The Anatomy of Management Fraud Schemes: Analyses and Implications[1]

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ABSTRACT

This study investigates the process of perpetration and concealment of management fraud in financial statements. First, we argue that fraud schemes consist of two components: "account schemes" and "evidence schemes." Account schemes are the schemes through which management perpetrates fraud by manipulating account balances or disclosures. Evidence schemes are the schemes through which management creates (or hides) evidence to conceal fraud. For our analysis, we create taxonomies of the account schemes and evidence schemes and explore their relationships. The study finds several positive relationships between certain specific types of account schemes (i.e. fraud) and specific types of evidence schemes. Furthermore, evidence schemes are affected by client industry, type of auditors, and type of financial reports.

Key words: *Management Fraud, Fraud Schemes, Evidence Schemes, Fraud Risk Assessment, Fraud Detection.*

The Anatomy of Management Fraud Schemes: Analyses and Implications

I. INTRODUCTION

The purpose of this study is to analyze the perpetration process of management fraud and to investigate the relationships between fraud types and the way management conceals fraud. In recent years, the occurrence of a series of frauds in public companies has made the detection of fraud a high priority in the audit profession (Elliott 2002; Wilks and Zimbelman 2004). However, because fraud often involves concealment through falsification and collusions, fraud can be difficult for auditors to detect (AICPA 2002). Current audit standards and prior research have focused on assessing the overall fraud risk (Wilks and Zimbelman 2004) using red flag cues. However, these provide little guidance as to how and where fraud could be perpetrated and how an auditor could detect it, especially when the management has concealed the fraud to deceive the auditor.

Grazioli et al. (2008) argue that those auditors who are successful in detecting fraud are able to combine a deep understanding of management's knowledge and intentions and a deep understanding of the audit discipline. Current research lacks examinations of the actual fraud schemes, especially those schemes that have been used to conceal the fraud. Without a deep understanding of how management perpetrates and conceals fraud, auditors can hardly design effective audit procedures to actually detect it. Therefore, our objectives are to understand the ways management perpetrates and conceals fraud and to explore the relationships between fraud types and different ways of concealing fraud. For our analysis we argue that fraud schemes consist of two components: "account schemes" and "evidence schemes." We define account schemes as the schemes through which management commits fraud by manipulating account balances or disclosures, such as fictitious revenues, resulting in fraudulent financial statements. Account schemes often are referred to as fraud types in prior research (Bonner et al. 1998) and these two terms are used interchangeably in this study. Evidence schemes are defined as the schemes through which management creates (or hides) evidence, such as the use of fake or falsified documents, to deceive auditors and thus to conceal fraud.

In this study, we collect disclosures relating to fraud schemes for a sample of firms with SEC allegations of fraud in *Accounting and Auditing Enforcement Releases* (AAERs) issued between 1997 and 2002. Using this sample, we identify various types of specific concealment approaches, i.e., evidence schemes, determine the frequency of different account schemes and evidence schemes, and use regression analyses to test the relationships among them.

Our descriptive results show that the most common evidence schemes include fake documents, collusion with third parties, altered documents, hidden documents or information, and false oral/written responses from clients. Management seems to engage in strategic reasoning when designing fraud schemes based on their knowledge and expectations of audit procedures. They also seem to use the limitations of audit procedures and the weaknesses of auditors to conceal fraud. Regression results show several positive relationships between certain

account schemes and evidence schemes. Such relationships, as discussed later, are affected by the type of fraudulent accounts and related management assertions.[2]

The remaining sections of the paper are organized as follows. Section II discusses prior research on management fraud. Section III explains the process of selecting the sample for the study and describes taxonomies of account schemes and evidence schemes used in this study. Section IV presents the descriptive results, while Section V presents a discussion on hypotheses development and regression methodologies. Section VI discusses the regression results and Section VII, using revenue fraud as an example, demonstrates how the relationships among account schemes and evidence schemes can be integrated into an audit program. Section VIII summarizes the findings.

II. PRIOR RESEARCH

Prior research on management fraud falls into two main areas: fraud risk assessment and evidential planning. Studies on fraud risk assessment focus largely on evaluating potential fraud risk factors ("red flag"[3] approach) to assess the risk of fraudulent financial reporting. In this approach, the auditor identifies the presence or absence of certain red flags from a list of all possible red flags and then assesses the risk of fraud (Beasley et al. 2000; Bell and Carcello 2000; Eining et al. 1997; Pincus 1989; Fischhoff et al. 1978; Mock and Turner 2001, 2005). SAS No. 99 (AICPA 2002) also focuses on red flag cues for assessing fraud risk (Wilks and Zimbelman 2004).

Evidential planning involves determining the focus, nature, extent, and timing of audit tests, along with staffing the engagement (e.g., Bedard et al. 1999). The Public Company Accounting Oversight Board (PCAOB) recently reported that although auditors are able to identify high fraud risk situations, they often fail to modify their standard audit procedures to respond to fraud risk (PCAOB 2007). This finding is consistent with the findings of most prior research. Some researchers have found that the presence of fraud risk does influence the extent but not the nature of planned evidence. For example, Zimbelman (1997), Shelton et al. (2001) and Glover et al. (2003) find that auditors do not choose different procedures in response to changes in perceived fraud risk. Also, Asare and Wright (2004) find no significant relationship between fraud risk assessment and audit program effectiveness. Mock and Turner (2005), using audit field data to investigate the effects of fraud risk assessments on audit programs following SAS No. 82 (AICPA 1997), find that auditors do modify the nature and extent, and add or delete procedures. However, the number of changes in the nature of audit procedures is not significant in their study. Therefore, they conclude that fraud risk assessment does not have a significant effect on the nature of audit tests. In another study commissioned by AICPA, Mock and Turner (2001) find that although auditors identified and documented fraud risks in some engagements, when selecting audit procedures, auditors sometimes chose to extend inappropriate procedures.

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[2] SAS No. 31 (AICPA 1980) defines management assertions as the "representations by management that are embodied in financial statement components." Specifically, the management assertions consist of "Existence or Occurrence," "Completeness," "Valuation or Allocation," "Rights and Obligations," and "Presentation and Disclosure." AICPA issued SAS No. 106 (AICPA 2006), *Audit Evidence*, to supersede SAS No. 31, *Evidential Matter,* in February 2006. Since the audits of previous fraudulent financial statements, which are examined in this study, were conducted in compliance with SAS No. 31, this study uses the terms and definitions of management assertions in SAS No. 31 (AICPA 1980).

[3] Red flags are "potential symptoms existing within the company's business environment that would indicate a higher risk of an intentional misstatement of the financial statements" (Price Waterhouse 1985, p. 31).

As indicated in SAS No. 99 (AICPA 2002) and prior fraud studies (Wilks and Zimbelman 2004; Patterson and Noel 2003; Newman et al. 2001; Zimbelman and Waller 1999; Bloomfield 1997), fraud is intentional and strategic, often involving concealment and deception. Adjusting only the extent of regular audit tests might not be effective in detecting fraud (Zimbelman 1997; Glover et al. 2003). One of the possible explanations for auditors not making appropriate changes in the nature of audit procedures is that, in general, auditors do not have the knowledge to adjust the procedures (Nieschwietz et al. 2000; Loebbecke et al. 1989, Zimbelman 1997).Furthermore, as mentioned in the introduction, Grazioli et al. (2008) argue that those auditors who are successful in detecting fraud are able to combine a deep understanding of management's knowledge and intentions, and a deep understanding of the audit discipline.

Bloomfield (1997), Zimbelman and Waller (1999), and Patterson and Noel (2003) have analyzed the strategic reasoning of auditors and auditees with the focus on the overall fraud risk assessment rather than considering specific fraud schemes. However, the lack of understanding of management strategic behavior in using specific fraud schemes limits auditors' ability to plan and implement effective audit procedures. Johnson et al. (1993), Jamal et al. (1995), and Grazioli et al. (2008) have used experiments to investigate the ways auditors may detect fraud. However, their studies focus on the techniques of detecting fraud rather than analyzing fraud schemes.

Hoffman and Zimbelman (2009) find that auditors who are prompted to engage in strategic reasoning can more effectively modify audit procedures. Although it is difficult for auditors to predict all schemes when strategic dependence[4] is high (Bloomfield 1997), it is still necessary for auditors to engage in strategic reasoning by considering how fraud could be perpetrated and concealed. The present study examines how management perpetrates and conceals fraud and it analyzes patterns in fraud schemes and the way they are concealed.

III. SAMPLE SELECTION AND FRAUD SCHEME TAXONOMY

Sample Selection and Description

Consistent with prior research on management fraud (Beasley et al. 2001, 1999; Beasley 1996; Bonner et al. 1998), we use the SEC's AAERs to obtain our sample of fraud companies. We use the AAERs issued during the period 1997 and 2002[5]. There are two main advantages of using AAERs. First, AAERs often describe the details of the perpetration of fraud, which is essential for identifying and classifying fraud schemes in this study. Second, the companies that appear in AAERs are usually involved in more serious fraud situations, and often auditors of these companies are sued (Carcello and Palmose 1994) because of not discovering the fraud. An analysis of such companies can provide insight as to how fraud is perpetrated and concealed by management and thus, help auditors defend against litigation. This applies especially when the audit evidence provided by management was falsified to conceal the fraud. A potential limitation of using AAERs is that the SEC may tend to include only extreme fraud cases in AAERs, which could limit the ability to generalize the results of this study. Consistent with prior research (Beasley et al. 2001, 1999; Beasley 1996; Carcello and Nagy 2004), we use Rule 10(b)-5 of the

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[4]Strategic dependence is defined as "the degree to which a change in the auditor's expectation of the manager's action affects the manager's action, assuming that the manager responds optimally to the auditor's action" (Bloomfield 1995, 72).

[5] There is normally a time lag between the occurrence of fraud and the release of AAERs (Feroz et al. 1991). The fraud cases used in this study occurred between 1987 and 2002. In the regression analysis, we performed a sensitivity test by including the year of fraud occurrence in regression models, and found no differences in major results.

1934 Securities Exchange Act as a proxy for fraud. Rule 10(b)-5 is violated when an issuer makes intentional material misstatements in financial reports.[6]

(Insert Table 1 Here)

Panel A in Table 1 shows the composition of the initial sample. From the set of 264 identified companies cited in AAERs released between 1997 and 2002, we deleted 98 companies that did not violate Rule 10(b)-5 and/or those companies whose AAERs do not disclose details of fraud, 51 companies that did not use any evidence schemes, and 7 companies that used evidence schemes but without detailed disclosures of evidence schemes[7]. We then eliminated 8 companies due to the lack of information for control variables. The final sample includes 100 companies that were found to have committed fraud.

Panel B in Table 1 reveals that fraud companies varied greatly in size, with the mean (median) total assets of $758 ($61) million. Panel B also indicates that 71 percent are clients of Big-Five accounting firms, 32 percent are bankrupt, 32 percent are in the computer industry, and 13 percent of the frauds involve only interim reports. Panel C in Table 1 presents the industry memberships of fraud companies, revealing that financial statement frauds have occurred most frequently in manufacturing companies. Service companies, especially companies providing computer services, also appear to be involved more frequently in financial statement fraud.

Fraud Scheme Taxonomy

The main objective of this paper is to examine what evidence schemes are used to conceal given types of fraud, i.e., account schemes. Therefore, separate taxonomies for account schemes and evidence schemes are needed.

Taxonomy of Account Schemes

Bonner et al. (1998) developed taxonomy of fraud primarily based on account schemes for analyzing the relationship between fraud types and the likelihood of litigation against auditors. Their fraud sample consists of fraud cases announced in AAERs during 1982 through 1995. We adjust the Bonner et al. (1998) taxonomy to reflect the more common account schemes found in the AAERs in our fraud sample. The final taxonomy for account schemes has eleven general categories of fraud. These are: (A) fictitious revenues, (B) premature revenue recognition, (C) overvalued assets and understated expenses, (D) omitted or understated expenses/liabilities, (E) fictitious assets, (F) other methods to overstate revenues, (G) overvalued assets/equity, (H) misclassification, (I) omitted or improper disclosures, (J) "wrong way" frauds, and (K) miscellaneous.

Taxonomy of Evidence Schemes

Bowyer (1982) identifies two basic strategies to create a deception: dissimulation and simulation. Dissimulation strategies are created to "hide the real;" simulation strategies are created to "show the false." To assist auditors in designing audit procedures that would improve the detection of fraud, we need to differentiate among evidence schemes based on how they

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[6] Rule 10(b)-5 in 1934 Act states that it shall be unlawful for any person to employ any scheme to defraud, to make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, or to engage in any act which operates or would operate as a fraud or deceit upon any person.

[7] These deleted cases include those that listed multiple account schemes and multiple evidence schemes without explaining specific relationships among them. For example, the AAERs might disclose that a company has created fictitious sales and recognized premature revenue and that the company has provided falsified accounting records and required customers to provide false confirmations to auditors. The relationship between the specific evidence schemes and account schemes cannot be accurately determined based on the disclosed information, and thus, such fraud cases were eliminated from the fraud sample.

would affect the design of audit procedures. Therefore, based on different types of audit evidence,[8] we create the taxonomy of evidence schemes.

The final taxonomy for evidence schemes has ten general categories. These are: (A) fake documents, (B) collusion with third parties, (C) altered documents, (D) hidden documents/information, (E) false oral/written responses from client, (F) fake products/equipment, (G) collusion with related parties, (H) shifts and/or the spreading of fraudulent items among accounts, (I) reversal accounting entries, and (J) miscellaneous.

IV. DESCRIPTIVE RESULTS

Table 2 summarizes the frequencies of different types of account schemes and evidence schemes in the fraud sample. To classify the fraud schemes into different types of account schemes and evidence schemes, one of the authors who had two years of audit experience coded the fraud schemes according to the fraud taxonomy. A second person, also with two years of audit experience, coded the fraud schemes independently. The differences in coding (about 5 percent) were analyzed and resolved. Panel A indicates that premature revenue recognition (50 percent), fictitious revenues (37 percent), overvalued assets and understated expenses (14 percent), and omitted or understated expenses/liabilities (12 percent) are the most frequently occurring account schemes in our sample. It is obvious that revenue fraud is the most frequently occurring fraud type in the sample.

(Insert Table 2 Here)

Panel B in Table 2 indicates that the five most frequently occurring evidence schemes include hidden documents/information (46 percent), altered documents (39 percent), fake documents (36 percent), collusion with third parties (27 percent), and false oral/written responses from clients (14 percent). Note that the three most frequently occurring evidence schemes are related to accounting documents. This might indicate a need for auditors to be more skeptical in examining the authenticity of certain documents or to perform additional procedures to corroborate the evidence obtained from documents when under a high fraud risk situation.

(Insert Table 3 Here)

Table 3 lists examples of a large variety of specific evidence schemes that have been used by management to conceal fraud. From Table 3, one can notice that most of the schemes are designed to manipulate the evidence that will be provided to the auditor. In other words, it seems that management is knowledgeable of what audit procedures are normally used and what evidence will be collected by the auditor. For instance, in order to verify the occurrence of sales transactions, auditors will normally review sales documents such as sales order, contracts, shipping documents, and sales invoices. In correspondence, as shown in Table 3, management will create fake contracts, sales orders, shipping documents, and invoices to deceive auditors. Furthermore, management understands that auditors will send confirmations to third parties to verify balances of accounts or transactions. Therefore some management takes extreme actions to collude with third parties to manipulate evidence that will be provided to the auditor.

From the way management conceals fraud, we also notice that not only that management seems to know what evidence auditors are looking for and how they collect it, but also they know some of the limitations of audit procedures and potential weaknesses of auditors. For example, Table 3 shows that management changes the dates on accounting records through reprogramming their computer systems. Auditors are normally knowledgeable of accounting

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[8]Arens et al. (2008) classify audit evidence into eight types: physical examination, confirmation, documentation, analytical procedures, inquiries of the client, recalculation, re-performance, and observation.

principles, but may lack knowledge of computer programs. Without the help from experts in computer systems, it will be difficult for auditors to indentify changes in clients' computer systems. This would suggest that if the auditor identifies a high fraud risk situation, he/she should consider involving an IT auditor to examine the client's computer system.

From the descriptive results, we learn that management has acted strategically when designing fraud schemes to deceive auditors. Based on their knowledge of audit procedures, management would manipulate the evidence they (or third parties) provide to auditors. Furthermore, some management seems to make use of the limitations of audit procedures and weaknesses of auditors to design schemes to conceal fraud. As argued by Grazioli et al. (2008), auditors should obtain a deep knowledge of both the management's intentions and preferences and the audit discipline itself. Besides evaluating whether poor internal controls may provide management with opportunities to commit fraud, auditors should also consider whether there are weaknesses in audit procedures and their knowledge of clients that might also provide opportunities for management to commit fraud.

V. HYPOTHESE DEVELOPMENT AND REGRESSION ANALYSES

Hypotheses Development

In this section we explore the relationships between various types of account schemes and evidence schemes. Our primary hypothesis is that management would prefer to use certain specific types of evidence schemes to conceal specific types of account schemes, and these relationships are related to the tested management assertion.

Bowyer (1982) argues that to be cost-effective, the deceiver would manipulate as few characteristics as possible. Management is expected to prefer schemes that provide the most persuasive evidence and can be implemented efficiently. Furthermore, to be successful the deceiver must use an intentional strategy which means "the deceiver must use some variant of a theory of action in which the behavior of others can be predicted from assumptions about their goals and benefits" (Johnson et al. 1993, p. 470). Such a theory is based on a model that specifies the goals and knowledge of the target of deception (the auditor). In our context, management needs to know the goals and knowledge of the auditors in financial audits, and the nature and timing of the evidence sought. Current auditing standards require auditors to form their opinions on financial statements by obtaining and evaluating evidential matter concerning the assertions in financial statements (SAS No. 31, AICPA 1980). Auditors normally would design audit procedures based on attributes of accounts and related assertions in financial statements. Therefore, we contend that the type of evidence scheme used by management to conceal fraud depends not only on the specific accounts involved, but also depends on the relevant management assertion. This aspect is elaborated further when we develop our hypotheses.

Certain types of account schemes and evidence schemes occur too infrequently to permit identification of meaningful patterns. To facilitate our analysis, we chose the most frequently used account schemes and evidence schemes to examine the relationships. For account schemes, we focus on four types: fictitious revenues, premature revenue recognition, overvalued assets and understated expenses, and omitted or understated expenses/liabilities. For evidence schemes, we focus on five types: fake documents, collusion with third parties, altered documents, hidden documents/information, and false oral/written responses from clients. To assist auditors in deciding what audit evidence is most likely to be manipulated by management, we focus on testing positive relationships among evidence schemes and account schemes.

As explained earlier, evidence schemes are used to deceive the auditor into believing that a fraudulent transaction is a genuine transaction or to hide a transaction that has actually

occurred. Fictitious revenues are representations that need evidence schemes to show that sales have really occurred. Fictitious revenues mainly violate the financial statement assertion of existence or occurrence. Through fake documents and collusion with customers, management can create both internal and external evidence to support the occurrence of recorded fictitious transactions. Therefore, we propose the following two hypotheses:

H1a: There is a positive relationship between the creation of fake documents and fictitious revenues.

H1b: There is a positive relationship between collusion with third parties and fictitious revenues.

Unlike fictitious sales, the account schemes of premature revenue recognition, overvalued assets and understated expenses, and omitted or understated expenses/liabilities are based on real transactions rather than fictitious ones. For the purpose of hiding real transactions, management usually applies those schemes that could alter the existing evidence by generating false attributes or by removing true attributes, or by hiding the existing evidence from the auditor.

The account scheme of premature revenue recognition mainly represents the violation of the assertion of valuation or allocation. Two frequently occurring types of premature revenue recognition are contingent sales and out-of-period sales that are related to the cut-off audit objective. To test whether the realization of sales is contingent on the fulfillment of certain terms, e.g. selling products to end-users, auditors may review contracts to ensure that no contingent terms or side agreements exist. In response, management may alter sales contracts to remove contingent terms or hide side agreements from the auditors. To test whether there are out-of-period sales, auditors may perform cut-off tests by reviewing shipping documents and other sales documents. In response, management may create fake shipping documents, alter the dates on the documents, or collude with third parties to change the shipping information. Also, the confirmations sent by auditors to clients' customers provide some evidence to the cut-off audit objective of sales. Management also may collude with their customers to conceal fraud. We therefore propose the following four hypotheses:

H2a: There is a positive relationship between the creation of fake documents and premature revenue recognition.

H2b: There is a positive relationship between collusion with third parties and premature revenue recognition.

H2c: There is a positive relationship between the use of altered documents and premature revenue recognition.

H2d: There is a positive relationship between hidden documents or information and premature revenue recognition.

The account scheme of overvalued assets and understated expenses (this scheme should affect both types of accounts) mainly violates the assertion of valuation or allocation. When determining the value of assets, auditors often examine supporting documents and make inquiries of management about the valuation methods. To justify the appropriateness of valuation and allocations of accounts, management must provide oral explanations and/or written documents to auditors. In order to conceal the fraud, management can alter certain documents or make inappropriate statements to auditors. Therefore, we propose the following two hypotheses:

H3a: There is a positive relationship between the use of altered documents and overvalued assets and understated expenses.

H3b: There is a positive relationship between false oral/written responses from client and overvalued assets and understated expenses.

The account scheme of omitted or understated expenses/liabilities is related mainly to the violation of the completeness assertion. In order to conceal omitted or understated liabilities or expenses, management needs to hide certain documents or information from auditors. Therefore, we propose the following hypothesis:

H4b: There is a positive relationship between hidden documents or information and omitted or understated expenses/liabilities.

Regression Models

To consider the effects of multiple factors on the likelihood of the occurrence of different types of evidence schemes, we use logistic regression to test our hypotheses. The following regression models are used to analyze whether the likelihood of the occurrence of specific types of evidence schemes is affected by the occurrence of specific types of account schemes, in other words, to examine whether fraud types (as called in Bonner et al. 1998) lead to certain ways of concealing fraud.

$$FAKEDOC = \alpha + \sum_{j=1}^{4} \beta_j *Control\ variable_j + \gamma*FICREV + \gamma_2*PREREV + \varepsilon \qquad (1)$$

$$THIRDPTY = \alpha + \sum_{j=1}^{4} \beta_j *Control\ variable_j + \gamma_1*FICREV + \gamma_2*PREREV + \varepsilon \qquad (2)$$

$$ALTERDOC = \alpha + \sum_{j=1}^{4} \beta_j *Control\ variable_j + \gamma_1*PREREV + \gamma_2*OVASST + \varepsilon \qquad (3)$$

$$HIDDOC = \alpha + \sum_{j=1}^{4} \beta_j *Control\ variable_j + \gamma_1*PREREV + \gamma_2*UNEXPLIB + \varepsilon \qquad (4)$$

$$MISREPT = \alpha + \sum_{j=1}^{4} \beta_j *Control\ variable_j + \gamma*OVASST + \varepsilon \qquad (5)$$

where,

j = the number of control variables

FAKEDOC = 1 if using fake accounting or other related documents, 0 otherwise;

THIRDPTY = 1 if colluding with third parties to provide false statements or confirmations to the auditor, 0 otherwise;

ALTERDOC = 1 if using altered accounting or other related documents, 0 otherwise;

HIDDOC = 1 if hiding important accounting or other related documents or information from the auditor, 0 otherwise;

MISREPT	=	1 if management is making false oral or written responses to the auditor, 0 otherwise;
FICREV	=	1 if including fictitious revenues in financial statements, 0 otherwise;
PREREV	=	1 if including premature revenues in financial statements, 0 otherwise;
OVASST	=	1 if including overvalued assets and understated expenses in financial statements, 0 otherwise; and
UVEXPLIB	=	1 if omitting or understating expenses and/or liabilities in financial statements, 0 otherwise.

In the proposed models, the dependent variables include the five evidence schemes to be tested in the hypotheses. The independent variables consist of the test variables and control variables. The test variables for each regression model are determined based on the hypotheses developed previously.

Control Variables

We control for other factors that may affect how management conceals fraud. These control variables relate to client characteristics, auditor characteristics, and financial report characteristics. Specifically, these control variables include client bankruptcy, client industry, type of audit firm, and type of financial reports. As discussed below, these variables may affect management's assessment of the efficiency and effectiveness (also called cost and benefit) of using specific types of evidence schemes, their expectations of the likelihood of fraud being detected by the auditor, and the likelihood of compromising with the auditor. Therefore, these variables may affect management's decisions on using evidence schemes.

Client bankruptcy often is a result of the company's solvency problem that exists before the occurrence of fraud. As found in prior research (e.g., Stice 1991, Houston et al. 1999, Johnstone 2000), audit firms generally apply more effort to the audits of financially weaker clients. In anticipation of the efforts of the auditors, management would prefer those schemes that could provide the most persuasive evidence to reduce the likelihood of detection. Therefore, we include client bankruptcy as a control variable in the regression models to control for its potential impact on evidence schemes that may provide more persuasive evidence such as fake documents and altered documents. Client bankruptcy is defined to be 1 if the company went bankrupt within three years of the last year of the fraudulent financial statements (Bonner et al. 1998) and 0 otherwise.[9]

The characteristics of an industry in which a business operates can have an important impact on the attributes of a business operation and its environment (Albrecht 2003). Thus, the nature of industry can provide management with opportunities and conditions to commit fraud. The computer industry normally involves high-tech products that often are subject to test periods and might become outdated quickly. As a result, side letters containing special return policies or contingent terms attached to contracts, which often are hidden from auditors, might be more often used in the computer industry than in other industries. We expect a positive relationship

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[9] We use the actual occurrence or non-occurrence of bankruptcy within three years after last year of the fraud as proxy for the managers' expectations of bankruptcy at the time fraud was committed. We also tested the Altman Z-scores (Altman 1968) as proxy for expectation of bankruptcy and obtained similar results.

between computer industry and hidden documents or information. Computer industry is defined to be 1 if the first three numbers of the SIC code of the fraud company are 737 or 357 (Bonner et al. 1998) and 0 otherwise.

The type of auditors could be another factor that affects management's decisions on evidence schemes. Beasley et al. (2001) analyzed the AAERs filed by the SEC between 1987 and 1997 and found that inadequate confirmation of accounts receivable was among the most common problems in the audits by small audit firms, but not in audits by large firms. In other words, large audit firms may have more strict policies for sending and collecting confirmations. In addition, considering the reputation of Big-Five accounting firms, clients of Big-Five firms may expect a more structured audit and a more careful evaluation of the audit evidence by their auditors. In response, clients of Big-Five firms may be more likely to collude with third parties or to use other more effective evidence schemes to deceive their auditors. Therefore, we include a control variable for auditor size in the regression models. If the company is a client of a Big-Five accounting firm at the time when fraud occurred, the value is set to 1, otherwise 0.

Finally, we include type of financial reports as a control variable in the regression models, with the value of 1 when the fraudulent financial statements involve only interim financial statements and 0 otherwise. Current auditing standards require the auditor to perform a review of interim financial statements, which provides a lower level of assurance than does an annual audit. As a result, management would expect less effort from the auditors in such a situation. The required review procedures include analytical procedures and inquiry of clients. Therefore, management may be more capable of hiding critical information from auditors or making false representations to auditors to conceal fraud in interim financial statements.

VI. REGRESSION RESULTS AND DISCUSSIONS

Tests of Hypotheses

Table 4 lists correlations among independent variables for all the regression models. The average of the variance inflation factors (VIFs) was between 1 and 2 for all analyses, indicating that multicollinearity was not a problem in these analyses.[10] Table 5 reports the logistic regression results of the hypotheses tests.

(Insert Table 4 Here)

(Insert Table 5 Here)

Fake Documents

The first column in Table 5 reports the regression results for the relationship between fake documents and fictitious revenues, and premature revenue recognition. Consistent with H1a, the coefficient on fictitious revenues is significantly positive ($p < 0.001$). This result suggests that the higher the likelihood of the occurrence of fictitious revenues, the more likely it is that managers would create fake documents to conceal the fraud. The result shows that the premature revenue recognition is positively related to fake documents as predicted by H2a, but the relationship is not significant (p=0.175). None of the control variables is significantly related to the use of fake documents. These results indicate that the occurrence of fictitious revenues is the primary explanatory factor for the strong prediction power of the regression model (Chi-square = 44.408, $p < 0.001$, Pseudo R^2 = 0.359). If the auditor assessed a high risk of fictitious revenues, he/she may consider performing additional procedures to obtain other types of evidence or use special procedures to examine the authenticity of accounting documents.

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[10] Variance inflation factors (VIF) often are used to assess the multicollinearity of regression models. A VIF larger than 10 is usually an indicator of multicollinearity (Marques de Sá 2003).

Collusion with Third Parties

The second column in Table 5 reports the regression results for the relationship between collusion with third parties and fictitious revenues, and premature revenue recognition. Consistent with H1b, management is more likely to collude with third parties to deceive the auditors when fictitious revenues are recorded (p = 0.02). This result suggests that when auditors suspect the existence of fictitious revenues, they should be skeptical of the statements or confirmations provided by third parties, e.g., customers or shipping carriers. Although the coefficient for premature revenue recognition is positive as predicted by H2b, the relationship is not significant (p = 0.380). This result indicates that compared to other schemes, management does not necessarily prefer to collude with third parties when they record premature revenue. The relationships between collusion with third parties and the control variables are consistent with our expectations. The coefficient on Big-Five firms, 0.932, is marginally positive (p = 0.066), which indicates that clients of Big-Five firms may be more likely to collude with third parties to deceive their auditors. However, since the Chi-Square, 7.099, for this regression is not significant (p = 0.312), these results should be interpreted with caution.

Altered Documents

Column three in Table 5 reports the regression results for the relationships between altered documents and two account schemes: premature revenue recognition and overvalued assets and understated expenses. As expected in H2c, the use of altered documents has a significant positive relationship with the occurrence of premature revenue recognition (p = 0.004). This result indicates that auditors should be more skeptical of the documents obtained when they suspect premature revenue recognition. The coefficient, 0.655, for the account scheme of overvalued assets and understated expenses is not significant (p = 0.169), which is inconsistent with H3a. Management does not appear to use altered documents more frequently than other schemes to conceal overvalued assets and understated expenses. The relationship between altered documents and client bankruptcy is, as expected, positive (r = 0.675) but is not significant (p = 0.107). In addition, the results indicate a significant negative relationship between altered documents and interim reports (r = −1.594, p = 0.028). This may suggest that management normally does not alter accounting records for interim reports.

Hidden Documents/Information

The fourth column in Table 5 shows the regression results for the relationship between hidden documents or information and two account schemes, premature revenue recognition and omitted or understated expenses or liabilities. Consistent with H2d and H4, the relationships between hidden documents or information, and premature revenue recognition, and omitted or understated expenses or liabilities are significantly positive (p-values of less than 0.001 and of 0.008, respectively). These results suggest that management are more likely to hide documents or information from auditors to conceal fraud of the type where revenue is prematurely recognized or expenses or liabilities are intentionally understated. Also consistent with our expectations, the coefficients on the computer industry and on interim reports are significantly positive (p-values of 0.063 and 0.042, respectively).

False Oral/Written Responses from Clients

The last column in Table 5 reports results for the test on the relationship between false oral/written responses from clients and the account scheme of overvalued assets and understated expenses. Although, as expected, the regression results indicate a positive coefficient for the account scheme of overvalued assets and understated expenses (r = 0.885), the coefficient is not significant (p=0.135). This result may indicate that there is no preference of management shown

for using false oral/written responses to conceal an account scheme. The results also indicate that control variables do not appear to distinguish between the evidence scheme of false oral/written responses from clients and other types of evidence schemes. The regression model Chi-square (1.607) is not significant (p = 0.900). Further research may be needed to investigate what other factors may affect the occurrence of false oral/written responses from clients.

Additional Analyses

To explore some additional relationships between account schemes and evidence schemes, we performed several sensitivity analyses: (1) we included dichotomous variables for all selected account schemes (fictitious revenue, premature revenue recognition, overvalued assets and understated expenses, and omitted or understated expenses and/or liabilities) in all the regression models, and found no changes in our results; (2) we added interactions in those regression models that have more than one test variable, and, again, found no changes in our results; (3) we added company size as a control variable in all regression models, and found no significant relationships between company size and evidence schemes; (4) we added dichotomous variables for the occurrence year of fraud in regression models, and found no differences in our results; and (5) for exploration purposes, we also examined the proposed relationships by treating account schemes as dependent variables and related evidence schemes as independent variables. Again, no major differences in our results were observed.

In summary, our regressions and additional analyses show that although management may employ multiple approaches to perpetrate and conceal fraud, some patterns exist in their choices of evidence schemes, affected by the relevant management assertions. Moreover, the use of evidence schemes is affected by other factors, such as industry, type of auditors, and type of financial reports. These relationships should be integrated into audit programs to improve the effectiveness and efficiency of fraud detection.

VII. IMPLICATIONS OF RESULTS ON THE AUDIT PROCESS

Due to the complexity of schemes used by management to deceive auditors and conceal fraud, it is infeasible for auditors to anticipate and investigate all possible fraud schemes. One way to improve the efficiency and effectiveness of audit programs is to use the knowledge of fraud schemes by the auditors to assess how fraud could be perpetrated and concealed, and then decide the nature and focus of audit procedures. Such knowledge could be based on results from empirical research, audit experience, and experts' advice. In this section, using premature revenue recognition in a manufacturing company as an example, we illustrate the process of how the results of this study can be used to plan an audit when fraud risk is assessed to be high.
(Insert Figure 1 Here)

In Figure 1, we classify fraud schemes at four different levels: fraudulent account, account schemes, specific account schemes,[11] and specific evidence schemes. Percentages shown on the top of each scheme represent the frequency of occurrence of the scheme conditioned upon its parent scheme. These frequencies are calculated based on the total number of fraud schemes used by the 100 companies in our fraud sample. Assuming that the auditor has assessed a preliminary high fraud risk in the revenue account, he/she should then assess what account schemes could have been used by management to perpetrate the fraud. Assuming that there is no

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[11] Specific account schemes are the sub-categories of the account schemes. Because of the limited sample size, we did not use the specific account schemes in our regression analysis. However, it is our experience with one of the Big Four firms that to implement our findings into practice, it is more efficient to focus the effort through specific account schemes and the corresponding specific evidence schemes when planning for an audit program.

other evidence, the auditor may focus first on the most frequently used account scheme for overstating revenues, premature revenue recognition (54 percent of revenue fraud). Next, the auditor should scan the specific account schemes as to how this premature revenue recognition scheme might be implemented and again focus on the most frequently used specific account schemes. As shown in Figure 1, the two specific approaches most commonly used to recognize premature revenue are contingent sales (46 percent) and out-of-period sales (19 percent). The auditor then should consider how, i.e., through what specific evidence schemes, the management would conceal the fraud. According Figure 1, the most likely ways for management to conceal contingent sales include hidden side letters or agreements (57 percent), collusion with customers (6 percent) or other third parties (8 percent), and etc. Thus, the auditor should consider performing procedures that could detect hidden side letters first. Figure 1 lists eight procedures, proposed by two experienced auditors[12], that could be used to detect hidden side letters.

Our regression results provide evidence of a significant positive relationship between premature revenue recognition and hidden documents or information. In addition, the regression results provide some evidence of positive relationships between hidden documents/information and the computer industry, and interim reports, and between collusions with third parties and clients of Big-Five firms. Such relations should also be considered when planning the audit program. Auditors should also incorporate client-specific information into the framework. It is possible that management can predict that auditors may also engage in strategic reasoning and anticipate some of their responses. Therefore, auditors should maintain their skepticism throughout the audit and incorporate unpredictability into audit procedures.

VIII. CONCLUSIONS

This study makes three major contributions to the fraud literature. First, as Jiambalvo and Waller (1984) posit that the decomposition of problem-solving strategies can improve judgment, we believe that by decomposing the process of management fraud into two components, account schemes and evidence schemes, and by knowing frequencies of these schemes as found in actual fraud cases, the auditor can better understand the process through which management commits fraud. The auditor can, consequently, adjust audit procedures to respond to fraud risk. Second, we provide the initial empirical evidence of the relationships between the most common account schemes and evidence schemes. As mentioned earlier, such knowledge can be useful in assessing the risk of management fraud and designing audit programs to respond to fraud risk. In addition, the knowledge of the frequencies of evidence schemes and the relationships among account schemes and evidence schemes can provide information to regulators such as PCAOB and AICPA to decide which accounting areas or aspects of audit evidence should receive critical examinations from auditors in order to respond to fraud risk. Finally, using revenue fraud as an example, we describe a conceptual framework for detecting fraud by constructing a network diagram of various account schemes and evidence schemes based on the frequency information and regression results. Moreover, the knowledge obtained in this study can be used in training auditors who have little or no experience with fraud to give them a deeper understanding of fraud process and management behavior.

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[12] The two auditors include a manager with 9 years of audit experience and a senior with 4 years of audit experience from one of the Big-Four firms. These procedures are only one firm's view and may change based on the firm's experience and the context.

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TABLE 1

Characteristics of Fraud Firms Subject to SEC Enforcement Actions 1997-2002

Panel A: Composition of Initial Sample

	Number of Sample Firms
Total Number of Identified Companies	264
Companies Not Violating 10(b)-5	(98)
Companies Not Using Evidence Schemes	(51)
Companies Using Evidence Schemes But without Disclosures of Specific Evidence Schemes	(7)
Companies without Available Financial Data	(8)
Final Fraud Sample	100

	Total Fraud Sample (n=100)
Panel B: Selected Characteristics	
Total Assets (in millions)	
Mean	$ 758
Standard Deviation	$ 4,155
Median	$ 61
Bankrupt	32 %
Computer Industry	32 %
Big Five Auditor	71 %
Interim Statements	13 %

Panel C: Company Industries

Agriculture, Mining and Construction	1
Manufacturing	40
- Computer and Office Equipment	8
Transportation, Communications, and Utilities	5
Wholesale and Retail Trade	11
Finance, Insurance and Real Estate	6
Services	32
- Computer Programming, Data Processing, and Other Computer Related Services	24
Other	5

TABLE 2

**Classification of Fraud Schemes Used by 100 Fraud Companies
by Account Schemes Category and Evidence Schemes Category**

	Total Sample (n=100)
Panel A: Account Schemes Categories	
(A) Fictitious Revenues	37%
(B) Premature Revenue Recognition	50%
(C) Overvalued Assets and Understated Expenses	14%
(D) Omitted or Understated Expenses/Liabilities	12%
(E) Fictitious Assets	7%
(F) Other Methods to Overstate Revenues	10%
(G) Overvalued Assets/Equity	3%
(H) Misclassification	2%
(I) Omitted or Improper Disclosure	9%
(J) "Wrong Way" Frauds	2%
(K) Miscellaneous	1%
Panel B: Evidence Schemes Categories	
(A) Fake Documents	36 %
(B) Collusion with Third Parties	27 %
(C) Altered Documents	39 %
(D) Hidden Documents/Information	46 %
(E) False Oral/Written Responses from Clients	14 %
(F) Fake Products/Equipment	4 %
(G) Collusion with Related Parties	5 %
(H) Shifts and/or the Spreading of Fraudulent Items among Accounts	5 %
(I) Reversal Accounting Entries	4 %
(J) Miscellaneous	2 %

TABLE 3

Examples of Specific Evidence Schemes Used by 100 Fraud Companies

(A)Fake Documents

Forged contracts

Fictional shipping documents

Fictional purchase orders

Faxed fabricated documents through reprogrammed fax machines

Phony documents misrepresenting the volume of inventory

Fabricated termination notices

Forged press releases or minutes

Forged cash receipts records

Fabricated stock certificates

Forged e-mails and letters

Forged account (transaction) statements

Forged cover letter or envelope to mail to auditors or other inspectors

Fictional cash payments

Forged sales invoices

Forged lading bills

(B)Collusion with Third Parties

Fabricated appraisal through friends

Require outside money managers to assure auditors with false confirmations

Require the brokers to sign the responsibility statements

Require resellers to verbally assure auditors the balance of accounts receivable

Require customers to make payments and then wire back all the payments

Ask customers to provide false audit confirmations

Solicit letters from vendors ostensibly supporting inaccurate rebates or credits

Require shipping carriers to falsify shipping documents

Require suppliers to provide improper audit confirmations

Require customers to backdate contracts and adjust the dates on facsimile machines

Orchestrate letters of credit to distributors to finance their payments for sham sales

Arrange companies that have good relationships with the company to be outside "warehouses"

TABLE 3 (Continued)
Examples of Specific Evidence Schemes Used by 100 Fraud Companies

(C)Altered Documents

Falsify inventory records for locations where physical takes will not be observed by auditors

Alter purchase orders to eliminate contingent conditions

Hand-typed invoices outside automated accounting systems

Modify amounts in purchase orders

Falsify the aging of accounts receivable

Reprogram accounting systems to suppress the printing of the line-items on subsidiary ledgers

Reprogram accounting systems to replace fictitious accounts receivable with receivables

Provide altered timing studies using wrong assumptions

Reset the computer clocks to backdate shipping records and shipping documents

Stop automatic systems and enter adjustments manually to the systems

Backdate and change quantities on received documents from customers

Modify confirmations before returning to auditors

Falsify documents to support the reclassifications of inventories to fixed assets

Reprogram the systems to freeze the computer dates while the quarter was held open

Modify and return confirmations through the audited companies

Falsify agreements with customers with forged signatures and fax it to the auditors

(D)Hidden Documents or Information

Oral agreements with customers and omissions of contingent terms on purchase orders

Keep secret collection memoranda to track collections of contingent transactions

Keep inventory destructions secret without timely notifications to accounting departments

Maintain separate record systems of inventories

Conceal vendor invoices off books during certain periods

Sign side letters or agreements with customers, distributors, resellers or agents

No disclosures of management's interests in certain companies (related parties)

Maintain invoices for unshipped goods in separate files

Keep returned products and resale to customers off accounting books

TABLE 3 (Continued)

Examples of Specific Evidence Schemes used by 100 Fraud Companies

(E)False Oral/Written Responses from Client

Misrepresent abnormal reversal entries to be routine entries

Misrepresent misappropriated loans from lenders to be debts owed to related parties

Misrepresent that previous accounting mistakes were due to miscommunication

Collaborate incorrect memos or management representations to guarantee auditors

(F)Fake Products/Equipments

Include fake items (that look similar) in inventories

Include incomplete products (that look similar from outside) in inventories

(G) Collusion with Related Parties

Create special entities to help circulate payments

Conceal executive compensations through payments to related parties by customers

Issue false confirmations to auditors from related parties

(H) Shifts and/or the Spreading of Fraudulent Items among Accounts

Create new categories to shift defective inventories

Change names of subsidiary accounts into those that have been explained to auditors before

Spread improper capitalized expenses to various accounts of equipment

Break up fictitious account into smaller amounts

Make fictitious additions to fixed assets through accounting entries of small dollars

(I) Reversal Accounting Entries

Reverse fictitious accounting entries made during quarters before the end of fiscal year

Write off accounts receivable in special charge events to cover frauds in prior quarters

Write off payables and cost of goods sold during quarters and reverse back before the year's end

Reverse fictitious sales in multiple accounts recorded during quarters and hide them in one account

(J) Miscellaneous

Unmatched shipping documents with shipped nominal value items

Offset secret compensations against the gains from unrelated IPOs of subsidiaries

TABLE 4

Correlation Matrix for Independent Variables[+]

	BANKRUPT	IND_COMP	BIGFIVE	INTERIM	FICREV	PREREV	OVASST	UNEXPLIB
BANKRUPT [a]	-	-.103 (.308)	.249** (.012)	.117 (.245)	.140 (.164)	-.257*** (.010)	.217** (.030)	.142 (.157)
IND_COMP[b]		-	.202** (.044)	.117 (.245)	-.126 (.211)	.343*** (.000)	-.091 (.366)	-.121 (.229)
BIGFIVE[c]			-	.050 (.618)	-.058 (.567)	.198** (.048)	.194* (.053)	.168* (.094)
INTERIM[d]				-	.012 (.908)	.030 (.769)	-.156* (.121)	.040 (.691)
FICREV[e]					-	-.104 (.305)	-.070 (.486)	-.156 (.122)
PREREV[f]						-	-.231** (.021)	-.123 (.222)
OVASST[g]							-	.117 (246)
UNEXPLIB[h]								-

[a] BANKRUPT = Bankruptcy
[b] IND_COMP = Computer Industry
[c] BIGFIVE = Client of Big-Five Auditors
[d] INTERIM = Interim Reports
[e] FICREV = Fictitious Revenues
[f] PREREV = Premature Revenue Recognition
[g] OVASST = Overvalued Assets and Understated Expenses
[h] UNEXPLIB = Omitted or Understated Expenses/Liabilities

[+] The first number listed is the Spearman correlation coefficient; the number in parentheses is the significance level.
***, **, * Significant at the .01, .05 and .10 levels, respectively (two-tailed).

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TABLE 5

Logistic Regression Results

$$Evidence\ Scheme = a + \beta_1*BKRUPT + \beta_2*IND\_COMP + \beta_3*BIGFIVE + \beta_4*INTERIM + \Sigma(\gamma_i * Tested\ Account\ Scheme_i) + \varepsilon$$

Dependent Variables

	FAKEDOC Predicted Direction	FAKEDOC Coefficient (p-value)	THIRDPTY Predicted Direction	THIRDPTY Coefficient (p-value)	ALTERDOC Predicted Direction	ALTERDOC Coefficient (p-value)	HIDDOC Predicted Direction	HIDDOC Coefficient (p-value)	MISREPST Predicted Direction	MISREPST Coefficient (p-value)
Intercept		-2.221 (.001)		-2.060 (.001)		-1.589 (.002)		-2.324 (.000)		-1.596 (.002)
BKRUPT	+	.424 (.255)	+/-	-.460 (.399)	+	.675 (.107)	+/-	-1.139* (.073)	+/-	-.288 (.678)
IND_COMP	+/-	.365 (.563)	+/-	-.042 (.938)	+/-	.180 (.726)	+	.896* (.063)	+/-	-.097 (.886)
BIGFIVE	+/-	-.571 (.387)	+	.932* (.066)	+/-	.246 (.663)	+/-	.765 (.215)	+/-	-.448 (.504)
INTERIM	+/-	.658 (.421)	+/-	.250 (.713)	+/-	-1.594** (.028)	+	1.518** (.042)	+	.400 (.325)
FICREV (H1a, H1b)	+	3.204*** (.000)	+	.997** (.020)						
PREREV (H2a, H2b, H2c, H2d)	+	.571 (.175)	+	.159 (.380)	+	1.429*** (.004)	+	2.306*** (.000)		
OVASST (H3a, H3b)					+	.655 (.169)			+	.885 (.135)
UNEXPLIB (H4)							+	2.015*** (.008)		

Model Summary Statistics

	FAKEDOC	THIRDPTY	ALTERDOC	HIDDOC	MISREPST
-2 log likelihood	86.276	109.552	117.596	92.395	79.385
χ^2 (p-value)	44.408*** (<.001)	7.099 (.312)	16.154** (.013)	45.594*** (<.001)	1.607 (.900)
Pseudo R^2	0.359	0.069	0.149	0.366	0.016
% correctly classified	83%	75%	65%	81%	86%

***, **, *Significant at the .01, .05, and .10 levels, respectively (one-tailed test for signed predictions and two-tailed tests otherwise).

Figure 1: A Schematic Diagram of Fraud Schemes for Revenue Fraud and Examples of Audit Procedures
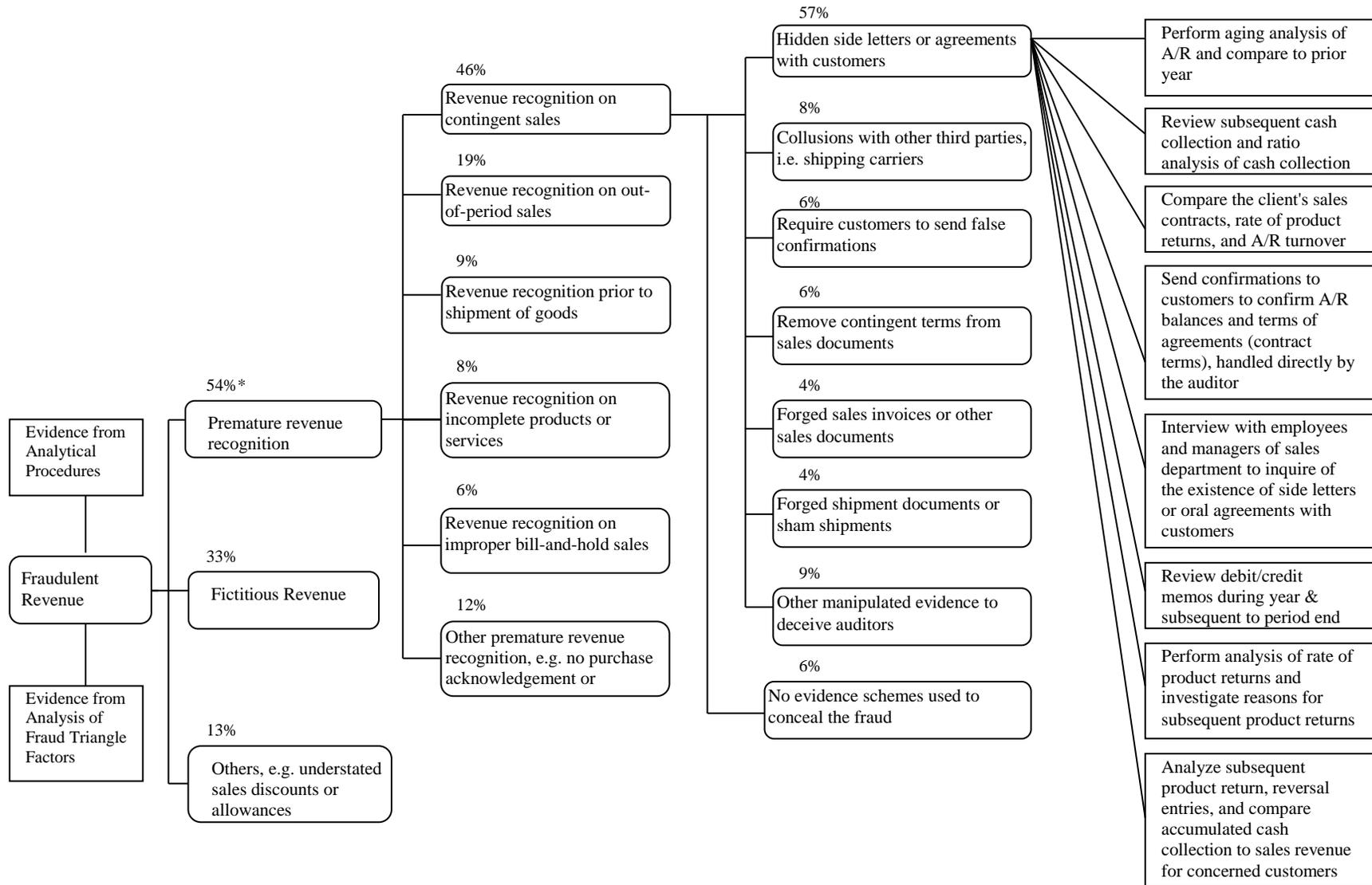
* Represents the frequency of the scheme conditioned on its parent scheme.