Auditor Choice under Client Information Uncertainty

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ABSTRACT

This study examines whether companies with financial statements that contain higher degrees of information uncertainty are more inclined to hire specialist auditing firms. We argue that they do so to signal the credibility of the financial statements and improve stakeholders' perceptions. We develop comprehensive measures of information uncertainty from the auditor's viewpoint and deconstruct it into fundamental volatility uncertainty and reporting quality uncertainty. We sample U.S. companies that switched auditors from 2001 to 2009 to examine whether information uncertainty influenced their auditor selection. Confirming our conjecture, companies confronting higher information uncertainty prefer to hire specialist auditors. Evidence partially supports that companies confronting higher reporting quality uncertainty are more inclined to hire specialist auditors when compared with those confronting fundamental volatility uncertainty.

Keywords: auditor choice, information uncertainty, auditor expertise.

1. INTRODUCTION

Numerous previous studies examine the determinants of auditor choice (Carcello and Neal 2003; Francis et al. 1999; Chaney et al. 2004; Blouin et al. 2007; Chen et al. 2008; Pittman and Fortin 2004). Two presiding determinants are auditors' status as a Big N CPA firm (Copley and Douthett 2002) and industry specialization (Abbott and Parker 2000; Beasley and Petroni 2001; Ettredge et al. 2009). However, ours is the first study to treat information uncertainty as a factor in auditor selection, arguing that the perception of outsiders influences a company's auditor choice decisions.

Applying game theory, Watson (2002) opines that managers align strategies in

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anticipation of investors' reactions. For example, companies select auditors able to provide high-quality audits in order to reduce cost of capital (Pittman and Fortin 2004) and correct underpricing of the company's stock (Balvers et al. 1988; Titman and Trueman 1986). That is, the perceptions of stakeholders outside the business operations affect the auditor-selection decisions by the management.

Extending this point, we argue that companies confronting information uncertainty need to decide if it is necessary to hire specialist auditors by conjecturing whether investors are sensitive about the information uncertainty contained in their financial statements. The literature suggests that companies with greater information uncertainty often discount company information and may short-sell or downgrade their stocks in order to pacify stakeholders (Merton 1987; Beneish et al. 2005; Beneish et al. 2008). Studies also note that psychological biases intensify when uncertainty rises (Hirshleifer 2001; Daniel et al. 1998, 2001; Zhang 2006). Moreover, shareholders and creditors avoid investing in companies with high information uncertainty. Hence, we propose that companies are more inclined to select specialist auditors to alleviate the stigma of information uncertainty.

Solomon et al. (1999) and Thibodeau (2003) indicate that auditors who specialize in an industry have superior insights and knowledge distinct to their specialty that helps them increase their accuracy and reduce auditing errors. Such auditors assess risks specific to those industries more effectively (Taylor 2000) and are more skilled at detect errors for clients in that industry (Owhoso et al. 2002). Moreover, they assess audit risks more accurately (Low 2004) and effectively (Moroney 2007) and better interpret incomplete cue patterns (Hammersley 2006). Specialist auditors provide higher-quality audits in their specialty, reducing uncertainty (Fortin and Pittman 2007) and enhancing the reliability of financial information (Elliott and Jacobson 1998). Therefore, we propose that companies with financial statements characterized by information uncertainty are more likely to hire specialist auditors in order to mitigate such uncertainty.

Previous studies define information uncertainty as ambiguity with respect to the implications of new information concerning a firm's value (Jiang et al. 2005; Zhang 2006; Autore et al. 2009) or "incomplete knowledge about signal quality" (Epstein and Schneider 2008). Hirshleifer (2001) and Zhang (2006) posit that the components of information uncertainty are a company's underlying fundamental volatility and informational quality. Zhang (2006) suggests that both contribute to information uncertainty about a company's valuation, but it is difficult to distinguish them

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empirically. Accordingly, we term the first component of information uncertainty "fundamental volatility uncertainty" because it pertains to the divergent assessments of a company's fundamental valuation. We call the second source "reporting quality uncertainty" because it resides in the quality of financial signals. In addition, the auditor's informational role is to present reliable reporting to users of financial statements (Dye 1993), and many prior studies state that reducing information risk is among the most important demands on audits[1] (Knechel et al. 2008). Hence, we deem auditors to be important in alleviating reporting uncertainty, particularly informational quality uncertainty.

Unlike prior studies using alternate and sporadic proxies for information uncertainty in a non-structured manner (Zhang 2006; Autore et al. 2009), we develop an integrated uncertainty framework from an auditor's perspective. Following the definition of information uncertainty and requirements specified in Statements on Auditing Standards (SAS), we identify five dimensions that guide auditors in learning about their clients, and build an information uncertainty structure based on them. We integrate these indicators into a comprehensive measure and develop integrated proxies for fundamental volatility uncertainty and reporting quality uncertainty.

We conduct logit regression on a sample of publicly traded U.S. companies (NYSE, AMEX, and NASDAQ) that switched auditors during the 2001–2009 period. We used audit fees instead of indirect proxies (e.g., clients' total sales) in order to determine whether auditors specialized in an industry. Our empirical results demonstrate that companies confronting information uncertainty prefer specialists. Further, companies confronting reporting quality uncertainty are more inclined to hire specialist auditors than companies facing fundamental volatility uncertainty.

This study is the first to link auditor selection directly to companies' information uncertainty and to explain that connection. First, it expands the work of Ettredge et al. (2009) by demonstrating that information uncertainty is also a factor which affects auditor selection. Second, this study operationalizes the abstract concept of information uncertainty and proposes a framework of information uncertainty from the viewpoint of auditors. No prior research constructs structural proxies of information uncertainty using concepts that auditors employ on the job. Third, our integrated measurement decomposes the source of information uncertainty into fundamental

[1] Information risk is the likelihood that information presented is incomplete and incorrect.

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volatility and reporting quality, a task that Zhang (2006) finds empirically problematic. Fourth, this study compares how two sources of information uncertainty motivate companies to hire specialist auditors and establishes that reporting quality uncertainty is more likely to motivate the choice of specialized auditors than fundamental volatility uncertainty.

Section 2 reviews the relevant literature and describes the formulation of hypotheses. Section 3 describes the sample and methods adopted in the study. Section 4 reports empirical findings. Section 5 concludes.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 INFORMATIONAL UNCERTAINTY FRAMEWORK

Prior studies describe environmental uncertainty as the degree to which changes in an organization's operations are affected by externalities such as unpredictability of customers, suppliers, competitors, and regulators (Dess and Beard 1984; Drago 1998). Environmental uncertainty is fundamental in the design of organizational frameworks (Chandler 1962) and is an important line of research; however, it is difficult to observe and predict because it is random (Ghosh and Olsen 2009).

Although information uncertainty focuses on the information environment, it is subsumed within environmental uncertainty. Griffin and Tversky (1992) state that people systematically overweigh/underweigh certain types of information. For example, people often overweigh more salient/less reliable and underweigh more abstract/statistical evidence (Jiang et al. 2005). Prior studies also argue that availability (Arbel and Strebel 1982; Barry and Brown 1984; Merton 1987) and precision of information determine equilibrium equity prices (Merton 1987; Beneish et al. 2005; Beneish et al. 2008). Therefore, the extent of information uncertainty is important because it affects corporate valuations.

This study focuses on financial statements because they present information uncertainty if they inaccurately reflect companies' conditions. Willful concealment by management, macroeconomic uncertainty, and deficient financial reporting systems generate information uncertainty. Irrespective of cause, information uncertainty may lead managers, investors, and auditors to decisions based on ambiguous, uncertain, or incorrect information. Eventually, the company's stock price will be discounted as investors revise beliefs about the credibility of its financial reporting (Beneish et al. 2005).

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Prior studies define information uncertainty as ambiguity concerning what new information implies about a firm's valuation (Jiang et al. 2005; Zhang 2006; Autore et al. 2009). An observed signal (s) is a function of a company's fundamental valuation (v) (e.g., future cash flows or dividends) and a noise term (e). Variance in the signal (var(s)), is a measure of information uncertainty. More specifically, var(v) denotes volatility in a company's fundamental valuation and the noise term var(e). We define var(e) as the quality of information following Epstein and Schneider (2008), who propose that incomplete knowledge about signal quality generates information uncertainty.

Therefore, we establish two types of information uncertainty: fundamental volatility uncertainty (Jiang et al. 2005; Zhang 2006; Autore et al. 2009) and reporting quality uncertainty (Epstein and Schneider 2008). Fundamental volatility uncertainty encompasses the uncertainty associated with a company's valuation. Reporting quality uncertainty refers to the level of unreliability of a company's financial signals and its internal reporting controls.

Zhang (2006, p. 105) states that "… both effects contribute to the uncertainty of a firm's value and it is hard to empirically disentangle one from the other as observed stock volatility and other empirical constructs capture both effects." Our framework, however, differentiates fundamental volatility uncertainty and reporting quality uncertainty from the auditor's viewpoint.

2.2 PROXIES OF INFORMATIONAL UNCERTAINTY

Previous studies concerning uncertainty (Zhang 2006; Autore et al. 2009) use dispersed proxies for information uncertainty. Although they reveal many factors that exacerbate information uncertainty, their approaches lack systematic structures and are not generalizable.

Auditors play an informational role in facilitating reliable reporting (Dye 1993), and reducing information risk arguably is their prime mandate (Knechel et al. 2008). Classical agency theory illustrates how auditors are asked to eliminate information asymmetry[2] between management and outsiders (Francis and Wilson 1988). Despite the importance of audits in assuring informational quality, no previous study examines how audits link directly to the information environment. We acknowledge auditors'

[2] Information asymmetry is a situation wherein parties to a transaction have unequal information, often resulting in an unfair exchange. If qualitative information asymmetry without a signaling effect exists between buyers and sellers, an adverse selection of low-quality goods will occur, as illustrated by Akerlof (1970).

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importance by constructing a framework of information uncertainty from their perspective. This study scrutinizes factors in the relationship between audit risks and information uncertainty.

SAS Nos. 108 and 109 specify several phases in auditing financial statements: grasping the organization and its environment, identifying risks that may produce material misstatements, evaluating the organization's response to those risks, assessing the risk of material misstatement, evaluating results, and issuing a report. Understanding the organization and its environment is important throughout the audit because the assessment depends on evidence collected early on, and potential audit risks affect the audit's follow-up procedures and scope (SAS No. 108).[3] Because understanding the organization and its environment affects the entire audit, industry-specific expertise differentiates specialists from non-specialist auditors.

To assess the risk of material misstatements, Generally Accepted Auditing Standards require auditors to gain overall understanding of their clients and plan their audit accordingly. To assess audit risk, control risk, and inherent risk, SAS No. 109 and International Standard on Auditing (ISA) 315[4] suggest five dimensions through which auditors may better understand clients: "Industry, Regulatory, and Other External Factors," "Nature of the Entity," "Objectives and Strategies and Related Business Risks," "Measurement and Review of the Entity's Financial Performance" and "Internal Control."[5]

To elaborate on how these statutory prescriptions relate to information uncertainty, we utilize their five-dimensional structure to illustrate dimensions an auditor should undertake to understand the client's business and determine audit strategies that assure audit quality. From the auditor's perspective, Figure 1 shows how company-specific financial statement uncertainty connects to the five dimensions, their

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[3] SAS No. 108—"Planning and Supervision"—supersedes SAS No. 22 and re-emphasizes that planning is continuous throughout the engagement as audit evidence accumulates. To reduce audit risk, these standards encourage auditors to consider circumstances that may impair their ability to plan the audit.

[4] Similar to SAS No. 108 and SAS No. 109 issued by the Auditing Standards Board, the International Standard on Auditing (ISA) 310 explores the importance of obtaining knowledge of the business, for "such knowledge is used by the auditor in assessing inherent and control risks and in determining the nature, timing and extent of audit procedures." ISA 315, which is titled exactly the same as SAS No. 109 ("Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement"), requires procedures for gaining an understanding of the client with the same basic outline but with more detailed rules.

[5] Elder et al. (2010) summarize the auditing standards and, like SAS No. 109, formulate a framework to "understand the client's business and industry."

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representative components, and the choice of specialist auditors.

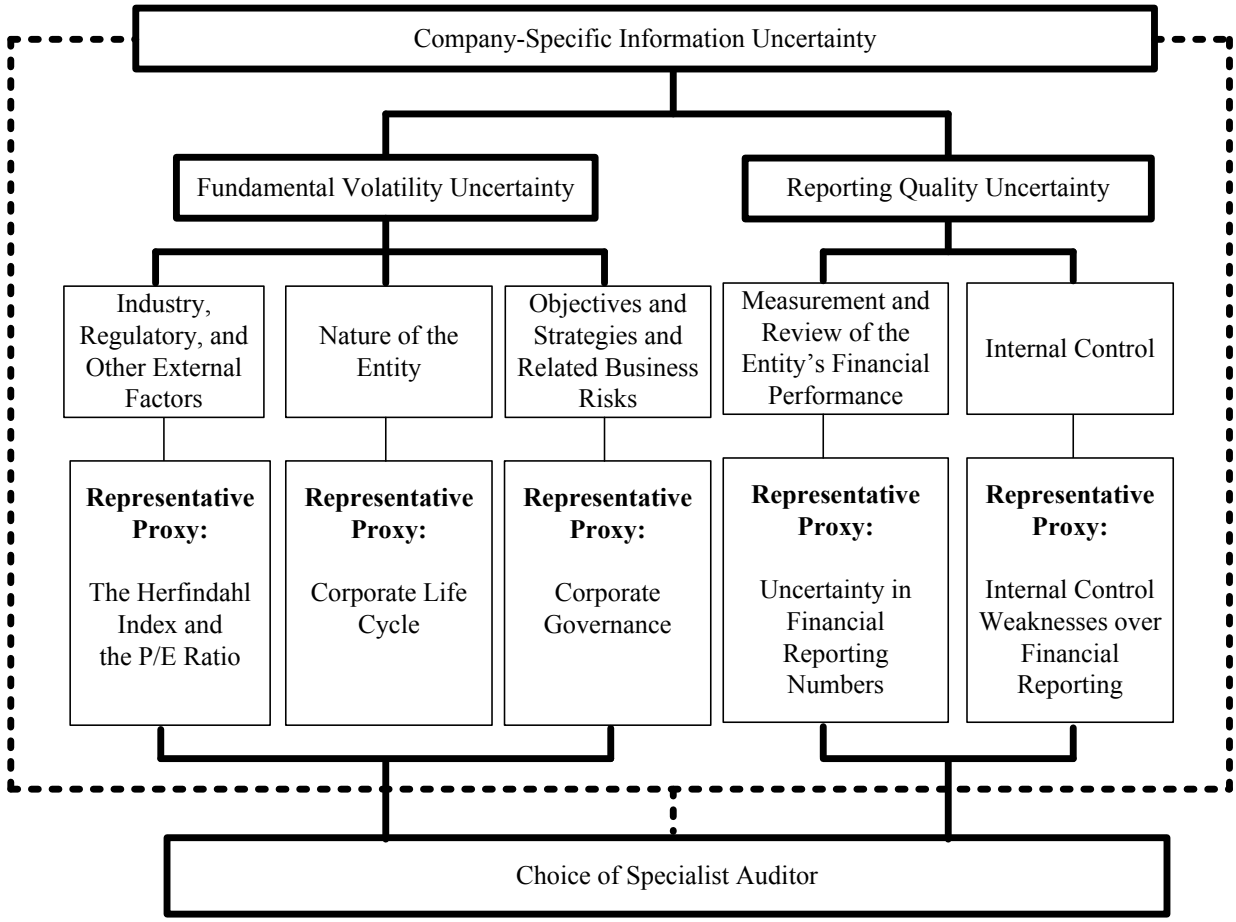

FIGURE 1 A Framework of Company-Specific Information Uncertainty and Choice of Specialist Auditor

We propose indicators representing each of the five dimensions: external factors, corporate life cycle, corporate governance, uncertainty in financial reporting, and weaknesses of internal control over financial reporting. We assign these five indicators to two hypotheses. The initial three indicators pertain to the components of fundamental volatility uncertainty because companies' external environments, governance, and life stages relate to their businesses and operations and affect the company's valuation and future. These components also engender uncertainty about its business—i.e., fundamental volatility uncertainty. The final two indicators pertain to reporting quality uncertainty. Uncertainty over accuracy of reported numbers and weak financial reporting controls impair the credibility of financial information.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

2.2.1 EXTERNAL FACTORS

SAS 109 item "Industry, Regulatory, and Other External Factors" states that auditor shall obtain an understanding of a client's industry, regulatory, and other external factors. Therefore, we adopt the Herfindahl-Hirschman Index (HHI) and the price-to-earnings ratio (P/E) to proxy intensity of competition and industry-specific risk. The HHI measures industrial concentration and is widely adopted in sociology (Voicu 2011). A higher HHI indicates a more concentrated industry wherein companies are usually investor-unfriendly and offer inadequate information, prompting information uncertainty.

P/E reflects investors' perception of uncertainty surrounding a company's future earnings. Higher P/E ratios suggest its prospects are risky but promising, signifying information uncertainty. The HHI and P/E exhibit companies' underlying business situation. Hence, we categorize this dimension as part of fundamental volatility uncertainty. Specialist auditors may mitigate this type of uncertainty related to the external environment via superior knowledge of environmental, economic, and contextual factors that affect contingent errors (Kreutzfeldt and Wallace 1986), industry dynamics and how they incite clients to misstate financial information (Shields et al. 1996).

2.2.2 CORPORATE LIFE CYCLE

SAS 109 item "Nature of the Entity" requires auditors to understand the client's business and industry, including its operations, ownership, governance, investment type, financing, and organizational structure. We use the corporate life cycle to assess the nature of a company's business, its development, and its future prospects. The concept of a corporate life cycle originated in marketing studies of product life cycles (Rink and Swan 1979). It proposes that most companies progress through four stages: start-up, growth, maturity, and decline (Gomez-Mejia 1992; Black 1998). Anthony and Ramesh (1992) demonstrate that companies in the growth stage exhibit larger response coefficients in sales and capital expenditures than companies in decline.

Black (1998) proposes that the relative importance of a company's earnings, operating cash flow, and financing cash flow differs as it advances through its life cycle. In the early stages, as per Anthony and Ramesh (1992) and Black (1998), corporations usually have high sales growth rates attributable to larger investment in production equipment and relatively low dividend payouts. In corporations' later stages, sales growth slows, investment in equipment declines, and dividend payouts rise. We adopt

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

the four life cycle descriptors to determine what stage a corporation occupies (Anthony and Ramesh 1992; Black 1998; Chin et al. 2005; Taso et al. 2010) because position in the life cycle indicates issues of fundamental volatility uncertainty that should be addressed in financial statements.

2.2.3 CORPORATE GOVERNANCE

SAS 109 item "Objectives and Strategies and Related Business Risks" prescribes that auditors examine client's objectives[6] as reflected in reliability of financial reporting, operational effectiveness and efficiency, and regulatory compliance. Therefore, we adopt corporate governance as the representative component for this phase. Companies with effective boards react more successfully to market volatility and operating conditions. They issue more frequent and generally more accurate earnings forecasts (Ajinkya et al. 2005; Karamanou and Vafeas 2005). Better corporate governance reduces earnings management and therefore information asymmetry (Kanagaretnam et al. 2007). Companies with weaker corporate governance respond less effectively and exacerbate information uncertainty.

According to Taylor (2000), specialist auditors are more proficient at understanding clients' procedures and policies; preventing, detecting, and correcting errors; and recognizing irregularities. The soundness of a company's governance determines its operations, strategy, and growth. Hence. we view corporate governance as one measurable component of fundamental volatility uncertainty.

2.2.4 UNCERTAINTY IN FINANCIAL REPORTING

Regarding SAS 109 item "Measurement and Review of the Entity's Financial Performance," Dechow and Skinner (2000) claim that stakeholders rarely detect the management's discretion in accrual decisions and suggest that the accrual flexibility allowed by the Generally Accepted Accounting Principles creates information asymmetry. Ghosh and Olsen (2009) infer that accruals-related choices must be examined, especially in analyzing environmental uncertainties that increase earnings variability. We adopt Francis et al.'s (2007) uncertainty measurement for accrual-based financial reporting numbers to obtain information about uncertainty in accounting accruals.

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[6] Strategies are defined as operational approaches adopted by management to achieve objectives (SAS No. 109).

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

If accruals relate poorly to current/surrounding cash flows or fundamental variables (i.e., fixed assets and revenue changes), information uncertainty is high (Francis et al. 2007). We measure accruals as an aspect of reporting quality uncertainty and will note that a specialist auditor better understands industry-specific errors in client accounts (Ashton 1991) and industry-specific risks inherent in audits (Wright and Wright 1997).

2.2.5 INTERNAL CONTROL WEAKNESS OVER FINANCIAL REPORTING

With regard to SAS 109 item "Internal Control," prior studies discuss the nature of companies that embrace internal control requirements (Ge and McVay 2005) and comply with Section 302 (Bronson et al. 2006; Ashbaugh-Skaife et al. 2007), Section 404 (Ettredge et al. 2006), and Sections 302 and 404 (Doyle et al. 2007; Ashbaugh-Skaife et al. 2008; Hogan and Wilkins 2008; Hoitash et al. 2009; Hoitash et al. 2008). We extend this discussion to the auditor's role in detecting weaknesses in internal controls.

The quality of internal controls determines the reliability of financial statements and the level of risk inherent in the audit (Elder et al. 2010). If a company's internal control system is weak, auditors elevate control risk and increase efforts to assure that statements reflect firms' true financial condition. The auditor's experience and skill become more critical than in normal circumstances. To examine investor reactions to information uncertainty, Beneish et al. (2008) use disclosure of material weaknesses in internal controls as a proxy for lower perceived reporting quality. They find that disclosing companies show negative abnormal returns and higher cost of capital; that is, companies with weak internal control mechanisms demonstrate higher probabilities of reporting errors or ambiguities. Because financial statements are the output of the internal control system, its material weaknesses relate to reporting quality. We view them as a component of reporting quality uncertainty.

In sum, our information uncertainty framework based on the auditor's perspectives finds that companies exhibit high information uncertainty if during the prior year their HHI and P/E are high, they are in the growth stage of their life cycle, corporate governance is weak, their financial reporting exhibits considerable uncertainty, and they disclose material weaknesses in accounting controls. As sources of information uncertainty, the first three considerations fall under fundamental volatility uncertainty, whereas the final two fall under reporting quality uncertainty.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

2.3 AUDITOR CHOICE AND INFORMATIONAL UNCERTAINTY

Research into auditor selection explains how client-specific characteristics affect choice of high-quality auditors. For example, in the property-liability insurance industry, selection of an industry-specialist auditor relates positively to audit committees' independence and engagement (Abbott and Parker 2000) and to the independence of directors (Beasley and Petroni 2001). Ettredge et al. (2009) itemize client-specific, industry-level, and country-level factors in high-quality audits. Their cross-country sample shows that they affect the choice of auditors by companies.

Previous studies concerning auditor selection extensively address why companies switch auditors. Some relate to opinion shopping—i.e., companies switch auditors to obtain the audit opinion they want (Lennox 2000; Carcello and Neal 2003). Francis et al. (1999) document that Big N CPA firms resist earnings manipulation, so companies that manipulate earnings may switch to non-Big N firms to portray their results as preferred. Other reasons for switching auditors include changes in management, disagreements over reporting matters, conflicts over audit fees (Schwartz and Menon 1985), and factors involving practical aspects of the audit. Blouin et al. (2007) argue that agency and switching costs influence switching auditors. Companies may choose a high-quality auditor to ameliorate underpricing of their stock (Balvers et al., 1988; Titman and Trueman, 1986) or signal that their financial information is trustworthy.

2.4 AUDITOR SPECIALIZATION AND INFORMATION UNCERTAINTY (H1)

Gramling and Stone (1998), Beasley and Petroni (2001), and others identify three reasons why industry specialist auditors are in demand: superior audit technologies (Dopuch and Simunic 1980), lower costs through economies of scale (Caves 1992), and superior knowledge through economies of knowledge. They provide higher-quality audits (Balsam et al. 2003; Dunn and Mayhew 2004; Krishnan 2005; Cahan et al. 2008), better interpret findings when informational cues are incomplete (Hammersley 2006), and better detect industry-specific errors (Bonner and Lewis 1990; Bédard and Biggs 1991; Owhoso et al. 2002). Moreover, companies that hire specialist auditors exhibit less information asymmetry (Almutairi et al. 2009). Hence, we infer that specialist auditors provide higher-quality audits even for companies that suffer information uncertainty.

There are two sources of information uncertainty: fundamental volatility

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

uncertainty (Jiang et al. 2005; Zhang 2006; Autore et al. 2009) and reporting quality uncertainty (Epstein and Schneider 2008). Specialist auditors can potentially alleviate the former, which stems from instability in valuations that they can assess more accurately. They also potentially provide higher-quality financial information that reduces reporting quality uncertainty. Being more experienced and possessed of professional audit techniques, they are unlikely to be misled by questionable disclosures (Bonner and Lewis 1990; Bédard and Biggs 1991; Owhoso et al. 2002; Hammersley 2006) and thereby reduce information risk (Knechel et al. 2008). Krishnan (2005) shows that specialist auditors urge clients to disclose bad news more promptly than non-specialist auditors, reducing information uncertainty by enhancing transparency of financial information sooner.

Facing clients whose financial statements are exposed to information uncertainty, specialist auditors may apply more thorough procedures to examine financial reports and include more experienced auditors on the engagement team. Their audits provide assurances about the perceived quality of information (Balsam et al. 2003; Knechel et al. 2007) and its actual reporting quality (Krishnan 2003; Dunn and Mayhew 2004). We surmise that companies hire specialist auditors to enhance the transparency and quality of their financial reporting, in the hope that stakeholders will raise their stock prices because they perceive that the reported information is of higher quality and reduced information uncertainty (Merton 1987; Beneish et al. 2005; Beneish et al. 2008). Therefore, our first hypothesis is as follows:

H1: Companies confronting information uncertainty are more inclined to hire specialist auditors.

Further, to test the effect of different types of information uncertainty on the choice of auditors, we trifurcate H1:

H1a: Companies seeking to relieve comprehensive information uncertainty are more inclined toward hiring specialist auditors.

H1b: Companies seeking to relieve fundamental volatility uncertainty are more inclined toward hiring specialist auditors.

H1c: Companies seeking to relieve reporting quality uncertainty are more inclined toward hiring specialist auditors.

2.5 AUDITOR'S INFORMATION ROLE AND REPORTING QUALITY

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

UNCERTAINTY (H2)

Dye (1993) proposes that stakeholders demand audits for two reasons. First, they need independent professionals to certify financial information (the information role). Second, they require indemnification in the event of audit failures (the insurance role).[7] Auditors' insurance role is apparent only when accounting firms go bankrupt, e.g., in the case of Laventhol and Horwath (Menon and Williams 1994; Baber et al. 1995), so we emphasize auditors' information role.

Previous studies posit that audits reduce uncertainty about companies (Fortin and Pittman 2007; Autore et al. 2009) and enhance reliability of their reported financial information (Elliott and Jacobson 1998). Specialists' expertise reduces the frequency of audit errors (Solomon et al. 1999), enhance effectiveness in assessing risks specific to their specialty (Taylor 2000), and facilitate detecting errors within their specialization (Owhoso et al. 2002). It can be inferred that auditors' major value is enhancing the quality of clients' reported financial information.

On the other hand, fundamental volatility uncertainty pertains to business valuation. Since auditor specialists are not involved in clients' daily operations and strategy-setting, we follow DeAngelo (1981) and posit that specialist auditors demonstrate their effectiveness more in addressing reporting quality uncertainty than fundamental volatility uncertainty. Therefore, companies are more inclined to hire specialist auditors when they confront the reporting quality uncertainty than the fundamental volatility uncertainty. Our second hypothesis is as follows:

H2: Companies confronting reporting quality uncertainty are more inclined to hire specialist auditors than companies confronting fundamental volatility uncertainty.

3. RESEARCH DESIGN

3.1 INFORMATIONAL PROXIES FOR UNCERTAINTY

3.1.1 EXTERNAL FACTORS

We construct an external factor indicator by combining an industry's HHI and mean P/E ratio. We define an industry's HHI and P/E as high if they exceed the median

[7] Prior studies examine the auditor's information and insurance roles in the IPO market. This line of research has yielded mixed results because of data limitation (Menon and Williams 1994; Willienborg 1999; Weber and Willenborg 2003).

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

in our sample and award it a value of 1 (0 otherwise). We compare the sum of these two variables with the sample median. We obtain an indicator of external factors (*EXTERNAL*) to measure information uncertainty originating from the external environment.

3.1.2 CORPORATE LIFE CYCLE

Prior studies (Anthony and Ramesh 1992; Black 1998; Chin et al. 2005; Taso et al. 2010) use four variables to describe the corporate life cycle: sales growth, capital expenditures, dividends, and firm age. Following Taso et al. (2010), we use the tierce method to differentiate sampled companies into three groups by constructing a composite life cycle score from those four variables. For each life cycle score composite variable, we denote the growth stage as 0, the maturing stage as 1, and the declining stage as 2. We obtain a composite score (*LIFECYCLE*) and classify companies scoring 0–2 as growing, 3–5 as maturing, and 6–8 as declining.

3.1.3 CORPORATE GOVERNANCE

Following Dhaliwal et al. (2007), Carcello et al. (2008), and Hoitash et al. (2009), we score the strength of corporate governance by considering five variables: size of the board of directors, independence, tenure, frequency of meetings, and average number of non-executive directors. In accord with previous literature, we expect that the abovementioned five variables are respectively associated with good governance negatively (Yermack 1996; Core et al. 1999), positively (Beasley 1996; Klein 2002), positively (Beasley 1996; Bédard et al. 2004), positively (Carcello et al. 2002), and positively (Fama 1980; Fama and Jensen 1983; Carcello et al. 2002). We define the board size score as 1 if it is smaller than the sample median and 0 otherwise. Other factors are defined as 1 if their variable exceeds the median and 0 otherwise. The sum of these five scores (*CG*) is our composite variable for board strength.

3.1.4 UNCERTAINTY MEASUREMENT OF FINANCIAL REPORTING NUMBERS

According to Francis et al. (2007), information uncertainty is high when accruals track poorly with cash flows or company variables related to accruals. They measure information uncertainty on the basis of the residuals from accrual-based models in prior studies (Dechow and Dichev 2002; Francis et al. 2005). Because this

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

measure includes only factors relating to financial statements, we regard this proxy as a measure of uncertainty in financial reporting (*FS_UNCERTAINTY*). We compute it as the standard deviation of each company's residual (υ_{it}) using Equation 1 calculated over years t−4 through t.

$$TCA_{it} = \varphi_0 + \varphi_1 CFO_{it-1} + \varphi_2 CFO_{it} + \varphi_3 CFO_{it+1} + \varphi_4 \triangle Rev_{it} + \varphi_5 PPE_{it} + \upsilon_{it} \quad (1)$$

where:

TCA_{it} = change in current assets − change in current liabilities − change in cash + change in debt in current liabilities;

TA_{it} = TCA_{it} − depreciation and amortization expense;

CFO_{it} = net income before extraordinary items − TA_{it};

$\triangle Rev_{it}$ = change in revenues;

PPE_{it} = gross value of property, plant, and equipment.

All variables in Equation 1 are scaled by average total assets. Following Francis et al. (2007), we estimate Equation 1 in cross-section for each industry that had at least 20 companies in year t. Larger standard deviations of residuals indicate greater information uncertainty.

3.1.5 INTERNAL CONTROL WEAKNESS OVER FINANCIAL REPORTING

We use material weaknesses in internal financial reporting controls under Section 302 of the Sarbanes–Oxley Act of 2002 (SOX). Variable *MW* is defined as the disclosure of a material weakness in the prior 10k report. *MW* equals 1 if the internal control report required by Section 302 discloses any weakness.

3.1.6 INFORMATIONAL UNCERTAINTY COMPREHENSIVE MEASUREMENT

We propose that auditors could interpret the variables above as proxies of information uncertainty. We develop comprehensive information uncertainty indices for fundamental volatility uncertainty (*FVU*) and reporting quality uncertainty (*RQU*) and calculate the comprehensive proxy of information uncertainty by summing those measurements. This comprehensive proxy captures the client's fundamental volatility uncertainty and reporting quality uncertainty in one dichotomous variable.

Because external environment, corporate life cycle, and corporate governance relate to fundamental volatility uncertainty, we first compute *FVU* by calculating dichotomous measures for each observation. In this case, 1 (0) indicates high (low) information uncertainty. According to our definitions, a company has high information

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uncertainty if it has a high external factor score, is in its growth stage, and shows weak corporate governance. We code companies 1 for information uncertainty if their external factor scores exceed the sample median, they are in their growth stage, and corporate governance scores are below the sample median. We further construct a fundamental volatility uncertainty summary measure by summing these dichotomous measures for each observation and creating an equally weighted aggregate dichotomous variable on the basis of the median of summed values.

We duplicate the procedure in order to determine reporting quality uncertainty (*RQU*). We code companies 1 (confronting information uncertainty) if their measures of uncertainty about reported financial numbers exceed the sample median and disclosures of internal controls reveal material weaknesses. After summing these two dichotomous measures, *RQU* is denoted as 1 if the summation exceeds the median of whole sample.

Applying the same approach to acquire a proxy of comprehensive information uncertainty (*COMIU*), we sum the five dummies in the information uncertainty framework. We mark *COMIU* as 1 if this summation exceeds the sample median and 0 if not. The higher the value of the comprehensive measure, including *COMIU*, *FVU* and *RQU*, the greater the company's information uncertainty.

3.2 EMPIRICAL MODEL

Krishnan (2003) operationalizes auditor specialization using two common approaches (Balsam et al. 2003; Romanus et al. 2008): auditor market share and portfolio share. Auditor market share captures differentiation across competing audit firms within-industry, estimated by dividing total sales of each auditor's clients in an industry by total industry sales. Auditor portfolio share captures differentiation across industries within the audit firm. It is estimated as the ratio of an auditor's client revenues per industry to total firm-wide client revenues.

Unlike studies that use client sales to proxy industry market share of Big 5 auditors (Krishnan 2003; Balsam et al. 2003; Dunn and Mayhew 2004; Lim and Tan 2008), we use audit fees to measure specialization.[8] Our fee-based measure of specialization is

[8] In November 2000, the SEC stipulated that public companies disclose audit and audit-related fees paid to their auditors. This disclosure rule entered into effect for proxy statements filed after February 5, 2001 (SEC Final Rule S7-13-00).

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

$$SPEC_{ik} = \frac{\sum_{i=1}^{I_{jk}} AUDFEE_{ijk}}{\sum_{j=1}^{J_k}\sum_{i=1}^{I_{jk}} AUDFEE_{ijk}}, \quad (2)$$

where *AUDFEE* is audit fees. The numerator is the summed audit fees of all clients (I_{jk}) of audit firm *j* in industry *k*. We adopt two-digit SIC codes to identify industry categories (Lim and Tan 2008). The denominator is audit fees of all clients of audit firm *j* summed over all *J* audit firms. Consistent with prior studies (Lys and Watts 1994; Chung and Kallapur 2003; Lim and Tan 2008), we define auditors as specialists if they rank in the top three by industry market share.[9] Following Ettredge et al. (2009),[10] we estimate the following logistic regression model of auditor selection to test H1, which states that companies confronting information uncertainty hire specialist auditors:

$$SPEC_{it}=\beta_0 + \beta_1 IU_{it-1} + \beta_2 LnSALE_{it} + \beta_3 LEV_{it} + \beta_4 MB_{it} + \beta_5 CAPINT_{it} + \beta_6 ISSUE_{it} + \beta_7 REGIND_{kt} + \beta_8 ICAUDIT_{it} + \beta_9 POSTSOX_{it} + \varepsilon_{it} \quad (3)$$

where

$SPEC_{it}$ = a dichotomous variable coded as 1 if a company switches to an auditor that specializes in industry *k* (top three in industry market shares) and as 0 otherwise;

IU_{it-1} = It is the lag measurement of the client's information uncertainty. It includes the comprehensive information uncertainty index (*COMIU*), the reporting quality uncertainty (*RQU*), and the fundamental volatility uncertainty (*FVU*). *RQU* is combined with the uncertainty measurement of financial statements (*FS_UNCERTAINTY*) and disclosure of material internal control weaknesses (*MW*); *FVU* is combined with the external factor (*EXTERNAL*), corporate life cycle (*LIFECYCLE*), corporate governance (*CG*);

$LnSALE_{it}$ = the log of company *i's* sales;

LEV_{it} = long-term debt-to-asset ratio of company *i*;

MB_{it} = company *i's* market-to-book equity ratio;

[9] Using number of clients avoids bias toward larger clients from using sales as the base. Therefore, following Lim and Tan (2008), we measure auditor specialization using number of clients.

[10] Ettredge et al. (2009) investigate international client choice of industry specialist auditors from among the Big N and use client-specific, industry-level, and country-level factors hypothesized to enhance or decrease Big N clients' demand for industry expertise. Since our sample is restricted to the United States, we disregard country-level factors.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

$CAPINT_{it}$ = company *i's* capital intensity measured by gross property, plant, and equipment divided by sales;

$ISSUE_{it}$ = a dichotomous variable coded 1 if company *i's* book value increases more than 15% from the prior year and 0 otherwise;

$REGIND_{kt}$ = a dichotomous variable coded 1 if company *i's* industry (k) is regulated and 0 otherwise;

$ICAUDIT_{it}$ = a dichotomous variable coded 1 if company *i's* 10-k report is audited, i.e., its internal control report is recorded in Audit Analytics's IC404 Database, and 0 otherwise;

$POSTSOX_{it}$ = a dichotomous variable coded 1 if company *i* is in its post-SOX period (2004–2009) and 0 otherwise.

Variable IU_{it} represents information uncertainty and includes three comprehensive proxies. Since H1a posits that companies confronting information uncertainty hire specialist auditors, we predict *COMIU* to be positive. Because the fundamental volatility uncertainty (H1b) and the reporting quality uncertainty (H1c) examine whether companies with high fundamental volatility information uncertainty and reporting quality uncertainty are inclined to hire specialist auditors, we predict the coefficients of *FVU* and *RQU* to be positive.

As to client-specific control variables client size ($LnSALE_{it}$), financial leverage (LEV_{it}) and the need for external capital ($ISSUE_{it}$) are included to control the effect of managers expropriating capital. The market-to-book equity ratio (MB_{it}) and $CAPINT_{it}$ proxy growth opportunities and capital intensity, respectively.

For industry-level factors, we include variable $REGIND_{kt}$. Since the regulated industries are subject to specialized reporting rules and filing requirements set by government or private sector regulatory bodies, specialist auditors are supposed to be familiar with the abovementioned regulations.

We then employ $REGIND_{kt}$ to represent regulated industries. Following Ettredge et al. (2009), we define an industry as regulated if the companies belong to one of the following industries: railroads (SICs 4011 and 4100), trucking (4210 and 4213), airlines (4512, 4513, 4522, and 4581), telephone communications (4812 and 4813), electric companies (4911), gas companies (4922, 4923, 4924), personal credit (6141), and insurance (6311), and zero otherwise.

To determine the validity of H2, we compare the coefficients between comprehensive measures of the fundamental volatility uncertainty (*FVU*) and the informational quality uncertainty (*RQU*). We combine *FVU* and *RQU* into one logistic

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

regression model as follows:

$$SPEC_{it}=\beta_0 + \beta_1 FVU_{it-1} + \beta_2 RQU_{it-1} + \beta_3 LnSALE_{it} + \beta_4 LEV_{it} + \beta_5 MB_{it} + \beta_6 CAPINT_{it} + \beta_7 ISSUE_{it} + \beta_8 REGIND_{kt} + \beta_9 ICAUDIT_{it} + \beta_{10} POSTSOX_{it} + \varepsilon_{it} \quad (4)$$

On the basis of the foregoing discussion, we infer that reporting quality uncertainty exerts a stronger effect than fundamental volatility uncertainty in specialist auditor selection. *RQU* should show higher impact on the decision to hire a specialist auditor than *FVU*.

4. EMPIRICAL RESULTS

4.1 SAMPLE

Because we examine whether information uncertainty influences auditor choice, we restrict our sample to companies that switched auditors and investigate whether companies confronting information uncertainty prefer specialist auditors. We sample companies listed on the NYSE, AMEX, and NASDAQ from 2001 to 2009.[11] Financial numbers, corporate governance, internal control disclosures, and audit fees are from Compustat annual files, RiskMetrics, and Audit Analytics, respectively. Although the RiskMetrics database contains rich governance information, its linkage with Compustat is incomplete,[12] and almost half the sample is lost. We adopt the material weaknesses disclosed in Section 302 in lieu of SOX Section 404 to enlarge our sample.

The data for non-accelerated filers to comply with Section 404 was extended several times,[13] and smaller public companies received a permanent exemption in the Dodd–Frank Wall Street Reform and Consumer Protection Act in July 2010. Internal controls continue to be disclosed under Section 302 for these smaller companies. There are 27,611 observations with available IU-related data, but only 2,268 involve switching auditors. After deleting missing values, our final sample extracted from all databases contains 1,417 companies/year observations of firms that switched auditors.

4.2 DESCRIPTIVE STATISTICS FOR VARIABLES

[11] To maximize our sample, we start with 2001, which is the first year we can find Section 302 of the Sarbanes–Oxley Act (SOX) in the Audit Analytics Database.

[12] We use ticker, CUSIP, and possible names to merge these two databases.

[13] The SEC had previously extended the deadline for compliance with the auditor attestation requirement for non-accelerated filers on several occasions. According to the latest extension before Dodd–Frank in July 2010, non-accelerated filers must provide an auditor's attestation of internal financial controls beginning with annual reports for fiscal years ending on or after June 15, 2010.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Panel A in Table 1 shows descriptive statistics of our sample. *COMIU* resembles *FVU* in mean and standard deviation. However, the number of observations under *RQU* is half that of our sample, indicating that over 50% of observations contain reporting quality uncertainty. Control variables *LEV*, *MB*, and *CAPINT* are left-skewed, and frequencies of *REGIND* and *POSTSOX* are less than half that of the sample. Over 50% of our sample is composed of auditor specialists (*SPEC*), probably because our sample contains only instances of switching auditors and final observations tend to be bigger companies that have data available in multiple databases. Panel B in Table 1 shows descriptive statistics for components of information uncertainty.

TABLE 1
Descriptive Statistics (N = 1,417)

Panel A: Descriptive Statistics for Logistic Model

Variable	Mean	Standard Deviation	Min	Median	Max
SPEC	0.508	0.5	0	1	1
COMIU	0.065	0.246	0	0	1
FVU	0.075	0.263	0	0	1
RQU	0.514	0.5	0	1	1
LnSALE	4.706	2.214	-6.908	4.763	10.895
LEV	0.532	0.63	0.001	0.451	11.242
MB	1.717	3.558	0.001	0.968	56.803
CAPINT	1.539	9.062	0	0.362	253
ISSUE	0.317	0.465	0	0	1
REGIND	0.45	0.498	0	0	1
ICAUDIT	0.105	0.307	0	0	1
POSTSOX	0.442	0.497	0	0	1

Panel B: Descriptive Statistics for Components of Information Uncertainty

Variable	Mean	Standard Deviation	Min	Median	Max
EXTERNAL	0.954	0.707	0	1	2
LIFECYCLE	0.513	0.52	0	1	2
CGSCORE	2.965	0.87	1	3	5

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

FS_UNCERTAINTY	66.762	265.234	0.002	12.462	3816.559
MW	0.113	0.317	0	0	1

$SPEC_{it}$	=	a dichotomous variable coded 1 if a company switch its auditor to the specialist one, i.e., top 3 industry market share with in industry *k*, and zero otherwise;
$COMIU_{it-1}$	=	the lag measurement of the client's comprehensive information uncertainty index (*COMIU*), a measure combined with external factor (*EXTERNAL*), corporate life cycle (*LIFECYCLE*), corporate governance (*CG*), uncertainty measurement of financial statements (*FS_UNCERTAINTY*) and disclosure of material internal control weaknesses (*MW*);
FVU_{it-1}	=	the lag fundamental volatility uncertainty, which includes external factor (*EXTERNAL*), corporate life cycle (*LIFECYCLE*) and corporate governance (*CG*);
RQU_{it-1}	=	the lag *reporting* quality uncertainty, which combines measurements of financial statement uncertainty (*FS_UNCERTAINTY*) and material internal control weaknesses (*MW*);
$LnSALE_{it}$	=	the log of company *i*'s sales;
LEV_{it}	=	the long-term debt-to-asset ratio of company *i*;
MB_{it}	=	company *i*'s market-to-book equity ratio;
$CAPINT_{it}$	=	company *i*'s capital intensity measured by gross property, plant, and equipment divided by sales;
$ISSUE_{it}$	=	a dichotomous variable coded 1 if company *i*'s book value of equity increases by more than 15 percent from the prior year, and zero otherwise;
$REGIND_{kt}$	=	a dichotomous variable coded one if company *i*'s industry k is regulated, and zero otherwise;
$ICAUDIT_{it}$	=	a dichotomous variable coded one if company *i*'s 10-k report is under SOX 404, i.e., its internal control report is recorded in Audit Analytics's IC404 Database, and zero otherwise;
$POSTSOX_{it}$	=	a dichotomous variable coded one if company i is in post-SOX period, i.e., 2004-2009, and zero otherwise;

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

$HINDEX_{kt}$	=	the 2-digital SIC based Herfindahl index of the industry k in time t;
$INDPE_{kt}$	=	the mean P/E ratio of the industry k in time t;
$EXTERNAL_{kt}$	=	a composite score which is composed by the HI and P/E ratio;
$LIFECYCLE_{it}$	=	a composite score to determine a company's life cycle stage;
LC_GROWTH_{it}	=	1 if company i is in the growth stage;
$CGSCORE_{it}$	=	a composite score to measure the overall strength of corporate governance;
$FS\_UNCERTAINTY_{it}$	=	proxy for uncertainty measurement of financial reporting numbers; and
MW_{it}	=	1 if the internal control report, which is required by Section 302, discloses at least one internal control weakness.

To further investigate the relationship between companies confronting information uncertainty and their likelihood of hiring specialist auditors, we perform chi-square frequency tests. Figure 2 Panel A shows a contingency table between *SPEC* and *COMIU*. Seventy-six companies (82.26%) hired specialist auditors from among 92 companies facing comprehensive information uncertainty (*COMIU*). Panel B in Figure 2 indicates that 85 (80.19%) companies hired specialist auditors from among 106 companies confronting fundamental volatility uncertainty. Panel C in Figure 2 indicates that 467 companies (64.15%) hired specialist auditors from among 728 companies confronting reporting quality uncertainty. Consistent with H1, there is a significant association between companies confronting information uncertainty and the selection of specialists as successor auditors because all chi-square frequencies provide significant support.

Panel A: *SPEC* and *COMIU*

		SPEC		
		0	1	Total
COMIU	0	681	644	1,325
	1	16	76	92
	Total	697	720	1,417

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Pearson χ^2 = 39.8008 p-value=0.000

Panel B: *SPEC* and *FVU*

		SPEC		
		0	1	Total
FVU	0	676	635	1,311
	1	21	85	106
	Total	697	720	1,417

Pearson χ^2 = 39.5608 p-value=0.000

Panel C: *SPEC* and *RQU*

		SPEC		
		0	1	Total
RQU	0	436	253	689
	1	261	467	728
	Total	697	720	1,417

Pearson χ^2 = 106.5512 p-value=0.000

FIGURE 2 IU and Auditor Specialist Selection

Table 2 demonstrates the descriptive statistics and univariate tests using different *IU* proxies to partition the sample. Panel A uses a comprehensive measurement of information uncertainty (*COMIU*) as a criterion to separate companies confronting information uncertainty. Consistent with H1, Panel A indicates that companies in the *COMIU* subgroup are apt to hire specialist auditors and have larger sales. In the median test, comparisons show that companies in the *COMIU* subgroup exhibit higher leverage and capital intensity and lower market-to-book ratios. Panel B in Table 2 employs fundamental volatility uncertainty (*FVU*) as a criterion. Its results resemble those in Panel A.

Table 2 Panel C adopts reporting quality uncertainty (*RQU*) as a partition variable. It classifies 728 observations (51.38%) as presenting information of uncertain quality. The sample of reporting quality uncertainty relative to the non-uncertainty

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

group contains fewer companies in regulated industries and more companies subject to 404 internal control reports.

Table 3 presents Pearson and Spearman correlations for dependent and explanatory variables. As we expected, *SPEC* correlates positively and significantly with all measures of information uncertainty, i.e., *COMIU*, *FVU* and *RQU*. Correlation coefficients between *COMIU* and *FVU* (*RQU*) are >0.9 (<0.3) at 10% significance. *FVU* correlates highly with *COMIU,* but *RQU* correlates far less than *FVU*. All other coefficients are <0.8, indicating multicollinearity does not appear in this sample. We provide evidence of the variable associations after controlling for all posited effects.

4.3 MULTIVARIATE RESULTS

Table 4 reports the results of multivariate logistic regressions after switching to specialist auditors (*SPEC*) as the dependent variable. The pseudo R^2s approach 20%, and goodness-of-fit tests confirm models are proper. In Models 1 to 3, coefficients of proxies for information uncertainty, including *COMIU*, *RQU* and *FVU*, are significantly positive. These results support H1 (H1a, H1b, and H1c) and indicate that companies facing all kinds of information uncertainty in prior years hire specialists when switching auditors. H2 posits that companies confronting informational quality uncertainty (*RQU*) are more inclined to hire a specialist than are companies confronting fundamental volatility uncertainty *(FVU*).

The joint test in Model 4 is positive but insignificant. Although the likelihood of switching to a specialist auditor for *RQU* is larger than for *FVU*, no evidence rejects the null hypothesis that *RQU* equals *FVU*. We also observe that the positive coefficient of *RQU* attains 1% significance ($p < 0.000$), which surpasses *FVU*'s 10% ($p = 0.087$). Moreover, the odd ratio of *RQU* in Model 4 (0.617) indicates that its economic significance is 1.853. *FVU*'s odd ratio is 0.481 and its economic significance 1.677. That is, reporting quality uncertainty exerts more economic influence upon choosing a specialist auditor than does fundamental volatility uncertainty.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

TABLE 2

Descriptive Statistics for Information Uncertainty and Non-Information Uncertainty Subsamples

Panel A: Classified by COMIU

	COMIU = 1 (N = 92)					*COMIU* = 0 (N = 1325)					t-test[a]		Wilcoxon Z[b]	
Variable	Mean	Standard Deviation	Min	Median	Max	Mean	Standard Deviation	Min	Median	Max	Mean	t-value	Median	z-value
SPEC	0.826	0.381	0	1	1	0.486	0.500	0	0	1	0.340	6.395***	1	6.307***
LnSALE	7.383	1.350	4.247	7.369	10.895	4.520	2.141	-6.908	4.612	10.855	2.862	12.649***	2.757	12.294***
LEV	0.555	0.244	0.083	0.550	1.396	0.530	0.648	0.001	0.444	11.242	0.026	0.376	0.106	3.297***
MB	1.213	1.232	0.062	0.802	5.110	1.752	3.663	0.001	0.979	56.803	-0.539	-1.407	-0.177	-1.985**
CAPINT	1.134	1.331	0.028291	0.556	6.216	1.567	9.365	0	0.356	253.000	-0.434	-0.444	0.200	2.778***
ISSUE	0.283	0.453	0	0	1	0.319	0.466	0	0	1	-0.037	-0.730	0	-0.730
REGIND	0.370	0.485	0	0	1	0.455	0.498	0	0	1	-0.086	-1.595	0	-1.594
ICAUDIT	0.141	0.350	0	0	1	0.103	0.304	0	0	1	0.039	1.169	0	1.169
POSTSOX	0.424	0.497	0	0	1	0.444	0.497	0	0	1	-0.020	-0.371	0	-0.371

Panel B: Classified by *FVU*

	FVU = 1 (N = 106)					*FVU* = 0 (N = 1311)					t-test[a]		Wilcoxon Z[b]	
Variable	Mean	Standard Deviation	Min	Median	Max	Mean	Standard Deviation	Min	Median	Max	Mean	t-value	Median	z-value
SPEC	0.802	0.400	0	1	1	0.484	0.500	0	0	1	0.318	6.375***	1	6.288***

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

LnSALE	7.198	1.363	4.247	7.096	10.895	4.505	2.146	-6.908	4.592	10.855	2.694	12.717***	2.503	12.604***
LEV	0.534	0.259	0.083	0.543	1.396	0.531	0.650	0.001	0.444	11.242	0.003	0.051	0.099	2.524**
MB	1.320	1.268	0.062	0.874	5.127	1.749	3.680	0.001	0.970	56.803	-0.430	-1.196	-0.096	-1.040
CAPINT	1.090	1.325	0.028291	0.549	6.216	1.576	9.413	0	0.355	253.000	-0.486	-0.531	0.194	2.759***
ISSUE	0.292	0.457	0	0	1	0.319	0.466	0	0	1	-0.026	-0.561	0	-0.561
REGIND	0.396	0.491	0	0	1	0.454	0.498	0	0	1	-0.058	-1.147	0	-1.147
ICAUDIT	0.142	0.350	0	0	1	0.102	0.303	0	0	1	0.039	1.268	0	1.268
POSTSOX	0.425	0.497	0	0	1	0.444	0.497	0	0	1	-0.019	-0.387	0	-0.387

Panel C: Classified by *RQU*

	RQU = 1 (N = 728)					*RQU* = 0 (N = 689)					t-test[a]		Wilcoxon Z[b]	
Variable	Mean	Standard Deviation	Min	Median	Max	Mean	Standard Deviation	Min	Median	Max	Mean	t-value	Median	z-value
SPEC	0.641	0.480	0	1	1	0.367	0.482	0	0	1	0.274	10.726***	1	10.319***
LnSALE	5.564	2.185	-4.605	5.695	10.895	3.799	1.853	-6.908	3.994	7.749	1.765	16.353***	1.700	15.785***
LEV	0.537	0.454	0.005	0.493	7.984	0.526	0.774	0.001	0.407	11.242	0.010	0.309	0.086	4.385***
MB	1.604	4.072	0.001	0.887	56.803	1.837	2.917	0.007	1.115	44.607	-0.234	-1.237	-0.228	-4.929***
CAPINT	1.308	6.039	0	0.378	148.200	1.783	11.418	0	0.351	253.000	-0.475	-0.986	0.027	0.397
ISSUE	0.302	0.460	0	0	1	0.332	0.471	0	0	1	-0.030	-1.220	0	-1.220
REGIND	0.409	0.492	0	0	1	0.492	0.500	0	0	1	-0.083	-3.136***	0	-3.126***
ICAUDIT	0.133	0.340	0	0	1	0.075	0.264	0	0	1	0.058	3.557***	0	3.542***

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

POSTSOX	0.411	0.492	0	0	1	0.476	0.500	0	0	1	-0.065	-2.479**	0	-2.474**

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

[a] Tests the hypothesis that the means for the groups are significantly different from each other.

[b] Tests the hypothesis that the medians for the groups are significantly different from each other.

See Table 1 for variable definitions.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

TABLE 3

Correlation Matrices

	SPEC	*COMIU*	*FVU*	*RQU*	*LnSALE*	*LEV*	*MB*	*CAPINT*	*ISSUE*	*REGIND*	*ICAUDIT*	*POSTSOX*
SPEC	1	0.1676*	0.1671*	0.2742*	0.3685*	0.1079*	-0.0902*	0.1140*	0.0299	-0.0587*	-0.0493*	-0.3029*
COMIU	0.1676*	1	0.9267*	0.2563*	0.3267*	0.0876*	-0.0528*	0.0738*	-0.0194	-0.0424	0.0311	-0.0099
FVU	0.1671*	0.9267*	1	0.2015*	0.3350*	0.0671*	-0.0276	0.0733*	-0.0149	-0.0305	0.0337	-0.0103
RQU	0.2742*	0.2563*	0.2015*	1	0.4195*	0.1165*	-0.1310*	0.0105	-0.0324	-0.0831*	0.0941*	-0.0657*
LnSALE	0.3574*	0.3187*	0.3203*	0.3987*	1	0.3105*	-0.2451*	-0.0306	0.0343	-0.1854*	0.1259*	-0.0257
LEV	-0.0274	0.01	0.0013	0.0082	-0.0588*	1	-0.4251*	0.0963*	0.0032	-0.1869*	-0.0427	-0.0881*
MB	-0.0705*	-0.0374	-0.0318	-0.0329	-0.2545*	0.0992*	1	-0.0876*	0.2345*	0.2573*	0.0819*	0.1660*
CAPINT	-0.0319	-0.0118	-0.0141	-0.0262	-0.2689*	0.0610*	0.0346	1	-0.0699*	-0.1145*	-0.0228	-0.1043*
ISSUE	0.0299	-0.0194	-0.0149	-0.0324	0.0222	-0.0399	0.1119*	0.0128	1	-0.0056	0.0435	0.0773*
REGIND	-0.0587*	-0.0424	-0.0305	-0.0831*	-0.1612*	-0.0971*	0.0584*	-0.0724*	-0.0056	1	0.0001	0.0861*
ICAUDIT	-0.0493*	0.0311	0.0337	0.0941*	0.1083*	-0.039	0.0363	0.0109	0.0435	0.0001	1	0.3848*
POSTSOX	-0.3029*	-0.0099	-0.0103	-0.0657*	-0.0241	-0.0085	0.0485*	-0.0367	0.0773*	0.0861*	0.3848*	1

* indicates significance at the 10%.

See Table 1 for variable definitions.

This table reports correlations for the regression variables with Pearson correlations presented below the diagonal and Spearman correlations presented above the diagonal.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

TABLE 4 Logistic Regression Results for Auditor Switching Sample

	H1a	H1b	H1c	H2
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-1.426***	-1.543***	-1.433***	-1.476***
	(0.000)	(0.000)	(0.000)	(0.000)
COMIU	0.684**			
	(0.028)			
RQU		0.632***		0.617***
		(0.000)		(0.000)
FVU			0.562**	0.481*
			(0.045)	(0.087)
LnSALE	0.432***	0.396***	0.433***	0.378***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.289*	-0.301*	-0.284*	-0.293*
	(0.094)	(0.083)	(0.099)	(0.088)
ISSUE	0.019	0.015	0.019	0.013
	(0.328)	(0.462)	(0.332)	(0.511)
MB	0.016**	0.015**	0.016**	0.014*
	(0.026)	(0.038)	(0.025)	(0.054)
CAPINT	0.220*	0.249*	0.217	0.256*
	(0.098)	(0.063)	(0.101)	(0.056)
REGIND	0.162	0.163	0.159	0.158
	(0.198)	(0.198)	(0.206)	(0.214)
ICAUDIT	0.194	0.126	0.194	0.125
	(0.348)	(0.545)	(0.347)	(0.548)
POSTSOX	-1.535***	-1.510***	-1.534***	-1.514***
	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	1417	1417	1417	1417
Pseudo R^2	18.44%	19.39%	18.39%	19.54%
Goodness of Fit χ^2	1439.554	1414.690	1439.034	1415.999
Model χ^2	362.197	380.727	361.244	383.799
Joint test				
RQU-FVU = 0				0.136
t-value				0.43

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; p value is listed in parenthesis. See Table 1 for variable definitions.

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Our empirical results provide evidence that companies confronting information uncertainty, including comprehensive fundamental volatility uncertainty and reporting quality uncertainty, prefer specialist auditors when switching auditors and strongly support H1. Although no strong statistical proof supports H2, its economic significance shows that companies facing reporting quality uncertainty are more willing to hire specialist auditors than are companies facing fundamental volatility uncertainty.

4.4 ADDITIONAL TESTS

We adopt several alternate measures of auditor specialization as robustness checks and perform additional tests. First, we re-estimate *SPEC* using the total fee base. Because auditors' services include audit fees or non-audit fees, the latter are important in auditing research. Arruñada (1999) proposes that non-audit services improve audit quality through knowledge spillover. Frankel et al. (2002) doubt that non-audit service fees impair auditor independence. Therefore, we use total fees to compute SPEC and denote the top three firms within the industry and year they belong to as the specialist auditors. Results appear in Table 5 and exhibit signs similar to the main results in Table 4.

TABLE 5 Logistic Regression Results for Auditor Switching Sample with Total Fee Based Dependent Variable

	H1a	H1b	H1c	H2
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-1.639***	-1.782***	-1.645***	-1.690***
	(0.000)	(0.000)	(0.000)	(0.000)
COMIU	0.909***			
	(0.005)			
RQU		0.652***		0.632***
		(0.000)		(0.000)
FVU			0.750***	0.672**
			(0.009)	(0.019)
LnSALE	0.431***	0.400***	0.432***	0.375***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.222	-0.234	-0.216	-0.224
	(0.189)	(0.168)	(0.200)	(0.181)
MB	0.009	0.005	0.009	0.003
	(0.637)	(0.813)	(0.646)	(0.896)

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

CAPINT	0.017**	0.016**	0.017**	0.015**
	(0.014)	(0.018)	(0.013)	(0.031)
ISSUE	0.239*	0.267**	0.236*	0.277**
	(0.069)	(0.044)	(0.072)	(0.037)
REGIND	0.239*	0.243*	0.235*	0.236*
	(0.056)	(0.053)	(0.061)	(0.062)
ICAUDIT	0.099	0.03	0.1	0.027
	(0.634)	(0.885)	(0.630)	(0.897)
POSTSOX	-1.328***	-1.296***	-1.326***	-1.302***
	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	1417	1417	1417	1417
Pseudo R^2	17.45%	18.30%	17.37%	18.60%
Goodness of Fit χ^2	1478.705	1436.643	1478.631	1441.708
Model χ^2	342.706	359.414	341.275	365.341
Joint test				
RQU-FVU = 0				-0.04
t-value				-0.124

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; p value is listed in parenthesis. See Table 1 for variable definitions.

Second, we follow Mayhew and Wilkins (2003) and Knechel et al. (2007), who employ a threshold of 30% market share to classify auditors as industry specialists since their sample covered the Big 5 and Big 4 eras. Our sample is drawn from the Big 4 era, so we also consider auditors as specialists if they hold more than a 30% market share. That threshold is based on the percentage of audit fees of clients in the industry. We also denote *SPEC* as any auditor with a market share of 30% or more (Neal and Riley 2004; Lim and Tan 2008). These results show that all measures of information uncertainty are insignificant and positive.

Third, following Lim and Tan (2008), we measure auditor specialization using number of clients as the base. However, coefficients of information uncertainty measurements are insignificant and positive, and the joint test remains insignificant. These findings only partially support H1.

Fourth, to differentiate between the effects of *FVU* and *RQU*, we separate the innate and discretionary components of accrual quality using the two-stage method of Francis et al. (2005). Although we classify *FS_UNCERTAINTY* as one component of *RQU*, it may be influenced by *FVU* because *FS_UNCERTAINTY* is estimated as the standard deviation of five years of rolling residuals after regressing total current accruals for cash flow, revenues, and property, plant, and equipment. Therefore, we perform an extra regression for

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

FS_UNCERTAINTY to control effects of *FVU*. The equation is

$$FS\_UNCERTAINTY_{it} = \gamma_0 + \gamma_1 HINDEX_{kt} + \gamma_2 INDPE_{kt} + \gamma_3 LIFECYCLE_{it} + \gamma_4 CGSCORE_{it} + \omega_{it}, \quad (6)$$

where

$HINDEX_{kt}$ = the two-digit SIC-based HHI of industry k at time t

$INDPE_{kt}$ = the mean P/E ratio of industry k at time t.

We denote the new two-stage *FS2_UNCERTAINTY* as ω_{it} and adopt it to estimate *COMIU2* and *RQU2*. Table 6 shows the results. Apart from an insignificant *RQU*, the *COMIU* and *FVU* are significantly positive.

Finally, instances of switching auditors include dismissals and resignations. An auditor's resignation signals concern over the performance of the preceding auditor and more likely links to indications of risk than dismissals (Menon and Williams 2008). Following the separation suggested by Krishnan and Krishnan (1997), we reduce our sample to dismissals. Results appear in Table 7. As with our main result, *COMIU*, *FVU,* and *RQU* are positive, significant, and consistent with H1. No strong statistical proof supports H2, but the significance of *RQU* exceeds *FVU* in Model 4.

TABLE 6 Logistic Regression Results for Auditor with Two-staged Proxies

	H1a	H1b	H1c	H2
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-1.433***	-1.426***	-1.433***	-1.278***
	(0.000)	(0.003)	(0.000)	(0.009)
COMIU	0.562**			
	(0.045)			
RQU		-0.085		-0.153
		(0.844)		(0.725)
FVU			0.562**	0.569**
			(0.045)	(0.043)
LnSALE	0.433***	0.456***	0.433***	0.432***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.284*	-0.291*	-0.284*	-0.281
	(0.099)	(0.094)	(0.099)	(0.103)
ISSUE	0.217	0.210	0.217	0.219*
	(0.101)	(0.113)	(0.101)	(0.098)
MB	0.019	0.021	0.019	0.019
	(0.332)	(0.288)	(0.332)	(0.336)

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

CAPINT	0.016**	0.017**	0.016**	0.016**
	(0.025)	(0.016)	(0.025)	(0.026)
REGIND	0.159	0.165	0.159	0.158
	(0.206)	(0.188)	(0.206)	(0.208)
ICAUDIT	0.194	0.194	0.194	0.190
	(0.347)	(0.346)	(0.347)	(0.358)
POSTSOX	-1.534***	-1.530***	-1.534***	-1.534***
	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	1417	1417	1417	1417
Pseudo R^2	18.39%	18.18%	18.39%	18.40%
Goodness of Fit χ^2	1439.034	1440.231	1439.034	1438.777
Model χ^2	361.244	357.017	361.244	361.369
Joint test				
RQU-FVU = 0				-0.722
t-value				-1.353

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; p value is listed in parenthesis. See Table 1 for variable definitions.

TABLE 7 Logistic Regression Results for Auditor Dismissal Sample

	H1a	H1b	H1c	H2
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-1.326***	-1.452***	-1.338***	-1.387***
	(0.000)	(0.000)	(0.000)	(0.000)
COMIU	0.751**			
	(0.021)			
RQU		0.664***		0.646***
		(0.000)		(0.000)
FVU			0.590**	0.481
			(0.046)	(0.105)
LnSALE	0.414***	0.377***	0.416***	0.360***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.281	-0.287	-0.278	-0.281
	(0.112)	(0.103)	(0.116)	(0.108)
ISSUE	0.226*	0.249*	0.225	0.257*
	(0.100)	(0.073)	(0.101)	(0.064)
MB	0.017	0.012	0.017	0.010
	(0.386)	(0.554)	(0.385)	(0.604)

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

CAPINT	0.015**	0.014*	0.015**	0.013*
	(0.037)	(0.054)	(0.035)	(0.074)
REGIND	0.182	0.183	0.177	0.177
	(0.162)	(0.163)	(0.173)	(0.177)
ICAUDIT	0.058	-0.017	0.059	-0.017
	(0.790)	(0.940)	(0.785)	(0.938)
POSTSOX	-1.417***	-1.388***	-1.412***	-1.389***
	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	1302	1302	1302	1302
Pseudo R^2	16.82%	17.86%	16.73%	18.02%
Goodness of Fit χ^2	1322.045	1299.983	1320.565	1302.329
Model χ^2	302.481	321.279	300.911	324.048
Joint test				
RQU-FVU = 0				0.165
t-value				0.492

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; p value is listed in parenthesis. See Table 1 for variable definitions.

5. CONCLUSION

This study has examined whether companies are likely to choose specialty auditors when their financial statements are characterized by uncertain information. Previous studies note that information uncertainty prompts stakeholders to lower stock prices and discount company financials (Merton 1987; Beneish et al., 2005; Beneish et al., 2008). In response to stakeholders' perceptions, companies confronting information uncertainty may hire specialist auditors to defend the credibility of their financial statements. Therefore, we hypothesize that companies confronting information uncertainty engage specialist auditors to alleviate their information uncertainty.

An effective audit plan is key for high-quality audits, and understanding a client's business and environment is essential in planning audits. Referring to audit standards, we analyze how auditors approach to understand a client's environment and establish a framework of information uncertainty from their viewpoint. We construct a comprehensive measure for information uncertainty that disentangle uncertainties in fundamental volatility and reporting quality, a task that Zhang (2006) perceive to be difficult. Because audits are intended to reduce information risk (Knechel et al., 2008), we further suggest that specialist auditors demonstrate their greatest value when qualitative information is uncertain.

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To estimate auditor specialization accurately, we compute *SPEC* variables using audit fees instead of indirect measurements of total sales of auditees. Empirical tests in U.S. markets confirm that our results support our conjectures that companies confronting information uncertainty hire specialist auditors. Our results also show that companies confronting reporting quality uncertainty are more likely to hire specialist auditors than are companies confronting fundamental volatility uncertainty. The final implication is that companies exhibiting reporting quality uncertainty are more likely to hire specialist auditors whom external stakeholders find more reliable.

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