

Bankruptcy and Fraud Analysis: Shorting and Selling Stocks

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To auditors, investors, fund managers, short sellers, and other external users, fraud and bankruptcy models may serve as important tools in analyzing the financial information presented by companies. Along with the earnings management ratios, quality of earnings and quality of revenue (Schilit 2003), more elaborate models and metrics (Altman 1968 and 2005, Dechow, Sloan and Sweeney 1996, Sloan 1996, Beneish 1999, and Dechow, Ge, Larson, and Sloan 2007, and Robinson 2007) may serve as a veritable arsenal of techniques for detecting financial problems within companies. When used together as a group, these models may also act as good leading indicators or predictors of future stock price performance. Furthermore, Security and Exchange Commission (SEC) letters to companies questioning their financial reporting may serve as a good screening tool for applying these models since such letters may alert auditors, investors, and other external users to potential financial reporting problems within a company.

When companies file their annual 10-K reports, SEC personnel evaluate the financial data and try to determine if there are any potential improprieties or unusual methods being used. If there are, they will send a comment letter to the company outlining the dispute. As of May 12th, 2005, the SEC began publicly releasing comment letters which were issued after August 1st, 2004. They are now available through the SEC's Edgar Database. The comment letters are sent by individual SEC staff members as part of a review and do not constitute a position taken by the SEC. These letters are only meant to outline reporting concerns, in contrast to Accounting and

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Auditing Enforcement Releases (AAERs), which occur when the SEC actually takes action against a company for financial reporting problems. This article is divided into the following three sections: red flag models, data analysis and results, and conclusions and future research.

Red Flag Models

Six different emerging models and ratios were used in this study to develop a more comprehensive red flag approach in screening for and identifying financial reporting problems in publicly held companies than just using traditional ratios. All six models are available from the authors in an Excel file.

1. Quality of Earnings

The quality of earnings ratio is a quick and simple way to judge the quality of a company's reported net income. The ratio is operating cash flow for the period divided by net income for the period. The red flag benchmark is a ratio of less than 1.0 (Schilit 2003). Also, large fluctuations in this ratio over time may be indicative of financial reporting problems, i.e., Enron's quality of earnings ratios were 4.9, 1.4, and 2.3 over its last three years of operation. In its last year of operation, Enron forced its electricity customers to prepay in order to receive any electricity which dramatically increased its operating cash flows and quality of earnings ratio.

Quality of earnings is also meant to measure whether a company is artificially inflating earnings, possibly to cover up operating problems. This ratio may indicate that a company has earnings which are not actually being converted into operating cash. Methods for inflating earnings (but not operating cash flows) include early booking of revenue, recognizing phony revenues, or booking one-time gains on sales of assets.

2. Quality of Revenues

The quality of revenues ratio is similar to the quality of earnings, except that the

emphasis is on cash relative to sales rather than cash relative to net income. It is the ratio of cash collected from customers (revenues plus or minus the change in accounts receivable) to the company's revenue. Similar to the quality of earnings ratio, the red flag benchmark is a ratio of less than 1.0 (Schilit 2003). For example, Enron's quality of revenues went down from 0.98 to 0.92 in its last year of operation. Since manipulation of revenue recognition is a common method for covering up poor results, this simple metric can help uncover schemes used to inflate revenues without the corresponding cash collection. Common methods include extending increased credit terms to spur revenues but with slow collections, shifting future revenues into the current period, or booking asset sales or swaps as revenue.

3. Sloan Accrual Measure

The Sloan accrual measure (1996 and updated as discussed by Robinson 2007) is based on the analysis of accrual components of earnings. It is calculated as follows: net income less free cash flows (operating cash flow minus capital expenditures) divided by average total assets. The red flag benchmark is a ratio of more than 0.10. For example, Sloan calculated that JetBlue had a ratio of 0.50 and his employer, Barclays Global Investors, shorted the stock and made over 12% in less than one year.

This ratio is used to help determine the quality of a company's earnings based on the amount of accruals included in income. If a large portion of a company's earnings are based more on accruals, rather than operating and free cash flows, then, it is likely to have a negative impact on future stock price since the income is not coming from the company's actual operations (Sloan 1996). Since many of the accrual components of net income are subjective, managers are able to manipulate earnings to make the company appear more profitable. In essence, the Sloan accrual measure is used to help determine the sustainability of a company's

earnings.

4. Altman Z-Score

The Altman (1968 and updated in 2005) Z-Score is a multivariate statistical formula used to forecast the probability a company will enter bankruptcy within the next two years. The model contains five ratios which are listed below with their coefficients, based on Altman's research. The model was originally developed in 1968 for evaluating the bankruptcy risk of traditional public firms, such as manufacturing, energy, and retail, but it can also be applied to non-traditional and service public firms, such as software, consulting, and banking, as well as private firms. All three versions of the model are available on the Bloomberg software subscription package. The traditional red flag benchmark is a Z-Score of less than 1.8, with a score between 1.8 and 3.0 indicating possible bankruptcy problems (Altman 2005). For example, Altman recently observed that General Motors will “absolutely” seek bankruptcy protection and “they still come up very seriously in the Z-Score test into the bankrupt zone after a 30 to 60 day reorganization” (Del Giudice 2009).

(Working Capital / Total Assets) x 1.2

This ratio is a measure of a firm's working capital (or net liquid assets) relative to capitalization. A company with higher working capital will have more short-term assets and, thus, will be able to meet its short term obligations more easily. This ratio is one of the strongest indicators of a firm's ultimate discontinuance because low or negative working capital signifies the firm may not be able to meet its short-term capital requirements.

(Retained Earnings / Total Assets) x 1.4

This ratio is a measure of a firm's cumulative profits relative to size. The age of the firm is implicitly considered due to the fact that relatively young firms have a lower ratio and the

incidence of business failures is much higher in a firm's early years.

(EBIT / Total Assets) x 3.3

A healthy company will be able to generate income using its assets on hand. If this ratio is low, then, it demonstrates that profitability is poor, and that the company is in danger of bankruptcy because it is likely more vulnerable to market downswings which affect earnings. This analysis is true for both manufacturing and service companies as this ratio is included in both versions of the bankruptcy model, as well as a private company model (Altman and Hotchkiss, 2005). All three models are available in the Bloomberg subscription databases.

(Market Value of Equity / Book Value of Total Liabilities) x 0.6

This ratio adds a market emphasis to the bankruptcy model. The theory is that firms with high capitalizations would be less likely to go bankrupt because their equities have higher values. In addition, it will gauge the market expectations for the company which should take into account relevant future financial information. This market value of equity variable assumes the efficient market hypothesis is applicable which will be questioned in the following future research section.

(Sales / Total Assets) x 0.999

This ratio, also known as total asset turnover, demonstrates how effective the company is utilizing its assets to generate revenue. If this number is low, then, it indicates that the company is not being run efficiently which creates a higher bankruptcy risk. Altman's service sector bankruptcy model drops this variable to avoid bias toward those types of companies (Altman and Hotchkiss, 2005).

5. Z-Score (Old Fraud Model)

Beneish (1999) developed a statistical model used to detect financial statement fraud and

earnings management through a variety of metrics. There are five key ratios used in the model, which are the Sales Growth Index (SGI), Gross Margin Index (GMI), Asset Quality Index (AQI), Days Sales in Receivables Index (DSRI), and Total Assets to Total Accruals (TATA). Each of these measures with its model coefficient, based upon Beneish's research, is outlined below. There is also a constant value in the model of -4.840. The red flag benchmark is a Z-Score greater than a negative 1.49, i.e., a smaller negative number or a positive number indicates possible financial reporting problems (Beneish 1999). For example, Enron had a Z-Score of a positive 0.045 in its last year of operation.

SGI – Sales Growth Index x 0.892

This measure is current year sales divided by prior year sales. It is meant to detect abnormal increases in sales which may be the result of fraudulent revenue recognition. If a company experiences a very large increase in sales from one period to the next, it may be because they are shifting revenue to a later period or booking phony revenue.

GMI – Gross Margin Index x 0.528

This measure is last year's gross margin divided by this year's gross margin. While not necessarily a direct measure for potential manipulation, companies that are experiencing declining gross margins may have increased pressure to improve financial performance. Such pressure may cause them to turn to fraud or questionable financial reporting to maintain net income margins.

AQI – Asset Quality Index x 0.404

This measure is the percentage of total assets that are intangible assets this year divided by the same percentage calculation for last year. An increase in this index may represent additional expenses that are being capitalized to preserve profitability. Rather than expensing

various costs, such as research and development or advertising, these costs are being capitalized as intangible assets. Capitalization increases assets while helping to maintain the profitability of the company.

DSRI – Days Sales in Receivables Index x 0.920

This measure is DSRI this year divided by DSRI last year. Companies that are trying to boost revenue and profit will often allow customers to have greatly extended credit terms so that they will buy earlier. This practice increases revenue in the current quarter but will hurt the company in the future. This metric is meant to detect companies which make significant changes in their collection policies or which recognize phony or early revenues. It could reflect a general economic slowdown which could impact most companies and, thus, not be an effective signal.

TATA – Total Accruals to Total Assets x 4.679

This measure represents total expense accruals to total assets. Such accruals represent non-cash earnings. Similar to Sloan's accrual measure and the upcoming accrual measure in the New Fraud Model, an increase in expense accruals represents an increased probability of earnings manipulation and possible operating and free cash flow problems.

6. F-Score (New Fraud Model)

The new F-Score fraud model (Dechow, Ge, Larson, and Sloan 2007) can be used as another initial test in determining the likelihood of financial reporting manipulation. Similar to the other models and ratios, a fraudulent score for this model does not necessarily imply such manipulation but it serves as a red flag for further analysis. The model contains measures to identify problems in accruals, receivables, inventory, cash sales, earnings and stock issuances as discussed below with their coefficients, based upon their research. There is also a constant value of -6.753 in the model. The red flag benchmark is an F-Score greater than 1.0 and is calculated

using an exponential model. For example, the F-Score for Enron in its last year of operation was 1.85. Their research is the most extensive of the two fraud models (designated as the old and the new models) since it was based upon an examination of all AAERs issued between 1982 and 2005 while the prior, older Beneish study was based only on AAERs issued between 1982 and 1992.

Accruals x 0.773

Firms that engage in earnings manipulation typically have abnormally high accruals. A significant amount of non-cash earnings results in inflated earnings and is a warning sign for earnings manipulation. This measure is a complex calculation based upon numerous accrual measures and is scaled by average total assets. Essentially any business transactions other than common stock are reflected in accrual measures (Dechow *et al.* 2007).

Change in receivables x 3.201

The change in receivables from last year to this year is scaled by average total assets. Large changes in accounts receivables may indicate revenue and earnings manipulation. Such manipulation can occur through the early or phony recognition of revenue and large swings in accounts receivable will distort cash flows from operating activities.

Change in inventory x 2.465

The change in inventories from last year to this year is scaled by average total assets. Large changes in inventory may indicate inventory surpluses, shortages, obsolescence, or liquidation. For example, if the company uses the last-in first-out (LIFO) method of accounting for inventory in a period of rising prices, selling older inventory will result in lower cost of goods sold, i.e., LIFO liquidation of inventory units or layers. This practice leads to inflated earnings.

Change in cash sales x 0.108

This measure is the percentage change in cash sales from last year to this year. For a firm not engaged in earnings manipulation, the growth rate in cash sales could be compared to the growth rate in revenues but these researchers did not include such an analysis. They argued and modeled that just the change in cash sales is a key metric to monitor when evaluating the potential for earning manipulation.

Change in earnings x -0.995

This measure is a percentage calculated as earnings divided by total assets this year less the same measure last year. Volatile earnings may be indicative of earnings manipulation. According to Dechow, Ge, Larson, and Sloan (2007), a consistent theme among manipulating firms is that they have shown strong performance prior to manipulations. The cause for such manipulations may be a current decline in performance which the management team attempts to cover up by manipulating financial reporting.

Actual issuance of stock x 0.938

This measure is a dummy variable that is ON if additional securities are issued during the manipulation year and is OFF if no such securities are issued. Such issuances may indicate operating cash flow problems that need to be offset by additional financing. Also, issuance of stock may indicate management is exercising stock options. The exercise of stock options may signify that managers are attempting to sell at the top because they foresee future underperformance of the company. Such insider sales resulted in the criminal conviction of Qwest's Chief Executive Officer and have been a significant non-financial red flag in many fraud cases, like Enron, Global Crossing, and WorldCom. For example, Qwest and Enron insiders made \$2.1 billion and \$1.1 billion, respectively, by exercising and selling their stock

options before their firms' financial reporting problems became public.

Data Analysis and Results

366 companies were found to have received SEC comment letters concerning filings of their 10-K reports during the first two years, 2005 and 2006, that such letters were made publicly available. After eliminating companies which did not have all the data required for the various red flag models, such as being public for at least two years and having quoted stock prices, 300 companies remained. These companies were from all eight categories of the Standard Industry Classification (SIC) codes as shown in Table 1. The 3000 category, primarily manufacturing firms, had the most companies (77) in this study, followed by the 6000 category, primarily banks, with 53 firms. The other categories ranged from 48 firms (7000) to 13 firms (8000).

Table 1
Sample Description

Panel A

SIC	Number of	Average
Codes	Companies	Number of Red Flags
1000's	16	2.5625
2000's	30	2.2667
3000's	77	1.9740
4000's	28	2.3571
5000's	35	1.9143
6000's	53	2.6226
7000's	48	2.2708
8000's	13	2.4615
	<u>300</u>	

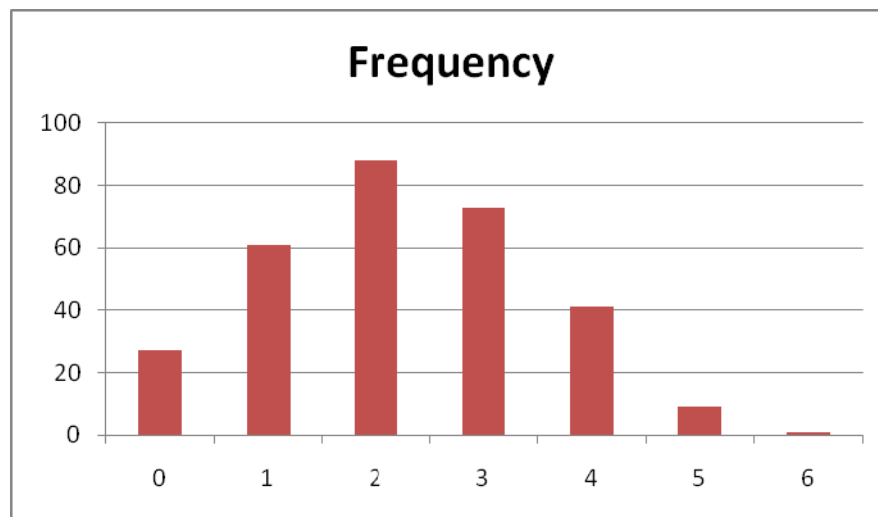
Panel B

Number of Red Flags	Number of Companies
0	26
1	61
2	88
3	74
4	41
5	9
6	1
Total Companies	<u>300</u>

The company's 10-K report referenced in its SEC comment letter was then used to collect the balance sheet, income statement, and cash flow information required by the various models.

For each of the six models, the appropriate benchmarks previously discussed were used in order to determine if a certain metric acted as a red flag for the company. The frequency of these red flags ranged from 0 (when no model returned a red flag) to 6 (when all of the models returned red flags). The frequencies approximated a normal distribution as shown in both Table 1 and Figure 1.

Figure 1: Frequency distribution of red flags



These red flags were also summarized by average number of red flags per SIC code in Table 1. The highest average number of red flags (2.62 out of 6 possible red flags) was the 6000 category, primarily banks, which was not a surprise, due to all their economic problems which were a leading cause of the current economic recession. The second highest average number of red flags (2.56) was the 1000 category, primarily energy companies, which was not a surprise, due to all the significant energy price fluctuations in recent years, especially in the current economic recession. The two lowest categories with average number of red flags of 1.97 and 1.91 were the 3000 category, primarily manufacturing companies, and the 5000 category, primarily retail companies, respectively, both of which have been effected by, but not causes of,

the current economic recession.

Table 2: Descriptive Statistics for the Sample Companies

Panel A: Median Values for Key Operating Statistics by Industry Group

Industry Group (SIC Code Groups)	Growth Rate	Net Profit Margin	Rate of Return on Assets	Market Capitalization (in \$ millions)	Market-to- Book Ratio
1000	0.252 ¹	0.087 ¹	0.187 ¹	\$ 1,041.9 ¹	2.51 ¹
2000	0.055 ¹	0.052 ¹	0.133 ¹	514.4	1.54
3000	0.113	0.045	0.087 ¹	591.2	1.46
4000	0.191 ¹	0.029	0.090 ²	1,344.9 ¹	1.12 ¹
5000	0.075 ¹	0.035	0.104	576.3	0.41 ¹
6000	0.109	0.013 ¹	0.128 ¹	847.3 ¹	3.04 ¹
7000	0.180 ¹	0.047 ¹	0.111	182.4 ¹	2.25 ¹
8000	0.164 ¹	0.033	0.048 ¹	225.7 ¹	1.39
Overall Average	0.115	0.033	0.107	549.7	1.61

Panel B: Median Values for Key Operating Statistics by Number of Red Flags

Number of Red Flags	Growth Rate	Net Profit Margin	Rate of Return on Assets	Market Capitalization (in \$ millions)	Market-to- Book Ratio
0	0.044 ¹	0.052 ¹	0.109	\$ 1,135.5 ¹	1.69
1	0.106	0.068 ¹	0.121 ²	847.3 ¹	1.64
2	0.120	0.030	0.104	683.3 ¹	1.69
3	0.139	0.014 ¹	0.087 ¹	448.6 ¹	1.59
4	0.243 ¹	0.003 ¹	0.081 ¹	159.7 ¹	1.22 ²
5	0.170 ¹	0.106 ¹	0.133 ¹	46.3 ¹	0.86 ¹
Overall Average	0.115	0.033	0.107	549.7	1.61

Notes:

1. Signifies that the p-value for the Wilcoxon Z of the difference between the group median and the overall average value is significant at the 0.01 level or greater.

2. Signifies that the p-value for the Wilcoxon Z of the difference between the group median and the overall average value is significant at the 0.05 level.

Table 2 shows descriptive statistics for the sample firms categorized by industry group and by the number of red flags. Panel A shows the firms grouped by industry. The 1000 category (primarily energy companies) outperformed the average firm on all five operating measures reported in Table 2. On the other hand, categories 2000, 5000 (primarily retail), and

6000 (primarily banks) generally performed below the average firm in the sample, with lower growth rates, net profit margin (category 6000), and return on assets (category 5000). In Panel B growth rate is increasing as the number of red flags increases, reflecting the common practice among manipulators of improperly increasing revenues. Market capitalization is falling steadily as the number of red flags increases, suggesting that the stock market is reacting to the likelihood that manipulation actually occurred.

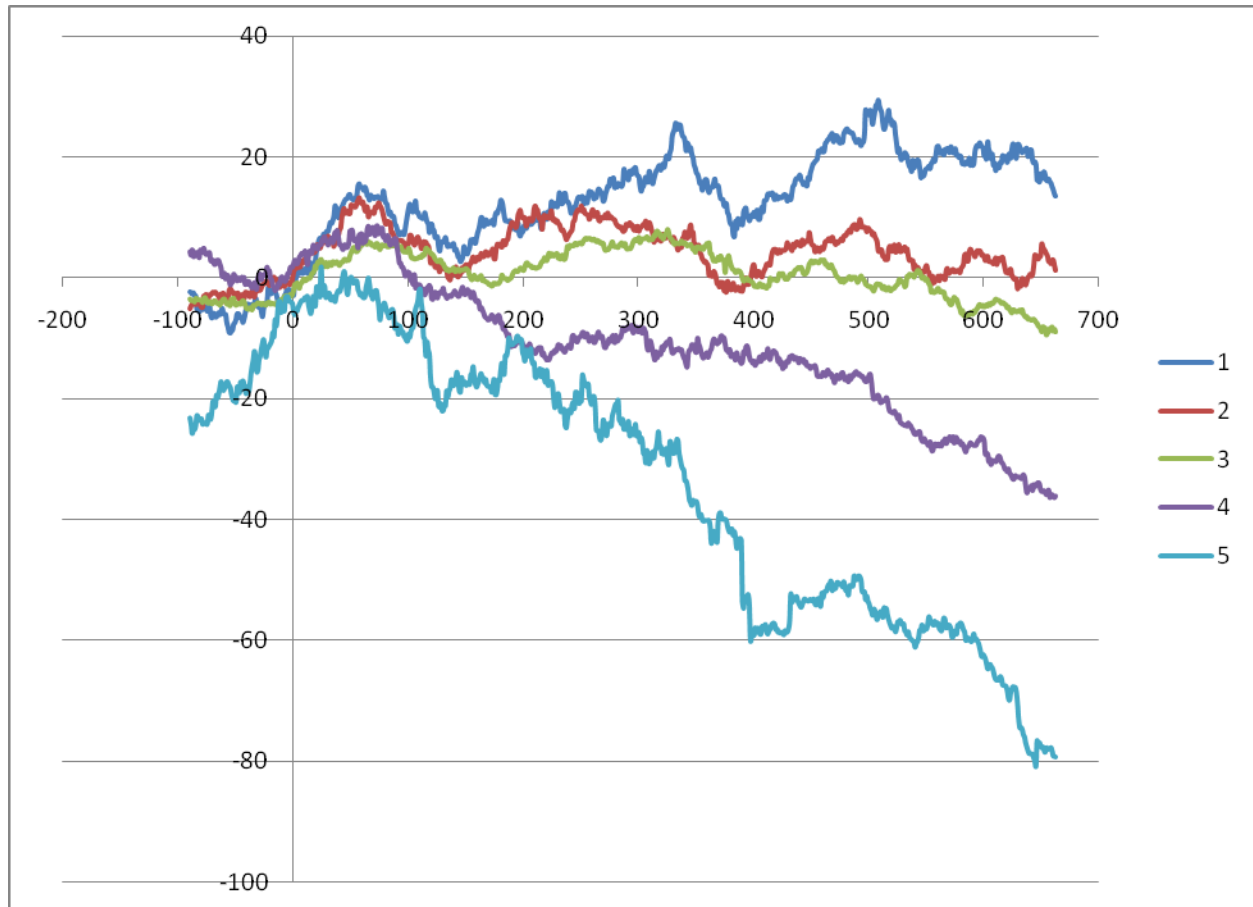
The date of the SEC comment letter, which was also the date it first became available in the SEC Edgar database, was used as a cutoff date for stock price (Binder 1998). This procedure assumed a strategy whereby an SEC comment letter would be used as an indication of a potential financial reporting impropriety or problems within a company. Then, the red flag models would be run against the information contained in the 10-K in question. External users, such as investors, fund managers, and short sellers, have access to such financial information through the SEC's Edgar database. They could adopt strategies based on the number of red flags for each company, potentially indicating which companies would underperform.

The companies were grouped together based on the number of red flags they received and their stock prices were set to an index value whereby the comment letter date would be equal to a value of 100. Each company's stock price return was then compared to the S&P 500 stock market returns, which were also indexed using the same method as the comment letter date of each company. These returns on the S&P 500 were then subtracted out in order to find each company's excess returns above or below the overall market returns.

The Figure 2 graph indicated the average excess returns over time for companies in each of the six red flag groups. The y-axis indicated the average excess company returns after eliminating the S&P 500 returns. Zero excess returns would track the S&P 500 returns exactly.

The x-axis indicated the number of days after the comment letters became publicly available.

Figure 2: Excess stock price performance: companies by number of red flags



The data showed that those companies with more red flags, especially four and five red flags, significantly underperformed the overall market on average over the 700 day time period. More importantly from an investor's perspective, there was approximately a 100 day lagged reaction to the comment letters' dates for the companies having four or five red flags. If these comment letters were used as a screening device, shrewd investors, such as fund managers implementing these red flag models, could be able to close their positions in these companies before the stock declined. Conversely, a short seller would have the opportunity to short shares before the market price fell and could earn a profit. The avoided losses or gains which could be

made from such practices could be very significant as shown in Figure 2.

Conclusions and Future Research

The application of these six red flag models has shown good potential to be used by various investors and auditors to check or screen for financial reporting problems at individual companies. As noted in the prior example, both fund managers and short sellers could take advantage of this red flag approach. Also, auditors could use this approach to supplement their traditional ratio analyses to help focus their investigations of clients.

Our results were similar to a previous study that found significant, negative cumulative abnormal returns (CARs) concerning stock prices of companies being investigated by the SEC (Cook and Grove 2009). These CARs existed for 1, 10 and 30 day windows around the event date when such SEC investigations became public. Cross-sectional tests on the CARs revealed that the sales growth index (SGI) from Beneish's old fraud model was significant. However, Sloan's older accrual variable was not significant and his new accrual variable was not tested in that study. Also, several corporate governance variables were significant in that study, such as the percentage of total common stock of all board of directors held by insider board members, the percentage of total compensation of the top five managers resulting in stock option compensation, and the percentage of insiders on the board of directors. Future research could continue to assess both financial and non-financial (corporate governance) variables in the investigation of both financial reporting problems and stock prices.

Future research could also investigate the issue of whether the efficient market is really efficient in light of the present economic recession. One of the problems is that the market doesn't react well to bad or missing information, such as non-disclosure of earnings management

problems. An example is the hiding of billions of mortgage backed securities in the off-balance sheet entities, Structured Investment Vehicles, similar to how Enron hid billions of debt in the off-balance sheet entities, Special Purpose Entities. A recent problem was the over-rating of risk by S&P and Moody's which thus misrepresented risk. The efficient markets should not be used to excuse CEOs of failed firms who did not see the risk that their actions posed for the economy. Future research could re-apply these red flag ratios and models in hindsight, being supplemented by such omitted information.

Another future approach would be to investigate the market reaction to earnings manipulation testing efficient market hypothesis. Paul Krugman, the 2008 winner of the Nobel Memorial Prize in Economic Science argues that many real-world investors bear little resemblance to the "cool calculators" of efficient market theory. Instead, they are subject to "herd behavior, to bouts of irrational exuberance and unwarranted panic." Second, he argues that even the "cool calculators" often find that they can't be that efficient as problems of trust, credibility and limited influence "force them to run with the herd." Perhaps different measures of stock market activity could be used to measure such behaviors. In summary, he argues that "the neat but wrong solution of assuming that everyone is rational and markets work perfectly" needs to be abandoned. He says that the resulting theory "won't be neat but we can hope that it will have the virtue of being at least partly right, as opposed to being neat, plausible and wrong" (Krugman, 2009).

In contrast, defenders of the efficient market hypothesis such as Jeremy Siegel argues that the efficient markets hypothesis(EMH) should not be blamed for the crisis, arguing that the hypothesis

states that the prices of securities reflect all known information that impacts

their value. The hypothesis does not claim that the market is always right. On the contrary, it implies that the prices in the market are mostly wrong, but at any given moment it is not at all easy to say whether they are too high or too low (Siegel, 2009).

The controversy over the EMH and behavior finance is an ongoing one. Testing these two theories as explanations of the market reaction to earnings manipulation data may shed new light on these two very different views of market behavior. Such future research could help explain why external users did not use these red flag results in a more timely manner. Our finding of 700 days in Figure 2 or almost two years is a long time for such financial reporting fraud or earnings management or impending bankruptcy to be ignored.

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