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Managing risk in a poor economy: The association between economic activity and auditor response to risk

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We examine the association between economic climate and auditor risk acceptance as measured by the auditors' reaction to internal control weaknesses. We hypothesize and find that auditors address risk in a way that is conditioned on the economic environment. In particular, we find that during periods of weak economic activity, auditors tend to assess lower risk premiums and are less likely to resign in response to an adverse ICFR opinion. However, we find evidence that economic factors do not influence fees assessed by incoming auditors following a resignation in the presence of an ICFR weakness. Our results indicate that auditors modify their engagement risk strategies during challenging economic times and accept higher levels of risk to attract and retain clients. For the riskiest clients, however, economic factors do not appear to influence auditors' risk pricing.

1. Introduction

Subsequent to the passage of the Sarbanes-Oxley (SOX) Act (U.S. House of Representatives, 2002) and the continuing developments guided by the Public Company Accounting Oversight Board (PCAOB), the issue of engagement risk continues to be a major concern for the audit profession. Audit partners must give careful consideration to the selection and retention of clients while maintaining a balance with regard to the audit risks each client represents. Pre-SOX studies show that auditors react to engagement risk, as auditor resignations are more likely to occur when companies indicate signs of being high-risk clients (e.g., Bockus & Giger, 1998; Krishnan & Krishnan, 1997; Shu, 2000). Post-SOX studies reiterate that auditors are less likely to continue with high-risk clients (e.g., Elder, Zhang, Zhou, & Zhou, 2009; Landsman, Nelson, & Rountree, 2009). Resignations, however, result in a loss of revenues to the firm. Audit firms are for-profit enterprises and must also make client engagement and continuance decisions based on their need for income and the economic environment in which they compete. Weak economic conditions have placed financial pressures on audit firms, forcing them to consider cost-cutting options such as lay-offs and spending cuts (Ramos, 2009). The increased financial pressure

may also cause audit firms to alter how they manage their client-based revenue stream; for example, they may be less likely to resign from engagements when there is a high need for the income generated by the engagement. The purpose of this paper is to examine whether poor economic conditions change auditors' risk management policies, particularly the auditors' willingness to retain and properly price risky clients.

We examine the association between auditor resignations and the presence of a material weakness in internal control, as indicated by an adverse opinion on internal controls over financial reporting (ICFR), and what impact the recent economic recession has had on such resignations in an effort to gain insight into how economic conditions impact a firm's risk management. An increase in auditor resignations following an adverse ICFR opinion is consistent with an auditor reacting to a perceived increase in engagement risk associated with the opinion (Ashbaugh-Skaife, Collins, & Kinney, 2007). However, difficult economic times may alter the profit-risk tradeoff, making a marginal increase in risk preferable to a resignation. An alternative reaction to the perceived increase in risk associated with an adverse ICFR opinion is to charge clients a risk premium (Canada, Sutton, & Kuhn, 2009; Hogan & Wilkins, 2008; Hoitash, Hoitash, & Bedard, 2008; Pratt & Stice, 1994; Raghunandan & Rama, 2006). In a difficult economic climate, however, the fear of losing a client may result in an auditor's unwillingness or inability to fully price the risk associated with that particular client. Accordingly, we further investigate auditor fees following an adverse ICFR opinion. We also provide insight into whether economic factors influence subsequent auditors risk pricing for what we assume are the riskiest clients, those with an adverse ICFR opinion whose auditors have resigned.

☆ Data availability: Data used in this paper are derived from publicly available sources.

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We use a sample of ICFR filers from November 15, 2004, through January 5, 2012, to investigate the association between adverse ICFR opinions and auditor resignations and fees in varying economic environments. We use the Leading Index for the United States provided by the Federal Reserve Bank of Philadelphia to measure the economic environment. We find evidence that audit firms are willing to accept more risk when the economy is poor. In particular, audit firms are more likely to continue with risky clients than they would be in more prosperous times. Although they continue to charge a risk premium to high-risk clients, as represented by those with an adverse ICFR opinion, the risk premium is significantly lower when the economy is weak. Given that prior literature shows a link between increased auditor fees and likelihood of auditor dismissal (Ettredge, Li, & Scholz, 2007), the observed decrease in risk premiums may represent an effort by firms to lower the likelihood of their dismissal. However, for those clients considered the most risky (i.e., auditor resignations following adverse ICFR opinions during a recession), the economic state does not appear to impact the risk premium successor auditors charge. Thus, audit firms appear to alter their risk management policies and accept more risk when the economy is weak. However, when considering risk pricing for the riskiest of clients, the economic environment is not a factor.

Our paper extends both the accounting risk management literature and the literature that examines the influence of economic factors on the audit. Prior risk management literature has examined how audit firms use resignations and fees to manage engagement risk (e.g., Bockus & Gigler, 1998; Johnstone & Bedard, 2004; Krishnan & Krishnan, 1997; Lee, Mande, & Ortman, 2004; Munsif, Raghunandan, Rama, & Singhvi, 2011; Pratt & Stice, 1994; Shu, 2000). We extend the literature by examining how the use of these risk management tools is altered by the economic climate. Our paper also contributes to the limited research examining the impact of economic factors on the audit. Prior literature investigates changes in audit fees and audit quality during various economic climates (e.g., Ettredge, Fuerherm, & Li, 2014; Krishnan & Zhang, 2014; Leone, Rice, Weber, & Willenborg, 2013). Most similar to our study, Schroeder and Hogan (2013) examine changes in client portfolios across varying economic climates and regulatory changes (i.e., Audit Standard 2 versus Audit Standard 5). While Schroeder and Hogan (2013) examine changes in financial, audit, and auditor risk of client portfolios as a whole, we extend their research by focusing on a subset of risky clients, those with adverse ICFR opinions, and how audit firms manage risk related to those particular clients over the various economic climates.

Our paper provides important insights to both practitioners and policy makers regarding risk management practices. Quality control standards at both the PCAOB and American Institute of Certified Public Accountants (AICPA) require firms to have policies and procedures in place to re-evaluate whether to continue client relationships each year, including examining various risk factors associated with client continuance (AICPA, 2011; PCAOB, 2003). Our results indicate that the economic environment impacts fee premium and retention decisions related to risky clients. Thus, our results demonstrate that practitioners are flexible with risk thresholds, indicating that firms' policies and procedures on quality control allow for variability in fee and retention decisions. Regulators and practitioners alike should keep in mind this need for flexibility when creating new policies and regulations in this area. Further, we provide insight into mechanisms other than cost-cutting that auditors use to manage their budget in difficult times. In particular, we provide evidence that auditors change how they manage their client base and risk profile, possibly in an effort to retain revenues.

Lastly, coupled with the findings of Ettredge et al. (2014), our findings provide insight regarding audit quality for high risk clients during difficult economic times. Ettredge et al. (2014) find that fee pressure during the economic downturn is associated with reduced audit quality. While we do not investigate the origins of the observed reduced fee premiums assessed to high risk clients during poor economic times (i.e., client pressure or auditor motivated), a reduction in fees as a result

of client pressure may be associated with reduced audit quality for riskier clients, the exact clients in which higher quality audits are critical.

The remainder of this paper is organized into four sections. Section 2 discusses the background literature and develops the hypotheses. Section 3 describes the methodology and sample selection procedures used to investigate our research question. Results are presented in Section 4. Section 5 summarizes and concludes the paper.

2. Background and hypotheses

Auditor departures, whether initiated by the client or the auditor, occur for a variety of reasons. Extant research has shown client characteristics, such as size, leverage, management changes, and audit committee composition can result in an auditor change (Carcello & Neal, 2003; DeFond, 1992; Ettredge et al., 2007; Johnson & Lys, 1990; Krishnan, 1994). Audit firm departures can also be motivated by disagreements over audit fees or a mismatch between services requested and those able to be performed by audit firms (Ettredge et al., 2007; Turner, Williams, & Weirich, 2005). Still other factors, such as the presence of internal control deficiencies (ICD), are associated with auditor changes (Ashbaugh-Skaife et al., 2007; Elder et al., 2009; Ettredge et al., 2007; Krishnan & Visvanathan, 2007; Thevenot & Hall, 2011).

2.1. Internal controls and auditor changes

Several recent research studies reveal a link between ICDs and auditor changes. Krishnan and Visvanathan (2007) directly test whether auditor changes are higher for firms that report ICDs versus those that do not report deficiencies. Findings support their hypotheses that firms reporting ICDs have more auditor changes than those without deficiencies. Thevenot and Hall (2011) find that entity level ICDs in particular, which are arguably more severe than account specific deficiencies, impact auditor changes. Ashbaugh-Skaife et al. (2007) examine auditor changes further and find that both auditor resignations and auditor dismissals are associated with higher frequencies of ICDs. Ettredge, Heintz, Li, and Scholz (2011) further Ashbaugh-Skaife et al. (2007) and find that firms receiving an adverse ICFR opinion are positively associated with auditor dismissals in particular. Auditor dismissals following the disclosure of ICDs and/or adverse ICFR opinions may occur for many reasons: to find a more compliant auditor, to punish the auditor for non-performance when the ICD is found by management versus the auditor, or, relatedly, to signal users of management efforts to improve overall financial reporting quality (Ashbaugh-Skaife et al., 2007; Ettredge et al., 2011). In contrast to Ettredge et al. (2011), Elder et al. (2009) examine the relationship between auditor resignations and ICDs. Using data from the year immediately following SOX implementation, they find that auditor resignations are more likely for firms with ICDs than for those without. Elder et al. (2009) conclude that the resignations are an effort made by the auditor to control litigation risk.

2.2. Auditor resignations and litigation risk

Auditor resignations motivated by an increase in litigation risk is a common finding among academic research (Bockus & Gigler, 1998; Johnstone & Bedard, 2004; Krishnan & Krishnan, 1997; Lee et al., 2004; Shu, 2000). Auditor resignations are more likely to occur when a company has high financial distress, high variability in stock returns, low auditor independence, and the receipt of a modified opinion, particularly a going concern opinion (Krishnan & Krishnan, 1997; Lee et al., 2004). Auditor resignations are also more likely following a restatement, especially one that is attributable to fraud or reverses a previously reported income, when there is a client disagreement, or when there are reportable events within the company (Huang & Scholz, 2012; Krishnan & Krishnan, 1997). All of these factors most likely increase the litigation risk for the auditor.

Companies reporting ICDs often have many of the same characteristics that are associated with an increase in litigation risk for the auditor. Doyle, Ge, and McVay (2007) find firms disclosing material weaknesses are smaller, younger, financially weaker, more complex, growing rapidly, or are undergoing restructuring. Similarly, Ashbaugh-Skaife et al. (2007) find companies with ICDs have more complex operations, recent organizational changes, and more accounting risk than firms that do not have ICDs. Ashbaugh-Skaife et al. (2007) also note there are more auditor resignations for companies reporting ICDs than those not reporting ICDs. Similarly, other research finds that firms are more likely to dismiss clients when their internal control effectiveness is weak and that, as the number of weaknesses increase, the likelihood that the auditor will resign also increases (Johnstone & Bedard, 2004; Thevenot & Hall, 2011). These findings are consistent with Elder et al.'s (2009) conclusion that auditors resign from clients reporting ICDs in an attempt to manage litigation risk.

2.3. Impact of economy on auditor resignations

In the immediate years following the Enron debacle and the implosion of Arthur Anderson, audit firms became more selective regarding their client base and began to resign from riskier clients (Hindo, 2003; Landsman et al., 2009). These resignations from risky clients were not, however, due entirely to audit firms becoming more risk averse. At that time, audit firms were faced with substantially more work. The demise of Arthur Anderson meant that many large companies were in the market for a new auditor. Furthermore, the requirement that public companies obtain an internal control audit, outlined in Section 404 of SOX, substantially increased the workload of larger auditing firms (Landsman et al., 2009). This prospect of new clients, coupled with the increased workload associated with public clients, allowed audit firms the opportunity to resign from riskier clients without an unnecessary financial burden.⁴

Unfortunately, poor economic conditions may not afford accounting firms the opportunity to resign from riskier clients as frequently as they might during more prosperous times. Accounting firms have lost audit clients due to bankruptcy, and some clients have chosen to forego an annual audit. Further, firms have lost consulting engagements due to clients' own cost-cutting strategies. Accounting firms themselves have been forced to consider cost-cutting options such as lay-offs and spending cuts (Ramos, 2009). Therefore, we may see that auditor resignations of clients with increased risk factors, such as those receiving an adverse opinion on ICFR, decreases during an economic downturn.

In contrast, an economic downturn likely impacts the operations and financial reporting of many audit firms' clients in a negative way. Such impacts can significantly increase previously identified audit risks or cause new risks to arise (PCAOB, 2008). The concern over increased audit risk during the most recent economic downturn was large enough to warrant attention from standard setters at both the PCAOB and the International Auditing and Assurance Standards Board (IAASB), as both organizations issued special practice alerts related to the increase in risk (IAASB, 2009; PCAOB, 2008). This response to the increase in risk by standard setters, coupled with the increase in overall risk factors among clients, suggests we may observe an increase in resignations of riskier clients during an economic downturn. Despite this possibility, retaining clients during difficult economic times is necessary for a firm's long-term viability. We assert that long-term viability concerns during a weak economy will cause firms to retain clients that would otherwise be dropped, with the expectation that internal control weaknesses can be remedied. As all audit firms seek to retain a client base during

difficult economic times, a dropped client (and the associated revenue) is more difficult to replace during a downturn. Therefore we state our first hypothesis as follows:

H1. Auditors are less likely to resign following an adverse ICFR opinion when the economy is weak.

2.4. Impact of economy on auditor fees

An alternative way audit firms can mitigate risk is to increase the audit fees associated with risky clients. Generally, the presence of ICDs is associated with an increase in audit fees (Canada et al., 2009; Hogan & Wilkins, 2008; Hoitash et al., 2008; Raghunandan & Rama, 2006). Such fee premiums continue to exist in the years following an adverse ICFR opinion, regardless of whether the deficiency is remediated, indicating that the fee premium is not related simply to workload, but instead to auditors continuing to associate higher risk with these clients (Munsif et al., 2011).

As is the case for all business entities attempting to endure economic hardship, audit firms are forced to consider their own need for income when considering risky clients and audit fees. During difficult economic times, firms are faced with significantly more pressure from clients to decrease audit fees (Ettredge et al., 2014). Further, prior research finds that increased audit fees can lead to auditor dismissals (Ettredge et al., 2007). Audit firms may not be in an economic position to afford the loss of revenues associated with dismissals and may therefore choose to limit or even eliminate any fee increase assessed to clients with ICDs in an effort to retain the current and future income from those clients.

We contend that audit firms will continue to charge a risk premium to clients with adverse ICFR opinions, as prior literature suggests. However, we believe the magnitude of the premium will be lower when the economy is weak, in the interest of retaining clients. Therefore, we hypothesize the following:

H2. Risk premiums assessed on adverse ICFR opinions are lower when the economy is weak.

2.5. Subsequent auditor fees

Regardless of the change in the relationship between adverse ICFR opinions and auditor resignations during times of economic difficulty, accounting firms are still likely to resign from those clients with adverse ICFR opinions that represent the highest level of risk. It is therefore likely that a firm taking on such a client in a recessionary period is in the most need of building and retaining a client base. Because these clients are arguably the most risky and the recent economic downturn is particularly acute, we are interested in assessing the degree to which the influence of economic pressures may or may not exceed the pressure to price risk appropriately. In the case where risk pricing is dominated by economic influences, the risk premium assessed on internal control weaknesses during a poor economy will be comparatively lower, so much so that the economic influences in a post-resignation situation may, in fact, dominate. Alternatively, when considering the level of risk represented by those clients with adverse ICFR opinions whose auditors resigned, the need for appropriate risk pricing may dominate economic influences. Therefore we pose the following research question:

RQ1. Will the premium assessed by incoming audit firms following a resignation after an adverse ICFR opinion be impacted by the economy?

3. Research methodology

The models used to test our hypotheses are based on prior research, including models used by Ettredge et al. (2011) to test auditor dismissals,

⁴ As Landsman et al. (2009) point out, an alternative explanation for the observed changes in auditor change behavior immediately following the demise of Arthur Anderson and the implementation of SOX could be due to the availability of former Anderson clients that were better aligned with the Big 4, thus allowing them to resign from less well aligned clients without the negative financial impact.

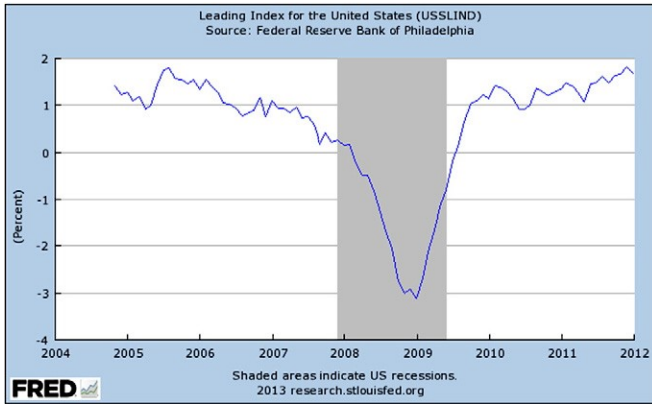


Fig. 1. Leading index for the United States from November 2004-January 2012.

Krishnan and Krishnan (1997) to test litigation risk factor differences between resignations and dismissals, Lee et al. (2004) to compare board of director characteristic differences of firms with resignations versus dismissals,⁵ and Huang and Scholz (2012) to test the association between restatements and resignations. Appendix A lists and defines client and auditor engagement factors identified by prior studies as variables that affect auditor changes and audit fees. We include these factors as control variables in our models.

We use the following logistic regression model to test H1 that auditors are less likely to resign following an adverse ICFR opinion when the economy is weak:

$$RES \approx \beta_0 + \beta_1 ICWEAK + \beta_2 ECON + \beta_3 ECON * ICWEAK + \beta_4 AS5 + \beta_5 CSIZE + \beta_6 BKMK + \beta_7 LEV + \beta_8 ROA + \beta_9 LOSS + \beta_{10} SPEC + \beta_{11} CEO + \beta_{12} GOCN + \beta_{13} ABFEE + \beta_{14} BIG4 + \beta_{15} RESTATE + \beta_{16} DISAGREE + \beta_{17} REPORTABLE + \beta_{18} AINDEP + \beta_{19} INDEP + \beta_{20} ABRETAN + \epsilon$$

The dependent variable, *RES*, is coded 1 if there is an auditor resignation during the fiscal year and is 0 otherwise; indicating that there was either no change in auditor or that the auditor change was the result of a dismissal. The independent variable, *ICWEAK*, is coded 1 if the incumbent auditor issues an adverse ICFR report and 0 otherwise. Our tests of the association between economic activity and auditor behavior require a relatively responsive, but non-volatile measure of near-term, forward-looking economic activity. The Leading Index for the United States provided by the Federal Reserve Bank of Philadelphia utilizes multiple economic inputs (e.g., housing permits, unemployment claims, manufacturing, and interest rates) to provide one composite index to capture economic trends. The combination of these metrics into a single index has a smoothing effect that avoids much of the volatility reflected in individual components, therefore providing us with a reliable, all-encompassing measure of the economic environment.⁶ A higher index value reflects a healthier economic outlook. We use the Leading Index for the United States provided by the Federal Reserve Bank of Philadelphia as a measure of broad economic conditions and label this metric *ECON*. Fig. 1 presents a graph of the Leading Index over our sample period. Support for H1 is found when the coefficient on the interaction term *ECON*ICWEAK* is significant and positive. The remaining variables,

⁵ Prior research assesses the independence of corporate leadership in two ways: (1) independence of the board of directors, and (2) independence of the audit committee. We include audit committee independence in our specification as it most appropriately relates to our characteristic of interest: auditor resignations.

⁶ The Philadelphia Reserve Bank makes the Leading Index for the United States freely available via the FRED database provided by the St. Louis Federal Reserve Bank.

Table 1
Sample details.

	Records	Registrants
ICFR opinions from November 15, 2004 to January 5, 2012	30,403	5894
Missing ICFR or financial data	(2121)	(348)
Sample in study	28,282	5546

defined in Appendix A, are control variables shown to influence auditor changes in prior research. The model is applied to the entire population of ICFR reports, with a total *n* of 28,282.

To test H2, that risk premiums following adverse ICFR opinions decrease when the economy is weak, and to provide insight into our research question (RQ1) regarding the influence of the economy on the risk premiums assessed by incoming auditors following resignations post adverse ICFR opinions, we use the following specification:

$$\ln(FEE) \approx \beta_0 + \beta_1 ICWEAK + \beta_2 NUMWK + \beta_3 ECON + \beta_4 ECON * ICWEAK + \beta_5 RES + \beta_6 ECON * RES + \beta_7 RES * ICWEAK + \beta_8 ECON * ICWEAK * RES + \beta_9 AS5 + \beta_{10} ASSET + \beta_{11} SALE=ASSET + \beta_{12} LEV + \beta_{13} ROA + \beta_{14} LOSS + \beta_{15} DELAY + \beta_{16} AREC + \beta_{17} INV + \beta_{18} SPEC + \beta_{19} RESTATE + \beta_{20} LSEG + \beta_{21} RESTRUCT + \beta_{22} GOCN + \beta_{23} BKMK + \beta_{24} BIG4 + \epsilon$$

Consistent with Ettredge et al. (2011), we define the dependent variable, $\ln(FEE)$, as the natural log of audit fees for the year following the adverse ICFR opinion. The variables *ICWEAK*, *ECON*, and *ECON*ICWEAK* are consistent with those used in Eq. (1). Support for H2 is found when the coefficient on the interaction term *ECON*ICWEAK* is significant and positive. We also include an indicator for auditor resigna-

tions (*RES*) and additional interactions, including a three-way interaction of *ECON*ICWEAK*RES*. We examine the coefficient on the three-way interaction to provide insight into our research question. A significant coefficient on the three-way interaction term indicates that the economy is a factor in the risk premiums assessed by incoming auditors following resignations in the presence of an adverse ICFR opinion. The remaining model variables, previously defined in Appendix A, are control variables for other company characteristics identified by prior research as influencing audit fees. The model is applied to the entire population of ICFR reports, with a total *n* of 28,282.

4. Results and analysis

4.1. Sample and descriptive statistics

Table 1 presents details of our sample obtained from Audit Analytics. We extracted 30,403 records, representing 5894 distinct registrants with an ICFR report from November 15, 2004 to January 5, 2012. From this, we lost 2121 records representing 348 distinct registrants that were missing either ICFR data or information from Compustat needed to calculate control variables. Our final sample results in 28,282 records with ICFR reports representing 5546 distinct registrants. We also obtained a file from Audit Analytics containing all auditor changes. This file was merged with our final sample of ICFR reports, resulting in 1443 records of companies that changed auditors within one calendar year of the issuance of an ICFR report, of which 295 were indicated as resignations. We utilize our entire sample of 28,282 ICFR opinions to test H1, H2, and our research question. Table 2 presents descriptive statistics for our sample variables for the full sample, the resignation sample, and the non-resignation sample.⁷

⁷ All scale variables are winsorized at the 1% level to address outliers.

Table 2
Sample descriptive statistics.

	Full Sample (n=28,282)				Resignation (n=295)				Noresignation (n=27,987)			
	Min	Mean	Max	SD	Min	Mean	Max	SD	Min	Mean	Max	SD
ABFEE	(2.7506)	0.0019	1.7726	0.7072	(2.7506)	(0.0716)	1.7736	0.8214	(2.7506)	0.0027	1.7726	0.7059
ABRETAN	0.0000	0.0010	0.1657	0.0024	0.0000	0.0011	0.0272	0.0028	0.0000	0.0010	0.1657	0.0024
AINDEP	0.0000	0.9752	1.0000	0.1556	0.0000	0.9356	1.0000	0.2459	0.0000	0.9756	1.0000	0.1543
AREC ¹	(4.6502)	4.6329	12.5633	2.7788	(4.6502)	3.4562	10.0272	2.9051	(4.6502)	4.6453	12.5633	2.7748
AS5	0.0000	0.6246	1.0000	0.4842	0.0000	0.4644	1.0000	0.4996	0.0000	0.6263	1.0000	0.4838
ASSET ¹	1.9626	7.0322	13.4392	1.9752	1.9626	5.7133	12.1306	1.7827	1.9626	7.0461	13.4392	1.9724
BIG4	0.0000	0.8060	1.0000	0.3954	0.0000	0.4644	1.0000	0.4996	0.0000	0.8096	1.0000	0.3926
BKMK	(6.1479)	0.3717	7.2074	0.9646	(6.1479)	0.5281	7.2074	1.0252	(6.1479)	0.3701	7.2074	0.9638
CEO	0.0000	0.0343	1.0000	0.1819	0.0000	0.0101	1.0000	0.1005	0.0000	0.0345	1.0000	0.1826
CSIZE ¹	0.0000	19.7427	25.4394	3.4302	0.0000	17.8328	25.2360	3.8265	0.0000	19.7629	25.4394	3.4202
DELAY	28.0000	70.2383	325.0000	31.7445	28.0000	94.9966	325.0000	59.1831	28.0000	69.9774	325.0000	31.2251
DISAGREE	0.0000	0.0002	1.0000	0.0133	0.0000	0.0034	1.0000	0.0582	0.0000	0.0001	1.0000	0.0120
ECON	(2.9672)	(1.0260)	0.2900	1.2964	(2.9672)	(0.8265)	0.2900	1.3103	(2.9672)	(1.0282)	0.2900	1.2959
GOCON	0.0000	0.0234	1.0000	0.1513	0.0000	0.0983	1.0000	0.2982	0.0000	0.0227	1.0000	0.1488
ICWEAK	0.0000	0.0843	1.0000	0.2778	0.0000	0.4610	1.0000	0.4993	0.0000	0.0803	1.0000	0.2718
INDEP	0.0000	0.9375	0.9999	0.2209	0.0000	0.8417	1.0000	0.3155	0.0000	0.9385	1.0000	0.2195
INV ¹	(4.6502)	1.6314	9.9200	4.3248	(4.6502)	0.4830	8.5071	3.7420	(4.6502)	1.6435	9.9200	4.3290
LEV	0.0284	0.5661	1.7849	0.2908	0.0284	0.5741	1.7849	0.3673	0.0284	0.5660	1.7849	0.2899
LOSS	0.0000	0.2755	1.0000	0.4468	0.0000	0.4542	1.0000	0.4987	0.0000	0.2737	1.0000	0.4458
LSEG	1.0000	1.9638	36.0000	3.9553	1.0000	1.7288	30.0000	3.7016	1.0000	1.9663	36.0000	3.9579
NUMWK	0.0000	0.1999	20.0000	0.9647	0.0000	1.4949	11.0000	2.3033	0.0000	0.1863	20.0000	0.9311
REPORTABLE	0.0000	0.0175	1.0000	0.1311	0.0000	0.4610	1.0000	0.4993	0.0000	0.0128	1.0000	0.1125
RESTATE	0.0000	0.1109	1.0000	0.3140	0.0000	0.1559	1.0000	0.3634	0.0000	0.1104	1.0000	0.3134
RESTRUCT	0.0000	0.2683	1.0000	0.4431	0.0000	0.1898	1.0000	0.3928	0.0000	0.2692	1.0000	0.4435
ROA	(1.3860)	(0.0078)	0.5245	0.2007	(1.3860)	(0.0711)	0.5245	0.3070	(1.3860)	(0.0071)	0.5245	0.1991
SALE/ASSET	0.0000	0.7877	4.3421	0.7411	0.0000	0.6914	4.3421	0.7323	0.0000	0.7887	4.3421	0.7411
SPEC	0.0000	0.1324	1.0000	0.3389	0.0000	0.2644	1.0000	0.4418	0.0000	0.1310	1.0000	0.3374

¹ These variables are computed as natural logs.

In Table 3 we present Pearson correlations for all variables. An analysis of the correlations provided in Table 3 reveal significant associations between resignations (*RES*) and most variables included in our study. Most importantly for our study, *RES* is positively associated with *ECON* and *ICWEAK*. The reported correlations are consistent with prior work. A summary of reported internal control weaknesses (*ICWEAK*) and the number of weaknesses reported (*NUMWK*) per sample year is presented in Table 4.⁸

In an untabulated preliminary analysis, we validate our data set in terms of prior literature. Our validation consists of replicating the key findings in two empirical studies, Ashbaugh-Skaife et al. (2007) and Elder et al. (2009) upon which our study relies. In both cases we employ the same model and methodological approach as the published works. Consistent with Ashbaugh-Skaife et al. (2007), we find a positive association between changes in auditor (resignation or dismissal) and an adverse ICFR opinion for our sample firms. Consistent with Elder et al. (2009), we find that, in our sample, adverse ICFR opinions increase the likelihood of resignations. We demonstrate comparability and consistency with prior work, and therefore proceed with our analyses.

4.2. Test of hypothesis 1

To test H1, we examine the impact of the economy on the frequency of resignations following an adverse ICFR opinion. Table 5 presents the results from the logistical regression used to test H1. We report results

for a two-way, cluster-robust standard error estimation of Eq. (1).⁹ Our model is significant ($p < 0.001$) with a Chi-Square of 1007.63. We

⁸ Our dataset encompasses registrants with an ICFR report from November 15, 2004 to January 5, 2012. The vast majority of audit reports for the 2011 year arrived subsequent to January 5, 2012. As a result, the number of observations for the 2011 sample year ($n = 545$) is smaller than for the other years.

⁹ The two-way, cluster-robust standard error estimation procedure is presented by Gow, Ormazabal, and Taylor (2010). This estimation procedure controls for heteroskedasticity in variance simultaneously for two vectors. We control for auditor and reporting year.

find that adverse ICFR reports, as measured by the *ICWEAK* variable, are a significant predictor for auditor resignations ($p = 0.014$). The economic environment variable (*ECON*)¹⁰ is significant and negative ($p < 0.001$), indicating that, in general, the more favorable the economy, the less likely the auditor is to resign from an engagement.¹¹ The interaction variable between adverse ICFR reports and economic outlook (*ECON*ICWEAK*) is significant ($p = 0.003$) and positive. The positive coefficient on the interaction term indicates that an audit firm has an incremental increase (decrease) in the tendency to resign in response to an adverse ICFR report when economic outlook is more favorable (unfavorable). That is, an auditor is less likely to resign from an audit engagement where an adverse ICFR opinion is issued when the economy is weak as compared to when it is strong. Thus, we find support for our first hypothesis.

The significant negative coefficient on the *AS5* control variable ($p = 0.053$) indicates, not surprisingly, that auditors are less likely to resign when performing the ICFR audit under the more simplified Audit Standard 5 guidance than when performing the audit under the guidance of the now superseded Audit Standard 2. Consistent with prior research (i.e., Carcello & Neal, 2003; Johnson & Lys, 1990), we also find that larger companies are less likely to experience an auditor resignation (*CSIZE*, $p = 0.059$).¹² Companies that utilize Big 4 auditors (*BIG4*, $p = 0.001$) are less likely to experience an auditor resignation, consistent with Johnson and Lys (1990) results. Auditors are more likely to resign

¹⁰ In untabulated results we replicate our entire analysis using an alternative proxy for economic activity. We use industrial production, manufacturing inventory and gross domestic product in a factor analysis to create our own economic index metric. The results obtained with the alternative economic metric are qualitatively identical to those reported.

¹¹ We do not hypothesize or expect economic factors to impact overall resignations, and therefore leave future research to further explore the observed negative relationship between economy and resignations.

¹² In untabulated results we also estimate our model using the log of total assets as a size control. The results are qualitatively identical yielding the same conclusion we formally present in Table 5.

Table 3
Pearson correlations.

	ABFEE	ABRETAN	AINDEP	AREC	ASSET	AS5	BIG4	BKMK	CEO	DELAY	DISAGREE
ABFEE	1.0000										
ABRETAN	(0.0149)*	1.0000									
AINDEP	(0.0187)**	0.1001***	1.0000								
AREC	0.0202***	(0.1060)***	0.0391***	1.0000							
ASSET	(0.0025)	(0.0980)***	0.0552***	0.8010***	1.0000						
AS5	(0.0093)	0.3196***	(0.1227)***	0.0103*	0.0459***	1.0000					
BIG4	(0.0030)	(0.0304)***	0.0510***	0.1605***	0.3169***	(0.0343)***	1.0000				
BKMK	(0.1186)***	0.0833***	(0.0075)	0.0449***	0.0372***	0.0749***	(0.0779)***	1.0000			
CEO	0.0193**	(0.0052)	0.0101*	0.0664***	0.0851***	0.0007	0.0629***	(0.0159)**	1.0000		
DELAY	0.0091	0.0250***	(0.0177)**	(0.0716)***	(0.0837)***	(0.0174)**	(0.0402)***	0.0305***	(0.0354)***	1.0000	
DISAGREE	0.0003	(0.0055)	0.0021	(0.0083)	(0.0115)*	(0.0172)**	(0.0069)	(0.0010)	(0.0025)	0.0254***	1.0000
ECON	0.0108*	(0.2687)***	0.2310***	(0.0106)*	(0.0434)***	(0.6232)***	0.0219***	(0.0667)***	(0.0019)	0.0182**	0.0126*
GOCN	(0.0024)	0.0711***	(0.0864)***	(0.1575)***	(0.1467)***	0.0381***	(0.0670)***	(0.0444)***	(0.0112)*	0.0928***	(0.0021)
ICWEAK	0.0004	(0.0098)	0.0051	(0.0808)***	(0.1144)***	(0.1349)***	(0.0871)***	(0.0262)***	0.0030	0.3073***	0.0438***
INDEP	0.0012	0.0847***	(0.0161)**	0.0385***	0.0508***	(0.0399)***	0.1599***	0.0149*	0.0202***	(0.0805)***	(0.0004)
INV	0.0946***	(0.0323)***	0.0283***	0.3840***	0.3862***	0.0476***	0.1596***	0.0163**	0.0620***	(0.0294)***	0.0004
LEV	(0.0621)***	0.0329***	(0.0266)***	0.3781***	0.3513***	0.0070	(0.0116)*	(0.1469)***	0.0117*	(0.0114)*	0.0033
LOSS	0.0008	0.2652***	(0.0857)***	(0.3138)***	(0.2959)***	0.1050***	(0.0805)***	(0.0136)*	(0.0100)*	0.1144***	0.0037
LSEG	(0.0009)	0.0215***	0.0043	0.1399***	0.1915***	0.1058***	0.0952***	(0.0174)**	0.0270***	(0.0097)	(0.0035)
NUMWK	0.0009	(0.0249)***	0.0055	(0.0538)***	(0.0788)***	(0.1055)***	(0.0606)***	(0.0281)***	0.0005	0.3849***	0.0221***
REPORTABLE	0.0244***	0.0071	0.0074	(0.0353)***	(0.0611)***	(0.0564)***	(0.0191)**	0.0045	0.0015	0.1198***	0.0388***
RES	(0.0107)*	0.0038	(0.0261)***	(0.0435)***	(0.0686)***	(0.0340)***	(0.0887)***	0.0166**	(0.0136)*	0.0801***	0.0248***
RESTATE	(0.0005)	(0.0064)	0.0202***	(0.0134)*	(0.0327)***	(0.1041)***	(0.0095)	(0.0053)	0.0009	0.0014	0.0122*
RESTRUCT	0.0004	0.0198***	(0.0090)	0.1215***	0.1151***	0.0464***	0.1555***	(0.1233)***	0.0768***	(0.0386)***	(0.0021)
ROA	(0.0100)*	(0.0394)***	0.0194**	0.0319**	0.0253***	(0.0021)	0.0224***	0.0507***	0.0002	(0.0122)*	(0.0016)
SALE/ASSET	0.1134***	(0.0171)**	(0.0091)	(0.0572)***	(0.1653)***	(0.0073)	0.1097***	(0.0913)***	0.0475***	(0.0441)***	0.0074
SPEC	0.0005	(0.0087)	(0.0208)***	0.1033***	0.0029	(0.0115)*	(0.4114)***	0.0948***	(0.0346)***	0.0114*	0.0105*
	ECON	GOCN	ICWEAK	INDEP	INV	LEV	LOSS	LSEG	NUMWK	REPORTABLE	
ECON	1.0000										
GOCN	(0.0287)***	1.0000									
ICWEAK	0.1056***	0.1019***	1.0000								
INDEP	(0.0009)	(0.0862)***	(0.0611)***	1.0000							
INV	(0.0294)***	(0.0509)***	(0.0205)***	0.0205***	1.0000						
LEV	(0.0171)**	0.1537***	0.0125*	(0.0373)***	0.0559***	1.0000					
LOSS	(0.0818)***	0.2214***	0.1288***	(0.0658)***	(0.1330)***	0.0527***	1.0000				
LSEG	(0.0795)***	(0.0171)**	(0.0243)***	0.0132*	0.1027***	0.0384***	(0.0292)***	1.0000			
NUMWK	0.0843***	0.1135***	0.6830***	(0.0846)***	(0.0077)	0.0318***	0.1164***	(0.0093)	1.0000		
REPORTABLE	0.0470***	0.0488***	0.2662***	(0.0185)**	(0.0099)*	(0.0014)	0.0649***	(0.0180)**	0.2258***	1.0000	
RES	0.0158**	0.0508***	0.1392***	(0.0406)***	(0.0273)***	0.0028	0.0411***	(0.0069)	0.1378***	0.3472***	
RESTATE	0.0779***	(0.0086)	0.0736***	0.0131*	(0.0257)***	0.0094	0.0007	(0.0238)***	0.0533***	0.0293***	
RESTRUCT	(0.0187)**	0.0148*	0.0251***	0.0206***	0.1855***	0.0468***	0.1145***	0.0746***	0.0184**	0.0062	
ROA	0.0063	(0.0687)***	(0.0221)***	0.0175**	0.0119*	(0.0486)***	(0.0973)***	0.0051	(0.0242)***	(0.0080)	
SALE/ASSET	(0.0023)	(0.0291)***	0.0141*	0.0299***	0.2670***	(0.1112)***	(0.0983)***	0.0210***	0.0185**	0.0085	
SPEC	0.0104*	0.0057	(0.0992)***	(0.1258)***	(0.0992)***	0.1538***	0.0028	(0.0505)***	0.0121*	0.0020	
	RES	RESTATE	RESTRUCT	ROA	SALE/ASSET						
RES	1.0000										
RESTATE	0.0147*	1.0000									
RESTRUCT	(0.0182)**	(0.0050)	1.0000								
ROA	(0.0064)	(0.0061)	(0.0178)**	1.0000							
SALE/AT	(0.0133)*	0.0049	0.1415***	0.0787***	1.0000						
SPEC	0.0400***	(0.0001)	(0.1163)***	(0.0080)	(0.2034)***						

* p b 0.100.

** p b 0.010.

*** p b 0.001.

when there is a reportable condition (*REPORTABLE*, p b 0.001), less likely to resign when the audit committee is independent (*AINDEP*, p b 0.001), and less likely to resign when there is an abnormal fee (*ABFEE*, $p = 0.027$) (Ettredge et al., 2007, 2011; Krishnan & Krishnan, 1997; Lee et al., 2004). Consistent with Krishnan and Krishnan (1997), increased auditor independence (*INDEP*, $p = 0.059$) is negatively associated with auditor resignations.¹³

¹³ We also test for the presence of an industry specific fixed-effect using a two-digit SIC classification. A total of 2879 observations represented by 29 two-digit SIC groups are

dropped due to a lack of variability in the outcome variable (RES). The results based on the remaining 25,389 observations represented by 41 two-digit SIC groups yield conclusions identical to those formally presented.

4.3. Test of hypothesis 2

To test *H2*, we examine the effect of economic outlook on subsequent audit fees when an adverse ICFR report is issued. We predict that risk premiums on audit fees following adverse ICFR opinions will decrease when the economy is weak. Table 6 presents the results for *H2* which is also estimated with a two-way, cluster-robust standard error estimation approach.¹⁴ Our model is significant (p b 0.001) with an F-statistic of 2315.56. The regression results presented in Table 6 show a positive (p b 0.001) coefficient on *ICWEAK*, which suggests

¹⁴ The SAS macro is available at <http://acct.wharton.upenn.edu/~dtayl/SAS2waycluster.sas>.

Table 4
Summary of frequency and number of internal control weaknesses.

Year	Obs	Observations with internal control weaknesses (ICWEAK=1)	Percent of observations with internal control weaknesses (ICWEAK=1)	Total number of internal control weaknesses (NUMWK)	Average number of internal control weaknesses for firms where ICWEAK = 1
2004	2651	472	0.18	1233	2.61
2005	3843	519	0.14	1301	2.51
2006	4122	417	0.10	983	2.36
2007	4274	355	0.08	792	2.23
2008	4497	257	0.06	537	2.09
2009	4243	185	0.04	444	2.40
2010	4107	158	0.04	320	2.02
2011	545 ¹	21	0.04	45	2.14
Total	28,282	2384	0.08	5655	2.37

¹ Our dataset encompasses registrants with an ICFR report from November 15, 2004 to January 5, 2012. The smaller number of observations in 2011 reflects that the vast majority of audit reports for the 2011 year arrived subsequent to January 5, 2012.

that fees assessed by auditors are higher when internal control weaknesses are present. The non-significant coefficient ($p = 0.136$) on *ECON* suggests that, in general, assessed fees are not adjusted in reference to economic outlook. The positive and significant interaction term (*ECON*ICWEAK*, $p = 0.002$) between adverse ICFR reports and economic outlook indicates that the penalty (i.e., higher fees) is higher for internal control weaknesses when the economy is stronger, therefore indicating that the fee penalty is lower when the economic outlook is less favorable. While the auditor continues to charge a risk premium when an adverse ICFR opinion is issued, they charge a lower risk premium during times of economic difficulty. Thus, we find support for our second hypothesis.

Consistent with prior literature, we find that larger companies (*ASSET*, $p < 0.001$; *SALE/ASSET*, $p = 0.072$; *AREC*, $p = 0.003$; *INV*,

$p < 0.001$; *LSEG*, $p < 0.001$) have higher audit fees (Carcello & Neal, 2003; Ettredge et al., 2011; Johnson & Lys, 1990). We also find that more leverage and higher return on assets (*LEV*, $p < 0.000$; *ROA*, $p < 0.001$) are associated with lower audit fees, while losses (*LOSS*, $p < 0.001$) are associated with higher fees (Johnstone & Bedard, 2004; Krishnan, 1994). Financial statement restatements, restructuring, and going concern opinions (*RESTATE*, $p < 0.001$; *RESTRUCT*, $p < 0.001$; *GOCN*, $p < 0.001$) are also associated with higher fees (Huang & Scholz, 2012; Krishnan & Krishnan, 1997). Lastly, we find that specialist auditors (*SPEC*, $p < 0.001$) charge a lower fee (Carcello & Neal, 2003; Ettredge et al., 2011) but Big 4 auditors (*BIG4*, $p < 0.001$) charge a higher fee in general.

Table 5
Auditor resignations following adverse ICFR opinion in an economic downturn.*

$RES \sim \beta_0 + \beta_1 ICWEAK + \beta_2 ECON + \beta_3 ECON * ICWEAK + \beta_4 AS5 + \beta_5 CSIZE + \beta_6 BKMK + \beta_7 LEV + \beta_8 ROA + \beta_9 LOSS + \beta_{10} SPEC + \beta_{11} CEO + \beta_{12} GOCN + \beta_{13} ABFEE + \beta_{14} BIG4 + \beta_{15} RESTATE + \beta_{16} DISAGREE + \beta_{17} REPORTABLE + \beta_{18} AINDEP$

Variables	Exp. sign	Coefficient	p-Values
Intercept	+/-	(2.0189)	0.012
ICWEAK	+	0.8741	0.014
ECON	+/-	(0.1690)	0.000
ECON*ICWEAK	-	0.3410	0.003
AS5	-	(0.6616)	0.053
CSIZE	-	(0.0508)	0.059
BKMK	+/-	0.0002	0.516
LEV	+	0.0108	0.923
ROA	-	(0.0722)	0.824
LOSS	+	0.1014	0.576
SPEC	+/-	0.2357	0.386
CEO	+	(0.6844)	0.179
GOCN	+	0.4969	0.135
ABFEE	-	(0.2293)	0.027
BIG4	-	(1.4751)	0.001
RESTATE	+	0.0649	0.780
DISAGREE	+	0.0761	0.937
REPORTABLE	+	3.8687	0.000
AINDEP	-	(1.1859)	0.000
INDEP	+	(0.1727)	0.059
ABRETAN	+	0.2376	0.516
Auditor Resignation =			295
Auditor Dismissal =			1149
No change =			26,838
Total n =			28,282
Model Chi-Square =			1007.63
Model Significance =			0.000
Pseudo R ² =			0.3073

* We report two-way, cluster-robust standard errors clustered on audit firm and reporting year.

Table 6
Association between internal control weakness and audit fees in economic downturn.*

$ln\delta FEE \sim \beta_0 + \beta_1 ICWEAK + \beta_2 NUMWK + \beta_3 ECON + \beta_4 ECON * ICWEAK + \beta_5 RES + \beta_6 ECON * RES + \beta_7 RES * ICWEAK + \beta_8 ECON * ICWEAK * RES + \beta_9 AS5 + \beta_{10} ASSET + \beta_{11} SALE=ASSET + \beta_{12} LEV + \beta_{13} ROA + \beta_{14} LOSS + \beta_{15} DELAY + \beta_{16} AREC + \beta_{17} INV + \beta_{18} SPEC + \beta_{19} RESTATE + \beta_{20} LSEG + \beta_{21} RESTRUCT + \beta_{22} GOCN + \beta_{23} BKMK + \beta_{24} BIG4 + \epsilon$

Variables	Exp. sign	Coefficient	p-Values
Intercept	+/-	10.3895	0.000
ICWEAK	+	0.2061	0.000
NUMWK	+	0.0902	0.000
ECON	+	(0.0039)	0.136
ECON*ICWEAK	+	0.0613	0.002
RES	+	0.0370	0.683
ECON*RES	+	0.1152	0.028
RES*ICWEAK	+/-	(0.0614)	0.545
ECON*ICWEAK*	+/-	(0.0381)	0.680
RES			
AS5	-	0.0004	0.988
ASSET	+	0.4409	0.000
SALE/ASSET	+	0.0823	0.072
LEV	-	(0.5097)	0.000
ROA	-	(0.3499)	0.000
LOSS	+	0.0913	0.000
DELAY	+	0.0002	0.503
AREC	+	0.0000	0.003
INV	+	0.0000	0.000
SPEC	-	(0.2428)	0.000
RESTATE	+	0.0962	0.000
LSEG	+	0.1022	0.000
RESTRUCT	+	0.5259	0.000
GOCN	+	0.2042	0.000
BKMK	+	(0.1099)	0.000
BIG4	+	0.6098	0.000
Total n =			28,282
Model F-statistic =			2315.56
Model Significance =			0.000
R ² =			0.7330

* We report two-way, cluster-robust standard errors clustered on audit firm and reporting year.

4.4. Research question

Table 6 also presents the results of a three-way interaction that provides insight into our research question, which examines the impact of the economic outlook on subsequent auditor fees for clients with adverse ICFR opinions who have experienced an auditor resignation ($ECON*ICWEAK*RES$). The non-significant coefficient on RES ($p = 0.683$) indicates that resignations in general do not affect subsequent auditor fees. However, the interaction of $ECON*RES$ is significant and positive ($p = 0.028$) indicating that a resignation coupled with a strong (weak) economy will result in the subsequent auditor charging higher (lower) incremental fees.

Our results also indicate that, in general, a resignation following an adverse ICFR opinion does not impact subsequent auditor fees, as the coefficient on $RES*ICWEAK$ is not significant ($p = 0.545$). Further, the three-way interaction of interest in our research question ($ECON*ICWEAK*RES$) is also not significant ($p = 0.680$), thereby providing no evidence that the economy will impact the fees subsequent auditors charge following a resignation in the presence of an adverse ICFR opinion. Given the higher need for income during a weak economy, those clients who receive adverse ICFR opinions and experience an auditor resignation likely represent the riskiest clients for audit firms. Our lack of significant findings indicates that subsequent auditors are not impacted by the economy when determining how to price the risk associated with such clients. Thus, it appears that for the riskiest of clients, economic factors do not exceed the need for auditors to appropriately price risk.

5. Summary and discussion

Our study examines the impact of the economy on auditor risk management strategies, as measured by auditor resignations and fees following adverse ICFR opinions. Our analyses indicate that the economic environment influences both auditor resignations and fee increases following adverse ICFR opinions. We find that when the economy is weak, auditors are less likely to resign from clients with adverse ICFR opinions than when the economy is strong. Further, for those clients with adverse ICFR opinions from whom the auditor does not resign, the fee premium often used to manage risk is lower during times of economic difficulty than otherwise. These results suggest that economic factors influence auditors' propensity to accept and price risk appropriately. However, for the riskiest of clients, clients with adverse ICFR opinions from which auditors resign, we do not find evidence indicating that the successor auditor is influenced by economic factors when making pricing decisions. Our results indicate that, while economic factors impact risk tolerance levels for audit firms overall, they do not influence risk pricing strategies for the most risky clients.

Our findings provide insight into how audit firms manage risk during difficult economic times. Our results indicate that auditors will change their risk management strategies in such a way as to maximize income. In particular, auditors are more willing to remain with risky clients (i.e., firms with adverse ICFR opinions) when the economy is poor. Further, auditors charge a lower risk premium to those clients. Given that increased audit fees are positively associated with dismissals (Ettredge et al., 2007); this may be an effort for firms to avoid losing clients and therefore revenues. However, for the riskiest of clients, successor auditors do not allow economic factors to influence how they price risk. Thus, auditors are willing to change their risk profiles to retain the income provided by risky clients, but only up to a certain point.

Our study extends the risk management literature by examining the impact of adverse ICFR audit opinions on auditors' risk management strategies, both resignations and fee increases, in varying economic environments. Our study also contributes to the growing body of literature that examines the influence of external economic factors on the audit process. Further, our results provide important information to

practitioners about trends in risk management. In today's litigious

environment, it is especially important that when performing client continuance and acceptance procedures, audit firms carefully consider the need for revenues versus the potential increase in liability resulting from loosened risk management policies.

We note the following area for future research: researchers could continue to investigate the impact of the economic environment on auditor change decisions, relating to both resignations and dismissals, and audit fees. Given that litigation risk remains a concern for firms, an improved understanding of post-SOX resignation and fee patterns could lead to more effective management of engagement risk by audit firms.

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Appendix A. Variable definitions

Variable	Description
ABFEE	Calculated as the residuals from standard audit fee model, ^a based on findings that abnormal fees are associated with auditor changes (Ettredge et al., 2007, 2011).
ABRETAN	Cumulative abnormal return estimated via the market model for the client firm over the 260 trading days prior to the fiscal year end.
AINDEP	Audit committee independence, equals 1 if over half of the audit committee members are independent and 0 otherwise, based on findings that low audit committee independence is more likely to lead to resignation (Lee et al., 2004).
AREC	Level of receivable balances reported as of the close of the reporting period divided by total assets (Ettredge et al., 2011). We compute AREC as the natural log of receivables.
AS5	Audit Standard 5. AS5 superseded AS2 as providing guidance for ICFR audits during our sample period. AS5 equals 0 in the period prior to AS5 implementation (2004–2006), 1 otherwise.
ASSET	Total assets based on findings indicating that larger clients are less likely to experience an auditor change (Carcello & Neal, 2003; Ettredge et al., 2011; Johnson & Lys, 1990). We compute ASSET as the natural log of total assets.
BIG4	Auditor size, operationalized by classifying auditors as either Big 4 or non-Big 4, where BIG4 equals 1 if the auditor is a Big 4, based on pre-SOX research that finds that an auditor change is less likely to occur with a Big 4 auditor (Johnson & Lys, 1990) and post-SOX research that finds that, at least for dismissals, a client is more likely to dismiss a Big 4 auditor (Ettredge et al., 2007; Ettredge et al., 2011).
BKMK	Book to market calculated as the book value of equity divided by the market value of equity. Lower values of BKMK indicate higher growth prospects. Prior research suggests that corporate growth is associated with auditor realignment (Ettredge et al., 2011; Johnson & Lys, 1990).
CEO	CEO Change, equals 1 if the client hired a new CEO during the fiscal year and 0 otherwise, based on findings that new CEOs are associated with auditor changes.
CSIZE	Client Size calculated as the natural log of client revenues, based on findings indicating that larger clients are less likely to experience and auditor change (Carcello & Neal, 2003; Ettredge et al., 2011; Johnson & Lys, 1990).
DELAY	Delay is the number of days between the client's fiscal year end and audit report date (Ettredge et al., 2011).
DISAGREE	Disagreement, equals 1 if the auditor disclosed information about disagreements with the client over accounting issues and 0 otherwise, based on findings of a positive association between disagreements and resignations (DeFond et al., 1992; Krishnan & Krishnan, 1997).
ECON	<i>ECON</i> represents the near-term economic environment. We use the Leading Index for the United States provided by the Federal Reserve

(continued)

Variable	Description
ECON	Bank of Philadelphia for the numerical value of our <i>ECON</i> variable. The Leading Index utilizes multiple economic inputs (e.g., housing permits, unemployment claims, manufacturing, and interest rates) to provide one composite index to capture economic trends.
GOCN	Going concern, equals 1 if the client received a going concern report and 0 otherwise, based on findings that going-concern reports can lead to auditor change.
INDEP	Auditor independence, measured as 1 – (fees collected from the client as a percent of the total audit fees collected). INDEP is a proxy for the relative importance of the client in the auditor's portfolio of clients. Auditors are more likely to resign from clients from whom they are more independent financially (Krishnan & Krishnan, 1997).
INV	Inventory balances reported as of the close of the reporting period divided by total assets (Ettredge et al., 2011). We compute INV in log form.
LEV	Leverage, calculated as total liabilities divided by total assets, based on findings that companies with increasing leverage are more likely to change auditors (Johnstone & Bedard, 2004; Krishnan, 1994).
LOSS	Loss, equals 1 for clients reporting a loss and 0 otherwise. Prior research finds that less profitable companies are more likely to experience an auditor change (Johnstone & Bedard, 2004; Krishnan, 1994).
LSEG	Log of the number of reporting segments reported by the client (Ettredge et al., 2011).
NUMWK	Number of material weaknesses (Ettredge et al., 2007, 2011).
REPORTABLE	Reportable event, equals 1 if the auditor disclosed a situation where the client was informed that the auditor questions the accuracy or reliability of the clients disclosed information and 0 otherwise, based on findings that reportable events can lead to resignations due to increased litigation risk (DeFond, 1992; Krishnan & Krishnan, 1997).
RESTATE	Restatement, equals 1 if the client restated their financial statements in a later period and 0 otherwise, based on findings that resignations are more likely to occur following restatements (Huang & Scholz, 2012; Krishnan & Krishnan, 1997).
RESTRUCT	Takes on the value of 1 if the firm underwent a restructuring during the year, 0 otherwise (Ettredge et al., 2011).
ROA	Return on asset, measured as net income divided by total assets. Prior research finds that less profitable companies are more likely to experience an auditor change (Johnstone & Bedard, 2004; Krishnan, 1994).
SALE/ASSET	Total Sales divided by Total Assets based on findings indicating that larger client are less likely to experience an auditor change (Carcello & Neal, 2003; Ettredge et al., 2011; Johnson & Lys, 1990).
SPEC	Specialist, equals 1 if the predecessor auditor's largest portfolio share is in the client's industry. Portfolio share is based on the sum of fees from each two-digit SIC industry code divided by the auditor's total audit fees (Ettredge et al., 2011). Prior work suggests that clients are less likely to dismiss an industry specialist auditor (Carcello & Neal, 2003), and more likely to change to an industry specialist (Ettredge et al., 2011).

^aThe model, based on the fee model used by Ettredge (Ettredge et al., 2007, 2011), is:

$$\ln \delta FEE_{it} = \beta_0 + \beta_1 LN \delta ASSET_{it} + \beta_2 SALE = ASSET_{it} + \beta_3 LEVERAGE_{it} + \beta_4 ROA_{it} + \beta_5 LOSS_{it} + \beta_6 BKMK_{it} + \beta_7 BIG4_{it} + \beta_8 DELAY_{it} + \beta_9 AREC_{it} + \beta_{10} INVENTORY_{it} + \beta_{11} SPECIALIST_{it} + \beta_{12} RESTATE_{it} + \beta_{13} LSEG_{it} + \beta_{14} RESTRUCT_{it} + \beta_{15} GOCN_{it} + \beta_{16} ICWEAK_{it} + \beta_{17} NUMBERMW_{it} + \beta_{18} YEAR_{it}$$

The model uses all companies receiving internal control reports over our sample period. It is highly significant and variables are significant in directions consistent with prior studies. $\ln(FEE)$ is the natural log of audit fees; $LN(ASSET)$ is the natural log of total assets; $SALE/ASSET$ is total client revenue divided by total client assets; $DELAY$ is the number of days between the client's fiscal year-end and audit report date; $LSEG$ is the natural log of the number of operating segments reported by the client; $YEAR$ is an indicator variable for fiscal years. Other variables are defined previously.

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