

DETECTING CORPORATE FRAUD AND FINANCIAL DISTRESS USING THE ALTMAN AND BENEISH MODELS THE CASE OF ENRON CORP

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Abstract

The Enron debacle is one of the cases of corporate economic fraud that hit the US, and indeed the world, in 2001. This paper uses two detective models – Altman's Z-Score and Beneish M-Score – to determine how early investors, regulators (particularly the SEC) and the other stakeholders could have detected the financial stress of the company. Data used in the analysis were the 10-K reports of Enron drawn from the U.S. SEC Edgar database. The analysis shows that the executives of Enron used various tools to engage in financial statement manipulation. The paper finds that the fraudulent acts of the company could have been detected as early as in 1997, long before its actual filing for bankruptcy in 2001. For a more accurate determination of fraud, the paper recommends that the models be complemented by analysis of the financial statements in totality with much emphasis on the analysis of the cash flow statement.

Keywords: Fraud, bankruptcy, earnings manipulation, Altman's Z-Score, Beneish M-Score

INTRODUCTION

An issue central to accounting research is the extent to which managers alter reported earnings for their own benefit (Beneish, 2001). In recent times, the world economic system has experienced significant levels of fraud, financial statement manipulations and unethical behaviour in corporate history. Following the fraud scandals in large companies like Enron, WorldCom, Xerox, and recently alleged fraud cases like Lehman Brothers, AIG, and Freddie Mac, investors' concerns about fraud in general and fraudulent financial reporting in particular has increased (Kassem and Higson, 2012).

Periodic high profile cases of fraudulent financial reporting raise concerns about the credibility of the U.S. financial reporting process (COSO, 1997) and indeed that of countries across the world. Studies have identified the control environment of the entity under audit as important when assessing the likelihood of management fraud (Bessley, 1996 and COSO, 1997). In a study, Beasley (1996) indicates that no-fraud firms have boards with significantly higher percentages of outside members than fraud firms. The study, however, finds that the presence of an audit committee does not significantly affect the likelihood of financial statement fraud. A study conducted by the COSO (1997) on U.S. companies between 1987 and 1997 found that companies committing fraud generally were small, and most were not listed. It also found that fraudulent companies have weak audit committees and boards and that the CEO is often involved in the fraud.

Tonge et al. (2003) report that Enron was formed in 1986 from the merger of natural gas pipeline companies Houston Natural Gas and Internorth, and in the following 15 years diversified to provide products and services related to natural gas, electricity and communications. The services included transportation of natural gas; the generation, transmission and distribution of electricity; marketing of natural gas, electricity and other commodities and related risk management and financial services. Enron was engaged in a costly and ultimately disastrous diversification strategy (Kroger, 2003). In addition, the independent auditors, Arthur Andersen, facilitated many questionable Enron transactions. As clever and unethical as some management and Arthur Andersen personnel were, they did not have an effective back-up plan for a decline in Enron's stock price (Wilson and Key, 2012). Andersen also seems to have allowed Enron to violate the requirement specified in FASB Statement 5 that guarantees of indebtedness and other loss contingencies that in substance have the same characteristics, should be disclosed even if the possibility of loss is remote (Benston and Hartgraves, 2002).

According to Nugent (2003), as late as December 31, 2000 Enron stock was trading at over \$90 a share, and more recently, June 2001, Enron stock was trading at \$53 a share. Moreover, as late as October 9, 2001, Enron was trading at approximately \$35 a share. On February 28, 2002, Enron was trading at 26 cents a share. On October 16, 2001, Enron Corporation of Houston, Texas, one of the largest corporations in the world, announced it was reducing its after-tax net income by \$544 million and its shareholders' equity by \$1.2 billion (Benston and Hartgraves, 2002). An analysis by Catanach & Rhoades-Catanach (2003) reveals increasing variability of key performance measures from 1997 through 2000, a time during which Enron's stock price generally outperformed the NASDAQ composite.

Enron's bankruptcy is of particular interest to accountants, because its longtime auditor, Arthur Andersen, LLP (Andersen), is (or was) one of the Big 5 CPA firms (Benston and Hartgraves, 2002). The company's failure will most likely go down in history as not only one of the most spectacular financial failures, but also as a turning point in professional accounting regulation and corporate financial reporting (Rockness and Rockness, 2005). Enron's financial condition was sustained by an institutionalized accounting fraud (Gore and Murthy, 2011) and its accounting practices mask severe underlying financial problems, and the combined effects of the 'Byzantine' structures ultimately brought the company down (Tonge et al., 2003). However, erroneously, throughout the 1990s and up to late 2001, most investors and commentators believed Enron was one of the most successful, innovative and profitable companies in America (Kroger, 2003).

Instances of corporate fraud and misconduct remain a constant threat to public trust and confidence in the capital markets. In recent years, a variety of laws and regulations have emerged worldwide, providing organizations with an array of criteria to incorporate into their antifraud efforts (KPMG Forensic, 2006). In the wake of recent high-profile scandals, the landscape is beginning to change. The majority of investors are now keenly aware of the concept of quality of earnings. It is now fairly common knowledge in the investment community that corporate management can in various ways manipulate earnings as reflected on the income statement (Siegel, 2006). Clearly, after the Enron scandal, investor sentiment was not expressed as public outrage but it affected the valuation of public firms and the US stock market and hence creating a need to improve investor confidence in the US financial markets (Cernuşca, 2011).

In providing protection in the corporate world for vulnerable stakeholders such as shareholders, creditors and employees, regulation by other stakeholders in providing checks and balances is important. In the Enron case, Tonge et al. (2003) identified key stakeholders including Board of Directors, audit committee, auditors, executives and senior management, analysts and banks, government and its agencies, financial accounting standards board and corporate governance. All regulations by the stakeholders appeared to have failed resulting in huge loss to the vulnerable stakeholders. Enron executive adopted varying means (including lying, manipulation, waiver, non-disclosure) to outwit these stakeholders to achieve personal gains.

On the responsibility of financial accounting standards board and governments and its agencies, Benston and Hartgraves (2002) believe that US GAAP, as structured and administered by the SEC, the FASB, and the AICPA, are substantially responsible for the Enron accounting debacle. The ingenuity, sophistication, and complexity of some of the frauds

perpetrated by company executives do not in any way excuse or mitigate the failure of boards to intervene (Hoffman and Rowe, 2007). Results of a study by Beasley (1996) indicate that board composition, rather than audit committee presence, is more important for reducing the likelihood of financial statement fraud. In the view of Catanach & Rhoades-Catanach (2003) investigation on Enron's failure suggests that considerable evidence existed that should have lead analysts, sophisticated investors and regulators to question Enron's financial results and soaring stock price.

Higson (2001) argues that financial governance breaks down if either the finance function within the firm or the auditors forget their role and absorb the belief system of top management. Carcello and Nagy (2004) however indicated that it may be more difficult for an auditor to possess industry expertise for larger clients who are likely to be more complex and operate in more than one industry. They pointed out that the negative relation between auditor industry specialization and financial fraud is weaker for larger clients.

The Enron debacle and other corporate scandals led to several losses to investors, creditors and employees and this shows once more an urgent need for more legislation and ethics (Sims and Brinkmann, 2003). In response to the many corporate frauds that took place in the U.S. and the other parts of the world, a number of regulations have been promulgated. Chief among these is the U.S. Sarbanes-Oxley Act of 2002. The Act has obviously had an impact on the managerial structure and government regulations of the public company (Cernuşca, 2011). The Sarbanes-Oxley Act legislates ethical behaviour for both publicly traded companies and their auditor firms (Rockness and Rockness, 2005).

On the international front, Tonge et al. (2003) report that following the Enron collapse, the UK trade and industry secretary, Patricia Hewitt, announced the creation of a high profile body charged with reviewing the UK's financial reporting and auditing rules. In response to these concerns, auditing standards setters have issued fraud standards that have expanded what is required of the external auditors in relation to fraud detection (Kassem and Higson, 2012).

It is, however, thought that these regulations have various consequences on the business environment and that the ever increasing complexity of the business world renders them ineffective in no time. Faced with an increasing array of rules and standards governing business conduct, many organizations worldwide continue to struggle with how to mitigate the innumerable risks posed by fraud and misconduct (KPMG Forensic, 2006). The risk of fraud is a part of doing business. It can even be considered a consequence (Kroll, 2008). On the continuation of fraudulent practices, Kroll predicts that the increased use of information

technology tools combined with dramatic growth in the world economy will lead to more challenging times.

The rest of the paper is set out as follows: the first section discusses methodology and data, the second section deals with the literature review, the third section is on discussion of the detection models, the fourth section is the analysis of the facts and issues, the fifth section is the conclusion, the sixth section is recommendation and the final section is the references.

LITERATURE REVIEW

Enron Corp's Corporate Social Responsibilities

According to Sims and Brinkmann (2003), not long ago, Enron had been heralded as a paragon of corporate responsibility and ethics – successful, driven, focused, philanthropic and environmentally responsible. Enron appeared to represent the best a 21st century organization had to offer, economically and ethically. However, events unfolding later in the history of corporate governance in the U.S. portray this very company differently. It turned out that, the company was grossly involved in unethical and corporate irresponsible acts. Enron and World.com are simply bad and rotten, one just didn't know before it was too late.

Among others, Enron used earnings management, special purpose entities and mark to market accounting to engage in unethical activities and create value for personal benefit. Tonge et al. report that Enron paid only \$17m of taxation between 1996 and 2000 despite posting pre-tax profits of \$1.79bn. Enron's cash flow from trading was poor but was masked by the deals it made including the continuous refinancing and swap deals it latterly engaged in. Enron's use of SPEs for off-balance sheet financing was a common practice (Wilson and Key, 2012). To maintain high credit rating and raise capital, Enron relocated many of its assets off the balance sheet into complex off-the-book partnerships or special purpose entities (Petrick and Scherer, 2003). In the view of Sims and Brinkmann (2003), the SPVs not only allowed Enron to boost earnings, but the SPVs also allowed the company to keep debt off its balance sheet. Deception and other unethical behavior were necessary in order for the scheme to work (Wilson and Key, 2012). Enron's use of SPEs is not the only accounting practice that deserves scrutiny. A very material portion of Enron's assets were fictional by any reasonable definition of the word "asset" (Haldeman, 2006).

Unethical behaviour occurred in several ways. The executives made misleading representations to the BOD, circumvented company policies and procedures, and placed subordinates under pressure to go buy into their proposals. Two of the most important lessons to learn from the Enron culture history is that bad top management morality can be a sufficient

condition for creating a self-destructive ethical climate and that a well-filled CSR and business ethics toolbox can neither stop nor compensate for such processes (Sims and Brinkmann, 2003). One thing that is unavoidable is the fact that employees at Enron were partially paid in stocks which motivated the workers to take actions that were unethical in order to raise the stock price and equivalently their own money (Pavel and Encontro, 2012).

Incentives for Committing Fraud

A manager decides to misreport after weighing the expected costs and benefits of misreporting versus reporting accurately (Stanley, 2006). Motives for committing fraud are numerous and diverse (ACFE, 2013). While agreeing with this, it may be said that two main categories may be identified: protection of the interest of the corporate entity and protection of interest of managers. As the financial statements are the responsibility of the company's management, transactions can be structured to best achieve a desired accounting result by reporting key financial transactions to the company's advantage (Warshavsky, 2012). A study by Stanley (2006) suggests that bank debt can provide incentives for managers to manipulate accounting numbers to avoid default or to reduce borrowing costs. It also finds that the likelihood of misreporting and bank borrowing is stronger for firms with public debt ratings. On their part, Rockness and Rockness (2005) indicate that the incentives for management to engage in unethical practices were driven by personal gain, ego and greed illustrated by opportunistic and exploitative executive behavior to achieve personal objectives.

METHODOLOGY

The study applied Altman's Z-Score and Beneish M-score to determine whether Enron Corp was engaged in fraudulent manipulation of its financial statements and how early this could have been detected by investors, creditors, employees, regulators and other stakeholders. The data sample used were the 10-K reports of Enron from 1996 to 2000 filed with the U.S. SEC. In view of the non-availability of the 10-K reports for 2001 on the SEC EDGAR database (probably because the company filed for bankruptcy in the year, the figures used were drawn from 10-Q for the third quarter ending 30th September, 2001 (as an approximation). The summaries of the financial reports are contained in Table 1. Again, some of the financial terminologies used in the computations of metrics in both models are not directly available on the face of the financial statements of Enron in the relevant period. Computations were therefore done using Generally Accepted Accounting Principles.

ALTMAN'S Z-SCORE

The Z-Score is a model used to predict whether a company is in financial distress. It was first coined out in 1968 by Edward I. Altman, a professor at the Stern School of Business at New York University. The model utilises some financial KPIs (working capital, total assets, retained earnings, earnings before interest and tax, market value of equity, book value of total debt and sales) to determine if a company is financially sound. The model was extremely accurate since the percentage of correct predictions was about 95% and it received many positive reactions and only a few criticisms (Altman et al., 2010). It explicitly measures a firm's relative liquidity, longevity, operating profitability, leverage, solvency, and productivity – virtually all aspects of corporate performance, lead to clearer conclusions, avoid judgment bias, reliability (Sulphey, 2013). A study conducted by Kpodoh (2009) on the Z-Score model confirmed the correlation between corporate governance and corporate failure. Rufus (2003) concludes that the Z-Score, which combines mutually exclusive ratios into a group, helps overcome the shortcomings of individual financial ratio analysis. He adds that statistical models like the Z-Score are more precise, lead to clearer conclusions, are more uniform, avoid judgment bias and, of course, their reliability can be evaluated statistically.

However, the use of ratios, with their associated limitations, reduces the effectiveness of the Z-Score. Though the Z-Score model has been a well accepted financial distress model for almost four decades, strategists generally haven't discovered its potential as a performance management tool (Calandro, 2007). Contributing to the discussions, The Kenexa High Performance Institute (KHPI) (2009) indicates that high risk of a potential bankruptcy (low values of the Altman's Z score) during a period of uncertainty may not reflect the true performance of an organization.

Altman used empirical data and regression analysis in order to formulate an algorithm comprised of fractions to which predetermined weights were applied (Nugent, 2003). The Z-Score is stated mathematically as follows:

$$Z = (1.2X_1) + (1.4X_2) + (3.3X_3) + (0.6X_4) + (1.0X_5) \quad (1)$$

$$\text{Where } X_1 = \left(\frac{\text{Working Capital}}{\text{Total Assets}} \right) \quad (2)$$

$$X_2 = \left(\frac{\text{Retained Earnings}}{\text{Total Assets}} \right) \quad (3)$$

$$X_3 = \left(\frac{\text{EBIT}}{\text{Total Assets}} \right) \quad (4)$$

$$X_4 = \left(\frac{\text{Equity at Market}}{\text{Total Debt}} \right) \quad (5)$$

$$X_5 = \left(\frac{\text{Net Sales}}{\text{Total Assets}} \right) \quad (6)$$

In equations (2), (3), ... (6), X_1 , X_2 , ... X_5 represent metrics developed out of accounting ratios. The metrics are a combination of various forms of conventional ratios including activity, profitability and gearing ratios.

Table 1: Summary of Enron's unaudited Financial Statements
(figures in billions of dollars except shares outstanding)

Category	2001	2000	1999	1998	1997	1996
Current Assets	24.847	30.381	7.255	5.933	4.669	3.979
Current Liabilities	27.005	28.406	6.759	6.107	4.412	3.708
Working Capital	(2.158)	1.975	0.496	(0.174)	0.257	0.271
Total Assets	61.783	65.503	33.381	29.350	23.422	16.137
Total Debt	48.895	50.715	20.381	19.158	15.664	11.067
EBIT	0.981	2.482	1.995	1.582	0.565	1.238
Equity at Market		60.207	51.231	21.923	14.146	11.276
Sales/Revenue	133.718	100.789	40.112	31.260	20.273	13.289
Cost of Sales	45.742	94.517	34.761	26.381	17.311	10.478
Gross Margins	1.135	6.272	5.351	4.879	2.962	2.811
Retained Earnings	2.495	3.226	2.698	2.226	1.852	2.007
Sales, General and Adm. Exp	4.684	4.319	4.549	3.501	2.947	2.121
Shares Outstanding	–	752,205,112	716,865,081	671,094,552	318,297,276	255,945,304
Depreciation and Amortisation	0.746	0.855	0.870	0.827	0.600	0.474
Cash	1.001	1.374	0.288	0.111	0.170	0.256
Trade Receivables	9.208	10.396	3.030	2.060	1.697	1.841
PPE	10.915	11.743	10.681	10.657	9.170	7.112
Long-term Debts	6.544	8.550	7.151	7.357	6.254	3.349
Tax Payable	1.947	1.644	1.894	2.357	2.039	2.290

Source: U.S. SEC EDGAR database

Table 2: Computation of metrics and Z-Score values for relevant years

Metric	2001	2000	1999	1998	1997	1996
X ₁	-2.158/ 61.783 -0.035	1.975/65.503 0.030	0.496/33.381 0.015	-0.174/29.350 -0.006	0.257/23.422 0.011	0.271/16.137 0.017
X ₂	2.495/ 61.783 0.040	3.226/65.503 0.049	2.698/33.381 0.081	2.226/29.350 0.076	1.852/23.422 0.079	2.007/16.137 0.124
X ₃	0.981/ 61.783 0.016	2.482/65.503 0.038	1.995/33.381 0.060	1.582/29.350 0.054	0.565/23.422 0.024	1.238/16.137 0.077
X ₄	/48.895	60.207/50.715 1.187	51.231/20.381 2.514	21.923/19.158 1.144	14.146/15.664 0.903	11.276/11.067 1.019
X ₅	133.718/ 61.783 2.164	100.789/65.503 1.539	40.112/33.381 1.202	31.260/29.350 1.065	20.273/23.422 0.866	13.289/16.137 0.824
Z-Score		2.481	3.040	2.029	1.611	1.884

BENEISH M-SCORE

Identifying earnings management is important for financial statement users to assess current economic performance, to predict future profitability, and to determine firm value (Jansen et al., 2012). The M-Score was modeled by Professor Messod Beneish. It is a mathematical model that adopts some financial metrics to identify the extent of a company's earnings. The M-Score is similar to the Z-Score except that the M-Score concentrates on estimating the extent of earnings manipulation instead of determining when a company becomes bankrupt. The M-Score is composed of eight ratios that capture either financial statement distortions that can result from earnings manipulation or indicate a predisposition to engage in earnings manipulation (Beneish and Nichols, 2005). Warshavsky (2012) indicates that companies with higher Beneish scores are more likely to be manipulators. One advantage of the M-score is that the treatment sample consists of firm that have indeed managed earnings and that determination is independent of abnormal accrual models (Beneish, 1998).

The Beneish (1999) model is presented mathematically as follows:

$$M = -4.84 + 0.920DSR + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI \\ + 4.679ACCRUALS - 0.327LEVI \quad (7)$$

Where,

$$DSRI = \left(\frac{\text{Receivable}_{s_t}}{\text{Sales}_t} \right) / \left(\frac{\text{Receivable}_{s_{t-1}}}{\text{Sales}_{t-1}} \right) \quad (8)$$

$$GMI = \left(\frac{\text{Sales}_{t-1} - \text{Costs of Goods Sold}_{t-1}}{\text{Sales}_{t-1}} \right) / \left(\frac{\text{Sales}_t - \text{Costs of Goods Sold}_t}{\text{Sales}_t} \right) \quad (9)$$

$$AQI = \left(1 - \frac{\text{Current Assets} + \text{PPE}_t}{\text{Total Assets}} \right) / \left(1 - \frac{\text{Current Assets}_{-1} + \text{PPE}_{-1}}{\text{Total Assets}_{-1}} \right) \quad (10)$$

$$SGI = \left(\frac{\text{Sales}_t}{\text{Sales}_{t-1}} \right) \quad (11)$$

$$DEPI = \left(\frac{\text{Depreciation}_{t-1}}{\text{Depreciation}_{t-1} + \text{PPE}_{-1}} \right) / \left(\frac{\text{Depreciation}_t}{\text{Depreciation}_t + \text{PPE}_t} \right) \quad (12)$$

$$SGAI = \left(\frac{\text{SGA Expenses}_t}{\text{Sales}_t} \right) / \left(\frac{\text{SGA Expenses}_{t-1}}{\text{Sales}_{t-1}} \right) \quad (13)$$

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$$\left(\frac{\text{Change in Working Capital}_t - \text{Change in Cash}_t - \text{Change in Income Tax Payable}_t - \text{Depreciation \& Amortisation}_t}{\text{Total Assets}_t} \right) \quad (14)$$

$$LEVI = \left(\frac{\text{LTD}_t + \text{Current Liabilities}_t}{\text{Total Assets}_t} \right) / \left(\frac{\text{LTD}_{t-1} + \text{Current Liabilities}_{t-1}}{\text{Total Assets}_{t-1}} \right) \quad (15)$$

GMI (equation (9)) is otherwise calculated as:

$$GMI = \left(\frac{\text{Gross Margin}_{t-1}}{\text{Sales}_{t-1}} \right) / \left(\frac{\text{Gross Margin}_t}{\text{Sales}_t} \right) \quad (16)$$

This formula effectively measures the change in the gross profit between the year under review and a year immediately preceding it.

This model consists of eight ratios that capture either financial statement distortions that can result from earnings manipulation (DSR, AQI, DEPI and Accruals) or indicate a predisposition to engage in earnings manipulation (GMI, SGI, SGAI, LEVI) (Beneish and Nichols, 2007).

Days' Sales in Receivables Index (DSRI)

The index measures the ratio of days that sales are in accounts receivable in a year compared to that of a prior year. An index higher than 1.0 in a year is interpreted to mean that the percentage of accounts receivable to sales is higher in the year as compared to the prior year. A disproportionate increase in accounts receivable relative to sales may be indicative of inflated revenues (Warshavsky, 2012). Harrington (2005) notes that if the ratio detects a rise in receivables the change might result from revenue inflation.

Gross Margin Index (GMI)

The gross margin index measures the ratio of prior year's gross margin to that of the year under review. An index greater than 1.0 signifies that the gross margin has worsened in the period under review with the consequence that the company is likely to manipulate its revenues. The vice versa is true. Tonge et al. note that earnings have become the main determinant of corporate value in the US. They conclude that the higher the earnings, the more stock is allocated which in turn is more valuable when the stock price rises on the back of met or exceeded earnings' predictions. On his part, Warshavsky (2012) points out that earnings quality is an important aspect of evaluating a company's financial health. Therefore, the temptation for fraudulent manipulation of earnings is quite high among companies. Earnings manipulation has become a widespread practice for US corporations (Chan et al., 2004).

Firms that have a high likelihood of earnings manipulation experience lower future earnings, but that investors expect these firms to have higher future earnings, consistent with earnings manipulation misleading investors (Beneish and Nichols, 2005). Again, Beneish and Nichols (2007) conclude that firms with a high probability of manipulation also have lower future returns, suggesting that market participants do not fully use publicly available information relevant for detecting fraud.

Asset Quality Index (AQI)

The index computes asset quality as a ratio of non-current assets other than PPE to total assets in one year to a prior year. This index reflects the change in asset realization risk by comparing current assets and property, plant, and equipment with total assets (Harrington, 2005). An AQI greater than 1.0 indicates that the company has potentially increased its cost deferral or increased its intangible assets, and created earnings manipulation (Warshavsky, 2012). An increase in this index may represent additional expenses that are being capitalized to preserve profitability (Grove and Clouse).

Sales Growth Index (SGI)

The metric is a measure of growth in revenue in one year over revenue of a prior year. An index greater than 1.0 represents a positive growth while less than 1.0 represents a negative growth in the year under review. Though other factors may be responsible, growth in sales may be interpreted to mean earnings manipulation. Higson (2001) suggests that Enron's revenue growth has reflected the shift in the mix of its activities towards businesses with a very different revenue model. A study by Callen et al. (2008) on revenue manipulation and restatements by loss firms show that the likelihood of revenue manipulation is increasing with the loss ratio, leverage, ratio of inventory to total assets, volatility of equity returns, and with the ratio of accounts receivable to sales, after controlling for the probability that the manipulation is not detected until a later stage.

Depreciation Index (DEPI)

Depreciation index is a measure of the ratio of depreciation expense and gross value of PPE in one year over a prior year. An index above 1.0 could be a reflection of an upward adjustment of the useful life of PPE. This has the tendency of a company's earnings being manipulated in the year under review.

Sales, General and Administrative Expenses Index (SGAI)

The index is a measure of the ratio SGA to sales in one year over a prior year. A disproportionate increase in sales, as compared to SGA, would serve as a negative indication concerning a company's future prospects (Warshavsky, 2012).

Total Accruals to Total Assets Index (TATA)

This index is used to measure the extent to which sales is made on cash basis. It is an indication of the quality of cash flows of the company. The total accruals metric is computed as change in working capital (except cash) less depreciation for the year under review adjusted for changes in income tax payable and current portion of long term debt. An increasing degree of accruals as part of total assets would indicate a higher chance of manipulation (Prevo, 2007). In a study to determine whether models of discretionary accruals detect actual cases of fraudulent and restated earnings, Jones et al. (2008) concluded that discretionary or abnormal accruals are often used as a proxy for earnings management. Consistent with the studies of Dechow and Dichev (2002) and McNichols (2002), Jones et al. found that only the accrual estimation errors estimated from cross-sectional models of working capital changes on past, present, and future cash flows have predictive power for both fraud and non-fraudulent

restatements of earnings. It is precisely when cash flow valuation fails that managers have an incentive to manipulate revenues in order to increase market capitalization (Callen et al., 2008).

Leverage Index (LEVI)

Leverage describes a company's financial structure and measures the long-term risks of a company (Abdullah and Ismail, 2008). The leverage index measures the ratio of total debt to total assets. An index of greater than 1.0 is interpreted as an increase in the gearing of the company and for that matter exposed to manipulation.

Beneish and Nichols (2007) further categorise the eight metrics into two: the predictive ratios focusing on financial statement distortions and the predictive ratios that suggest propitious conditions for manipulation.

Table 3: Computation of metrics and M-Score values for relevant years

Metric	2001	2000	1999	1998	1997
DSRI	0.069/0.103 = 0.670	0.103/0.076 = 1.355	0.076/0.066 = 1.152	0.066/0.084 = 0.786	0.084/0.139 = 0.604
GMI	0.032/0.019 = 1.684	0.067/0.032 = 2.094	0.156/0.067 = 2.328	0.146/0.156 = 0.936	0.212/0.146 = 1.452
AQI	0.421/0.357 = 1.179	0.357/0.463 = 0.771	0.463/0.435 = 1.064	0.435/0.409 = 1.064	0.409/0.313 = 1.307
SGI	133.718/100.7 89 = 1.327	100.789/40.11 2 = 2.513	40.112/31.260 = 1.283	31.260/20.273 = 1.542	20.273/13.28 9 = 1.526
DEPI	0.076/0.064 = 1.188	0.075/0.076 = 0.987	0.072/0.075 = 0.960	0.061/0.072 = 0.847	0.062/0.061 = 1.016
SGAI	0.035/0.043 = 0.814	0.043/0.113 = 0.381	0.113/0.112 = 1.009	0.112/0.145 = 0.772	0.145/0.160 = 0.906
TATA	-4.809/61.783 = -0.078	0.212/65.503 = -0.003	0.086/33.381 = 0.003	-1.517/29.350 = -0.052	-0.277/23.422 = -0.012
LEVI	0.543/0.564 = 0.963	0.564/0.417 = 1.353	0.417/0.459 = 0.908	0.459/0.455 = 1.009	0.455/0.437 = 1.041
M-Score	-2.358	-0.343	-1.323	-2.426	-2.064

ANALYSIS & DISCUSSION OF THE FACTS AND ISSUES

Altman's Z-Score

When applying the model Altman found that all firms having a Z-score greater than 2.99 unmistakably fall into the "non-bankrupt" group, while all firms having a Z-score below 1.81 were in fact bankrupt. The gray area between 1.81 and 2.99 was defined as the "zone of ignorance" because of the vulnerability to misclassification (Prevoo, 2007). With a Z-Score of 1.611, the results of Altman's model (Table 2) applied to the financial statements of Enron have shown that

the company was in a state of bankruptcy as early as 1997. Results of subsequent years indicated that the company was largely in the “zone of ignorance” placing it in a very vulnerable position of bankruptcy. In view of the non-availability of the requisite figures for (equity at market), the Z-Score for 2001 could not be computed. This does not, however, affect the results of the analysis.

Beneish M-Score

When applying the Beneish model, a score of greater than -2.22 (i.e., less of a negative) is an indication that the company’s financial statements may have been manipulated (Warshavsky, 2012). Applying this standard to the case of Enron, the modeling (Table 3) shows the financial statements appeared to have been manipulated as back as 1998 when an M-Score of -2.426 was made. This is contrary to the results of the work of Warshavsky (2012) and those of the Z-Score in this study. Again, using metrics developed by Beneish, Catanach & Rhoades-Catanach (2003) find a high probability of earnings manipulation in Enron’s financial statements for several years preceding its bankruptcy. The individual indices used in the model showed mixed results. The indices for the year (1998) were 0.786, 0.936, 1.064, 1.542, 0.847, 0.772, -0.052 and 1.009 for DSRI, GMI, AQI, SGI, DEPI, SGAI, TATA and LEVI respectively. Of the eight indices, only three (AQI, SGI and LEVI) had values above 1.0 in 1998 thus agreeing with the results of the M-Score.

The disparity between the results of the Z-Score and the M-Score may not be inexplicable. It may probably be that the manipulation of earnings in 1998 was done to cover up for the financial distress that the company suffered in 1997. The results of the M-Score are, however, consistent with other studies as Beneish and Nichols (2007) point out that the model received additional attention subsequent to the Enron scandal as Brewer (2004) and others discovered that the model in Beneish (1999) had flagged Enron as early as 1998.

CONCLUSIONS

Corruption is endemic in some countries and it will take many years for that to change. The recent rise in the number of Foreign Corrupt Practice Act (FCPA) cases in the U.S. is a testament both to increased activity by law enforcement as well as to intense competition for markets (Kroll, 2008). The scandal brought attention to the financial statement fraud by executives and, as a result, good governance has become a priority for most companies, while the focus on ethics in financial reporting has increased investors confidence in some companies (Cernuşca, 2011).

The Enron case provides us with a perfect map of the shortcomings in our regulatory scheme, and those shortcomings are clearly enormous, calling for serious reform (Kroger, 2003). However, Gore and Murthy (2011) suggest that fraud detection remains an unstructured task and often requires the auditor to think out of box and derive information from disparate sources. Both the Altman's Z-Score and the Beneish M-Score have indicated that Enron was in financial turmoil as early as 1997 and for that matter was engaged in gross earnings manipulation. However, the models were not without any shortcomings which analysts would have to beware of. The two models used in the study suffer from the effect of definition of the metrics often associated with accounting ratios. Though accounting ratios are important tools in financial analysis (Abdullah and Ismail, 2008), ratios are constructed from accounting data, which (as recent events have demonstrated) is subject to interpretations and even manipulation (Rufus, 2003). Literature reviewed indicated different values for some of the metrics used in the computation. This has the tendency of producing varying results in the prediction of business failure, bankruptcy or financial statement manipulation. The study also shows that by the application of year on year computation of metrics, the Beneish model suffers another shortcoming in applying it to cases where financial statement manipulation is done over several years. The results are based on Enron's reported financial results, which we now know were erroneous (Catanach & Rhoades-Catanach, 2003). However, Warshavsky (2012) argues that the strength of the Beneish model is that it applies eight unique indices, both individually and collectively.

RECOMMENDATIONS

Financial metrics alone are not enough in detecting fraud and financial statement manipulation. They ought to be complemented by an analysis of the financial statements in totality. Siegel (2006) suggests that analysing the cash flow statement is integral to understanding a company's financial performance and position because it often provides a check to the quality of the earnings shown in the income statement. Generally, the statement of cash flows may be considered a more objective measure of performance, and a better predictor of a company's true earnings and future stability (Warshavsky, 2012).

Given the costs associated with financial statement fraud in capital markets, one would expect market participants to exploit all information useful for assessing fraud (Beneish and Nichols, 2007). In forestalling the reemergence of the Enron Corp. scandal, Beneish (2001) suggests that employment and monetary penalties subsequently imposed on managers should be substantial if they are to serve as a deterrent. External penalties for unethical or illegal

behavior must be greater than the rewards realized from engaging in the behavior (Rockness and Rockness, 2005).

Internal control systems, including IT controls, can help reduce the opportunity for fraudulent or unethical behavior (Rockness and Rockness, 2005). To ensure early detection of fraud and avoid the recurrence of the Enron debacle, the models as discussed should be supported by the use of Fraud-detection software. A strong CEO, with significant share ownership in a small organization, needs an experienced, independent board to insure objectivity (COSO, 1997). Direct responsibility for antifraud efforts should reside with a senior leader, often a chief compliance officer who works together with internal audit staff and designated subject matter experts (KPMG Forensic, 2006). Cohan (2002) suggests that companies should implement programs to encourage employees to expose wrongdoing without fear of retribution. To ensure managerial integrity capacity, Petrick and Scherer (2003) proposed three positive action steps including expanding the scope of managerial fiduciary duties to include institutionalised stakeholder democratic participation in corporate governance.

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