COMMENTARY

Using Nonfinancial Measures to Improve Fraud Risk Assessments


SUMMARY: Nonfinancial measures (e.g., number of employees, square feet of operations, independent customer satisfaction, number of customer accounts) can be helpful in assessing the risk of revenue frauds. Companies committing such frauds may have a hard time falsifying nonfinancial measures, especially those produced independently (e.g., customer satisfaction). Auditors can benefit from examining relationships between nonfinancial measures and financial measures to validate financial statement data. A recent study, “Using Nonfinancial Measures to Assess Fraud Risk” (Brazel et al. 2009), provides empirical evidence concerning the relationship between various nonfinancial measures and revenue frauds. This article may be useful as a reference for auditors, or as a teaching tool in the classroom, as it reviews and summarizes Brazel et al.’s (2009) study and provides specific actual examples.

Keywords: auditing; fraud; nonfinancial performance measures; risk assessment.

INTRODUCTION

Auditors long have relied on analytical procedures that use financial statement data to help assess and detect fraud, as required by auditing standards (e.g., AICPA 1988, 2002). However, the PCAOB has concluded that analytical procedures using only financial statement data are likely to be ineffective in detecting fraud (PCAOB 2004, 16). Relatedly, various audit regulators have speculated that nonfinancial measures (NFMs) may improve auditors’ abilities to detect fraud (AICPA 1988, 2002; PCAOB 2004).

The premise for using NFMs to help detect fraud is that some NFMs are correlated with “true” financial performance. Such correlations often reflect patterns between the NFMs and applicable financial statement measures. Consequently, when financial statement measures are distorted by

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fraud, the pattern between financial statement measures and NFMs also is altered, unless the NFMs also are changed accordingly.

This paper summarizes a recent study (Brazel et al. 2009) that evaluates whether publicly available NFMs that were expected to be positively correlated with revenue could be useful in assessing the risk of revenue fraud.\footnote{Brazel et al. (2009) were supported by a grant from the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation. All results, interpretations, and conclusions expressed are those of the authors alone, and do not necessarily represent the views of the FINRA Investor Education Foundation or any of its affiliated companies.} Brazel et al. (2009) found that publicly available NFMs could be used to better identify revenue fraud, with the most useful being (1) number of employees and (2) measures of capacity (e.g., number of retail outlets, square footage of warehouse space). Their statistical analysis matched firms known to have committed revenue fraud with a non-fraud competitor (i.e., a matched-pair design), with their data based on the year that the SEC identified as the first in which the firm committed fraud. The results show that the relationship between reported revenue growth and NFMs for the fraud firms is significantly different than the relationship for the non-fraud firms.

**ACTUAL EXAMPLES**

To illustrate the logic of using the relationship between revenue growth and NFMs, consider these two cases that exemplify how NFMs can signal when a firm is committing fraud. These cases were identified through the authors’ searches of SEC Accounting and Auditing Enforcement Releases (AAERs), and are included in Brazel et al.’s (2009) sample described below.

**Case 1: Del Global Technologies**

The SEC alleged that Del Global Technologies Corp. engaged in improper revenue recognition in fiscal years 1997–2000, when it held open quarters (i.e., improper cutoff), prematurely shipped products to third-party warehouses, and recorded sales on products that it had not yet manufactured. Del Global’s revenue increased by 25 percent between 1996 and 1997, from $43.7 million to $54.7 million. However, during this same period Del Global reported a 6.4 percent decrease in the total number of employees (from 440 to 412). In addition, Del Global’s total number of distributors during this same period decreased by 37.5 percent, from 400 to 250 (SEC 2004a).

In contrast, one of Del Global’s competitors, Fischer Imaging Corp., legitimately reported a 27 percent decrease in revenue over the same period, which was accompanied by a 20 percent decrease in employees and a 7 percent decrease in distributors. By comparing reported financial results to NFMs for Del Global and Fischer (with Fischer being illustrative of a competitor in the industry), Del Global’s auditors could have noted that the NFMs were inconsistent with the financial results and therefore been more aware of the potential for fraud.

**Case 2: Anicom Inc.**

Anicom Incorporated provides another example in which NFMs could have heightened auditors’ awareness of the high risk of financial statement fraud. The SEC alleged that from January 1998 until March 2000, Anicom’s management perpetrated a massive fraud, including reporting millions of dollars in false revenues. In total, net income was inflated by more than $20 million. Anicom’s management reported that, during this period, the company had a 24 percent increase in revenue, from $14.6 million in 1997 to $18.0 million in 1998. However, the SEC alleged that this increase was due to a surge in the number of distributors, which increased by 23 percent over the same period (from 148 to 181). By contrast, Fischer Imaging Corp., a competitor in the industry, reported a 10 percent decrease in revenue over the same period, accompanied by a 10 percent decrease in the number of distributors (from 128 to 115). The SEC alleged that the NFMs for Anicom were inconsistent with the reported financial results and therefore could have heightened auditors’ awareness of the potential for fraud.

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million. From 1997 to 1998, Anicom reported a substantial increase in employees (46 percent), facilities (i.e., number of locations; 55 percent), and square feet of operations (29 percent). However, the company’s revenue growth over the same period was 93 percent (from $244 million to $470 million). In this case, even though employees, facilities, and square feet of operations increased, the percentage increase in each NFM was clearly smaller than the percentage increase in revenue (SEC 2004b).

In contrast, one of Anicom’s key competitors, Graybar Electric Company Inc., reported an 11 percent increase in sales between 1997 and 1998. At the same time, Graybar’s employees grew by 10 percent, facilities increased by 3 percent, and square feet of operations increased by 6 percent. Graybar’s increase in revenue is clearly more consistent with its increase in NFMs than is Anicom’s. If Anicom’s auditors had completed this analysis, they could have recognized the potential for fraud.

Similar illustrations also have been used in the courtroom. For example, during former HealthSouth CEO Richard Scrushy’s trial, federal prosecutors argued that Scrushy must have known that something was amiss with HealthSouth’s financial statements because there was a discrepancy between the company’s financial and nonfinancial performance. The prosecution noted that twice during the seven-year fraud, both revenues and assets increased even though the number of HealthSouth facilities decreased. In fact, during the trial, Prosecutor Colleen Conry asked an expert witness (forensic accountant) testifying for the defense: “And that’s not a red flag to you?” The witness responded that the inconsistency was not apparent at the time, and importantly, HealthSouth’s external auditors also failed to notice this discrepancy (Reeves 2005).

**SAMPLE SELECTION AND RESEARCH METHOD**

Brazel et al. (2009) determined their sample based on information from three sources. First, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) published a report that identified and investigated various aspects of frauds that were identified in SEC Accounting and Auditing Enforcement Releases (AAERs) during the period 1987–1997. Second, the authors searched AAERs issued between 1998 and 2007 for mentions of fraud. Third, the authors searched the popular press (e.g., Wall Street Journal) for mentions of fraud. These searches resulted in a final sample of 110 revenue fraud firms for which the number of employees was available (to allow the researchers to examine the related NFMs). When focusing on capacity NFMs, however, data availability resulted in a smaller sample of 50 fraud firms. Table 1 presents the other types of alleged accounting fraud (in addition to revenue) that were present in each of the two samples.

The authors obtained the number of employees NFMs from the 10-Ks and the capacity NFMs from various publicly available sources (e.g., 10-Ks, Hoover’s Online, ProQuest, ABI-INFORM, LexisNexis, Standard & Poor’s Market Insight, Google). The data collection was completed by undergraduate and graduate auditing students at three universities. The students were asked to collect NFMs (along with source references) that they believed would be positively correlated with revenue. All NFMs that were quantitative, nonfinancial, and related to firm capacity were included. For example, several NFMs involved the capacity of the firm’s operational space (e.g., square feet of operations, manufacturing space, floor space, warehouse space). Other measures involved the quantity of facilities, including the number of retail outlets and number of stores. Some measures were explicitly labeled by the firms as capacity, including annual capacity in tons, as well as energy-producing capacity. The authors deemed other NFMs as reflecting capacity, including gas reserves, distribution dealers, and number of product lines.
The authors created the variable **CAPACITY DIFF** by taking the difference between the percent change in revenue (**REVENUE GROWTH**) and the percent change in the NFMs related to capacity (**NFM GROWTH**) for each fraud firm and competitor. The competitor that was matched with each fraud firm was selected by students based on a review of the fraud company on Hoover’s Online database (which provides a description of the company and its main competitors). Therefore, the matching procedure was not complex, and it is something that an auditor with minimal industry expertise can complete. The difference for each firm is measured from the year prior to the fraud to the year that the fraud appeared to begin. In addition, the authors created a second variable, **EMPLOYEE DIFF**, by taking the difference between **REVENUE GROWTH** and the percent change in the number of employees (**EMPLOYEE GROWTH**). Brazel et al. (2009) report that the difference between the percentage change in revenue growth and the percentage change in the growth of capacity NFMs (**CAPACITY DIFF**) was 30 percent for fraud firms and only 11 percent for non-fraud firms. Further, the difference between the percentage change in revenue growth and the percentage change in employee growth (**EMPLOYEE DIFF**) was 20 percent for fraud firms and 4 percent for non-fraud firms. Both differences are statistically significant.

Consequently, Brazel et al.’s (2009) results suggest that, for example, when a firm’s reported revenue is growing at a rate significantly higher than are its measures of capacity, the risk of revenue fraud is very high. Simply put, because a fraud firm’s revenues are fictitious, the firm is not forced to expand facilities or increase its workforce, as would be necessary if the increase were legitimate.

<table>
<thead>
<tr>
<th>Accounts and Other Factors Involved in Fraud</th>
<th>Number of Firms</th>
<th>% of Fraud Sample</th>
<th>Capacity Sample</th>
<th>Number of Firms</th>
<th>% of Fraud Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>110</td>
<td>100</td>
<td>50</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Accounts Receivable (net)</td>
<td>86</td>
<td>78</td>
<td>33</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Expenses</td>
<td>43</td>
<td>39</td>
<td>17</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Other Assets</td>
<td>23</td>
<td>21</td>
<td>16</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>23</td>
<td>21</td>
<td>9</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>17</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Accounts Payable and Other Accrued Expenses</td>
<td>15</td>
<td>14</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Debt</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Other Gains/Losses</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Related Parties</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Acquisitions and Mergers</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>339(^{a})</strong></td>
<td></td>
<td><strong>146(^{a})</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{a}\) Does not sum to the number of firms in the sample because double-entry accounting may generate both a fraudulent credit to revenues and a fraudulent debit, for example, to accounts receivable. Additionally, several firms are accused of multiple frauds.
ASSESSING FRAUD RISK

In this section, we provide examples of how auditors could use NFMs to better assess fraud risk. Consider the following hypothetical financial statement data for a hypothetical company.

For the Years Ended December 31 (in Thousands)

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>Change from Prior Year</th>
<th>2010</th>
<th>2011</th>
<th>Change from Prior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$400,000</td>
<td>$450,000</td>
<td>12.5%</td>
<td>$500,000</td>
<td>100%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>80,000</td>
<td>90,000</td>
<td>12.5%</td>
<td>100,000</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>320,000</td>
<td>360,000</td>
<td>12.5%</td>
<td>400,000</td>
<td>80%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>280,000</td>
<td>315,000</td>
<td>10.7%</td>
<td>350,000</td>
<td>70%</td>
<td>12.9%</td>
</tr>
<tr>
<td>Net Income</td>
<td>$40,000</td>
<td>$45,000</td>
<td>12.5%</td>
<td>$50,000</td>
<td>10%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

First, notice that traditional analytical procedures would suggest no reason for concern. Specifically, the cost structure has remained stable, based on the consistent gross margin and net profit percentages of 80 percent and 10 percent, respectively. The upward trend in revenues appears reasonable, although auditors typically form specific expectations based on knowledge of the client and its industry. Assuming that the company’s revenue growth for the period is consistent with client and industry-specific client conditions, there is little reason, on the surface, to doubt the veracity of the revenues.

However, auditors can use NFM data to corroborate revenue trends, yielding the possibility that NFM data could indicate that the growth is unusual. For example, employee head count and independently produced customer satisfaction ratings are readily available for many companies. Importantly, these and other NFMs often are difficult or impossible for management to manipulate. Even if management can manipulate the NFM data, each NFM requires another fraud that management must perpetrate in order to appear consistent.

Continuing our example, assume that the hypothetical company’s auditors obtained the following NFM data:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>Change from Prior Year</th>
<th>2011</th>
<th>Change from Prior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$400,000</td>
<td>$450,000</td>
<td>12.5%</td>
<td>$500,000</td>
<td>11.1%</td>
</tr>
<tr>
<td>Number of employees</td>
<td>1,000</td>
<td>1,100</td>
<td>10.0%</td>
<td>900</td>
<td>(18.2%)</td>
</tr>
<tr>
<td>J.D. Power Customer Satisfaction Ratings</td>
<td>8.5</td>
<td>8.5</td>
<td>0.0%</td>
<td>7.4</td>
<td>(12.9%)</td>
</tr>
</tbody>
</table>

In most cases, as revenues increase, the number of employees likely will increase to some extent. The rate at which employees should increase for legitimate growth depends on the industry. Benchmarks based on competitors are publicly available in the 10-K filings of publicly held competitors. Alternatively, auditors can compare past increases to current changes. For example, from 2009 to 2010, revenues increased by 12.5 percent, and employees increased by 10 percent. From 2010 to 2011, however, while revenues increased by 11 percent, employees decreased by 18 percent. Similarly, from 2009 to 2010, customer satisfaction ratings did not change. By contrast, from 2010 to 2011, average customer satisfaction ratings decreased from 8.5
to 7.4, a 13 percent decline. This increase in revenues from 2010 to 2011, accompanied by the
decrease in number of employees and customer satisfaction ratings over the same time frame,
should heighten auditor concern over the appropriateness of the increase in revenues.

Auditors also have access to information that is not publicly available. For example, auditors
may find informative nonfinancial measures such as the number of customer accounts, sales
representatives by product or region, and number of distributors. Consider the following
information for our hypothetical company:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>Change from Prior Year</th>
<th>2011</th>
<th>Change from Prior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of customer accounts</td>
<td>13,000</td>
<td>14,000</td>
<td>7.7%</td>
<td>12,000</td>
<td>(14.3%)</td>
</tr>
</tbody>
</table>

This information appears consistent with the employee head count and customer satisfaction
declines shown above, thus further increasing concern with the increase in revenues in 2011.

**TIPS FOR AUDITORS**

The number of employees, square feet of operations, customer satisfaction ratings, and
number of customer accounts are only a few examples of the many potential NFMs to which
auditors have access and that they can use to verify whether financial statement figures appear
reasonable. For example, auditors have access to key performance indicators that are prepared by
company management. Such measures often are industry specific; for example, in the retail
industry, key performance indicators may include transactions per average store and average
transaction value. However, our purpose is not so much to identify all of the NFMs that auditors
can use, but rather to emphasize that there are many opportunities for auditors to use NFM data to
corroborate revenue trends with measures that are difficult (e.g., employee head count) or nearly
impossible (e.g., independent customer satisfaction ratings, number of facilities) for management
to manipulate. Still, there have been several high-profile cases in which companies actually
manipulated NFM data produced by the company. For example, WorldCom inflated its Internet
traffic growth while committing fraud (Eichenwald 2002). As with other forms of audit evidence,
NFMs gathered from outside the organization (e.g., industry or trade associations, independent
rating agencies) certainly are less susceptible to management manipulation.

Brazel et al.’s (2009) results clearly show that auditors can use NFMs to enhance the
effectiveness of analytical procedures during planning (i.e., at the aggregate/company level).
However, these techniques also can be incorporated into analytical procedures used for
substantive testing, provided the company maintains NFM data at the disaggregated level (e.g.,
number of employees, patents, products per division). In addition, our example examines revenue
growth in relation to NFM growth because of the importance of the revenue account in relation to
fraud and restatements. This technique could be adjusted to test other financial statement
accounts. For example, Dechow et al. (2011) describe how employee growth can be used to verify
growth in assets. Also, changes in the allowance for doubtful accounts could be linked to the
number of new customers, or changes in cost of goods sold could be linked to changes in
production space. Moving forward, standard setters should work to better emphasize to auditors
the importance of utilizing the techniques described in this article, and auditors should work toward
incorporating these techniques into the audit process.
REFERENCES


Eichenwald, K. 2002. For WorldCom, acquisitions were behind its rise and fall. Available at: http://www.nytimes.com/2002/08/08/business/for-worldcom-acquisitions-were-behind-its-rise-and-fall.html?pagewanted=all&src=pm


