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Detecting Corporate Financial Fraud Using Modified Altman Z-Score and Beneish M-Score. The Case of Enron Corp

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Abstract
Enron Corp. was a U.S. corporation involved in three main business units made up of Wholesale Services, Energy Services and Global Services. Enron Corp. used fraudulent financial reporting to mislead and confuse investors, shareholders, creditors, employees of Enron Corp, government and regulatory agencies of the financial market. The purpose of the study was to analysis Enron Company's annual 10K reports filed with U.S. Security Exchange Commission (SEC) from 1997 - 2001 using Modified Altman Z-Score and Beneish M-Score detective models to find out how early the company's financial fraud could have been identified. Data for the study was retrieved from the U.S. SEC Edgar Database. Using the Modified Altman Z-Score values, the study found that Enron Corp. financial fraud could have been detected in 1997. The Beneish M-Score values also revealed that, Enron Corp. financial fraud could have been identified in 1998.
Keywords: Financial fraud, earnings manipulation, bankruptcy, Modified Altman Z-Score, Beneish M-Score.

1.0 Introduction

Fraudulent financial reporting with the aim of misleading and confusing investors, shareholders, creditors, employees of a company, government and regulatory agencies of the financial market is disastrous to the firm value. Reporting of financial performance of a firm to the public in a fraudulent manner to improve the financial condition of the firm is risky as revealed in Enron Corp. in United States (U.S.) bankruptcy (Fung, 2015). Loopholes in financial reporting standards worldwide contribute to fraudulent financial reporting. This raise concerns about the high quality of financial reporting standards, the role of auditors of a firm and regulators of the financial market (Jung, Lee & Weber, 2014). Frauds in organizations financial reporting cause many organizations business to collapse and impact negatively on the reputations, brands and image of many existing organizations (Eng, Sun & Vichitsarawong, 2014).

Enron Corp. was a U.S. corporation involved in three main business units made up of Wholesale Services, Energy Services and Global Services. The Wholesale Services unit was responsible for marketing commodity products, the Energy Services unit offered companies a better way to develop and execute their energy strategies and the Global Service unit was involved in transmission and transportation of natural gas (Shirur, 2011). Based on the past fraudulent financial reporting in large companies such as Enron Corp., Xerox and alleged fraud reporting cases concerning AIG, Freddie Mac and Lehman Brothers (Kassem & Higson, 2012), there appears to be considerable literature on financial fraud reporting by Enron Corp. that led to the collapse of the company. However, these studies focused on Enron deception strategies without using fraud detecting tools to find out if such financial fraud could have been detected early before the collapse of Enron Corp. This has accounted for little literature on using detective tools to analysis Enron Corp. financial fraud. Therefore, the purpose of the study is to analysis Enron Company's annual 10K reports filed with U.S. Security Exchange Commission (SEC) using Altman Z-Score and Beneish M-Score to find out how early the company's financial fraud could have been identified. This study will contribute to literature by answering the question how early Enron Corp. financial fraud could have identified.

The Altman Z-Score model revealed that Enron Corp. financial fraud could have been detected in 1997 whilst the Beneish M-Score also found that, Enron Corp. financial fraud could have been identified in 1998. The remaining part of this paper is organised as follows: section 2 reveals the history of Enron corp., section 3 discusses the deception strategies adopted by Enron Corp., section 4 provides an insight into the Enron Corp's corporate social responsibility, section 5 is on discussion of the facts and issues, section 6 provides analytical review of the results, section 7 is the conclusion and section 8 is the recommendation and the final part of the paper is the references.

2.0 History of Enron Corp.

Enron Corp. was a U.S. Corp. founded by Kenneth Lay in 1985 by merging Houston Natural Gas Company with InterNorth Natural-Gas Pipeline Company with headquarters based in Omaha, Nebraska, after the deregulation of the natural gas market by federal government. In 1987, Enron oil traders based in their New York office were exposed for diverting the company's funds of almost US$1 billion into their personal accounts. Enron became a major gas merchant in North America in 1989 when the company was trading natural gas. Enron Corp. in 1990, diversified the company's business locally and internationally by engaging into several business areas in U.S., Europe and the developing world (Shirur, 2011).

The company was engaged in energy derivatives trading, water, power generation, coal, paper and forest products, telecommunications, retail electricity and metals. Enron Corp. operated in Canada, United Kingdom, Philippines, Guatemala, India and Guam. Consultant Jeffery Skilling of Mickinsey & Co. was hired to lead the new division of Enron Finance Corp.in the year 1990 (Patra, 2010). In 1992 Enron Corp. received the approval from the U.S. SEC to use mark-to-market financial reporting method (Kroger, 2003). In 1996 there was a construction of the first phase of a US$2 billion Dabhol power project in India (Shirur, 2011).

In 1997, Consultant Jeffery Skilling who was hired in 1990 became the president and chief operating officer for Enron Corp (Patra, 2010). In 1999, Enron Corp. introduced the company's broadband services unit and Enron Online Website for trading commodities which later produce about 90 percent of Enron Corp. income. Within the same year, Time Belden conducted first research to exploit the deregulated energy market of California (Shirur, 2011). In the year 2000, the Company's annual revenue increased to US$100 billion from US$9 billion in 1995 whilst the stock price in the year also increased to US$67.25 per stock. The stock price of Enron further increased to US$90.56. Enron Corp. was ranked the seventh largest company on Fortune 500 (Li, 2010). In August, 2001 Jeffery Skilling resigned as Chief Executive Officer (CEO) of Enron Corp. and Kenneth Lay took over as CEO of the company (Shirur, 2011).

In 2001, the company reported his first third quarter loss of US$618 million for operating as business entity for four years which caused SEC of U.S. to investigate the loss. The investigation revealed that Enron Corp. was hiding its debt through complex web of partnership. Enron Corp. filed for bankruptcy on 2nd December, 2001(Shirur, 2011). The financial statements of Enron Corp. was audited by an independent accounting firm led by Arthur Anderson. This auditor was actively involved in devising of the complex deception strategies that will be discuss in the next section adopted by Enron Corp (Patra, 2010).

3.0 Deception Strategies Adopted by Enron Corp.

Enron Corp. used manipulated financial data to deceive investors, shareholders, creditors, employees of the company, government and regulatory agencies of the financial market because the company was making little return from their business operations and also desperately needed billions of U.S. dollars in cash to finance Enron Corp. increasing costs, to compensate the company's poor performance and to support their local and international diversification policy. Raising of funds from the capital market was ruled out by Enron Corp. since such act could have caused investors to identify that the company was not making huge returns from their operations causing the company's credit ratings and stock prices to fall (Kroger, 2003).

Enron Corp. depended on derivatives instruments such as energy future contract to fraudulently manipulate the company's publicly reported financial results. Enron Corp. used energy future contract to hide their debts from the U.S. SEC and investors when reporting financial data to the public (Catanach & Ketz, 2012). If the company needs to borrow an amount of US$1.7 billion to finance the company's operations, the company will not borrow from a bank or the capital market by issuing debt securities and report it as debts to investors. But the company will develop an energy future contract worth US$1.7 billion and provide an option in the future contract that Enron Corp. will buy it back after one year at US$2 billion. The company will trade this energy future contract and receive the US$1.7 billion and report it to investors as cash inflow from trading activities. The US$2 billion Enron owes and need to pay back in one year is reported as "price risk management liability". The contract will always be bought because those who will buy it know that they will make a profit of US$300 million in after one year. Enron Corp. used this strategy to borrow at least US$8.6 billion between 1992 and 2001. In 2000, this strategy provided over 50% of Enron Corp. cash inflow. The selling of this energy future contract assisted Enron Corp. to hide over US$5 billion in debt on their balance sheet as "price risk management liability" (Kroger, 2003).

Enron Corp. also used special purpose entities to hide debts from the investors and U.S. SEC. Limited partnership and companies were established by Enron Corp. to specifically perform certain activities for the company. The company decided to hide their transactions details with their enormous special purpose entities (Hays & Ariail, 2013). The company was in partnership with Thomas and Condor tax shelters, real estate investment trusts and real estate mortgage investment conduits. With the use of special purpose entities created by Enron Corp., the company was able to hide US$600 million debt with these special purpose entities (Bansal & Kandola, 2003).

Mark-to-Market (MTM) manipulation financial reporting method was also adopted by Enron Corp. to deceive investors (Kroger, 2003). MTM is accounting reporting method that allow companies using it to report the company's assets at fair value but not book value (Schnabel, 2014). In U.S. companies use this method to value their assets every quarter and report the gain or loss made by the company. If market value of a company's assets increased by US$2 million the company has the right to report the US$2 million as revenue. Enron Corp. received the approval to use mark-to-market financial reporting method from the U.S. SEC in 1992. Enron therefore took advantage of this MTM method to report huge gains on their assets and reported it quarterly to deceive investors and U.S. SEC (Kroger, 2003).

These deception strategies adopted by Enron caused employees to lose jobs, shareholders lost billions of

U.S. dollars on their investment and the public to lose confidence in investment. However, top executives of the company gain by taking advantage of insider trading to make profit by selling their share before the company collapsed (Di Miceli da Silveira, 2013).

4. 0 Enron Corp's Corporate Social Responsibility

Corporate Social Responsibility (CSR) requires companies to perform their obligations in relation to economic, legal, moral and ethical rules of the society (Chetty, Naidoo & Seetharam, 2015). According to European Commission Green Paper, business success cannot be only attained through maximization of profit but requires responsible behaviour from companies. Companies are therefore expected to integrate in a voluntary manner social and environmental actions with their business strategies to maximize profit for shareholders (Chetty, Naidoo & Seetharam, 2015).

The financial fraud behaviour demonstrated by Enron Corp., that resulted in company's fall which became the biggest business surprise during this 21st century and unexpected left 20, 000 employees in problems was not in favour of the society and environment (Petrache, 2009). Enron Corp. filed for bankruptcy at the time the company was building a number of oil-fired plants around the world that could have been beneficial to the society and the environment. Enron Corp. used manipulated financial data to deceive investors (Di Miceli da Silveira, 2013).

5. 0 Discussion of the facts and Issues

Modified Altman Z-Score and Messod Beneish M-Score models will be utilized in this study to examine the secondary data that will be collected from Enron Corp. annual 10K reports filed with the U.S. SEC from 1997 to 2001 to find out if potential financial fraud could have been detected earlier before the collapse of Enron Corp. These two models were adopted because they provide detailed analysis of financial statements which make it easy for financial fraud to be detected and identification of earnings manipulations. The income statement, balance sheet and cash flow statement will be retrieved from the U.S. SEC Edgar Database for company 10k Annual Financial Reports. The next section provides a description of annual report, Modified Altman Z-Score, Messod Beneish M-Score and the results of the study.

Annual Report of a Company

Annual report refers to an annual publication issued by corporations to their shareholders that describes the operations and financial conditions of the corporations (Albrecht, Holand, Malagueño & Tzafrir, 2015). Annual reports are audited by a qualified chartered accountants so information provided in these reports are reliable information (Bar-Lev, Geri & Raban, 2015). Annual 10K report is a comprehensive summary report prepared by U.S. companies and submitted to the SEC. The annual 10K report is much detailed than the annual report issue to shareholders of the company (Scott Bell, 2014).

Within annual report, the financial conditions of the company during a fiscal year is presented in the financial statements. Financial statements is made up of the income statement, balance sheet and cash flow statement. These three financial statements are perfectly correlated to each other, indicating a realistic picture of the company's financial conditions for any fiscal year. Whenever these three financial statements are not perfectly correlated to each other to provide the overall health of the company, then there is a possibility of financial fraud in the financial reporting of the company (Bar-Lev, Geri & Raban, 2015). The balance sheet and income statement will be used for this study.

Characteristics of the Modified Altman Z-Score

The Modified Altman Z-Score used by financial analyst for predicting bankruptcy was developed by Edward I. Altman (Kasilingam & Jayabal, 2012). Statistical technique known as discriminant analysis was used by Altman to predict the bankruptcy of companies from five best performing accounting ratios (Celli, 2015):

X_1: working capital/total assets. Working capital measures the difference between current assets and current liabilities. According to Altman (1968), operating losses of a company will shrink current assets in relation to total assets.

X_2: retain earnings/total assets. This measures the gains the company can derive from reinvesting the company's retained earnings in the company or new business.

X_3: earnings before interest and taxes/total assets. This ratio indicates the actual return the company generates from assets of the company before deducting interest and taxes.

X_4: market value of equity/ book value of total liabilities. This indicates how much the value of the assets of the company can decline before the liabilities of the company exceed the value of asset of the company which may result in bankruptcy of the company.

X_5: sales/total assets. This ratio measures the contribution of total assets to sales of the company.

The last version (1993) of the modified Altman discriminant function is given by the formula: $Z= 1.2X_1$

$+ 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$ (Celli, 2015).

The Z-Score value obtained from solving the linear equation developed by Altman is always compare to the cut-off value of 2.6750 set by Altman to make a decision on the default risk of companies (Cîrciumaru, 2011). A company with Z-Score greater than 2.6750 is not likely to face bankruptcy but a company with Z-Score less than 2.6750 is heading towards bankruptcy. To make a clear assessment of company base on the Z-Score further classification of the Z-Score has been made. If the Z-Score is greater than 2.9900, the company is unlikely to default. If it is between 2.6750 and 2.9900, then the default rate is low but the company must be on alert. If it is between 1.8100 and 2.6750, there is a good chance of default. If it is less than 1.8100, then the probability of default is very high (Celli, 2015).

Altman calculated the Z-Score from a sample of sixty six publicly traded manufacturing companies. Thirty three companies failed within one year whilst thirty three companies did not fail (Cîrciumaru, 2011). The function of the Z-Score is to identify the trend of variables used in calculating the Z-Score. The Z-Score is a descriptive and comparative approach but not probabilistic approach (Altman, Danovi, & Falini, 2013). Hence, the Z-score gives warnings to companies rather than predicting bankruptcy of companies (Astebro & Winter, 2012)

Results

Table 1: Computation of Z-Score Values for Enron Corp. from 2001 – 1997

Metric	2001	2000	1999	1998	1997
X_1	-2.158/61.783 = - 0.0349	1.975/65.503 = 0.0302	0.496/33.381 = 0.0149	-0.174/29.350 = -0.0059	0.271/23.422 = 0.0116
X_2	2.495/61.783 = 0.0404	3.226/65.503 = 0.0492	2.698/33.381 = 0.0808	2.226/29.350 = 0.0758	1.852/23.422 = 0.0791
X_3	0.981/61.783 = 0.0159	2.482/65.503 = 0.0379	1.995/33.381 = 0.0598	1.582/29.350 = 0.0539	0.565/23.422 = 0.0241
X_4	45.306/48.895 = 0.9266	60.207/50.715 = 1.1872	51.231/20.381 = 2.5137	21.923/19.158 = 1.1448	11.276/11.067 = 1.0189
X_5	133.718/61.783 = 2.1643	100.789/65.503 = 1.5387	40.112/33.381 1 = 1.2016	31.260/29.350 = 1.0651	20.273/23.422 = 0.8656
Z-Score	1.2(-0.0349) + 1.4(0.0404) + 3.3(0.0159) + 0.6(0.9266) + 1.0(2.1643) = 2.2870	1.2(0.0302) + 1.4(0.0492) + 3.3(0.0379) + 0.6(1.1872) + 1.0(1.5387) = 2.4812	1.2(0.0149) + 1.4(0.0808) + 3.3(0.0598) + 0.6(2.5137) + 1.0(1.2016) = 3.0382	1.2(-0.0059) + 1.4(0.0758) + 3.3(0.0539) + 0.6(1.1448) + 1.0(1.0651) = 2.0289	1.2(0.0116) + 1.4(0.0791) + 3.3(0.0241) + 0.6(1.0189) + 1.0(0.8656) = 1.6811

Characteristics of Messod Beneish M-Score Model

The M-Score model was developed by Messod Beneish. The M-Score is used to estimate the extent of earnings manipulation reported by companies (Nwoye Ugochukwu, Obiorah Justina & Chukwunonso, 2015). The M-Score is made up of eight financial ratios use to detect the manipulation of company's earnings. The eight financial ratios are utilized on companies' financial statements to create a score to describe the extent to which companies earnings can be manipulated. M-Score model is based on the following variables (Beneish & Nichols, 2013):

1. Days Sales in Receivables Index (DSRI) = [Account receivables $_{cy}$ / Sales $_{cy}$] / [Account receivables $_{py}$ / Sales $_{py}$]. This index captures the distortions in account receivables resulting from inflation of revenue. It measures how account receivables as a percentage of sales changed when compared to previous year. Note: Current year is represented by $_{cy}$ and previous year is represented by $_{py}$.
2. Gross Margin Index (GMI) = [Sales $_{py}$ – Cost of Goods Sales $_{py}$ / Sales $_{py}$] / [Sales cy – Cost of Goods $_{cy}$ / Sales $_{cy}$]. This index measures changes that may occur in gross margin between the previous year and the current year which may cause companies to manipulate earnings.
3. Asset Quality Index (AQI) = [1- (Current Assets $_{cy}$ + Property Plant & Equipment $_{cy}$) / Total Assets $_{cy}$] / [1- (Current Assets $_{py}$ + Property Plant & Equipment $_{py}$) / Total Assets $_{py}$]. It measures the manipulations in the assets of a company as a results of excessive expenses.
4. Sale Growth Index (SGI) = Sales $_{cy}$ / Sales $_{py}$. This index captures the growth in company's sales by comparing the company's sales in the previous year to the company's sales in the current year.
5. Depreciation Index (DEPI) = [Depreciation $_{py}$ /Depreciation $_{py}$+ Property Plant & Equipment $_{py}$] / [Depreciation $_{cy}$ /Depreciation $_{cy}$ + Property Plant & Equipment $_{cy}$]. The index captures the growth in income of the company as results of reduction in depreciation which may indicate earnings manipulation.
6. Sales, General and Administration Expenses Index (SGAI) = [Sales, General and Administrative Expenses $_{cy}$ / Sales $_{cy}$] / [Sales, General and Administrative Expenses $_{py}$ / Sales $_{py}$]. This index compares the company's sales, general and administrative expenses to the company's sales.

7. Total Accruals to Total Assets Index (TATA) = [Change in Working Capital – Change in Cash – Change in Current Tax Payable – Depreciation and Amortization] / Total Assets. The index measures the company's profits which are not real but have been manipulated.
8. Leverage Index (LVGI) = [Long Term Debt $_{cy}$ + Current Liabilities $_{cy}$ / Total Assets $_{cy}$] / [Long Term Debt $_{py}$ + Current Liabilities $_{py}$ / Total Assets $_{py}$]. The debt position of the company is captured by this index. The Beneish (1999) model is mathematically presented as:
M = -4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI + 0.115*DEPI – 0.172*SGAI + 4.679*TATA – 0.327*LEGI (Beneish & Nichols, 2013).

If the M-Score derived from the eight variable is greater than -2.22 then, the company is likely to be a manipulator of their financial records whilst when M-Score less than -2.22 it suggest that the company will not manipulates it financial records (Nwoye Ugochukwu, Obiorah Justina & Chukwunonso, 2015).

Results

Table 2: Computation of M-Score Values for Enron Corp. from 2001 – 1997

Metric	2001	2000	1999	1998	1997
DSRI	0.069/0.103 = 0.6699	0.103/0.076 = 1.3553	0.076/0.066 = 1.1515	0.066/0.084 = 0.7857	0.084/0.139 = 0.6043
GMI	0.032/0.019 = 1.6842	0.067/0.032 = 2.0938	0.156/0.067 = 2.3284	0.146/0.156 = 0.9359	0.212/0.146 = 1.4523
AQI	0.421/0.357 = 1.1793	0.357/0.463 = 0.7712	0.463/0.435 = 1.0644	0.435/0.409 = 1.0636	0.409/0.313 = 1.3067
SGI	133.718/100.789 = 1.3267	100.789/40.112 = 2.5127	40.112/31.260 = 1.2832	31.260/20.273 = 1.5420	20.273/13.289 =1.5255
DEPI	0.076/0.064 = 1.1875	0.075/0.076 = 0.9868	0.072/0.075 = 0.9600	0.061/0.072 = 0.8472	0.062/0.061 = 1.0164
SGAI	0.035/0.043 = 0.8140	0.043/0.113 = 0.3805	0.113/0.112 = 1.0089	0.112/0.145 = 0.7724	0.145/0.160 = 0.9063
TATA	-4.809/61.783 = -0.0778	-0.212/65.503 = -0.0032	0.086/33.381 = 0.0026	-1.517/29.350 = -0.0517	-0.277/23.422 = -0.0118
LVGI	0.543/0.564 = 0.9628	0.564/0.417 = 1.3525	0.417/0.459 = 0.9085	0.459/0.455 = 1.0088	0.455/0.437 = 1.0412
M-Score	-2.3569	-0.3439	-1.3246	-2.4251	-2.0633

6.0 Analysis of the Results

Altman Z-Score

Table 3: Z-Score Values for Enron Corp. from 2001 – 1997

	2001	2000	1999	1998	1997
Z-Score	2.2870	2.4812	3.0382	2.0289	1.6811

From the table 3, Enron Corp. recorded a Z-Score value of 1.6811 in 1997 which was less than 1.8100 indicating very high default risk. Enron Corp. Z-Score value of 2.0289 in 1998 falls between the range of 1.8100 and 2.6750 indicating a good chance of default for the company. Z-Score value of 3.0382 for Enron Corp. in the year 1999 is greater than 2.9900 indicating that the company is unlikely to default. Enron Corp. Z-Score values of 2.4812 in 2000 and 2.2870 in 2001 fall between 1.8100 and 2.6750. This shows a good chance of default for the company. Enron Corp. Z-Score value increased by 34.75 percent from 1997 to 1998. The Z-Score again increased by 100.93 percent from 1998 to 1999. Both increased in the Enron Corp. Z-Score values indicate improvement in the Enron Corp. performance. The Z-Score value decreased by 55.7 percent from 1999 to 2000 and 19.24 percent from 2000 to 2001. The decreased shows a reduction in the performance on the Enron Corp. from 1999 to 2001.

Beneish M-Score

Table 4: M-Score Values for Enron Corp. from 2001 – 1997

	2001	2000	1999	1998	1997
M-Score	-2.3569	-0.3439	-1.3246	-2.4251	-2.0633

Comparing the M-Scores values of Enron Corp. in table 4 to the benchmark of -2.22 set by Beneish (Nwoye Ugochukwu, Obiorah Justina & Chukwunonso, 2015), M-Score values of Enron Corp. -2.0633, -1.3246 and -0.3439 in 1997, 1999 and 2000 respectively are less than -2.22 benchmark set by Beneish, meaning earnings for Enron Corp for these years were not manipulated. However, M-Score values of Enron Corp. -2.4251 and -2.3569 in 1998 and 2001 respectively are greater than -2.22 showing manipulation of Enron Corp. earnings in those years. The M-Score value increased by 36.18% from 1997 to 1998 indicating the start of Enron Corp.

earnings manipulation. The M-Score value decreased by 110.05% from 1998 to 1999. The M-Score value again decreased by 98.07% from 1999 to 2000. Both decreased show Enron Corp. reduced earnings manipulation. The M-Score value increased by 201.31% from 2000 to 2001, indicating a massive increase in earnings manipulation by Enron Corp in 2001.

7.0 Conclusions

The study analysed Enron Company's annual 10K reports filed with U.S. SEC using Altman Z-Score and Beneish M-Score to find out the how early the company's financial fraud could have been identified. The results from Altman Z-Score values calculated from Enron Corps. annual 10K reports did indicate early signs of bankruptcy in 1997. Altman Z-Score values in 1998, 2000 and 2001 all indicated signs of bankruptcy in Enron Corp. The results from the Beneish M-Score values also show that Enron Corp. started manipulation its earnings in 1998. This suggest that financial analysts could have save investors from losing their funds in Enron Corp. as it has been revealed by Altman Z-Score and Beneish M-Score that there was an indication of default in 1997 and manipulation of earnings in 1998.

The two models used for analysing the data retrieved from Enron Company's annual 10K reports have their flaws. The two models suffer from the effect of definition of the metrics used in performing the financial analysis. Hence, these two models can produce different values for some of the metrics used for calculating the ratios. This can results in different prediction of company default risk and earning manipulation (Celli, 2015).

8.0 Recommendations

Financial market participants including both individual and institutional investors, commercial banks and SEC should always gather detailed information for assessing financial fraud of companies in the financial market before and after their investment and dealings with companies to avoid losing their invested funds. The SEC should always accept annual reports of companies audited by qualified chartered accountant with sufficient skills. In addition external qualified and experience chartered accountant and certified fraud examiners should be sent to the various companies under their supervision to audit the annual reports submitted to the SEC by the companies, to serve as a way for detecting financial fraud (Nix & Morgan, 2013). Financial analysts should always perform a continuous financial fraud analysis on randomly selected companies and report their findings to participants in the financial market to expose companies involving in financial fraud. This will prevent companies from engaging in financial fraud (Ramamoorti & Dupree, 2010).

The financial ratios developed by Edward I. Altman and Messod Beneish are not enough methods in detecting financial fraud and earnings manipulations conducted by companies. Further studies on detecting financial fraud and earnings manipulations should include analysing the cash flow statement of companies because it provides a check to the quality of earnings presented in the income statement (Warshavsky, 2012).

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