during the period from 2014 to 2016. By 2014, there were 306 firms which reduced to 289 after excluding financial institutions. Among the 289 firms, there were only 208 with sufficient data to identify the variables during the period from 2014 to 2016. Data was collected from consolidated financial statements of 2014, 2015, and 2016 (unaudited) and of the year 2013, 2014, 2015, and 2016 (audited).

Data of profit after tax on consolidated financial statements along with other criteria on these statements after audit consists of 208 listed firms on HOSE during 2014 to 2016. These numbers then imported to Excel to calculate dependent, independent and control variables. Then, STATA tool was used to support handling the descriptive statistic function, regression analysis, and prediction analysis. The final results reflected the tendency and impact level as well as the direction of impact for each factor toward frauds and errors on financial statements.

Dependent variable of difference in profit after tax is calculated as followed:

$$\text{Profit differing Ratio} = \frac{\text{Profit after audit} - \text{Profit prior audit}}{\text{Profit after audit}} \times 100$$

From the formula, a negative result on profit difference means that the profit prior audit is higher than profit after audit. This indicates a misstatement which might be originated from the intention to exaggerate company's profit. Vice versa, if the result is positive, the company might be hiding a part of their actual profit.

Tu's research on the seriousness in financial statement audit (2007) concluded that those using financial statement when making decisions usually consider the business performance as the deciding factor. Thus,

auditors often used the ratio over profit to establish the level of seriousness. This means that the auditing difference of fewer than 5% is usually considered as not serious. We use the differing ratio being profit after tax to identify the serious ratio of difference when the differing ratio of profit after tax and before audit being over 5%.

3.3. Analysis Method

Research data is summarized in panel data format. With panel data, the cross sections are investigated in time series. The order of research followed steps as below:

- First, primary analysis was firstly conducted to filter research samples and remove outliers in the sample. This step helped to test the sample fit of research observations before conducting logit regression analysis and ensured the credibility of estimated results. We conduct descriptive statistic, correlation analysis to eliminate multicollinearity among independent variables.
- Second, test the difference between two groups of material misstatements and immaterial misstatements, we run Paired *t*-test, and Wilcoxon signed rank test. This step helped to identify independent variables with differences and those without differences between the two groups. At the same time, this testing step helped to quickly detect variables with impact toward the possibility of frauds and errors on financial statements. Furthermore, if testing results showed variables with differences between two groups of samples, the multivariable regression will show more credibility and significance.
- Third, identify in respective order the impact of independent variables with or without statistical meaning toward the dependent variable through testing the regression coefficients of multivariable model. Data used in this step consists of the whole sample size including financial statement information of listed firms on HOSE during 3 years from 2014 to 2016. The purpose of this action is to figure out which independent variables have statistical relationship with dependent variable and then propose suitable policies for effective prediction of frauds and errors on financial statements.
- Fourth, regression model then was rebuilt based on all data samples in 3 years from 2014 to 2016 in which independent variables without significant statistical meaning toward dependent variable (tested in the previous step) would be removed to accurately identify the predicting factors in the model. Logit regression model was built to predict and evaluate the predictability of factors in this model.

4. RESULTS AND DISCUSSIONS

4.1. Study Results

As data shown in Table 4, for listed firms 208 surveyed in time series from 2014 to 2016, there are 624 observations in which 201 of them do not have differences in profit after tax before and after auditing, accounting for 32%. There are 163 observation for differences in profit after tax with the ratio of 1%, accounting for 26% of total observation. For discrepancy ratio of in the range of 1% to 5%, 5% to 10%, 10% to 50%, and over 50%, the percentage of observation is 19%, 7%, 11%, and 5%, respectively.

Table 3
Variables in Research Model

Name of variables	*Code*	*Measurement*	*Explanation of index*	*Interpretation*	*Expected sign*
Misstated financial statement	MISS	1: Financial statement with material misstatements 0: Financial statement without material misstatements			
Days Sales in Receivables Index (DSRI)	DSRI	DSRI = (Receivables$_t$/Sales$_t$)/(Receivables$_{t-1}$/Sales$_{t-1}$)	Receivables:amounts owed by customers and not yet paid	According to Beneish, the higher DSRI is, the higher the likelihood that revenues and earnings are overstated due to the inadequate growth of receivables compared to revenues	+
Gross Margin Index (GMI)	GMI	GMI = [(Sales$_{t-1}$ – COGS$_{t-1}$)/Sales$_{t-1}$]/[(Sales$_t$ – COGS$_t$)/Sales$_t$]	COGS:cost of goods sold	When GMI is greater than 1, it indicates that gross margins have deteriorated. According to Beneish, there is a positive relation between GMI and the probability of frauds, evidenced by decreased gross margins and motives for earnings manipulation	+
Sales Growth Index (SGI)	SGI	SGI = Sales$_t$/Sales$_{t-1}$	Sales:net sale	If an enterprise has exceptionally high SGI, it may have greater incentives to manipulate earnings than those with normal SGI value	+
Asset Quality Index (AQI)	AQI	AQI = [1 – (Current Assets$_t$ + TLTA$_t$)/Total Assets$_t$]/[1 – (Current Assets$_t$ + TLTA$_{t-1}$)/Total Assets$_{t-1}$)]	TLTA:remaining value of long-term tangible assets; Current Assets: short-term assets	If AQI is greater than 1 it indicates that the enterprise has potentially increased its involvement in cost deferral, which serves as the basis for wrong realization of assets and incorrectly high profit	+
Depreciation Index (DEPI)	DEPI	DEPI = [Depreciation$_{t-1}$/(PP&E$_{t-1}$ + Depreciation$_{t-1}$)]/[Depreciation$_t$/(PP&E$_t$ + Depreciation)]	Depreciation:reduction in asset value of long-term tangible asset	A DEPI greater than 1 indicates that there are certain changes in the depreciation policy to manipulate earnings	+
Selling and General & administrative expense Index (SGAI)	SGAI	SGAI = (SG&A Expense$_t$/Sales$_t$)/(SG&A Expense$_{t-1}$/Sales$_{t-1}$)	SG&A Expense: Selling and General & Administrative expense	According to Beneish, SGAI has positive relation with the possibility of earnings manipulation in financial reports	-
Leverage Index (LVGI)	LVGI	LVGI = [(Current Liabilities$_t$ + LTD$_t$)/Total Assets$_t$]/[(Current Liabilities$_{t-1}$ + LTD$_{t-1}$)/Total Assets$_{t-1}$]	Current Liabilities:short-term debt; Total Long Term Debt Total Assets:	A LVGI greater than 1 indicates an increase in leverage. An enterprise with high value of LVGI means high financial pressure, which can serve as incentives for earnings manipulation.	-
Total Accruals to Total Assets (TATA)	TATA	TATA = (Net Income$_t$ – CFOs$_t$)/Total Assets$_t$	CFOs: Cash Flow From Operating Activities	Beneish defined the difference in profit after tax and cash flow from operating activities as the total accruals. The lower that value, the lower the real money balance and the higher likelihood of earnings manipulation.	+

Source: Beneish (1999)

Table 4
Differences in Profit After Tax before and after Audit By Ratio of Difference

Content	*2014*		*2015*		*2016*		*Total*	
	No. of firms	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*
No difference	68	33%	65	31%	68	33%	201	32%
Difference < 1%	60	29%	56	27%	47	23%	163	26%
Difference 1% to 5%	41	20%	34	16%	45	22%	120	19%
Difference 5%to under 10%	14	7%	14	7%	15	7%	43	7%
Difference 10% to under 50%	19	9%	27	13%	21	10%	67	11%
Difference over 50%	6	3%	12	6%	12	6%	30	5%
Total	208	100%	208	100%	208	100%	624	100%

In 624 observations, 210 listed firms have difference of decrease, accounting for 33.7% while 213 firms have difference of increase, accounting 34.1%. So profit after tax in financial statements increases more than decreases but the trend of difference between increase and decrease percentage is not considerable.

Table 5
Trend of Difference in Profit After Tax Before and After Audit

Content	*2014*		*2015*		*2016*		*Total*	
	No. of firms	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*
No difference	68	33%	65	31%	68	33%	201	32.2%
Increase	71	34%	75	36%	67	32%	213	34.1%
Decrease	69	33%	68	33%	73	35%	210	33.7%
Total	208	100%	208	100%	208	100%	624	100%

Table 6
Difference in Profit After Tax Before and After Audit by Materiality

Item	*2014*		*2015*		*2016*		*Total*	
	No. of firms	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*	*No. of firms*	*Ratio*
Immaterial misstatements	169	81%	155	75%	160	77%	484	77.6%
Material misstatements	39	19%	53	25%	48	23%	140	22.4%
Total	208	100%	208	100%	208	100%	624	100%

As can be seen in Table 6, there are 140 observations in financial statements with material misstatements (difference in profit before and after audit larger than 5%), accounting for 22.4%. There are differences in ratios of frauds and errors in financial statement among business field that is shown in Table 7, in which fields with the misstatement ratio is agriculture, real estates, construction of 29%, 28%, and 26%, respectively. The industry field has the lowest material misstatement ratio of 11%.

Table 8 reveals that the rate of material misstatements in financial statements is 22.0%. DSRI,GMI, SGI, AQI, LVGI all have the average ratios higher than 1; meanwhile DEPI and SGAI have average ratios lower than 1 at 0.75 and 0.77, respectively. TATA have the average ratio of 0,00, meaning profit after tax and cash flows of from operating activities are similar. Listed firms have the average ratio of Return on sales of 12%, and leverage index (total debt/total asset) of 49%.

Table 7
Summary of Material Misstatements by Sectors

Sectors	*Number of observations*		*Number of material misstatements*		
	Number	*Percentage*	*Number*	*Misstatement ratio*	*Percentage*
Agriculture	72	12%	21	29%	15%
Consumer goods	60	10%	11	18%	8%
Energy	48	8%	8	17%	6%
Health care	21	3%	4	19%	3%
Industry	90	14%	10	11%	7%
Material	54	9%	14	26%	10%
Real estate and construction	201	32%	56	28%	40%
Service	63	10%	13	21%	9%
Technology	15	2%	3	20%	2%
Total	624	100%	140	22%	100%

Table 8
Descriptive Statistics of Variables

Variables	*Number of observations*	*Average*	*Standard deviation*	*Minimum value*	*Maximum value*
MISS	624	0.22	0.42	0.00	1.00
DSRI	624	1.17	0.70	0.10	7.95
GMI	624	1.02	0.82	-11.99	7.77
AQI	624	1.20	1.14	0.00	19.69
SGI	624	1.16	0.59	0.31	9.70
DEPI	624	0.75	0.44	0.00	3.98
SGAI	624	0.77	0.78	0.00	9.22
LVGI	624	1.14	1.64	0.01	18.79
TATA	624	0.00	0.12	-0.40	0.81
ROA	624	0.12	0.45	-1.32	10.23
SIZE	624	13.76	1.42	8.07	18.11
LV	624	0.49	0.22	0.03	1.27

As mentioned above, a research goal of this article is to verify the average level of variables between the group of having material misstatements and the group of having immaterial misstatements. Results of nonparametric tests show there are average difference between the two groups and of statistical significance regarding DSRI, DEPI, ROA, SIZE, and LV variables. There are differences without statistical significance regarding other variables.

As shown in Table 10, results of correlation coefficients among variables; the purpose of verifying the close correlation among independent variables, dependent variables, and control variables is to eliminate factors that can lead to multicollinearity before applying the regression model. Regarding correlation coefficients among independent variables in the model, nopair has the value higher than 0.8 so there is little chance that multicollinearity occurs independent variables. When applying the regression model, we use variance inflation factor (VIF) for testing.

Table 9
Testing Mean Differences between Two Groups

Variables	*Prob > chi2*	*Normal distribution*	*Nonparametric Tests*				*Wilcoxon Signed Rank Test (z)*
			Mean of group without material misstatements	*Mean of group with material misstatements*	*Difference*	*Statistic value t*	
DSRI	0.0000	No	1.130	1.310	-0.180	-2.696**	-1.725*
GMI	0.0000	No	0.984	1.143	-0.160	-2.042**	-3.08
AQI	0.0000	No	1.204	1.177	0.026	0.2376	-1.4
SGI	0.0000	No	1.169	1.137	0.032	0.5621	0.576
DEPI	0.0000	No	0.762	0.692	0.070	1.669	2.325**
SGAI	0.0000	No	0.742	0.844	-0.102	-1.3604	1.357
LVGI	0.0000	No	1.085	1.309	-0.224	-1.4284	-1.45
TATA	0.0000	No	0.004	0.007	0.005	-0.3004	-1.101
ROA	0.0000	No	0.137	0.056	0.081	1.8795*	5.812***
SIZE	0.0059	No	13.829	13.513	0.316	2.3283**	2.201**
LV	0.0015	No	0.475	0.533	-0.059	-2.8319**	-3.015**

Table 10
Correlation Matrix

	MISS	*DSRI*	*GMI*	*AQI*	*SGI*	*DEPI*	*SGAI*	*LVGI*	*TATA*	*ROA*	*SIZE*	*LV*
MISS	1.00											
DSRI	0.11	1.00										
GMI	0.08	0.14	1.00									
AQI	-0.01	-0.04	0.00	1.00								
SGI	-0.02	-0.24	0.17	0.07	1.00							
DEPI	-0.07	-0.05	0.01	-0.15	-0.06	1.00						
SGAI	0.05	0.20	-0.06	-0.08	-0.19	0.48	1.00					
LVGI	0.06	0.04	0.03	0.00	0.10	-0.20	-0.10	1.00				
TATA	0.01	0.22	0.06	0.02	0.08	-0.02	-0.04	0.02	1.00			
ROA	-0.08	0.03	0.02	-0.01	0.06	0.02	0.01	0.00	0.15	1.00		
SIZE	-0.09	-0.14	-0.06	-0.02	0.01	0.02	-0.08	-0.04	0.06	-0.22	1.00	
LV	0.11	0.00	-0.06	-0.01	-0.01	0.00	-0.07	0.17	-0.04	-0.23	0.30	1.00

As data shown in Table 10, supposing that each entity has its own characteristics that may affect explanatory variable; however such factor can not be observed. Whether these factors are present would be checked with Fixed Effect Model (FEM), and Random Effect Model (REM). In addition to logit with fixed effects and random effects, We use PA model in accordance with study of Hardin & Hilbe (2003) which allow estimates in case structure correlation occurs in the group of data in the table (Logit PA). White's method(1980) in Logit PA Robust model allows estimation of regression index with lower standard deviation in order to test reliability of quantitative conclusion.

Table 11 presents regression results of factors with fraudulent behaviors and errors in financial statements according to 5 regression models. Statistic value *t* is presented in parentheses, below regression

indexes. From analyzing strengths and weaknesses of all 5 models, the regression method according to Logit PA Robust provides the most reliable results because it overcomes shortcomings of other models. However, for higher reliability, we compare results of all 5 methods. There are 3 independent variables, namely GMI, DEPI, GSAI, with statistical significance in at least 1 out of 5 models; the remaining variables without statistical significance are eliminated.

After testing independent variables with statistical significance with dependent variables, in the next step, we build the optimal regression model according Logit PA Robust model with 3 independent variables: GMI, DEPI, and GSAI. Regression models are presented in details in Appendix 1, showing that independent variables all have statistical significance at 5% and 10%.

Table 11
Regression Result for Model 1

	VIF	*OLS*	*REM*	*FEM*	*PA*	*PA, Robust*
DSRI	1.27	0.157	0.219	0.0893	0.147	0.147
		[1.04]	[1.10]	[0.36]	[1.05]	[1.06]
GMI	1.09	0.325**	0.323	0.117	0.236	0.236
		[1.97]	[1.63]	[0.61]	[1.63]	[1.19]
AQI	1.03	-0.0366	-0.0376	-0.0309	-0.0256	-0.0256
		[-0.38]	[-0.31]	[-0.21]	[-0.30]	[-0.33]
SQI	1.17	-0.0868	-0.238	-0.358	-0.196	-0.196
		[-0.47]	[-1.00]	[-1.38]	[-0.92]	[-0.85]
DEPI	1.43	-0.641**	-0.792**	-1.182**	-0.610**	-0.610*
		[-2.11]	[-2.14]	[-2.22]	[-2.18]	[-1.74]
SGAI	1.45	0.293**	0.316	0.438	0.230*	0.230*
		[2.01]	[1.63]	[1.36]	[1.71]	[1.88]
LVGI	1.06	0.0497	-0.0152	-0.141	-0.0171	-0.0171
		[0.93]	[-0.21]	[-1.54]	[-0.30]	[-0.31]
TATA	1.08	0.0774	-0.379	-1.105	-0.243	-0.243
		[0.09]	[-0.35]	[-0.96]	[-0.30]	[-0.25]
_cons		-1.451***	-1.659***		-1.128***	-1.128**
		[-3.51]	[-3.05]		[-2.68]	[-2.53]
N		624	624	243	624	624

t statistics in brackets $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

For model 2, 3 control variables, namely ROA, SIZE and LV, were added. Results of the 5 regression models are presented in Table 12; according to them, all ROA, SIZE, LV control variables have statistical significance in at least 1 out of 5 regression model. We eliminate independent variables without statistical significance and carry out regression process according to Log it PA Robust method with 3independent variables (GMI, DEPI, GSAI) and 3 control variable (ROA, SIZE, LV). Regression results are presented in detail in Appendix 2. All 3independent variables and 3 control variables have statistical significance at 5% and 10% level, respectively. The result of Chi-squared test for the model is 0.0005 < 0.05, showing that the model has statistic significance.

Table 12
Regression Result for Model 2

	VIF	*OLS*	*REM*	*FEM*	*PA*	*PA, Ropust*
DSRI	1.29	0.111	0.156	0.0749	0.12	0.12
		[0.69]	[0.78]	[0.28]	[0.81]	[0.77]
GMI	1.1	0.328**	0.326*	0.159	0.246*	0.246
		[2.04]	[1.72]	[0.81]	[1.70]	[1.31]
AQI	1.03	-0.0564	-0.0495	-0.0505	-0.0365	-0.0365
		[-0.56]	[-0.42]	[-0.34]	[-0.40]	[-0.49]
SQI	1.17	-0.0153	-0.146	-0.312	-0.121	-0.121
		[-0.08]	[-0.63]	[-1.12]	[-0.61]	[-0.54]
DEPI	1.44	-0.686**	-0.827**	-1.302**	-0.649**	-0.649*
		[-2.21]	[-2.24]	[-2.36]	[-2.23]	[-1.88]
SGAI	1.47	0.318**	0.338*	0.511	0.250*	0.250**
		[1.99]	[1.69]	[1.59]	[1.72]	[2.00]
LVGI	1.1	0.00925	-0.042	-0.125	-0.0337	-0.0337
		[0.16]	[-0.57]	[-1.36]	[-0.58]	[-0.63]
TATA	1.12	1.022	0.47	-1.213	0.397	0.397
		[1.14]	[0.43]	[-1.01]	[0.46]	[0.38]
ROA	1.13	-1.940**	-1.795**	0.177	-1.436*	-1.436
		[-2.51]	[-1.97]	[0.16]	[-1.91]	[-1.23]
SIZE	1.21	-0.245***	-0.310***	-0.0248	-0.231**	-0.231**
		[-3.00]	[-2.64]	[-0.05]	[-2.46]	[-2.36]
LV	1.22	1.260**	1.616**	-3.993*	1.143*	1.143*
		[2.34]	[2.10]	[-1.78]	[1.90]	[1.79]
_cons		1.492	2.066		1.574	1.574
		[1.25]	[1.25]		[1.19]	[1.08]
N		624	624	243	624	624

t statistics in brackets $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 13
Forecast Results of Model 1 and Model 2

	Model 1			*Model 2*		
	1	*0*	*Total*	*1*	*0*	*Total*
1	6	2	8	9	6	15
0	134	482	616	131	478	609
Total	140	484	624	140	484	624
Correct forecast rate of frauds and errors			75.00%			60.00%
Incorrect prediction rate of frauds and errors			78.25%			78.49%
Average correct prediction rate			78.21%			78.04%
Type I error			25.00%			40.00%
Type II error			21.75%			21.51%

The final step of this paper is to verify the error prediction ability of chosen factors in the models in order to answer the question: can we rely on variables in Beneish model (1999) to build an effective predictive model for material misstatements including frauds and errors in financial statement in Vietnam? Results of verification show that the average correct prediction rate is 78.21% for model 1 and 78.04% for model 2.

4.2. Discussion

The study results show that the Beneish model (1999) is suitable and feasible for empirical research in Vietnam. In 8 variables of the model, there are only 3 variables that have impact and statistical significance, namely: GMI, DEPI, SGAI.

- Gross Margin Index (GMI) has positive correlation with the possibilities of fraud and errors in financial statements. It has the correlation of 0.239 with model 1 and 0.250 with model 2; this result matches with the initial hypothesis and study result of Beneish (1999).
- Depreciation Index (DEPI) has negative correlation with the possibilities of fraud and errors in financial statements. It has the correlation of -0.664 with model 1 and -0.656 with model 2; this result contradicts with the initial hypothesis and study result of Beneish (1999) but matches with study results of Hoang & Tran (2015) in Vietnamese stock exchange.
- Selling and General &Administrative Expenses (SGAI) has positive correlation with the possibilities of fraud and errors in financial statements. It has the correlation of 0.308 with model 1 and 0.312 with model 2; this result does not match with the initial hypothesis and study result of Beneish (1999).

For model 2, when adding 3 control variables, namely Return on Assets (ROA), size by revenue (SIZE) and leverage (LV), these variables all have statistical significance. ROA and SIZE variables have positive correlation with the possibilities of fraud and errors in financial statements, which matches with the initial hypothesis and study results of Summers & Sweeney (1998), Skousen et. al., (2009), Beasley et. al., (1999), Bonner et. al., (1998) and Lou & Wang (2011). In addition, variable LV also has positive correlation with the possibilities of fraud and errors in financial statements, which matches with the initial hypothesis and study results of DeAngeloet al.(1994), DeFond & Jiambalvo (1991), Beneish, (1997), Lou & Wang, (2011), Persons, (1995), Skousen et. al., (2009) and Tran et. al.(2015).

In terms of prediction ability of the two models, correct prediction ability for observations in study sample is 78.21% for model 1 and 78.04% for model 2. However, inaccurate ratio is considerably different between the two models: it is 25% for model 1 and 40% for model 2.

5. CONCLUSION AND RECOMMENDATIONS

Material misstatements including fraud and errors in financial statements have become more and more common in Vietnam while auditing plays an important role in detecting and reporting such cases. According to descriptive statistics, difference in profit before and after tax occur in 22.4% of financial statements. It is appropriate to apply Beneish model (1999) to determine variables that affect frauds and errors in financial statements in Vietnam. In 8 variables of Beneish model, there are 3 independent variables with

impact and statistic significance: GMI, DEPI, SGAI,we also added 3 control variables with impact and statistical significance, namely: ROA, SIZE and LV. The ability to predict material misstatements in financial statements of the model is 78.21%.

Based on study results, we propose the following recommendations:

First, identify pressure factors leading to fraudulent behaviors errors, auditors can analyze and compare DSRI, GMI, SGI, AQI, LVGI, DEPI, SGAI, TATA to detect abnormalities and have stricter measures to check for suspicious signals.

Second, for investors and financial institutions, when considering the true and fair financial statements, in addition to basing on auditors' reports, they can use M-score to check where there are possibilities of frauds and error. The fact is that, there are many cases where listed firms and auditors join hands to have good images on financial statements for different purposes.

Third, the quality of accounting staff should be improved. Difference in profit after taxis partly due to intentional misstatements from people who prepare financial statements and also due to objective reasons like weak skill of accounting staff and the lack of honesty, objectiveness, observation skill, analytical skill and professional judgment.

Fourth, frauds, and errorsin financial statements are normally well-hidden and hard to detect. The State Securities Commission of Vietnam (SSC) and the Vietnam Association of Certified Public Accountants (VACPA) should increase inspection and handle violations related to transparency and true& fair information in financial statements of listed firms. Punishment should stricter and more deterrent with increased penalty for violations.

Last, inspection should be enhanced by issuing documents to increase the role and define responsibilities of the State Securities Commission of Vietnam and the stock exchanges in supervising information disclosure activities of listed activities. This will hold listed firms responsible for information disclosure and make them carry out their duties seriously.

The study results present evidence about Beneish model (1999) in identifying factors affecting frauds and errors in financial statement and providing good prediction for possibilities of frauds and errors for listed firms in Ho Chi Minh City Stock Exchange (HOSE). However, the study has certain shortcomings because it only identifies a number of factors; as a result further studies are required. Firstly, this study only includes dataset in 3 years from 2014 to 2016 for listed firms in HOSE; upcoming studies need to expand the sample size to include data in more years and data of firms in Hanoi Stock Exchange (HNX). Secondly, financial cost variables need to be added to the research model to increase the predictability of frauds and errors and reduce type I and II error rates.

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Appendix

Appendix 1
Regression results after eliminating variables without statistical significance (Model 1)

```
GEE population-averaged model                   Number of obs      =       624
Group variable:                         ma      Number of groups   =       208
Link:                                logit      Obs per group: min =         3
Family:                           binomial                     avg =       3.0
Correlation:                  exchangeable                     max =         3
                                                Wald chi2(3)       =     10.35
Scale parameter:                         1      Prob > chi2        =    0.0158
```

miss	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gmi	.2396219	.1366037	1.75	0.079	-.0281164	.5073603
depi	-.6642938	.2661648	-2.50	0.013	-1.185967	-.1426204
sgai	.3081206	.1262146	2.44	0.015	.0607446	.5554965
_cons	-1.256534	.2496444	-5.03	0.000	-1.745828	-.7672404

Appendix 2

Regression results after eliminating variables without statistical significance (Model 2)

GEE population-averaged model		Number of obs	= 624
Group variable:	ma	Number of groups	= 208
Link:	logit	Obs per group: min	= 3
Family:	binomial	avg	= 3.0
Correlation:	exchangeable	max	= 3
		Wald chi2(6)	= 23.99
Scale parameter:	1	Prob > chi2	= 0.0005

miss	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gmi	.2502625	.1342789	1.86	0.062	-.0129193	.5134443
depi	-.6565626	.2734954	-2.40	0.016	-1.192604	-.1205216
sgai	.3124159	.1372656	2.28	0.023	.0433802	.5814516
roa	-1.377964	.7080307	-1.95	0.052	-2.765679	.0097507
lndt	-.2375689	.0912677	-2.60	0.009	-.4164504	-.0586874
lv	1.166559	.5835221	2.00	0.046	.0228772	2.310242
_cons	1.518663	1.242924	1.22	0.222	-.9174232	3.954749