Detect Fraud Before Catastrophe

Proactive content analysis techniques can help management accountants prevent catastrophic financial fallout.

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Reducing fraudulent activity is a crucial issue facing accountants today. Data from trusted sources, such as the Association of Certified Fraud Examiners (ACFE), concludes that fraud levels aren't receding. This is especially troubling given that we now have tougher laws, more aggressive enforcement, and steeper penalties with fines and settlements regularly topping $100 million when they were only several million dollars a few years ago.

Internal fraud is on the rise. On January 29, 2013, www.lovemoney.com reported that 80% of financial loss suffered by companies through fraud was caused by internal personnel. "The number of these cases reaching court rose from 22 in 2011 to 35 in 2012, with the value of these frauds more than doubling from £12 million to £25.1 million." The authors of the website suggest a persistent need for prevention, detection, and responding with better fraud prevention modeling. We couldn't agree more.

The Sarbanes-Oxley Act of 2002 (SOX) was intended to aid in preventing fraud by making organizations more responsible for their financial statements—something they were already responsible for. Also, Congress created the Public Company Accounting Oversight Board (PCAOB) to oversee the audits of public companies in order to protect stockholders' and the public's interests. Nevertheless, fraud has continued to increase, and the damages from fraud have increased even more.

When external auditors use conventional audit procedures, their efforts often come too late to avoid catastrophic damage to the organization—think Enron and WorldCom. External auditors typically use financial ratio analysis (conventional models) *after* the audit year is over and the books have been closed. At this point, the damage has already been done, and it's too late to prevent fallout. Moreover, numbers are easy to manipulate, and auditors won't see a dramatic change in the financial ratios if fraud increases gradually.

There's a better option: Companies can use early fraud detection models at any time in a given year. These models often involve nonfinancial, language-based variables or contemporaneous risk factors that can be measured as leading indicators long before the financial results are known. For example, variables could include number of words, amount of specific punctuation used, or certain suggestive words, such as emotionally positive or negative words.

These content analysis techniques create increasingly better modeling. With this in mind, we explored the proposition of being able to detect fraud earlier without having to rely primarily on public accounting or external auditors. We believe that internal auditors can use early fraud detection models to detect fraud and reduce the damage it causes. This view is consistent with the role of management accounting professionals to provide risk assessment as well as design and implement internal controls to safeguard against fraud.

Theoretically sound, these early detection mechanisms provide a higher level of accuracy in fraud detection than the conventional models that many external auditors currently emphasize. Studies have shown that conventional financial models are 30% to 40% accurate in predicting fraud. But examining narrative disclosures with new language-based models is both timelier and closer to 70% accurate.

To successfully mitigate financial disaster, both accuracy and timeliness in fraud detection are important: Accuracy increases the reliability and probability of results, and greater timeliness increases the likelihood that a company will discover fraud before the effects become overwhelming. The earlier a company detects ongoing fraud, the less financial damage accrues. Accordingly, our project using the content analysis method seeks to place the emphasis where it belongs—on those accountants adding value to their organizations in a timely manner. In this regard, we believe this approach provides a significant contribution to rebalancing the profession.

A Quick Review

In one of our prior studies, as a proxy for fraud, we obtained 118 observations from companies that were required to restate their financials by the Securities & Exchange Commission (SEC). We then compared the Management's Discussion and Analysis (MD&A) section of each annual report to a matched set of similar compa-

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nies not required to restate financials (such as nonfraud companies). We used the content analysis method to statistically analyze words and other textual cues and categorize them in terms of significance. We targeted contextual variables that would suggest deception and explained how each variable could be an indicator of fraud. Based on this comparison, we frequently observed significant differences in text between companies required to restate their financials and those not required to restate. The results of the study suggested we do another study and use the significant indicators of fraud as a basis for a prediction model for early fraud detection. We'll deliver on that promise, but first we need to establish the motivation for such a model.

Is the discovery of these results (early prediction and accuracy approaching 70% from a nonfinancial model) merely a fascination, or is this important to pursue? Part of the answer is indicated by an overwhelmingly positive response from IMA® (Institute of Management Accountants) members and many readers of our prior *Strategic Finance* article on the topic. Stemming the tide of fraudulent activity using a simple tool is an attractive proposition. Another part of the answer is likely based on the severity of the fraud problem.

Our enthusiasm for a new study came from watching the devastating damages resulting from major fraud in companies that are now famous, unfortunately, because of their ruinous experiences. Out of curiosity, we conducted anecdotal applications of the approach on some of these now-famous companies and found some startling results. For example, we discovered that healthy companies averaged roughly 17 negative words in these reports, while WorldCom, Enron, and Tyco averaged 61 negative words—a difference of 44 words. We noted similar patterns in other companies famous for fraudulent fallout as well.

If they had detected the fraud earlier, some of these now-famous companies could have avoided many of the

ultimately devastating results (such as innocent employees losing their pensions as a result of the company's financial ruin). Conventional fraud detection measures using ratio analysis and other financial data were either unable to detect the fraud or unable to detect it soon enough to avoid catastrophic outcomes. Moreover, management accountants could have used our techniques to discover these fraud patterns rather than depending on external auditors. Waiting for outside auditors to confirm fraudulent activity using conventional financially oriented metrics is an example of driving the car by only using the rear view mirror. Companies sorely need leading indicators of fraudulent activity.

Current Study Results

In our previous study, we found significant textual differences between companies with fraud and companies without. At that point, we hadn't yet developed an early fraud prediction model because we merely did testing to determine which variables were significantly different between the MD&As of companies required to restate financials and those not required to restate. In our current study, we attempted to build a model using the variables that were statistically significantly different in the first study and then used a different sample to validate the model's predictive ability.

We entered the most significant variables from the first study into a logistic regression and then performed backward elimination stepwise regression to determine which variables had predictive ability. We ultimately included four variables in the model describing characteristics of restating companies: (1) more words, (2) fewer colons, (3) fewer positive emotion words, and (4) fewer present-tense words. Our goal was to see if our new prediction model could correctly discriminate between restating firms (companies where fraud was present) and those not required to restate.

Confirming Early Fraud Detection

To test the predictability of our new fraud prediction model, we needed a new sample. We used the same general approach as before to identify it. Our original sample came from Accounting and Auditing Enforcement Releases (AAERs) issued between 2000 and 2003, and the new sample came from AAERs issued between 2004 and 2006. (The SEC issues an AAER when a company is formally charged with a violation requiring restatement of its financial reports.) The new sample consisted of 68 companies that restated financials and included firms such as

The Fraud Testing Process

Early fraud detection model based on MD&As:

$$FRAUD_i = 2.89757 - 0.83408\,(POSITIVE\ EMOTION_i) - 0.48315\,(PRESENT\ TENSE_i)$$
$$+\ .0001\,(TOTAL\ WORDS_i) - 2.80753\,(COLONS_i)$$

GENERAL STEP-BY-STEP PROCEDURE:

1. Apply the LIWC program to the narrative using the chosen variables of interest.

Management accountants, who are familiar with their company, on their own could find language cues of interest that provide differentiating predictors for certain documents. In our case, we used a more scientific approach for choosing variables, examining theory for behavior of different variables and using regression to build our model. Our model is also only directly relevant to the MD&A narratives and samples we tested. We examined the number of words, colons, present-tense words, and positive-emotion words to achieve our 64.8% accuracy rating.

One way to start is by learning how to use the program and checking for frequency of terms that might indicate deception. For example, if the writer uses more words, he or she may be trying to obscure the communication. Use of fewer positive-emotion words is associated with negative unintended cases.

2. Compare the frequencies of the analysis to other narrative results from similar documents within the organization.

Comparing the narrative to similar ones of the same type can potentially disclose an intent to deceive. When we used the model applied to the MD&A sections of the annual reports, the difference was clearly measurable between fraud and nonfraud firms. The difference could have been available to internal accountants immediately after the document was written—and perhaps prior to the release of the MD&A to the public. Using conventional financial methods, however, would have determined fraud too late.

3. If the results are substantially different and directionally revealing, this could provide a red flag about deception in the narrative's content.

Although some experience is required to determine which variables are potentially useful, management accountants can apply this process to narratives of their choice in the organization. If there's a similar narrative that can be compared to prior periods or across writers, then these differences could potentially provide useful information for further investigation. Accountants in their own organizations can examine and compare narratives of various types at any time. They don't need to wait for financial fallout to follow up on suspicious results.

Adelphia, Qwest, and Tyco. As before, we matched the 68 companies with similar companies that weren't issued AAERs. We also confirmed that these companies were involved in fraud as opposed to restating because of a reporting error.

We used the content analysis method to examine the MD&A section of the annual reports of all companies in both samples, observing textual patterns of cues to potentially reveal differences between the two groups. To accomplish this, we used the Linguistic Inquiry and Word Count (LIWC) program, a widely available software program that parses documents to identify parts of speech, syntax, and the like. After we performed that operation,

the software organized the frequencies of certain words and other textual cues into groups of interrelated themes or combinations of word patterns.

Although we had to exercise judgment regarding what textual variables to include, the software was reasonably easy to use. We then performed statistical analysis that identified particular characteristics that might suggest fraud based on the frequencies of key language-oriented cues. These cues provided red flags to initiate an investigation rule to check further for foul play.

The sidebar "The Fraud Testing Process" explains a systematic, step-by-step process for management accountants to effectively use this model or create and validate

their own. For example, the controller of a large company thinks that one of his 10 division controllers may be deceitful and wants to prove it one way or the other. As part of the annual budgeting process, every division controller must document the need for budgeted resources for the division by submitting a formal budget proposal. The controller decides to examine the 10 budget proposals based on content analysis and his experience of deceptive writers vs. truth tellers.

Steps he should take include:

1. Apply a content analysis software program to the narrative using variables of interest.
2. Compare the frequency of occurrences to that same type of document written by someone else in the organization.
3. If the results are substantially different and directionally revealing, this could raise a red flag about deception in the narrative's content.

Results

Using this process to analyze number of words, key words, and punctuation in comparable MD&A disclosures (along with some experience and good theory), we achieved an accuracy rating of 64.8% in our predictions of companies with or without fraud. Granted, this isn't a perfect accuracy rating, but it's adequate to formulate investigation rules to delve deeper where the data suggests it makes sense.

Remember, this new model is for early fraud prediction and reflects a procedure that management accountants can easily and inexpensively use. It's a dramatic way in which financial professionals can add value in their organizations. This tool is also useful for external auditors and could raise awareness about the likelihood of fraud that can be incorporated into their going-concern analysis.

As a risk assessment for fraud, early prediction models present red flags. This means that an accountant can run the model to see if there's a higher probability of fraud—not to provide a certainty of whether there is or isn't fraud. The state of the art isn't that advanced, but a model that reveals a higher probability of fraud should indicate the need to run increased tests, making the accountant more alert to the possibility of fraud.

Complementary Research Progress

Other studies are examining the predictability of specific risk factors, such as not having an audit committee, a higher proportion of insider ownership, and having the same person as both CEO and chairman of the board. But the benefit of these variables to management accountants specifically is less certain: These variables don't typically change from year to year. In addition, all publicly traded companies must have an audit committee because of SOX. Nevertheless, contemporaneous risk factors can be helpful to some degree.

The Future of Internal Fraud Detection

Will we succeed in halting the increase of fraudulent activity? Some speculate that once the economy recovers, fraudulent activity will decrease. Unfortunately, even during years when the economy has been strong, fraud has continued to rise. Yet there are reasons to be hopeful, such as the findings from our current study and those of others. If early fraud detection methods can approach 70% accuracy when routine, traditional external auditing achieves 30% to 40% accuracy, then we've made significant headway toward providing a tangible deterrent to fraud. These results are achievable now without the mastery of complex and difficult tools.

We should also remember that fraud predicted by the model may still go undetected, which may consist of some of the differences in predictive accuracy. Another reason for hope is that management accounting is the requisite choice of professionals to make this happen. Some forward-looking external auditors are using these tools effectively, but management accounting professionals have the most informed view of the business and daily operations, including access to narratives that potentially reflect others' intentions. Being familiar with the business makes them better equipped than external auditors at sniffing out conditions that signal something isn't right. **SF**

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