



Quadrophobia: Predicting the Next Enron?

By Charlie Curnow

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In March 2001, *Fortune* magazine writer Bethany McLean observed in a piece entitled "Is Enron Overpriced?" that some financial analysts considered Enron to be a "big black box," impenetrable to the outside observer. No one knew for sure how the firm managed to increase reported earnings 25 percent or double its reported revenues to more than \$100 billion in 2000, as the tech bubble burst. Over the next year, a Securities and Exchange Commission investigation and federal trial revealed that those reported earnings figures were a sham.

The Enron accounting scandal and others like it led to calls for more transparent corporate earnings reports and spurred Congress to pass tighter auditing rules in the Sarbanes-Oxley Act of 2002. Even after the enactment of Sarbanes-Oxley, however, accounting scandals cropped up at several other major firms, including HeathSouth, Chiquita, AIG, and most infamously, Bernard Madoff Investment Securities. These scandals have sent many academics and financial professionals in search of new formulas to predict "the next Enron."

In October 2009, Stanford Law School professor of Joseph A. Grundfest and Stanford Business School graduate student Nadya Malenko unveiled one such formula in a [report](#) for the university's Rock Center for Corporate Governance. Their method hinges on a pattern they found in the earnings per share data of companies that tweak their quarterly and annual earnings reports in order to meet analyst expectations. They call the pattern "quadrophobia."

Quadrophobia appears in the first decimal place of quarterly and annual earnings per share figures. Because official quarterly and annual reports only show EPS figures to the nearest cent, Grundfest and Malenko needed to recalculate each value using COMPUSTATS's raw earnings and share data. Other things equal, each digit from one through nine should appear in the first decimal place of reported EPS data about 10 percent of the time. In practice, however, each digit is not equally represented in the first decimal place. For some firms, the number four is markedly underrepresented. The trend is most prevalent among firms with high analyst coverage and companies whose reported EPS figures come close to analyst forecasts. It is also more prominent among businesses that restate financials or get sued by the SEC for alleged accounting violations.

According to Grundfest and Malenko, firms that intentionally engage in quadrophobia do so in order to raise their EPS estimates to the next-highest cent by nudging up the value in the first decimal place of EPS figures from four to five.



Under standard accounting procedures, companies may round up their EPS figures to the next-highest cent if the value in the first decimal place is greater than or equal to five. In most cases, this leads companies to overstate their earnings by just a fraction of a percentage point. Among the firms examined in the study, the mean amount firms would have needed to overstate their earnings in a given quarter in order to raise the value of the first decimal place value in EPS reports from four to five was \$149,000, and the median was \$31,000. This translated to a mean change in reported revenues of 0.15 percent, and a median change of 0.41 percent. Even though the direct impact of quadrophobia on earnings figures may be negligible, however, dishonest rounding behavior can still make a noticeable impact on markets if it hides failures to meet analyst expectations, leads to rises in stock prices or allows for increases in executive compensation.

Unfortunately, spotting and preventing individual cases of intentional quadrophobia could prove difficult for regulators, because companies engaging in quadrophobia will always have a strong statistical case to hide behind. Even if fours are evenly distributed, there is a 90 percent chance in any given quarter that the value in the first decimal place of reported EPS figures will not be four. And, even over four years, or 16 quarters, there is an 18.5 percent chance that honest companies will never report a four in the first decimal place.

Furthermore, it is uncertain whether increased attention from auditors would deter quadrophobia, anyway. Grundfest and Malenko found quadrophobia to be statistically significant in both audited and unaudited data prior to 2001, which means that auditors failed to deter the practice. From 2002, the year Sarbanes-Oxley passed, onwards, quadrophobia does decrease in audited annual data, in which the number of fours has approached 10 percent. Grundfest and Malenko caution, however, that these numbers may be skewed by loopholes included in Sarbanes-Oxley such as allowances for "unusual and nonrecurring transactions." It is therefore impossible, they say, to tell whether the tighter auditing process had any effect on quadrophobia. Sarbanes-Oxley did not significantly change the auditing process for quarterly data, and has the prevalence of quadrophobia in quarterly data has stayed about the same.

To get an idea what it would be like for auditors looking for individual cases of quadrophobia, Advisor Perspectives examined COMPUSTAT's quarterly EPS data for Enron from 1999 through 2001 and for WorldCom from 1999 through 2002, the years of each company's alleged accounting violations. Because official EPS reports show EPS figures rounded to the nearest cent, we calculated EPS values for each quarter using the raw data for income and common shares. In 11 quarters, a four appeared in the first decimal place of Enron's EPS figures once, in the second quarter of 2000, for a rate of 9 percent. In WorldCom's data, a four showed up in the first decimal place of EPS figures once in 13 quarters, in



the first quarter of 1999, for a rate of 8 percent. While both rates are lower than 10 percent, neither is low enough to suggest any sort of wrongdoing.

Finally, even if increased attention from auditors could deter quadrophobia, it is uncertain whether increased investment in the auditing of quarterly data to spot the behavior pattern is warranted. Once again, the dollar amounts involved in quadrophobia tend to be very small. And deterring quadrophobia alone would leave other, more damaging accounting practices unaffected. Grufest and Malekno therefore urge us to view quadrophobia as simply one more forensic tool investigators can use to detect accounting fraud at individual firms.

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