

The Incremental Effects of Fraud and Going-concern Risk on Audit Procedures

Allen D. Blay  
University of California, Riverside

Tim Kizirian  
Craig and Joan Young Professor of Accounting  
California State University, Chico

and

L. Dwight Sneathen, Jr.  
Mississippi State University

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## The Auditors' Consideration of Fraud and Going-concern Risk and the Audit Risk Model

### Abstract

This study uses audit file data to analyze the relationship between the auditors' preliminary assessments of going-concern and fraud risk and the planning and performance of the audit. We analyze the relationship between these risks and the auditor's assessment of inherent and control risk within the revenue cycle. We also examine whether these risk assessments have an effect on the persuasiveness, timing and extent of audit evidence gathered beyond the components of the audit risk model (ARM). Our results indicate that both fraud risk and going-concern risk are significantly related to both inherent risk and control risk. In addition our results indicate that while fraud risk is substantially captured by the current audit risk model, going-concern risk remains significantly related to our proxies for the persuasiveness and timing of audit evidence after controlling for inherent and control risk.

**Key words:** Audit risk, going-concern, fraud, audit evidence.

**Data availability:** The data was obtained via a confidentiality agreement with the providing audit firm. As a result, revealing the identity of the providing firm and disseminating the data is prohibited.

## I. Introduction

This study uses audit file data to analyze the relationship between the auditors' preliminary assessments of going-concern and fraud risk and the performance of the audit. We analyze the relationship between these risks and the auditor's assessment of inherent and control risk within the revenue cycle. We also examine whether these risk assessments have an effect on the persuasiveness, timing and extent of audit evidence gathered beyond the risk and effort components outlined in the audit risk model (ARM)<sup>1</sup>. Auditing standards indicate that the planning and performance of an audit should be related to the risks present in the audit (AICPA 1983). These risks include not only the inherent and control risk identified in the audit risk model, but also the client's business risk (Johnstone 2000; Public Oversight Board 2000). Most client business risks eventually have consequences to the financial statements, and the AICPA's Risk Exposure Draft from December, 2002, specifically states that the auditor should consider the effect of client business risk in planning the audit (AICPA 2002a). Thus, the relationship between client business risk and evidential planning is important to both standard setters and practitioners.

We choose to study the going-concern risk assessment and the fraud risk assessment for several reasons. First, SAS Nos. 59 and 99 specifically require the auditor to consider the client's ability to continue and the risk of fraud, thus both risk assessments are present in all audits. Second, the AICPA has identified both going-concern and fraud problems as pervasive inherent risks (AICPA 1990), thus these risk assessments are likely to affect many areas of the audit. Third, in our data, both assessments have

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<sup>1</sup> Auditing standards refer to nature, timing and extent of audit evidence, however, we use a proxy for nature that is better described as persuasiveness. Therefore, we will refer to the persuasiveness of audit evidence throughout the paper.

multiple levels of risk. Prior archival research has had difficulty detecting a strong link between components of the audit risk model and planned testing (e.g. Mock and Wright 1999). Bedard and Graham (2002) suggest that examining different levels of risk may alleviate this problem. Finally, the going-concern risk assessment and the fraud risk assessment have significantly different implications for the audit. Thus, the analysis of both risks allows us to study the effect of two very different risk assessments on the planning and performance of an audit. While the risk of fraud is directly related to both inherent risk and control risk, going-concern risk is seemingly only related to inherent risk (AICPA 1990). Thus, studying two business risks with different implications within the audit risk model allows us to analyze the auditor's ability to differentiate between different risks within the audit and provide additional evidence about the conditional dependency of inherent and control risk.

The ability to modify the audit report for going-concern uncertainty enables the auditor to make what is often the first public statement about the firm's ability to continue, based on relatively privileged information (Kida 1980; Mutchler 1985). Prior research has studied many aspects of the auditor's going-concern reporting decision, from information content (e.g. Fleak and Wilson 1992), to implications for litigation (Carcello and Palmrose 1994), and auditor criteria used to make the decision (Hopwood et al. 1994). However, no prior study has considered the relationship between the auditor's preliminary assessment of going-concern risk and the planning and performance of the audit. This relationship is important because it can provide additional evidence about the relationship between the auditor's assessment of inherent risk and control risk in the audit, as well as how the auditor applies risk assessment to audit evidence. Prior

literature has documented linkages between the auditor's assessment of inherent risk and control risk (e.g. Dusenbury et al. 2000; Messier and Austen 2000). However, the going-concern risk assessment does not have a theoretical link to control risk. Thus, studying the relationship between the going-concern risk assessment and the audit risk model enables us to study the interrelationship between inherent risk and control risk in a situation where the standards indicate no effect on control risk should be present.

The relationship between the fraud risk assessment and the assessment of audit risk and audit planning is also interesting. While there has been much research on auditor's ability to assess fraud risk (see Nieschwietz et al. (2000) for a summary), there has been relatively little research about the effect of the fraud risk assessment on the gathering of audit evidence. While it is generally concluded that the presence of fraud risk should result in different audit procedures than risk of unintentional misstatement (AICPA 2002; Zimbelman 1997), researchers have been unable to detect significant variation in the nature of audit plans through experimental research, and archival audit file data has been largely unavailable. Zimbelman (1997) experimentally identified adaptations in the extent of planned audit testing in the presence of fraud risk, however, auditors did not appear to adjust the nature of the tests. Our data provides an opportunity to view actual evidence decisions made by auditors following the assessment of fraud risk.

Our results indicate that both fraud risk and going-concern risk are significantly related to both inherent risk and control risk. The positive relationship between going-concern risk and control risk, in the absence of a theoretical linkage, provides additional support for the conditional dependency of inherent risk and control risk. In addition our

results indicate that while fraud risk is substantially captured by the current audit risk model, going-concern risk remains significantly related to our proxies for the persuasiveness and timing of audit evidence after controlling for inherent and control risk. We propose that this is related to the dynamic nature of going-concern risk, and that future auditing standards should address the issue of changing risk factors during the performance of the audit.

The remainder of the paper proceeds as follows. Section II discusses relevant literature and develops hypotheses. Section III discusses the data and presents results. Section IV discusses implications, limitations, and concludes.

## **II. Hypothesis Development**

An effective and efficient audit requires proper assessment of risk and proper allocation of effort subsequent to risk assessment (Bedard et al. 1999). The importance of audit risk assessment can be seen in the attention paid by both the Auditing Standards Board (2002) and the Public Company Accounting Oversight Board (PCAOB). SAS 47 proposes an audit risk model (ARM) that allows the auditor to set overall audit risk by assessing two broad risks, and implementing a third risk. The ARM is normally written as:

$$AR = IR \times CR \times DR \quad (1)$$

Where, AR= Audit risk, the risk that the auditor may fail to modify the opinion on financial statements containing a material misstatement.

IR = Inherent risk, the susceptibility of an assertion to material misstatements, presuming no controls are in place

CR = Control risk, the risk that material misstatements in an assertion will not be detected by the controls

DR = Detection risk, the risk that the auditor will not detect a material misstatement in an assertion.

While the ARM is widely used by practitioners, it does not specifically allow for assessments of business risks outside of the assessments of inherent risk (IR) and control risk (CR). Thus, as auditors identify risks in the audit, they must apply these risks in their assessment of either control risk, inherent risk, or both. Because of this, the ARM has been criticized as not fully representing the considerations auditors make in audit planning.

### *Business Risk Assessment*

Two client business risks specifically mentioned in the audit standards are the auditor's consideration of a client's ability to continue (the going-concern assessment) and the auditor's consideration of the likelihood of fraud. The AICPA identifies both of these risks as pervasive risk factors (AICPA 1990), meaning they affect many areas of the audit. Prior research on the assessment of IR and CR has noted a correlation between these components of the ARM (Dusenbury et al. 2000; Messier and Austen 2000). However, it is unknown whether this is because the same factors that affect IR often affect CR, or if auditors have difficulty in distinguishing the effects of an identified risk factor. Our design enables us to specifically test the auditor's linkage between an identified business risk and the ARM where one risk should affect both IR and CR, and the other risk should affect only IR. AICPA (1990) guidance links the risk of fraud to both IR and CR. However, the AICPA links the going-concern assessment to IR, but not to CR (AICPA 1990). This suggests the following hypotheses:

- H1: a. The auditor's assessed risk of fraud will be positively related to both the inherent risk and control risk assessments.**
- b. The auditor's assessed going-concern risk will be positively related to the inherent risk assessment, but not the control risk assessment.**

### *Risk assessment and audit evidence*

Identified audit risk is directly linked to audit procedures in the ARM. Auditors are able to adjust three primary areas to improve the sufficiency of testing: nature, timing and extent (SAS 31). However, research examining the link between assessed audit risk and actual audit effort has reached mixed conclusions. Bedard et al. (1999) summarize the existing literature on audit evidence and conclude that while there are documented links between risk assessment and extent of testing, there are few empirically documented links between risk and nature, and only limited testing of timing. Recently, Kizirian and Sneathen (2003) documented a strong link between overall misstatement risk and the three characteristics of audit evidence using audit file data. However, they do not address pervasive audit risks.

The Auditing Standards Board specifically addressed the issue of linking risks to the nature, timing and extent of audit procedures in its recent exposure draft on audit risk (AICPA 2002)<sup>2</sup>. The Exposure Draft was issued with the intent to improve the link between assessed risk and audit testing by requiring auditors to document the purpose of audit tests and how the test relates to an assessed audit risk.

This relationship between risk and the purpose of the test implies that specific substantive procedures should be chosen by auditors to specifically test assertions relevant to a risk. This does not necessarily imply that auditors will perform **more** substantive procedures when faced with pervasive client business risks, but will perform procedures targeted directly to the risk. While prior literature on audit effort has sometimes found significant links between risk and extent of testing, the majority of these

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<sup>2</sup> The Public Company Accounting Oversight Board determined that existing audit standards are applicable to public companies. Therefore, the Exposure Draft does not apply to these companies. However, it is indicative of current thought within the profession and therefore is relevant to a discussion of audit risk.

risks related to specific risks at the assertion level, not pervasive risks (e.g. Houston 1999; Quadackers et al. 1996). Prior archival research related to pervasive risk factors has generally found a weak relationship between risk assessment and extent of testing (e.g. Mock and Wright 1999). One potential explanation for this is that pervasive business risk factors such as the going-concern risk and fraud risk affect the persuasiveness and timing of auditor's substantive procedures, but not the extent of testing. As an example, Summers and Sweeney (1989) suggest that external audit tests may improve the likelihood of detecting fraud. Thus, this would be a shift in the persuasiveness of audit evidence. Similarly, SAS 59 indicates that subsequent results often provides evidence related to the client's ability to continue, thus going-concern risk would be closely related to the persuasiveness and timing of tests also. The above discussion suggests the following hypotheses:

- H2: a. The *persuasiveness* of audit testing will be affected by pervasive client business risks.**
- b. The *timing* of audit testing will be affected by pervasive client business risks.**
- c. The *extent* of audit testing will not be affected by pervasive client business risks.**

The hypotheses above predict a direct effect on the persuasiveness and timing of audit evidence. An additional research question is the effect of pervasive client business risks beyond their hypothesized effect on IR and CR. The ASB's Risk Exposure Draft (2002) does not materially change the audit risk model. Audit risk continues to be defined as consisting of inherent risk, control risk, and detection risk, implying that IR

and CR should encompass all risks in an audit related to gathering sufficient, competent audit evidence.

Research on the link between pervasive client business risks and the performance of audit procedures beyond their effect on IR and CR can provide key evidence for standard setters. Evidence that pervasive business risk factors do not have an effect on choice of audit procedures beyond the effect of IR and CR could provide some indication that the general framework of the ARM adequately describes current practice. However, evidence that pervasive business risks result in changes to audit procedures beyond the effect on IR and CR could provide evidence that the current ARM should be extended to include guidance on pervasive business risks. In line with current standards, we propose the following hypotheses:

- H3: a. The *persuasiveness* of audit testing will not be affected by pervasive client business risks beyond the implications to inherent risk and control risk.**
- b. The *timing* of audit testing will not be affected by pervasive client business risks beyond the implications to inherent risk and control risk.**
- c. The *extent* of audit testing will not be affected by pervasive client business risks beyond the implications to inherent risk and control risk.**

### III. Research Design and Analysis

#### *Data*

The data for this study was obtained from a participating Big 4 firm. The firm allowed access to all of its audit files from a single office under a confidentiality agreement. We selected audits randomly using a number generator, and arrived at a sample of 78 audits from 1996-1999. The clients selected were all technology-based,

which provided an appropriate sample for examining going-concern risk and fraud risk<sup>3</sup>. No client was selected twice, and 66 of the clients are publicly traded. No audit was a first-year audit, and the average time the firm served as auditor was seven years. Among the audits, 14 received audit opinions modified for going-concern uncertainty, the remainder received standard unqualified opinions. The variables used in this study were coded with the assistance of the firm, and corroborated by 2 of the researchers.

In making risk assessments, the firm assesses audit risk at both the overall level and at the cycle level. For the purposes of this study, we chose to use the revenue cycle to examine audit file testing. We did this for several reasons. First, the data-providing auditing firm considers revenue to be critical to the prevention of audit failure. Second, the revenue cycle is important to both fraud risk and going-concern risk. Third, risk assessment and audit testing is highly variable in the revenue cycle, thus this cycle will allow us to have more powerful tests. Finally, choosing a single cycle enabled us to gather more detailed information regarding the persuasiveness, timing and extent of testing.

### *Models and variable specification*

#### Inherent and control risk assessments

We hypothesized that going-concern risk and fraud risk assessments are positively related to assessed IR and that fraud risk assessments are positively related to CR. To test these hypotheses, we use the following regression models:

$$IR_i = \beta_{0i} + \beta_1 GC_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i \quad (2a)$$

(?)   (+)   (?)   (?)   (+)   (?)   (-)   Predicted Sign

$$IR_i = \beta_{0i} + \beta_1 FR_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i \quad (2b)$$

(?)   (+)   (?)   (?)   (+)   (?)   (-)   Predicted Sign

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<sup>3</sup> The practice office almost exclusively audits technology-based clients.

$$CR_i = \beta_{0i} + \beta_1 GC_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i \quad (3a)$$

(?)    (NS)    (-)    (?)    (-)    (?)    (?)    Predicted Sign

$$CR_i = \beta_{0i} + \beta_1 FR_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i \quad (3b)$$

(?)    (+)    (-)    (?)    (-)    (?)    (?)    Predicted Sign

Inherent risk (IR) and control risk (CR) are measured as the auditor's assessed level of inherent risk and control risk in the revenue cycle. Going-concern risk (GC) and fraud risk (FR) are assessed by the auditor during audit planning on a 0-2 scale of low, medium or high. To control for other possible explanations, we include variables that may be related to audit risk and evidence gathering in the revenue cycle.

To control for client size, we include the natural log of revenues (REV) for the audit year. Prior research has shown that firm size is correlated with both risk and audit evidence (Bell et al 1994). Larger companies often have more sophisticated internal control systems and more outside regulation, leading to lower levels of inherent and control risk. However, greater revenues may also increase the inherent risk in the revenue cycle. Therefore, we predict that the sign on REV will be negatively related to CR, but we do not predict a relationship to IR.

Auditor tenure (YA) is also significantly related to risk in the audit due to learning over time (O'Keefe et al 1994), although recent findings indicate that audit failures also increase when the auditor has a long tenure (Knechel 2003). While we cannot predict a relationship between IR, CR and years as auditor, we include the variable to control for any possible effects. We also control for whether the client is publicly traded (PUB). While publicly traded clients may be subject to more regulation, litigation is also more common for publicly traded companies (Palmrose 1988). Therefore, we predict a positive relationship between PUB and IR. Publicly traded companies may have more

sophisticated internal control systems, thus PUB may be negatively related to CR. In our sample, 66 of the 78 audits are of publicly traded clients, thus there is very little variability in the sample and therefore we may not obtain a significant relationship.

To control for any systematic differences in risk between industries, we also include a 0/1 dummy variable for industry (IND). All the firms in our sample were technology-based, however they were evenly distributed between biotech and computer technology. We do not hypothesize a sign on the industry variable.

As a final control, we include firm return on assets (ROA). Prior literature has shown a positive relationship between financial distress and audit risk (Carcello and Palmrose 1994). Therefore, to control for any effects of financial distress, or profitability in general, we include the ROA control variable. We predict a negative relationship between ROA and inherent risk. We do not predict a relationship between ROA and control risk.

#### Audit evidence

We also hypothesized that fraud risk and going-concern risk would be related to the persuasiveness and timing of audit evidence gathered, but not related to the extent of evidence gathered. To test these hypotheses, we estimated the following regressions:

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [4a]$$

(?)    (+)        (?)        (?)        (?)        (?)        (?) Predicted

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [4b]$$

(?)    (+)        (?)        (?)        (?)        (?)        (?) Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [5a]$$

(?)    (+)        (-)        (-)        (?)        (?)        (?) Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [5b]$$

(?)    (+)        (-)        (-)        (?)        (?)        (?) Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [6a]$$

(?) (NS) (+) (-) (?) (?) (?) Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i \quad [6b]$$

(?) (NS) (+) (-) (?) (?) (?) Predicted

Because persuasiveness, timing and extent cannot be directly measured, we used proxies from the audit file to represent the constructs. To proxy for persuasiveness, we use a measure of the independence of the evidence (PERSUASIVE), in line with SAS 31's hierarchy of audit evidence. We categorized all audit procedures from the revenue cycle using a three-point scale with the least independent evidence (internal evidence) equal to one, and the most independent evidence (external evidence) equal to three. Mixed evidence, such as a bank statement obtained directly from the client, was coded as a two. The PERSUASIVE variable was calculated as the average rating of all evidence documented in the audit file for the revenue cycle. The higher the value of PERSUASIVE, the more independent the evidence collected<sup>4</sup>.

TIMING equals the proportion of revenue cycle audit hours conducted at the client's fiscal year-end relative to total revenue cycle audit hours. As an example, if the firm conducted 40 percent of the audit hours at year-end, and 60 percent during interim testing, the TIMING variable would have a value of 40. Consistent with prior literature, we use total revenue cycle audit hours as the EXTENT variable. We use the same control variables from equations (2) and (3). Our only sign predictions are related to REV and YA for TIMING and EXTENT. We predict that for larger clients (REV), more testing will be performed, but that because of the size of the audit, a larger percentage

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<sup>4</sup> There obviously are other possibilities for investigating the nature of audit evidence. One example would be analytical procedures compared to detail tests. We chose to use independence or persuasiveness of evidence because it would likely be an aspect of the nature of evidence that would be adapted in cases of fraud risk or going-concern risk.

will be conducted at interim. Therefore, we predict that REV will be negative in equation (5) and positive in equation (6). Increased auditor tenure will result in the auditor having a better understanding of the client, thus leading to less testing at an earlier time.

Therefore, we predict that YA will be negative in equations (5) and (6).

To further test the *incremental* effect of fraud risk and going-concern risk on the gathering of audit evidence, we re-estimated equations (4) - (6) including a variable to represent misstatement risk from the ARM. As shown in equation (1), IR and CR are multiplicative in the ARM. Therefore, to test whether the ARM adequately describes the effect of pervasive business risks such as fraud and going-concern, we include a variable MR, equal to IR x CR. According to the ARM, since the auditor's detection risk is determined based on IR and CR, we hypothesize that MR will be positive in the regression of equations (4) - (6). We earlier hypothesized that if the ARM adequately described the effect of pervasive business risks on audit evidence, the coefficients on GC and FR should be insignificant in the re-estimation of equations (4) - (6).

### *Results*

Table 1 presents basic descriptive statistics. As shown, the overall level of IR was .51, or relatively low. Similarly, the mean for CR was .44, also relatively low. The mean value of PERSUASIVE was 1.67, indicating that the majority of evidence gathered was internal, and over 83 percent of the evidence was gathered at year end, as shown by the mean value of the TIMING variable. The average number of revenue cycle audit hours, or EXTENT, was 74.8. Table 2 presents a 3 x 3 matrix of going-concern risk and fraud risk assessments. As can be seen, 47 of the 78 clients received low risk ratings for both fraud risk and going-concern risk. Ten clients received "high" ratings for going-concern

risk, but only one was rated as high for fraud risk. This is consistent with the low base-rate of fraud, and the relatively higher rate of failure in the technology industry.

#### The effect of fraud risk and going-concern risk on the ARM

Table 3 presents the results of regressions of IR and CR on the assessed business risks. Increased assessed fraud risk is significantly, positively related to both IR ( $p=0.02$ ) and CR ( $p<0.01$ ), providing support for hypothesis 1a. Similarly, increased assessed risk of going-concern issues is significantly positively related to IR ( $p=0.02$ ), providing support for hypothesis 1a. However, increased assessed risk of going-concern is also significantly positively related to control risk ( $p=0.03$ ), in opposition to our prediction of no relationship. AICPA guidance on the going-concern risk indicates that this risk factor is pervasive to many areas of the audit, and directly related to IR. However, there is no theoretical linkage between going-concern risk and control risk. One possible explanation for this finding is that auditors have difficulty separating IR and CR and that there is a knowledge-based dependence between these two elements of the ARM (Waller 1993; Messier and Austen 2000). Our finding supports this conjecture. An alternative explanation for our finding is that going-concern risk is correlated with other risks not included in our regressions.

#### The relationship between pervasive risk factors and audit evidence

We hypothesized that pervasive business risks such as going-concern risk and fraud risk would affect the persuasiveness and timing of audit evidence, but not the extent. Our results support this hypothesis. Table 4 presents the results of audit effort on assessed going-concern risk. As hypothesized, higher levels of going-concern risk results in auditors gathering more independent evidence ( $p<0.01$ ) at a later time ( $p<0.01$ ),

providing support for hypotheses 2a and 2b. As predicted, higher going-concern risk is not significantly related to the extent of evidence gathered in the revenue cycle, providing support for hypothesis 2c. Total client revenue and auditor tenure maintained their predicted signs, no other control variables were significant, nor were they predicted to be significantly related to the persuasiveness, timing or extent of evidence gathered.

Similarly, Table 5 presents the results of audit effort on assessed fraud risk. As hypothesized, higher levels of fraud risk results in auditors gathering more independent evidence ( $p=0.09$ ) at a later time ( $p<.01$ ), providing support for hypotheses 2a and 2b. Again, as predicted, there was no relationship between fraud risk and the extent of audit evidence gathered in the revenue cycle, providing support for hypothesis 2c. The increased risk resulted in a shift in audit effort, but not an increase in the total time expended. The revenue and audit tenure variables were again significant in the predicted directions, no other control variables were significantly related to audit evidence.

#### The effect of pervasive business risks beyond IR and CR

The audit risk model according to SAS 47 and the December 2002 Risk Exposure Draft consists of two assessed risk factors, IR and CR, that are implied to encompass the client related risks in the audit. We hypothesized in the null form that subsequent to taking into account IR and CR, as specified by the ARM, the assessed pervasive business risk factors would no longer significantly affect the persuasiveness, timing, and extent of evidence gathered.

Table 6 presents the results of the audit effort variables on going-concern risk and the ARM. In line with the audit risk model, we included one measure of misstatement risk(MR), IR x CR. As predicted, MR is positively related to persuasiveness ( $p=0.03$ ),

timing ( $p < 0.01$ ), and extent ( $p < 0.01$ ) of evidence gathered. However, contrary to our null, going-concern risk remains significantly related to persuasiveness ( $p = 0.03$ ) and timing ( $p = 0.09$ ). The revenue and audit tenure control variables maintain their predicted signs.

Table 7 presents the results of the audit effort variables on fraud risk and the ARM. As predicted, MR is positively related to persuasiveness ( $p = 0.03$ ), timing ( $p < 0.01$ ), and extent ( $p < 0.01$ ) of evidence gathered. In line with our null prediction, fraud risk is no longer significantly associated with the persuasiveness, timing, nor extent of audit evidence gathered. Revenue and auditor tenure control variables maintain their predicted signs.

These contradicting results on going-concern risk and fraud risk provide an interesting commentary on the ARM and certainly leave room for future research on the relationship between pervasive risk factors and the ARM. While IR and CR appear to subsume fraud risk, going-concern risk appears to be a different construct and provide incremental information to the auditor in planning the audit. One possible explanation for this finding is the nature of the pervasive risk. While fraud risk likely remains constant throughout the audit, the risk of going-concern may change as the auditor gathers more information. Therefore, when the auditor initially assesses audit risk, the persuasiveness and timing of tests related to the going-concern assessment may not be accurately determinable, and it is likely that the elements that determine these tests are not discovered until later in the audit. Thus, preliminary assessments of IR and CR are not able to subsume going-concern risk. However, the presence of increased fraud risk guides the auditor in the planning of the audit procedures (SAS 99).

#### **IV. Discussion and Implications for Future Research**

We investigate the relationship between two pervasive business risks, fraud and going-concern risk, and the audit risk model. Our results indicate that in line with our expectations, fraud risk increases auditor's assessments of IR and CR, increases the persuasiveness of audit evidence gathered, and results in later gathering of that evidence. In addition, after controlling for assessed IR and CR, fraud risk no longer affects the gathering of audit evidence, providing some evidence that the current audit risk model provides an adequate approximation for audit practice related to fraud risk.

However, our results for going-concern risk do not directly follow from AICPA guidance. While going-concern risk is directly related to IR, there is no theoretical link to CR. Our results indicate that in practice the auditor's assessed going-concern risk does have a direct effect on the assessment of control risk. This provides support for Waller (1993), as well as Messier and Austin (2000) that there is a conditional dependency between assessed IR and CR. Alternatively, the going-concern risk assessment could be correlated with an omitted risk factor that is related to CR.

In addition, we find that the relationship between going-concern risk and audit effort remains strong even after controlling for IR and CR. This provides an indication that some aspect of going-concern risk is not subsumed by the current ARM. One possible explanation is that while tests of the ARM assume a static risk that can be accurately assessed at the planning stage, going-concern risk indicates that as of the planning stage, the auditor has some level of doubt about the entity's ability to continue. As the audit proceeds, this level of doubt often changes dynamically, either in one direction or the other. The opinion formulation process is a complex, sequential, and

iterative evidential exercise (Felix and Kinney 1982). Because of this, while these changes are associated primarily with companies where some doubt existed at the planning stage, IR and CR cannot subsume all changes to the audit plan as a result of changing circumstances. As further support for this notion, of the 14 companies in our sample receiving modified opinions, only eight were rated as high risk of going-concern during preliminary planning. In addition, six of the clients with moderate assessed risk of going-concern problems received modified opinion. Thus, our findings are not as much an indication that the ARM does not describe audit practice, but suggest that the ARM cannot capture the effects on audit evidence as a result of dynamic changes in risk factors.

Our combined results provide some evidence that the pervasive business risk factors are incorporated into auditor judgments about IR and CR, and that IR and CR do an adequate job of characterizing risks that remain somewhat static from the planning stages of the audit. Our findings do have significant limitations. First, our results are based on 78 audits conducted by one office of one Big 4 CPA firm, and hence are not necessarily generalizable to the population of audits. In addition, while we are able to obtain direct measures of IR, CR, fraud risk, and going-concern risk, our measures of the persuasiveness, timing and extent of evidence are proxies that contain significant measurement error. In particular, the nature of audit evidence is difficult to assess empirically. We chose to use the independence of the gathered evidence as opposed to other measures of nature, as this is a main consideration of the persuasiveness of audit evidence. However, other specifications, such as analytical procedures versus detail tests, or audit staffing decisions could also provide additional evidence and potentially

different results (see Bedard et al. 1999). Our study is also unable to control for the many factors that vary across audits that we do not measure. Experimental evidence in a controlled setting may also provide different results, although our findings support many of the general conclusions reached in experimental research on audit evidence.

Future research can further improve our understanding of the relationship of pervasive business risks, the ARM, and audit evidence. For example, we found that going-concern risk remains significantly related to the persuasiveness and timing of audit evidence after controlling for IR and CR. If our conjecture that the result is due to dynamic versus relatively static risk factors, this has implications to standard setters. Standard setters can provide guidance to auditors on how to adjust the audit plan for changing risk factors and document these changes.

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**Table 1 Descriptive Statistics**

Variable	Mean	Standard Deviation
GC	0.48	0.71
FR	0.24	0.46
PERSUASIVE	1.67	0.33
TIMING	83.50	14.35
EXTENT	74.83	112.30
IR	0.51	0.70
CR	0.43	0.65

## Variable Definitions:

GC = Planning going-concern risk assessment, scaled from 0 (low) to 2 (high)

FR = Planning fraud risk assessment, scaled from 0 (low) to 2 (high)

PERSUASIVE = Average independence of revenue cycle audit evidence: 1 (internal),  
2(mixed), 3(external)

TIMING = Percentage of revenue cycle audit testing performed at fiscal year-end

EXTENT = Total audit hours in the revenue cycle

IR = Revenue cycle inherent risk assessment

CR = Revenue cycle control risk assessment

**Table 2 Fraud Risk Assessment by Going-concern Risk Assessment**

Fraud Risk		Going-concern Risk			Total
		0	1	2	
Frequency					
Percent					
Row Pct					
Col Pct					
		0	1	2	
0	47	9	4	60	
	60.26	11.54	5.13	76.92	
	78.33	15.00	6.67		
	94.00	50.00	40.00		
1	3	8	6	17	
	3.85	10.26	7.69	21.79	
	17.65	47.06	35.29		
	6.00	44.44	60.00		
2	0	1	0	1	
	0.00	1.28	0.00	1.28	
	0.00	100.00	0.00		
	0.00	5.56	0.00		
Total	50	18	10	78	
	64.10	23.08	12.82	100.00	

Note: Fraud risk and going-concern risk were assessed during audit planning on a scale of 0-2, with 0 being low and 2 being high.

**Table 3**  
**Regression of Risk Measures on Assessed Fraud Risk and Going-Concern Risk**

$$IR_i = \beta_{0i} + \beta_1 GC_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i$$

(?)    (+)        (?)        (?)        (+)        (?)        (-)        Predicted Sign

$$IR_i = \beta_{0i} + \beta_1 FR_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i$$

(?)    (+)        (?)        (?)        (+)        (?)        (-)        Predicted Sign

$$CR_i = \beta_{0i} + \beta_1 GC_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i$$

(?)    (NS)        (-)        (?)        (-)        (?)        (?)        Predicted Sign

$$CR_i = \beta_{0i} + \beta_1 FR_i + \beta_2 REV_i + \beta_3 YA_i + \beta_4 PUB_i + \beta_5 IND_i + \beta_6 ROA_i + e_i$$

(?)    (+)        (-)        (?)        (-)        (?)        (?)        Predicted Sign

**Dependent Variables**

<b>Independent Variables</b>	<b>Inherent Risk</b>	<b>Inherent Risk</b>	<b>Control Risk</b>	<b>Control Risk</b>
<i>Intercept</i>	2.599### <0.0001	2.683### <0.0001	2.632### 0.0001	2.344### 0.0001
<i>GC</i>	0.220** 0.019	-	0.211## 0.031	-
<i>FR</i>	-	0.331** 0.016	-	0.606*** 0.0001
<i>REV</i>	-0.123### 0.0007	-0.131### 0.0002	-0.135*** 0.0001	-0.131*** 0.0001
<i>YA</i>	-0.0170 0.357	-0.020 0.285	-0.005 0.747	-0.004 0.810
<i>PUB</i>	-0.01437 0.939	0.061 0.748	0.008 0.965	0.146 0.357
<i>IND</i>	0.125 0.371	0.184 0.190	0.072 0.576	0.156 0.176
<i>ROA</i>	0.082 0.461	0.015 0.891	0.093 0.371	0.004 0.966
<i>Adjusted R-squared</i>	40.94%	41.23%	43.64%	55.08%

**Table 3 (cont)**  
**Regression of Risk Measures on Assessed Fraud Risk and Going-Concern Risk**

GC = Planning going-concern risk assessment, scaled from 0 (low) to 2 (high)

FR = Planning fraud risk assessment, scaled from 0 (low) to 2 (high)

IR = Revenue cycle inherent risk assessment

CR = Revenue cycle control risk assessment

REV = Natural log of total client revenues

YA = # of years of auditor tenure

PUB = 1 if client is publicly traded, 0 otherwise

IND = 0/1 dummy variable for the two industries in the sample

ROA = Net income/total assets for audit year

Statistical significance for parameter estimates are indicated at the 1% (\*\*\*) , 5% (\*\*) and 10% (\*) levels for one-tailed tests, and 1% (###) , 5% (##) and 10% (#) levels for two-tailed tests.

**Table 4**  
**Regression of Audit Effort on Assessed Going-Concern Risk**

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?)    (+)        (?)        (?)        (?)        (?)        (?)        Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?)    (+)        (-)        (-)        (?)        (?)        (?)        Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?)    (NS)        (+)        (-)        (?)        (?)        (?)        Predicted

Independent Variables	Dependent Variables		
	Persuasive	Timing	Extent
<i>Intercept</i>	1.996### <0.0001	128.37### <0.0001	-292.93### 0.0001
<i>GC</i>	0.168*** 0.003	4.169*** 0.007	3.409 0.862
<i>REV</i>	-0.023 0.251	-2.352*** 0.0001	23.854*** 0.001
<i>YA</i>	-0.012 0.265	-1.250*** 0.0001	-5.874** 0.045
<i>PUB</i>	0.045 0.672	-0.588 0.844	-1.810 0.960
<i>IND</i>	0.025 0.747	-0.294 0.894	30.648 0.244
<i>ROA</i>	0.031 0.906	-0.297 0.868	3.048 0.885
<i>Adjusted R-squared</i>	20.48%	65.07%	19.84

PERSUASIVE = Average independence of revenue cycle audit evidence: 1 (internal), 2(mixed),3(external)

TIMING = Percentage of revenue cycle audit testing performed at fiscal year-end

EXTENT = Total audit hours in the revenue cycle

GC = Planning going-concern risk assessment, scaled from 0 (low) to 2 (high)

REV = Natural log of total client revenues

YA = # of years of auditor tenure

PUB = 1 if client is publicly traded, 0 otherwise

IND = 0/1 dummy variable for the two industries in the sample

ROA = Net income/total assets for audit year

Statistical significance for parameter estimates are indicated at the 1% (\*\*\*) , 5% (\*\*) and 10% (\*) levels for one-tailed tests, and 1% (###) , 5% (##) and 10% (#) levels for two-tailed tests.

**Table 5**  
**Regression of Audit Effort on Assessed Fraud Risk**

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (+) (?) (?) (?) (?) (?) Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (+) (-) (-) (?) (?) (?) Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (-) (?) (?) (?) Predicted

Independent Variables	Dependent Variables		
	Persuasive	Timing	Extent
<i>Intercept</i>	2.1925### <0.0001	130.02### <0.0001	-285.746### 0.0001
<i>FR</i>	0.148** 0.048	6.221*** 0.005	0.534 0.985
<i>REV</i>	-0.033# 0.095	-2.508*** <0.0001	23.536*** 0.0002
<i>YA</i>	-0.011 0.16	-1.293*** <0.0001	-5.981** 0.042
<i>PUB</i>	0.079 0.478	0.838 0.782	-1.672 0.963
<i>IND</i>	0.060 0.462	0.812 0.713	31.11 0.238
<i>ROA</i>	-0.012 0.849	-1.574 0.375	2.378 0.909
<i>Adjusted R-squared</i>	14.67%	65.27%	19.81%

PERSUASIVE = Average independence of revenue cycle audit evidence: 1 (internal), 2(mixed),3(external)

TIMING = Percentage of revenue cycle audit testing performed at fiscal year-end

EXTENT = Total audit hours in the revenue cycle

FR = Planning fraud risk assessment, scaled from 0 (low) to 2 (high)

REV = Natural log of total client revenues

YA = # of years of auditor tenure

PUB = 1 if client is publicly traded, 0 otherwise

IND = 0/1 dummy variable for the two industries in the sample

ROA = Net income/total assets for audit year

Statistical significance for parameter estimates are indicated at the 1% (\*\*\*), 5% (\*\*) and 10% (\*) levels for one-tailed tests, and 1% (###), 5% (##) and 10% (#) levels for two-tailed tests.

**Table 6**  
**Regression of Audit Effort on Assessed Going-Concern Risk and the ARM**

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (?) (?) (?) (?) (?) Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (-) (-) (?) (?) (?) Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{GC}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (+) (-) (?) (?) (?) Predicted

Independent Variables	Dependent Variables		
	Persuasive	Timing	Extent
<i>Intercept</i>	1.593### <0.0001	110.77### <0.0001	-503.216### 0.0001
<i>GC</i>	0.136## 0.027	2.770# 0.092	-13.300 0.491
<i>MR</i>	0.041** 0.028	1.808*** 0.002	21.592*** 0.002
<i>REV</i>	-0.004 0.854	-1.541*** 0.005	33.545*** <0.0001
<i>YA</i>	-0.010 0.326	-1.177 <.0001	-5.068* 0.062
<i>PUB</i>	0.038 0.713	-0.880 0.755	-5.295 0.874
<i>IND</i>	0.005 0.945	-1.167 0.579	20.218 0.417
<i>ROA</i>	0.016 0.791	-0.917 0.587	-4.356 0.827
<i>Adjusted R-squared</i>	23.45%	68.91%	28.84%

PERSUASIVE = Average independence of revenue cycle audit evidence: 1 (internal), 2(mixed),3(external)

TIMING = Percentage of revenue cycle audit testing performed at fiscal year-end

EXTENT = Total audit hours in the revenue cycle

GC = Planning going-concern risk assessment, scaled from 0 (low) to 2 (high)

MR = Revenue cycle inherent risk x revenue cycle control risk

REV = Natural log of total client revenues

YA = # of years of auditor tenure

PUB = 1 if client is publicly traded, 0 otherwise

IND = 0/1 dummy variable for the two industries in the sample

ROA = Net income/total assets for audit year

Statistical significance for parameter estimates are indicated at the 1% (\*\*\*), 5% (\*\*) and 10% (\*) levels for one-tailed tests, and 1% (###), 5% (##) and 10% (#) levels for two-tailed tests.

**Table 7**  
**Regression of Audit Effort on Assessed Fraud Risk and the ARM**

$$\text{PERSUASIVE}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (?) (?) (?) (?) (?) Predicted

$$\text{TIMING}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (-) (-) (?) (?) (?) Predicted

$$\text{EXTENT}_i = \beta_{0i} + \beta_1 \text{FR}_i + \beta_{11} \text{MR}_i + \beta_2 \text{REV}_i + \beta_3 \text{YA}_i + \beta_4 \text{PUB}_i + \beta_5 \text{IND}_i + \beta_6 \text{ROA}_i + e_i$$

(?) (NS) (+) (+) (-) (?) (?) (?) Predicted

Independent Variables	Dependent Variables		
	Persuasive	Timing	Extent
<i>Intercept</i>	1.745### <0.0001	113.708### <0.0001	-515.235### 0.0001
<i>FR</i>	0.067 0.479	3.268 .196	-41.016 .163
<i>MR</i>	0.048** 0.028	1.743 0.007	24.533*** 0.001
<i>REV</i>	-0.011 0.609	-1.715*** 0.002	34.703*** <0.0001
<i>YA</i>	-0.013 0.208	-1.226 <0.0001	-5.040* 0.060
<i>PUB</i>	0.053 0.629	-0.118 0.968	-15.113 0.655
<i>IND</i>	0.024 0.765	-0.480 0.824	12.929 0.606
<i>ROA</i>	-0.015 0.809	-1.681 0.318	0.869 0.964
<i>Adjusted R-squared</i>	18.36%	68.38%	30.35%

PERSUASIVE = Average independence of revenue cycle audit evidence: 1 (internal), 2(mixed),3(external)

TIMING = Percentage of revenue cycle audit testing performed at fiscal year-end

EXTENT = Total audit hours in the revenue cycle

FR = Planning fraud risk assessment, scaled from 0 (low) to 2 (high)

MR = Revenue cycle inherent risk x revenue cycle control risk

REV = Natural log of total client revenues

YA = # of years of auditor tenure

PUB = 1 if client is publicly traded, 0 otherwise

IND = 0/1 dummy variable for the two industries in the sample

ROA = Net income/total assets for audit year

Statistical significance for parameter estimates are indicated at the 1% (\*\*\*) , 5% (\*\*) and 10% (\*) levels for one-tailed tests, and 1% (###), 5% (##) and 10% (#) levels for two-tailed tests.