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There were Several Early Warning Signs of Financial Irregularities Before the Enron Bankruptcy

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This paper will examine several elements of the Enron Corporation's finances. It includes

the annual filing of 10K with the Securities and Exchange Commission (SEC), and analytical tools

such as modified Altman, Chanos, Beneish, and others, in order to detect early warning signs of financial fraud leading to its bankruptcy.

Enron the company

Enron was a name changed after the merger of tow pipeline operators companies, Houston Natural Gas Corporation, and Internorth. Kenneth Lay became the Chief Executive Officer in 1984, and was very instrumental in energy deregulation, thereby widening the mission of Enron to include trading energy contracts. He hired Jeffrey Skilling, who successfully developed the new Enron's highly profitable business of trading energy derivatives. Thereafter, Skilling hired Andrew Fastow in 1990 and was appointed Chief Financial Officer (CFO) of Enron in 1998. Fastow was thought to complement Skilling's interests and abilities (Bierman, 2008).

Enron and 13 of its related companies filed their bankruptcy petition in a New York federal court on December 2, 2102; leading to the largest bankruptcy filing in the history of the United States (Forbes, 2001). But it was not only Enron, rather there was a sudden explosion of corporate accounting scandals, and related financial irregularities, which burst over the financial markets between late 2001 and the first half of 2002; most commentary has rounded up the usual suspects and placed the blame on a decline in business morality, and greed (Coffee, 2004). Enron used its notorious off-balance-sheet special purpose entities (SPE) to move debt off its own books, and similarly present a misleading picture of its financial condition (Bodie, Kane & Marcus, 2014). In one instance, Enron was able to borrow $ 658 million by setting up an SPE, which raised cash by a mixture of equity and debt and then used these debts to help fund the parent company. None of this debt showed up on Enron's balance sheet (Brealey, Myers & Allen, 2011). It is important that we understand why the seventh largest U.S. Corporation collapsed in 2001; especially, when it is unusual for a profitable corporation with an apparently strong balance sheet go from a firm with profitable growth prospects to a bankrupt shell in a matter of less than eight weeks, from mid-October to mid-December 2001 (Bierman, 2008). Yet the most reliable evidence, when properly

read, suggests that Enron scandal was neither unique nor idiosyncratic; rather, pervasive problems arose that undercut existing systems of corporate governance, are by-products of a system, which has indeed made corporate managers more accountable to the market. Yet sensitivity to the market can be a mixed blessing, particularly when the market becomes euphoric and uncritical (Coffee, 2004). In the year 2001, Enron was the seventh largest US Corporation (based on revenues) and possibly would have been ranked much lower if trading transactions were not treated as revenue. Interestingly, Enron was ranked number five in the Fortune 500 listing for 2001, published in March 2002. But no matter where we exactly rank it, Enron was a large profitable corporation before October 2001, if we consider only the available public information as of August 2001 (Bierman, 2008).

Congress enacted the Sarbanes-Oxley act in response to the Enron debacle; it called the Public Oversight Board, to monitor the activities of auditors. It also prohibited an auditing firm from providing both auditing and consulting services to the company. This act sought to prevent a repeat of the corporate scandals that brought about the collapse of Enron (Brealy, Myers & Marcus, 2011). Enron's auditors, Arthur Anderson, might have been tougher on the company had it not also earned substantial fees from providing Enron with consulting services; but it seems monitors are likely to have their own agenda (Brealy, Myers & Allen, 2011). Enron's (now-defunct) auditor Arthur Andersen earned more money consulting for Enron than by auditing it; we should not be surprised that it, and other auditors, were overly lenient in their auditing work, given their incentive of profits (Bodie, Kane & Marcus, 2014).

Credit Scoring and bankruptcy

Credit scoring methods constitute of data back testing, using various variables of financial statements in order to construct risk index. Unfortunately, such data mining that showed good result in the past may not work as well in the future (Brealey, Myers & Allen, 2011). Credit risk is still a tougher risk to master than market risk, due to many more variables to consider. However, there are

now more tools, much more information, and some important new players who are willing to take credit risk, expect to be fairly compensated for it, and are demanding more transparent market pricing (Caouette, Altman, Narayanan & Nimmo, 2008). Credit scoring systems rely primarily on the companies' financial statements to estimate which firms are most likely to become bankrupt and default on their debts; thus such accounting data have impact on the security prices of publicly traded companies, and hence allowing the stockholders, and creditors to exercise their option to default if the market prices of the security falls below the payments that must be made on the debts. A variety of techniques have bee used to develop credit-scoring systems. An early, and still widely used model, the famous Z-score model developed by Edward Altman that uses *multiple discriminant analysis* approach, which assigns a numerical weight to each category of a predictive variable and then computes a score for a new applicant by adding all weights over the variables (Brealy, Myers & Allen, 2011). Altman in 1968 found the following equation to best separate failing and non-failing firms:

$Z = 1.2\,X_1 + 1.4\,X_2 + 3.3\,X_3 + 0.6\,X_4 + 1.0\,X_5$
X_1 = Working Capital/Total Assets
X_2 = Retained Earnings/Total Assets
X_3 = Earnings before Interest and Taxes/Total Assets
X_4 = Market Value of Equity/Book Value of Total Liabilities
X_5 = Sales/Total Assets
Z = Overall Index or Score

Z -scores below 1.23 indicate vulnerability to bankruptcy, scores between 1.23 and 2.90 are a gray area, and scores above 2.90 are considered safe. (Bodie, Kane & Marcus, 2014). Since bond ratings reflect the probability of default, it is not surprising that there is also a close correspondence between a bond's rating and its promised yield. When Enron went bankrupt in 2001, investors protested that only two months earlier the company's debt had an investment-grade rating (Brealey & Myers, 2008).

Modified Altman

Altman's original five-ratio model above was designed for manufacturers, or sectors with high capital intensity, such as mining. As such, the problem is it uses the sales/total assets ratio, which can skew the result in sectors that are not capital intensive, such as services where people are the main source of value. Hence, low total assets figure brings this ratio, and the resulting Z score, down too far and can generate a number that suggests financial distress when there may be none (Money Week, 2013). The result of the revised Z-Score model with a new X4 variable is:

$Z' = 0.717(X1) + 0.847(X2) + 3.107(X3) + 0.420(X4) + 0.998(X5)$.

The equation now looks somewhat different than the earlier model; note, for instance, the coefficient for X1 went from 1.2 to 0.7. But, the model looks quite similar to the one using Market Values. The actual variable that was modified, X4, showed a coefficient change to 0.42 from 0.60; that is, it now has less a slightly lesser impact on the Z-Score. X3 and X5 are virtually unchanged (Altman, 2002).

(P-Score)

Igor Pustlynick developed a modified Altman model that has been expressed as follows:

P = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 1.0x5, where

X1 = Shareholders Equity / Total Assets x 1.2

X2 = Retained earnings / Total Assets x .014

X3 = EBIT / Total Assets x .033

X4 = Market value of Equity /Total Debt x .006

X5 = Revenue / Total Assets x .999

The P-Score and Z-Score were calculated for each of the five years preceding the year where the company was charged with fraud (Pustlynick, 2009).

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Beneish M-score

The Model was developed by professor Messod Beneish has two versions, the original one has eight variables, and the latter one has five. It is similar to the Altman Z-Score, but is used to uncover earnings manipulation from annual financial statements, rather than as a predictor of bankruptcy. As such, companies with higher M-scores are more likely to be manipulators (Warshavsky, 2010). M-score does not prove there is a fraud incurring, but rather indicates the need for further investigation into the company's financial information; further, such analytical method is relatively inexpensive and easy to perform (Roxas, 2011). When M score is greater than -2.22 it indicates a strong likelihood of a firm being a manipulator (Harrington, 2005). For the companies examined in this study, using five variables M-score for year t-1 increased the classification of manipulators by 15% (Roxas, 2011).

The ratios measure sales growth, the quality of assets and gross margins, the progression of receivables versus sales, and that ratio of general, and administrative expense. The probability of earnings manipulation goes higher with unusual increases in receivables, deteriorating gross margins, decreasing asset quality, sales growth, and increasing accruals. "The results point to where there is most likely a problem," says Beneish Auditors for instance might note an unusual accumulation of receivables, which would cause them to probe until they find a reasonable explanation (Harrington, 2005).

In May 1998 a team of students at Cornell University's MBA class selected Enron as the subject of their term project for Professor Lee's course in financial statement analysis. The team applied Beneish model, which indicated possible earnings manipulation, and the students recommended a "sell". At the time, Enron's share was trading around $40 per share and was widely touted by analysts as being the company best placed to take advantage of accelerating deregulation in energy markets. Moreover, the Cornell's students again recommended another sell on Enron in the summer of 2000 when the share was trading over $ 90 (Morris, 2009).

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Chanos Algorithm

James Chanos is the President of Kynikos Associates, a New York private investment management company, which he founded in 1985, specializes in short selling, an investment technique that profits in finding fundamentally overvalued securities that are likely to fall in price. His analysis focuses on the materiality of overstated earnings, unsustainable operation of business plan, and engagement in outright fraud (Chanos, 2003). He made his reputation by digging deeper into the facts than any other analysts were willing to go (Ware, 2001). Chanos sold short Enron in November 2000. He identified problems from disclosures on related party transactions involving senior officers of Enron, and insider trading in late 2000 (Healy & Palepu, 2003). Chanos received widespread publicity when he was an early critic of the accounting practices of Enron (Verhofen, 2011). Tobego (2011) expressed Chanos' Algorithm = (Current asset + Retained earning + EBIT + Revenue)/ Total assets. According to Davidoff (2012) of the New York Times, Chanos was instrumental in helping point to possible fraud at Enron, and his short selling is significant market benefits, including adding liquidity and incentives for price discovery as investors seek to profit from public company problems. Further, Asquith and Meulbroek (1996), in a Harvard Business School working paper, found a strong correlation between short interest, and subsequent negative corporate returns. But Chanos himself described to the Securities and Exchange Commission (SEC) in an interview in 2003, the reason behind his decision to sell Enron short. It started in October of 2000, when he learned from the article of Jonathan Weil in the Texas Wall Street Journal that the accounting practices at large energy trading firms including Enron employed "gain-on-sale" accounting method for their long-term trading. As such, profitability of a trade made today is booked based on the present value of those estimated future profits. Chanos was troubled by the quality of disclosure of Enron described in its 1999 Form 10-K, and its quarterly Form 10-Qs SEC filing in 2000. He was unable to understand the financial

statements of Enron, which added to his conviction. However, what immediately struck him was that despite using the ``gain-on- sale'' model, Enron's return on capital, a widely used measure of profitability, was a meager 7 percent before taxes. He viewed Enron as a trading company that was akin to an "energy hedge fund." For this type of firm, a 7 percent return on capital seemed extremely low, particularly given its market dominance and accounting methods. Further, his view was that Enron's cost of capital was likely in excess of 7 percent and probably closer to 9 percent, which meant from an economic point of view, that Enron wasn't really earning any money at all, despite reporting "profits" to its shareholders.

Hazard Analysis

Hazard analysis is not a new model, and still widely used in accounting to predict bankruptcy (Beaver, 1966). Beaver, McNichols, and Rhei (2004) researched the financial statements of companies that went bankrupt over forty years period and compared them with those survived. They detected deterioration of the financial condition of the bankrupt companies four years before bankruptcy (Brealy, Myers & Allen, 2011). They concluded that a three-variable model: ROA = Net income divided by total assets, LTA = Total liabilities divided by total assets, and ETL = EBITDA divided by total liabilities, where EBITDA = Earnings before interest, taxes, depreciation, and amortization. Such a model provides significant explanatory power throughout the time period. Moreover, the mean ratios of the bankrupt firms deteriorate as the year of bankruptcy approaches (Beaver, McNichols, and Rhei, 2004). This is not surprising, since the ex ante probability of bankruptcy for the entire sample of ex post non-bankrupt firms is likely to be low. The mean ROA for the non-bankrupt firms is .05, while the mean for the bankrupt firms is -.03, -.04, -.10, and-.18, declining over the four years prior to bankruptcy. For ETL, the non-bankrupt mean is .35, while the means for the fourth through the last year prior to bankruptcy are .09, .05, -.01, and -.05. For LTA, the non-bankrupt mean is 0.52, while the bankrupt firms' means are 0.71,

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0.74, 0.82, and 0.98 for the four years prior to bankruptcy. When compared with the means of the non-bankrupt firms, the poor profitability, poor cash flow, and higher leverage positions are evident as early as four years prior to bankruptcy.

Analysis

Enron never scored above 2.90 threshold, which is considered "safe" between 1997 and 2001 according to Altman Z score, revised Altman, P score, and Chanos Algorithm as shown in the table below; but rather always in the "grey area". Where Z -scores below 1.23 indicates vulnerability to bankruptcy, scores between 1.23 and 2.90 are a gray area, and scores above 2.90 are considered safe (Bodie, Kane & Marcus, 2014). But in reality, Moody's, and Finch downgraded Enron's credit to junk only in October 2001(Markham, 2006), nevertheless, its credit scores were to the contrary.

Beneish M-Score five variables benchmark stipulates that greater than -2.76 score indicates the likelihood of earning manipulation, and suggest a review (Beneish, 2007). Accordingly, 1998 was the first sign of Enron's earning manipulation, which was rightly picked up by the student of Cornell when they issued a sell on the stock (Morris, 2009).

Hazard analysis of ROA, LTA, and ETL are correlated with Beaver et al., (2007), though the average numbers are not exact, but fall within the maximums/minimums range of the bankrupt companies in their study; and thus adding another early sign to Enron's fraud.

All calculations are in the attached Excel spread sheet					
Result of analysis	1997	1998	1999	2000	2001 3rd Quarter
Altman Z-score	1.34	1.58	1.68	1.81	0.58
Altman revised (2002) Z-score	1.25	1.44	1.63	1.8	0.95
P-score	1.43	1.68	1.93	2.05	2.32
Chanos	1.13	1.26	1.43	1.73	2.21
Beneish five variables M	-3.27	-1.24	-3.56	-1.79	
Hazard analysis (Beaver et al) average	1-year	2-years	3-years	4-years	
ROA	-0.01	-0.01	-0.02	-0.02	
LTA	1.94	2.65	1.80	1.80	
ETL	-0.02	-0.04	-0.02	-0.02	

Enron's primary challenge in using mark-to-market accounting was estimating the market value of the contracts, which in some cases ran as long as 20 years. Income was estimated as the present value of net future cash flows (Healy & Palepu, 2003). It seems that the financial analysts, the banks, and the credit rating agencies had all made subjective, rather than objective interpretation, in ignoring Enron's financial ratios early warning signs against their benchmarks. The result was like when two persons watch the same movie, one thinks it was the best he has seen, and while the other thinks it was the worst. This is for the experience/benchmark each person has seen, which gave rise to subjectivity (Britton & Waterston, 2010). As late as October 2001, shortly before Enron declared bankruptcy, fifteen of the sixteen securities analysts covering the company maintained "buy" or "strong buy" recommendations on its stock (Coffee, 2004).

Several Enron officials were close to the Bush administration. Kenneth Lay was a personal friend of both the present and former President Bush. Lay had been offered a cabinet position in the senior Bush's administration. He had contributed heavily to George W. Bush's upset gubernatorial race in Texas, and acted as an adviser during his transition into the White House. Their relationship was so close that, as the press later ridiculed George W. Bush as "Kenny Boy." Ken Lay and Enron wrote checks for a total of $200,000 for Bush's inaugural committee. Enron officers contributed to the campaigns of 186 members of the House of Representatives, and to seventy-one senators. Thomas E. White, a retired brigadier general in the U.S. Army and executive assistant to the chairman of the Joint Chiefs of Staff had been a senior Enron official before joining the Bush administration as secretary of the army. He sold $ 25 million of Enron stock in order to meet the ethics concerns. Moreover, Lawrence Lindsey, the president's economic adviser, had been an Enron consultant and owned a significant amount of Enron stock, which he had been criticized for not selling before entering the White House. Karl Rove, the president's political adviser, had held over $100,000 in Enron stock, which he did sell after being criticized for owning stock that might seek favorable treatment from the White House. Another administration official, I. Lewis Libby, Vice President Richard Cheney's chief of staff, also owned Enron stock.

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Enron was just one powerful corporation who played the game well for a time, but simply pushed the envelope too far. As a result, the unprecedented Enron media spectacle magnified the conflicts of interest with Wall Street analysts, the financial community, and accounting firms (Foss, 2002). Finally, Enron, suffered from lack of corporate governance, and moral compass, hence conforms to the famous quote of Lord Acton (1887) "power tends to corrupt, and absolute power corrupt absolutely".

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