

Statistical Thinking For Data Science And Analytics

Introduction

Dr. Mukaddas Parpidjanova

A Framework for Detecting Financial Statement Fraud

- Four Steps to Detecting Fraud:
 - Identify fraud exposures
 - Understand the symptoms (red flags) the exposures exhibit
 - Use various kinds of analyses to proactively look for relevant symptoms
 - Follow-up on symptoms observed to determine whether or not these symptoms are occurring because of fraud

- Fraudulent financial statements are rarely detected by analyzing the financial statements alone. Rather, financial statement fraud is usually detected when the information in the financial statements is compared with the real-world assets those numbers are supposed to represent, and the context in which management is operating and being motivated.
- Fraud is often detected by focusing on the changes in reported assets, liabilities, revenues, and expenses from period to period or by comparing company performance to industry norms.

Identifying Fraud Exposures

- There are many reasons auditors fail to react properly to information or observations on an engagement:
 - Unsure of what to look for
 - Reluctant to bring issues to engagement management's attention
 - Fearful of offending company personnel
 - Assume that a more senior member of the engagement team will handle the issue
 - Too much trust in the company staff
 - Pressure to complete audit tasks within budget
 - Afraid of appearing incompetent in front of the client or colleagues
 - Unwilling to second guess management
 - Too willing to accept management responses to inquiries

Identifying Fraud Exposures (Continued)

Management & Directors

Relationships with Others



Organization & Industry

**Financial Results
& Operating Characteristics**

Management and the Board of Directors

- It is essential to examine four aspects of management:
 - Backgrounds
 - Motivations
 - Influence in making decisions for the organization
 - Turnover
- Many frauds have the potential to be detected earlier, or even prevented, by examining management more closely

Backgrounds

- Are they new executives or directors?
- Did they work their way up within the organization or were they brought in from the outside?
- Have they been executives or directors in other organizations, and if so, what types of organizations?
- Have they had any previous regulatory or legal problems, either personally or with organizations they have been associated with?

Motivations

- Regarding management and director *motivations*, it is important to understand what it is that really drives and motivates the organization's leaders. Is their personal worth tied up in the equity of the organization; does management have millions or even hundreds of millions in stock options, restricted stock or outstanding stock; is management under pressure to deliver unrealistic results; is management compensation primarily performance based; are there debt covenants or other financial measures that must be met; and is management's job at risk

Current auditing standards specified in SAS No. 99 require the auditor to ask the following questions:

- Does management communicate its views on ethical behavior to all employees?
- Does management have programs and internal controls designed to prevent, deter, and detect fraud?
- Does management discuss with the audit committee of the board of directors how its internal control system serves to prevent, detect, and deter fraud?
- Does management understand the fraud risks specific to its business?
- Does management monitor fraud risks relevant to specific components or divisions within the entity?
- Does management have any knowledge or suspicion of fraud?
- Is management aware of any allegations of fraud?

Understanding Management and Director Backgrounds

- Have any of the key executives or Board Members been associated with other organizations in the past, and what was the nature of those organizations and relationships?
- Were key members of management promoted from within the organization or recruited from outside the organization?
- Have any key members of management had past regulatory or legal problems, either personally or with organizations they have been associated with?
- Have there been significant changes in the makeup of management or the Board of Directors?
- Has there been a high turnover of management and/or Board members?
- Do any members of management or the Board of Directors have criminal backgrounds?
- Are there other issues related to the backgrounds of key members of management or the Board of Directors?

Understanding What Motivates Management and the Board of Directors

- Is any of the key executives' personal worth tied up in the organization?
- Is management under pressure to meet earnings or other financial expectations, or does management commit to analysts, creditors, and others to achieve what appear to be unduly aggressive forecasts?
- Is management's compensation primarily performance based (bonuses, stock options, etc.)?
- Are there significant debt covenants or other financial restrictions that management must meet?
- Is the job security of any key members of management at serious risk?
- Is the organization's reported financial performance decreasing?
- Is there an excessive interest by management in maintaining or increasing the entity's stock price?
- Does management have an incentive to use inappropriate means to minimize reported earnings for tax reasons?
- Are there other significant issues related to the motivations of management and Board members?

Understanding the Degree of Influence of Key Members of Management and/or the Board of Directors

- Who are the key members of management and/or the Board of Directors who have the most influence?
- Are there one or two key people who dominate the organization's leadership?
- Is the management style of the organization more autocratic or democratic?
- Is the organization's management centralized or decentralized?
- Does management use ineffective means of communicating and supporting the entity's values or ethics, or do they communicate inappropriate values or ethics?
- Does management fail to correct known reportable conditions in internal control on a timely basis?
- Does management set unduly aggressive financial targets and expenditures for operating personnel?
- Does management have too much involvement in or influence over the selection of accounting principles or the determination of significant estimates?
- Are there other significant issues related to the degree of influence of key members of management and/or the Board of Directors?

Understanding Whether There Has Been Unusually High Turnover of Management or Board Members

- Has an unusually high number of executives or board members left the firm in recent months?
- If so, can the reasons for their departures be reasonably explained?

Relationship With Others

- Financial statement fraud is often perpetrated with the help of other real or fictitious organizations
- Frauds such as Lincoln Savings and Loan, Parmalat, and Enron were all accomplished with the help of other organizations

Variable Interest Entities (VIEs)

- In response to Enron's use of SPEs, the FASB adopted FIN 46R, Consolidation of Variable Interest Entities
- FIN 46R is complex. Judgment is called for in analyzing entities with which a company has business arrangements to determine if those entities are VIEs and, if so, whether consolidation is required
- FASB Statement No. 167 significantly amended FIN 46(R).

FIN 46R

- In applying FIN 46R, an enterprise and its related parties (which include the enterprise's officers, employees and directors, parties that have a "close business relationship" with the enterprise, and parties that cannot sell their interests in an entity without the enterprise's prior approval) must first determine whether they have a variable interest in another entity.




If the enterprise and its related parties have a variable interest in an entity, they next need to determine if the entity is a VIE. An entity is a VIE if

- The equity in the entity is not sufficient to absorb the entity's "expected losses."
- The equity investors do not have the ability to control the activities of the entity.
- The investors are not obligated to absorb losses, if they occur, or receive the entity's residual returns, if they occur.

- If an entity is a VIE, the enterprise and its related parties need to determine if they – or another investor – are exposed to a majority of the entity's "expected losses." If so, that party is required to consolidate the VIE.
- If no investor is exposed to a majority of "expected losses," then the enterprise and its related parties need to determine if they are entitled to a majority of the entity's residual rewards. If so, the enterprise would be required to consolidate the entity.
- If the enterprise is not required to consolidate the VIE, it should account for its investment in the entity using whatever method is appropriate under other accounting literature.

Examples of the kinds of financial institution relationships that must be examined include the following:

- Is the company highly leveraged and, if so, with which financial institutions?
- Which assets of the organization are pledged as collateral?
- Are there debt covenants or other restrictions that must be met?
- Do the banking relationships appear normal, or are there strange relationships with financial institutions such as using institutions in unusual geographical locations?
- Are there relationships between the officers of the financial institutions and your client organization?



These kinds of relationships are usually identified by examining large and/or unusual transactions, often occurring at strategic times (such as at the end of a period), to make the financial statements look better. The kinds of relationships that should be examined include:

- Large transactions that result in revenues and/or income for the organization.
- Sales and/or purchases of assets between related entities.
- Transactions that result in goodwill or other intangible assets being recognized in the financial statements.
- Loans or other financing transactions between related entities.
- Any transaction that appears to be unusual or questionable for the organization, especially transactions that are unrealistically large.

Relationships with Financial Institutions

- What financial institutions does the organization have significant relationships with?
- Is the organization highly leveraged through bank loans?
- Are there loan or debt covenants or restrictions that pose significant problems for the organization?
- Do the banking relationships appear normal, or are there unusual attributes about the relationships (strange geographical locations, too many banks, etc.)?
- Do members of management or the Board have personal or other close relationships with officers of any of the major banks used by the company?
- Have there been significant changes in the financial institutions used by the company? If so, why?
- Are there significant bank accounts or subsidiary or branch operations in tax-haven jurisdictions for which there appears to be no clear business justification?
- Have critical assets of the company been pledged as collateral on risky loans?
- Other questionable financial institution relationships.

Relationships with Related Parties

- Are there significant related-party transactions not in the ordinary course of business or with related entities not audited or audited by another firm?
- Are there large and/or unusual transactions at or near the end of a period that significantly improve the reported financial performance of the company?
- Are there significant receivables and/or payables between related entities?
- Has a significant amount of the organization's revenues and/or income been derived from related-party transactions?
- Is a significant part of the company's income or revenues derived from one or two large transactions?
- Other questionable related-party relationships.

Relationships with Auditors

- Have there been frequent disputes with the current or predecessor auditors on accounting, auditing, or reporting matters?
- Has management placed unreasonable demands on the auditor, including unreasonable time constraints?
- Has the company placed formal or informal restrictions on the auditor that inappropriately limit his/her access to people or information or his/her ability to communicate effectively with the Board of Directors or the Audit Committee?
- Is there domineering management behavior in dealing with the auditor, especially involving attempts to influence the scope of the auditor's work?
- Has there been an auditor change and for what reason?
- Other questionable auditor relationships.

Relationships with Lawyers

- Has there been significant litigation involving the company in matters that could severely and adversely affect the company's financial results?
- Has there been an attempt to hide litigation from the auditors or others?
- Has there been a change in outside counsel and for what reasons?
- Other questionable lawyer relationships.

Relationships with Investors

- Is the organization in the process of issuing an initial or secondary public debt or equity offering?
- Are there any investor-related lawsuits?
- Are there any problematic or questionable relationships with investment bankers, stock analysts or others?
- Has there been significant "short selling" of the company's stock and for what reasons?
- Other questionable investor relationships.

Relationships with Regulatory Bodies

- Does management display a significant disregard for regulatory authorities?
- Has there been a history of securities law violations or claims against the entity or its senior management alleging fraud or violations of securities laws?
- Have any 8-Ks been filed with the SEC and for what reasons?
- Are there any new accounting, statutory, or regulatory requirements that could impair the financial stability or profitability of the entity?
- Are there significant tax disputes with the IRS or other taxing authorities?
- Is the company current on paying its payroll taxes and other payroll-related liabilities?
- Other questionable relationships with regulatory bodies

Relationships with the Media

- Have there been any negative articles written about the company in business periodicals, newspapers, or other news outlets?

Organization and Industry

- Many factors can increase the probability of fraud:
 - Smaller companies are more likely to have senior executives with insufficient financial reporting knowledge, weak controls, and weak audit committees
 - Family or personal relationships among individuals who hold significant power or incompatible job functions
 - Change in customer demand, competition, losses in the industry can all be cause for concern

Other organizational/industry factors that can increase fraud exposure:

- Significant declines in customer demand, deteriorating sales, and/or increased business failures in the industry or the overall economy.
- High degree of competition or market saturation, accompanied by declining margins.
- Operating losses making the threat of bankruptcy, foreclosure, or hostile takeover imminent.
- Inadequate segregation of duties or independent checks.
- Significant operations located or conducted across international borders or jurisdictions where differing business environments and cultures exist.
- A need to increase debt or equity financing to stay competitive-including financing of major R&D or capital expenditures.
- A strong financial presence or ability to dominate a certain industry as it can allow a company to dictate terms or conditions to suppliers or customers in such a way that transactions may not be arm's length.
- High turnover.
- Ineffective accounting and/or internal audit function (i.e., incompetent employees).

Questions to be Asked

- Does the company have an overly complex organizational structure involving numerous or unusual legal entities, managerial lines of authority, or contractual arrangements without apparent business purpose?
- Is there a legitimate business purpose for each separate entity of the business?
- Is the Board of Directors comprised primarily of officers of the company or other related individuals?
- Is there a passive or active independent Board of Directors?
- Is the audit committee comprised primarily of insiders or independent outsiders?
- Is the audit committee passive, or active?
- Does the organization have an independent and/or active internal audit department?
- Does the organization have off-shore activities without any apparent business purpose?

- Is the organization a new entity without a proven history?
- Have there been significant recent changes in the nature of the organization?
- Is there adequate monitoring of significant controls?
- Is there an effective accounting and information technology staff and organization?
- Is there a high degree of competition or market saturation accompanied by declining margins?
- Is the client in a declining industry with increasing business failures and significant declines in customer demand?
- Are there rapid changes in the industry, such as high vulnerability to rapidly changing technology or rapid product obsolescence?
- Is the performance of the company similar or contrary to other firms in the industry?
- Other significant issues related to organization and industry.

Financial Results and Operating Characteristics

- Fraud symptoms most often exhibit themselves through *changes* in the financial statements
- For example, financial statements that contain large changes in account balances from period to period are more likely to contain fraud than financial statements that exhibit only small, incremental changes in account balances.
- Compare the balances and amounts with those of similar organizations in the same industry and determine the real-world referents to the financial statement amounts
- Break an organization down into various activities or cycles and then, for each cycle, identify the major functions that are performed, the major risks inherent in each function, the kinds of fraud that could occur, and the kinds of symptoms those frauds would generate

Questions to be Asked

- Are there unrealistic changes or increases in financial statement account balances?
- Are the account balances realistic given the nature, age, and size of the company?
- Do actual physical assets exist in the amounts and values indicated on the financial statements?
- Have there been significant changes in the nature of the organization's revenues or expenses?
- Do one or a few large transactions account for a significant portion of any account balance or amount?
- Are there significant transactions near the end of the period that positively impact results of operations, especially transactions that are unusual, highly complex, or that pose "substance over form" questions?
- Do financial results appear consistent on a quarter-by-quarter or month-by-month basis, or are there unrealistic amounts in a sub-period?
- Is there an inability to generate cash flows from operations while reporting earnings and earnings growth?

- Is there significant pressure to obtain additional capital necessary to stay competitive considering the financial position of the entity – including the need for funds to finance major research and development or capital expenditures?
- Are reported assets, liabilities, revenues, or expenses based on significant estimates that involve unusually subjective judgments or uncertainties, or that are subject to potential significant change in the near term in a manner that may have a financially disruptive effect on the entity – such as ultimate collectability of receivables, timing of revenue recognition, realizability of financial instruments based on the highly subjective valuation of collateral or difficult-to-assess repayment sources, or significant deferral of costs?
- Is there an unusually rapid growth or profitability, especially compared with that of other companies in the same industry?
- Is the organization highly vulnerable to changes in interest rates?
- Are there unrealistically aggressive sales or profitability incentive programs?
- Is there a threat of imminent bankruptcy or foreclosure, or hostile takeover?

- Is there a high possibility of adverse consequences on significant pending transactions, such as a business combination or contract award, if poor financial results are reported?
- Is there a poor or deteriorating financial position when management has personally guaranteed significant debts of the entity?
- Does the firm continuously operate on a "crisis" basis or without a careful budgeting and planning process? Does the organization have difficulty collecting receivables or have other cash flow problems?
- Is the organization dependent on one or two key products or services, especially products or services that can become quickly obsolete or where other organizations have the ability to adapt more quickly to market swings?
- Do the footnotes contain information about difficult-to-understand issues?
- Are there adequate disclosures in the footnotes?
- Other questionable or suspicious factors relating to financial results or operating characteristics.

Importance of Context When Using Red Flags to Detect Fraud

- In fact, there is a growing body of academic research that has found that when auditors use red flag checklists (like those presented in the SAS 53, SAS 82, and SAS 99) without considering context, they may even be less likely to detect financial statement fraud than if no checklists were used at all.
- Simply answering yes or no to red-flag-type questions in considering the possibility of fraud may not help in identifying or detecting such fraud.
- Do not depend on checklists, instead develop a “coherent story” when assessing fraud risk

- Results show that auditors who use a fraud checklist are less sensitive to the presence of fraud when compared with auditors who do not use a checklist.
- Fraud theory explains fraud as the interaction of three causal influences – pressure, opportunity, and rationalization – affecting a potential perpetrator. Wilks and Zimbelman suggest that perhaps if fraud checklists were to incorporate this categorization, auditors would be better able to assimilate all important cues.
- Because of someone's knowledge or context, a potential red flag may be recognizable to one person but not another.

Types of Financial Statement Fraud

- Revenue and receivable financial statement frauds
- Inventory and cost of goods sold financial statement frauds
- Financial statement frauds involving the understatement of liabilities
- Financial statement frauds involving the overstatement of assets (other than receivables and inventory)
- Other types of financial statement frauds, including inadequate disclosure frauds
- Each of these will be considered in the following chapters

Reference

- Adventures in Financial Data Science: The empirical properties of financial data and some other things that interested me... Book 1 of 2: Financial Data Science | by Graham Giller | Nov 17, 2020
- Statistical Analysis of Network Data with R (Use R!) Part of: Use R! (70 Books) | by Eric D. Kolaczyk and Gábor Csárdi | Jun 3, 2020
- Statistical Data Analysis Using SAS: Intermediate Statistical Methods (Springer Texts in Statistics) Part of: Springer Texts in Statistics (70 Books) | by Mervyn G. Marasinghe and Kenneth J. Koehler | Apr 23, 2018
- A Common-Sense Guide to Data Structures and Algorithms, Second Edition: Level Up Your Core Programming Skills by Jay Wengrow | Sep 1, 2020
- Statistical Data Analysis (Oxford Science Publications) by Glen Cowan | Jun 4, 1998
- How to do Linguistics with R: Data exploration and statistical analysis by Natalia Levshina | Nov 25, 2015