THREE ESSAYS ON MONITORING OF FINANCIAL REPORTING BY CORPORATE DIRECTORS

BY

YANG XU

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ABSTRACT

Recent high-profile financial scandals and increasing instances of restatements focus public attention on the role of audit committees, auditors and CFOs in maintaining the integrity and quality of corporate financial reporting. The U.S. Congress passed the Sarbanes-Oxley Act (SOX) in July 2002, and the New York Stock Exchange (NYSE) and the NASDAQ Stock Market, Inc. (Nasdaq) changed their listing requirements in 2004 to encourage more effective corporate governance in order to protect the integrity of the financial reporting system.

The purpose of my dissertation is to examine monitoring of financial reporting by corporate directors. My dissertation, entitled "Three Essay on Monitoring of Financial Reporting by Corporate Directors" examines how boards strengthen corporate governance through the formation of audit committees, the choice of external auditors, and the hiring of new CFOs. Study one proposes and tests two models explaining what factors affect the existence of designated audit committees and the extent of audit committee financial expertise at IPOs. Study two investigates factors impacting IPO firms' choice of an industry expert audit. Study three examines whether restatement companies experiencing chief financial officer (CFO) turnover hire new CFOs with more financial expertise.

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Audit Committee Formation at the IPO: Existence and Financial Expertise

ABSTRACT: Audit committee formation is of great importance in corporation governance. Overtime, regulators, shareholder, and investors have called for improvement in the monitoring service provided by audit committees. In this paper, we propose and test two models explaining what factors affect the existence of designated audit committees and the extent of audit committee financial expertise at IPOs. Our results show that foreign operations, industry concentration, CEO shareholdings, venture capital presence, underwriter ranking, the board size, and the percentage of outside directors are positively associated with the likelihood that companies have audit committees established before IPOs. Firm size is negatively associated with designation of audit committees pre-IPO. Results also show that IPO firms that have larger size, foreign operations, greater growth opportunity, less CEO power, the presence of venture capital, higher underwriter ranking, and more independent board members have greater proportions of audit committee members with financial expertise. These results provide new evidence on an important choice in the literature that seeks to understand factors related to audit committee formation.

I. INTRODUCTION

Corporate boards are often the focus of efforts to improve corporate governance. After a series of high-profile accounting scandals such as Enron and WorldCom, the U.S. Congress passed the Sarbanes-Oxley Act (SOX) in July 2002, and the New York Stock Exchange (NYSE) and the Nasdaq Stock Market, Inc. (Nasdaq) changed their listing requirements in 2004 to encourage more effective corporate governance in order to protect the integrity of the financial reporting system. Given the critical role of corporate audit committees in overseeing the financial reporting process, both SOX and related listing requirements of the major stock exchanges contain regulations intended to improve the conduct of audit committees.[1] The audit committee oversees corporate financial reporting by meeting regularly with the firm's outside auditors and internal financial managers to review the corporation's financial statements, audit process, and internal accounting controls. The regulations aim to improve the effectiveness of audit committees, yet such improvement can also result from individual company initiatives. No study to date explores how companies establish the effectiveness of their audit committees without regulatory intervention. The purpose of this paper is to investigate determinants associated with the establishment of an audit committee and the financial expertise of the audit committee under a unique setting – a firm's initial public offering (IPO).

We examine the determinants of audit committee formation at the IPO for the following three reasons. First, prior research studying audit committees has focused on characteristics of existing audit committees. Factors associated with establishing new audit committees have not been investigated. The IPO provides a unique setting to examine these issues because firms completing an IPO have a one-year phase-in period to establish a full independent audit committee (NYSE Listed Company

[1] For example, Section 407 of SOX (Disclosure of Audit Committee Financial Expert) requires the SEC to adopt rules mandating that audit committees of public firms must comprise at least one member who is a financial expert, or otherwise disclose reasons for not adopting this requirement. Under both NYSE's Section 303A and Nasdaq's Listing Rule 5600 Series rules, the audit committee must have at least three directors, all of whom must meet independence requirements, and at least one member must have accounting or related financial management expertise.

Manual Section 303A and Nasdaq Corporate Governance Rules & the Interpretative Process).[2] Venkataraman et al. (2008) find 22.4% of IPO firms during 2000-2002 do not have an audit committee at the time of the IPO. Therefore, the IPO provides a natural setting to examine why some firms choose not to have audit committees when they go public and if they choose to have one how they establish it.

Second, the IPO is a particularly rich setting for studying board issues because the IPO is the first time that most private firms raise equity from dispersed investors and begin to comply with public firms' filing requirements. Therefore, the IPO is normally associated with a significant change in the firm's corporate governance (Baker and Gompers 2003). The formation of the audit committee is likely to reflect such change. In addition, the formation of the audit committee at the IPO is expected to reflect a value-maximizing decision of IPO company insiders. As Gertner and Kaplan (1996) point out, firms undertaking a public offering are more likely to choose value-maximizing governance features than already-public firms because the selling insiders directly bear the financial effects of such features. Therefore, we choose such a setting to shed light on board structure at an early state.

Finally, prior research has extensively examined the consequences associated with effective audit committees, such as audit committee independence and audit committee financial expertise (e.g., Abbott et al. 2004, Carcello et al. 2003 and 2006, and Zhang et al. 2007). The only study on the determinants of audit committee effectiveness is Klein (2002), which examines the determinants of audit committee independence. Prior studies have not investigated determinants of audit committee financial expertise, which has been widely documented to be associated with better financial reporting

[2] http://www.nyse.com/pdfs/section303Afaqs.pdf and https://listingcenter.nasdaqomx.com/Show_Doc.aspx?File=FAQsCorpGov.html

quality. Thus, investigating the determinants of audit committee financial expertise should be informative to investors and regulators.

We study a sample of 659 IPO firms during the period of 2000-2010. We hand-collect audit committee information from the offering prospectuses (S-1 files). There have been variations in the definition of audit committee financial expert across time. The SEC adopted the initial definition of financial expertise in Section 407 of SOX, which only referred to prior accounting-related experience with SEC financial reporting. Qualifying work experiences included serving as a public accountant, auditor, principal financial or accounting officer, or controller. Some observers argued that this provision narrowed the pool of candidates qualified to serve as financial experts. In response, the SEC adopted a broader definition of financial expert for its final rules. The definition now allows for experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions. This definition qualifies CEOs or company presidents as financial experts. The revised SEC definition also allows for experience assessing the performance of companies or relevant similar experience (such as being an investment banker or venture capitalist) (SEC 2003).[3] However, academic research generally finds that only financial expertise under the narrow definition (both accounting experience and CFO working experience) is persistently and positively associated with audit committee effectiveness (Carcello and Neal 2003; Defond et al. 2005; Carcello et al. 2006; Krishnan and Visvanathan 2008). Thus, we adopt the narrow definition of financial expert in this study.

We group existing theories about corporate board structure into three non-mutually exclusive hypotheses to examine the determinants of the establishment of an audit committee and the financial expertise of the audit committee at the IPO. First, under the scope of operations hypothesis, the board

[3] http://www.sec.gov/rules/final/33-8177.htm

structure is driven by the scope and complexity of the firm's operations (Fama and Jensen 1983; Coles et al. 2008a; Lehn et al. 2009). The second hypothesis is that audit committee formation is the outcome of agency problems. We refer to this as the agency hypothesis. The third hypothesis, the negotiation hypothesis, states that audit committee formation results from a negotiation between the firm's CEO and its outside board members.

Our results provide mixed support for the three hypotheses. First, we find that measures of the scope and complexity of the firm's operations are positively associated with the early formation of the audit committee. For example, foreign operations are positively related to the likelihood that a firm will have an audit committee established at the IPO. Larger firms, firms with greater growth opportunity, and those having foreign operations are more likely to have audit committee financial expertise at the IPO. Thus, as private firms grow in scope and complexity of operations, they are more likely to set up their audit committees and to add more financial experts into them.

Second, audit committee existence is positively related to industry concentration, a measure of the private benefits available to insiders, and to CEO ownership, an interest alignment measure. This is consistent with the prediction, developed from the arguments forwarded by Jensen and Meckling (1976) and Berger and Hannan (1998), that audit committee existence is positively associated with high agency costs. However, we find no evidence that the financial expertise of audit committee members is related to the agency costs.

Third, both the existence of audit committees and the audit committee financial expertise are positively related to the constraints on CEO influence, such as the presence of a venture capitalist, the reputation of the firm's investment bank at the time of its IPO, the number of board members, and the proportion of outside directors on the board. In addition, the financial expertise of audit committee

members is negatively related to measures of the CEO's influence, including CEO/chairman duality, and job tenure. Our results are consistent with the theory proposed by Hermalin and Weisbach (1998) that corporate boards reflect the outcome of a negotiation between the self-interested CEO and outside board members.

Additional analyses reveal that passage of SOX is marginally associated with an increase in IPO audit committee financial expertise but is not associated with the early formation of audit committees.

Our paper contributes to research on corporate board structure. Specifically, we investigate the formation and financial expertise of audit committees. Several studies have examined the determinants of general board composition, such as board size and board independence (e.g. Boone et al. 2007; Linck et al. 2008; Lehn et al. 2009). Despite the important role of the audit committee in monitoring corporate financial reporting, only one study examines which economic factors affect audit committee composition. Klein (2002) finds that some board characteristics and firm characteristics affect audit committee independence. However, little is known about non-regulatory incentives to establish an audit committee and to have financial experts on the audit committee. These issues are important especially given the widely documented positive effect of audit committee financial expertise on financial reporting quality (Abbott et al. 2004; Abbott et al. 2003; Aier et al. 2005; Krishnan 2005; Lee et al. 2004). This paper fills the gap by providing empirical evidence on the determinants of audit committee establishment and financial expertise.

Our paper focuses on IPO firms, a setting where audit committee existence and financial expertise are not mandatory, thus allowing for a greater variability in governance structures across firms. Examining the audit committee formation for IPO firms also addresses a concern voiced by

Hermalin and Weisbach (2003) that most research on corporate boards has been limited to large, established companies. Moreover, IPO firms have unique and important stakeholders, such as venture capitalists and investment bankers. Thus, our study contributes to the literature by providing empirical evidence on how those unique players help shape firms' audit committee structure.

The remainder of the paper proceeds as follows. In Section II, we provide brief reviews of the literatures, and then turn to a discussion on how they impact audit committee formation and financial expertise in the IPO setting. This discussion provides the academic theory underlying the development of our conceptual models of determinants of audit committee existence and financial expertise at IPOs. We describe the research design in Section III and present the results in Section IV. Section V provides discussion on the results and concludes the paper.

II. BACKGROUND AND HYPOTHESES

Board Composition

Boards play a vital role in corporate governance. Studies investigating board composition largely focus only on the size and independence of boards. Several papers argue that small boards operate more effectively than large boards because of the high coordination costs and free-rider problems associated with large boards (Lipton and Lorsch 1992; Harris and Raviv 2008). Empirical studies examining the determinants of board size find it increases with asset tangibility, firm size, diversity of operations, and market-to-book ratio (Baker and Gompers 2003; Boone et al. 2007; Coles et al. 2008), but decreases with growth opportunities, stock return volatility, and CEO ownership (Mak and Roush 2000; Boone et al. 2007; Linck et al. 2008).

Independence is the other characteristic of board composition frequently examined by the literature. To strengthen corporate governance, regulations promoting specific board guidelines, such as SOX, typically call for greater outside representation. Most research finds that independence is necessary for the monitoring role taken by the board, and is the outcome of a negotiation between management and the board (Hermalin and Weisbach 1998). Anderson et al. (2000) and Coles et al. (2008b) argue that diversified firms deploy more independent directors to monitor complex operations and oversee managers' performance. These arguments are supported by the empirical findings of Lehn et al. (2009) and Boone et al. (2007). Boone et al. (2007) also provide evidence that the proportion of independent directors increases as firms grow while decreasing with the CEO's influence.

Audit Committee Existence, Size, and Independence

A well-functioning audit committee safeguards the independence of the auditor and imposes discipline on the financial reporting processes. Despite its important role in the assurance of corporate financial reporting, we know little about the formation and initial composition of audit committees. Beginning in 2004, Section 205 of the SOX Act of 2002 specifies that if no separate audit committee is designated, the entire board of directors acts as the audit committee. However, the full board does not meet SEC and exchange independence requirements for audit committees because it includes managers and other insiders. Thus, mature firms have designated audit committees comprised of subsets of their full boards. To our best knowledge, Klein (2002) conducts the first, and so far the only, empirical study examining what firm characteristics determine the independence of audit committees of mature firms.[4] Subsequent to the passage of SOX 2002, the NYSE amended its listing rules in 2004 to require that designated audit committees have a minimum of three members. All are

[4] Her main findings suggest that audit committee independence increases with board size and board independence and decreases with firms' growth opportunities. Firms reporting consecutive losses also have less independent audit committees.

required to be independent unless the company is exempted. Given the prevailing independence of audit committee members since SOX, we focus on the financial expertise of audit committee members, for which rules are much more flexible.

Financial Expertise of Audit Committee Members

Financial expertise of audit committee members is another important characteristic which contributes to the effective functioning of audit committees. In 1998, the chairman of the SEC, Arthur Levitt, gave a speech decrying the low quality of financial reporting numbers, especially earnings (Levitt, 1998). In response, the NYSE and NASD sponsored a Blue Ribbon Committee (BRC) to study the issues. The Committee recommended that at least one member of a company's audit committee should have accounting or related financial management expertise (BRC, 1999).[5] The NYSE and NASD adopted this recommendation. The exchanges' rules provided that this requirement could be satisfied either by a member having knowledge of GAAP obtained from experience as an accountant, auditor or CFO, or by someone having experience in supervising or assessing the performance of accountants or auditors, such as company presidents, CEOs, or investment bankers.[6]

After a series of high profile corporate accounting scandals, more specific requirements on the audit committee structure became effective. For instance, Section 407 of SOX requires that public firms' audit committees must include at least one member who is a financial expert or, otherwise, must disclose reasons for not doing so. This arguably increases pressure on companies to appoint financial experts to their audit committees. The initial definition of financial expertise in Section 407

[5] http://www.nasdaq.com/about/Blue_Ribbon_Panel.pdf

[6] The NYSE (2012, section 303A.07.a) requires that each member of the AC be (or become) financially literate. The financial literacy qualification is interpreted by the listed company's board of directors. The standard of financial literacy is less stringent than the standard for financial expertise employed in this study because it includes non-accounting financial expertise, such as experience supervising accountants and auditors. (http://nysemanual.nyse.com/lcm/Help/mapContent.asp?sec=lcm-sections&title=sx-ruling-nyse-policymanual_303A.07&id=chp_1_4_3_8)

of SOX only referred to education and experience in accounting and auditing. Some observers argued that provision narrows the pool of candidates qualified to serve as financial experts. In response, the SEC adopted a broader definition of financial expert for its final rules, similar to the provisions of the NYSE and NASD. In addition to experience in accounting and auditing , the SEC's definition of financial expert now allows for experience in supervising employees with financial responsibilities and overseeing the performance of companies (such as being a CEO or company president), as well as experience in financial services (such as being a banker or venture capitalist) .

We choose to study the narrowly defined financial expertise (i.e. accounting or auditing education and work experience) since the literature documents that audit committees having members with this expertise are associated with improved financial reporting quality. For example, a number of studies demonstrate that firms with narrowly defined financial experts serving on the audit committee are less likely to restate earnings (Abbot et al. 2004), and less likely to manage earnings (Carcello et al. 2006; Dhaliwal et al. 2006; Xie et al. 2003). However, research provides mixed evidence on the effectiveness of broadly defined financial expertise in promoting improved financial reporting (Carcello and Neal 2003; Defond et al. 2005; Park and Shin 2004; Goh 2009). Although Goh (2009) finds that audit committees with greater nonaccounting financial expertise remediate internal control material weakness more rapidly, several other studies fail to provide evidence that financial expertise under the broad definition positively influences audit committee effectiveness (Carcello and Neal 2003; Defond et al. 2005; Carcello et al. 2006; Krishnan and Visvanathan 2008). Therefore, we adopt narrowly defined financial expertise in this study.

Audit Committees at IPOs

Our paper extends the literature by exploring the formation and financial expertise of designated audit committees at the IPO. Specifically, we examine the existence of designated audit committees and the nature of financial expertise of the audit committee when companies initially go public. As we discussed earlier, the IPO represents an important corporate event because it is the first time that most private firms raise equity from dispersed investors and begin to comply with public firms' filing requirements. Therefore, establishing effective corporate governance that ensures reporting quality to protect shareholders' interest is important at IPOs. The audit committee and the financial expertise of audit committee members should play an important role as a governance mechanism for overseeing IPO firms' financial reporting.

Some IPO companies do not have designated audit committees during the first year post-IPO because companies completing an IPO have a one-year phase-in period in which to comply with the requirements governing audit committees (see the examples in the Appendix). SEC rules require only one fully independent audit committee member at IPO, a majority of independent members within 90 days, and a fully independent audit committee within one year. Major stock exchange rules are similar (NYSE 303A.07 Audit Committee Additional Requirements; Nasdaq Listing Rule 5600 Series). Furthermore, there is no requirement that audit committees be separately designated. The entire board can function as an undesignated audit committee. Venkataraman et al. (2008) report that 78.6 percent of 350 IPO firms during 2000-2002 make reference to specific individuals as being current members of an audit committee in the prospectuses while the remaining 22.4 percent do not. Thus, IPOs provide a natural setting for us to investigate the factors associated with the establishment of designated audit committees at the initial IPO and the presence of financial experts on the audit committee.

We now turn to three theories about board formation (the scope of operations theory; the agency theory; and the negotiation theory) to propose the determinants of the existence and financial expertise of audit committees at IPOs.

Determinants of Existence and Financial Expertise of the Audit Committee at IPOs

The scope of operations hypothesis

We propose that the scope of a firm's operations determine the existence and financial expertise of the audit committee at IPO. Although prior research primarily focuses on the impact of scope of operations on board size and independence, we argue that the scope of operations hypothesis also applies to existence of designated audit committees and to audit committee financial expertise. The scope of operations hypothesis refers to the view that the scope and complexity of production processes affect corporate governance: larger or more complex processes tend to require larger and more independent boards (Fama and Jensen 1983; Coles et al. 2008a). Consistent with this view, Boone et al. (2007) and Lehn et al. (2009) argue that more diversified firms require more board services and more monitoring because they have more significant agency problems and wider scope of operations. Similarly, Linck et al. (2008) argue that larger boards represent a wider range of expertise and document that board size and independence increase with firm complexity. Klein (2002) also suggests that high-growth opportunity firms face more uncertainty and require more expertise in the audit committee. We expect that IPO companies having larger or more complex processes will tend to provide designated audit committees and greater audit committee financial expertise at IPO. In empirical tests, we use four measures to proxy for the firm's scope and complexity: the firm's size, age, the existence of foreign operations, and growth opportunities.

H1a: The existence of a designated audit committee at the IPO is positively related to operational complexity and scope.

H1b: The extent of audit committee financial expertise is positively related to operational complexity and scope.

The agency costs hypothesis

Agency theory posits an inherent moral hazard problem in principal-agent (owner-manager) relations that gives rise to agency costs. Jensen and Meckling (1976) put forward managerial ownership as an internal control mechanism for agency problems. Under the interest alignment argument, owner-managers have an opportunity for entrepreneurial gains so they have incentives to increase the value of the firm.[7] Boone et al. (2007) and Linck et al. (2008) find that CEO ownership is negatively related to board size and board independence. It follows from this argument that firms with higher levels of manager ownership would have less need for the monitoring provided by audit committees than would firms with lower levels of manager ownership, assuming a "convergence of interests" as manager ownership increases.

However, under a countervailing argument, called managerial entrenchment, high CEO ownership can decrease firm value (DeAngelo and DeAngelo 1985; Shivdasani 1993; Stulz 1988). Denis et al. (1997) find that CEO ownership is negatively related to the likelihood of CEO turnover. Lins (2003) documents that top management ownership reduces firm value in emerging markets. Therefore, we argue that CEO ownership will motivate the CEO to manipulate financial reporting to pursue private interests at the expense of shareholders, so that effective monitoring by audit

[7] The argument states that managerial ownership is positively related to firm performance because the alignment of the interests of managers and shareholders reduces agency costs (Jensen and Meckling 1976).

committees is necessary. We expect CEO ownership is positively related to the existence of an audit committee and the extent of an audit committee financial expertise.

In addition, the models developed by Raheja (2005) and Harris and Raviv (2008) suggest that agency costs increase with managers' opportunities to consume private benefits. Thus, the establishment of an audit committee and financial expertise of the audit committee should be positively related to managers' private opportunities. We use two measures of managers' potential private benefits to test the agency costs hypothesis: the firm's free cash flow and a Herfindahl measure of industry concentration. Jensen (1986) argues that managers are more likely to exploit private benefits in firms with more free cash flow because free cash flow is under the direct control of managers. Berger and Hannan (1998) document that the lack of market discipline resulting from high levels of market concentration allows managers to take part of the benefits of concentration not as higher profits, but in the form of a ''quiet life,'' in which they do not work hard to keep costs under control.

H2a The existence of an audit committee at the IPO is positively related to agency costs (negatively related to inverse proxies for agency costs).

H2b: The extent of audit committee financial expertise at the IPO is positively related to agency costs (negatively related to inverse proxies for agency costs).

The negotiation hypothesis

The negotiation hypothesis states that the board structure is the outcome of a negotiation between the CEO and outsiders (Hermalin and Weisbach 1998). In this view, a powerful CEO influences the composition and function of the board by placing insiders and affiliated outsiders on it. Consistent with this, Boone et al. (2007) show that the CEO's influence is negatively related to the proportion of

independent board members. Carcello et al. (2011) find CEOs sitting on the nominating committee negatively affect the effectiveness of the monitoring role of the audit committee. Therefore, we argue that the CEO's influence is negatively related with the existence and financial expertise of an audit committee, while constraints on the CEO's influence are positively related to the existence and financial expertise of an audit committee. We use three measures of the CEO's influence in our empirical tests: the CEO's job tenure, and two dummy variables that represent whether the CEO is also the chairman of the board and a founder of the firm. Measures of constraints on this influence consist of a dummy variable that represents the presence of a venture capital investor at the time of the IPO, and the Carter and Manaster (1990) ranking of the reputation of the firm's investment banker at the time of its IPO.

The CEO's financial expertise is another factor that could impact the formation of the audit committee. The CEO's financial expertise could proxy for either the CEO's influence or a constraint on this influence. On the one side, CEOs with financial expertise could have higher professional competence and ethics, continuing education, and reputation, which might constrain the CEOs' self-serving behavior. On the other side, CEOs with financial expertise might wish to use their financial expertise to manipulate accounting reports. Feng et al. (2011) find that CFOs of firms engaging in irregularities are more likely to be CPAs than those of control firms, which suggests that CEOs with financial expertise are better able to come up with accounting schemes to boost earnings. Therefore, we have no directional prediction on the relation between CEO financial expertise and the existence and financial expertise of an audit committee at the IPO.

H3a: The existence of an audit committee at the IPO is negatively related to CEOs' influence and positively related to constraints on this influence.

H3b: The extent of audit committee financial expertise is negatively related to CEOs' influence and positively related to constraints on this influence.

III. SAMPLE AND RESEARCH MODEL

Sample

We start with all initial public offerings of common equity reported in the SDC/Platinum New Issue database during the period between 2000 and 2009. Adopting criteria that are common in the empirical IPO literature (Chemmanur and Paeglis 2005; Boone et al. 2007), we eliminate REITs, closed-end funds, unit offerings, financial firms (all firms with SIC codes between 6000 and 6999) and utility firms (all firms with SIC codes between 4900 and 4949), leveraged buyouts (LBO), roll-ups, IPOs having offer price less than 5 dollars, and foreign companies. We then delete offerings listed on non-US public marketplaces, foreign firms, and firms not covered by Compustat. Finally, we eliminate offerings with missing prospectuses, missing management and board information, and missing financial data, yielding a final sample of 659 firms. Table 1 summarizes the sample selection process.

We then collect CEOs, CFOs, board, and ownership data on the sample firms at the IPO from the offering prospectuses (S-1 files). The prospectuses are obtained from the SEC's Edgar database. Audit committee members' financial expertise is measured in the fiscal year in which the IPO occurs. We code each audit committee member's financial expertise into one of the following categories:[8] (1) specific accounting experience as a CPA or in public accounting; (2) work experience as a chief financial officer, vice-president of finance, or controller; (3) work experience as an investment banker, financial analyst, venture capitalist, or any other financial management roles; and, (4) work experience

[8] We follow the categories of financial expertise classified by Naiker and Sharma (2009) who adopt the most detailed categories on audit committee financial expertise.

as a chief executive officer or company president. We code accounting financial expertise (the narrow definition) equal to one if an audit committee member has experience in either category (1) or (2). We also conduct additional analyses by incorporating non-accounting financial expertise (the broad definition) in which we code financial expertise equal to one if an audit committee member has experience in any one of the four categories above.

[Insert Table 1 here]

Research Model

Determinants of the existence and financial expertise of an audit committee at the IPO

First, to examine the determinants of an IPO firm's choice to establish an audit committee, we use a logit model with the dependent variable, *AC*, which equals one if a given IPO firm has an audit committee prior to its IPO and 0 otherwise. Second, to examine the determinants of an IPO firm's choice of financial expertise on the audit committee, we restrict our sample to firms that established an audit committee. We employ an OLS regression model with the dependent variable, *ACFE%*, equaling the proportion of financial experts on the audit committee. Independent variables represent factors that are hypothesized to affect the IPO firm's choice to establish an audit committee or appoint financial experts.

The scope of operations hypothesis

We use firm size, firm age, growth opportunity, and foreign operations to proxy for the scope and complexity of a firm's operations. The scope of operations hypothesis predicts that the existence of an audit committee and its financial expertise are positively related to all four measures. Firm size (*LNAT*) is measured as the natural log of total assets. Firm age (*FMAGE*) is calculated as the number

of years since the firm was founded.[9] Growth opportunity (*GRWOPP*) is measured as the market value of equity plus book value of total debt, divided by total assets. Foreign operations (*FOREIGN*) is measured as an indicator variable that equals one if a firm has pretax foreign income, and zero otherwise.

The agency costs hypothesis

We use three variables to test the agency costs hypothesis. CEO shareholdings (*CEOHD*), is measured as the proportion of outstanding common shares held by the CEO prior to the offerings. CEO ownership proxies for the convergence of interests between agents and principals, thus it is an inverse proxy for agency costs. The other two measures proxy for managers' opportunities for private benefit. Free cash flow (*FREECF*) is measured as the firms' earnings plus depreciation minus capital expenditures, scaled by assets. Firms in more concentrated industries face greater agency costs due to the increased likelihood that CEOs will pursue private benefits (Linck et al. 2008). Herfindahl index of industry sales (*HHI*) based on all firms on Compustat is used to measure industry concentration. The agency costs hypothesis predicts that the existence of an audit committee and its financial expertise are negatively related to CEO ownership (due to interest alignment) and positively related to free cash flow and industry concentration. The managerial entrenchment hypothesis predicts that the existence of an audit committee and its financial expertise are positively related to CEO ownership and positively related to free cash flow and industry concentration. Due to the existence of the two countervailing effects of interest alignment and managerial entrenchment, we make no directional prediction of the coefficient for CEO ownership (CEOHD)

[9] Founding dates are obtained from the Field-Ritter dataset (Field and Karpoff 2002; Loughran and Ritter 2004).

The negotiation hypothesis

We use two sets of variables to test whether the existence of an audit committee and its financial expertise reflect a negotiation between the CEO and outside board members. Three dummy variables, CEO tenure, CEO duality (holding the chair position), and a CEO founder variable represent the CEO's influence in the negotiation. CEO tenure equals one if the number of years in which the CEO has held the CEO position in the firm is greater than the sample median, and zero otherwise. CEO chair equals one if the CEO is the chairman of the board, and zero otherwise. CEO founder equals one if the CEO is the founder of the IPO firm, and zero otherwise. We use a combination variable, *CEO_POWER*, to capture the overall effect of the above three variables. *CEO_POWER* is the sum of CEO tenure, CEO duality, and CEO founder. Higher values of the CEO power variable imply greater CEO influence on the board.

Venture capital investment and investment bank reputation measure the constraints on the CEO's influence. The venture capital dummy variable (*VC*) is set to one if a venture capital investor owns an equity stake at the IPO, and investment bank reputation (*UWRANK*) is measured by the bank's Carter-Manaster (1990) rank at the time of the firm's IPO. The negotiation hypothesis predicts that the existence of an audit committee and its financial expertise are negatively related to CEO power, and positively related to venture capital investment and investment bank reputation.

To proxy for financial expertise of CEOs, we use a dummy, equal to 1 if the CEO has work experience as an accountant, auditor, controller, chief accounting officer or CFO; otherwise 0.[10] We have no directional prediction on the sign of the coefficient for financial expertise of CEOs (CEOFE) due to the competing theories under the negotiation hypothesis.

[10] We also use a dummy, equal to 1 if the CEO has work experience meeting the broad definition of financial expertise. The untabulated results are similar.

We also control for corporate governance (board size and percent of outside directors) and two IPO firm financial characteristics (leverage and loss) in the model. Because the audit committee is a subset of the board, its structure depends on the board's composition. The size of the board determines the number of directors available to serve on the audit committee. If the pool of board members is small, the likelihood of establishing an audit committee is limited. Klein (2002) finds that audit committee independence increases with board size and with the independence of the board. Board size (*BDSIZE*) is the number of directors on the board. Outside directors are measured as the number of outside directors divided by the total number of directors. Outside directors (*BDINDEP*) are defined as those who are not employees or stakeholders in the company. We expect *BDSIZE* and *BDINDEP* are positively related to AC existence and financial expertise. Two financial variables are leverage and loss. Leverage (*LEV*) equals total debt divided by total assets. Loss (*LOSS*) equals one if income before extraordinary items is negative, and zero otherwise. We make no directional predictions for these two variables.

The logit model of IPO firms' choice to establish an audit committee is specified in the Model (1) as follows:

$$\begin{aligned} AC = {} & \beta_0 + \beta_1 LNAT + \beta_2 FIRMAGE + \beta_3 GRWOPP + \beta_4 FOREIGN \\ & + \beta_5 FREECF + \beta_6 HHI + \beta_7 CEOHD + \beta_8 CEOPOWER + \beta_9 CEOFE \\ & + B_{10} VC + \beta_{11} UWRANK + \beta_{12} BDSIZE + \beta_{13} BDINDEP + \beta_{14} LEV + \beta_{15} LOSS \\ & + Industrydummies + e_t \end{aligned}$$

The OLS regression model of IPO firms' choice to establish the financial expertise of audit committees is specified in the Model (2) as follows:

$$
\begin{aligned}
ACFE\% = \quad & \beta_0 + \beta_1 LNAT + \beta_2 FIRMAGE + \beta_3 GRWOPP + \beta_4 FOREIGN \\
& + \beta_5 FREECF + \beta_6 HHI + \beta_7 CEOHD + \beta_8 CEOPOWER + \beta_9 CEOFE \\
& + B_{10} VC + \beta_{11} UWRANK + \beta_{12} BDSIZE + \beta_{13} BDIND + \beta_{14} LEV + \beta_{15} LOSS \\
& + Industrydummies + e_t .
\end{aligned}
$$

IV. RESULTS

Descriptive Statistics

Panel A of Table 2 presents descriptive statistics of the IPO sample. 87.9% of firms have audit committees, indicating that although regulation requires all public firms to have an audit committee within one year after IPO, some firms wait until after their IPOs to establish audit committees. Among firms that have an audit committee, 60.7% of the audit committee members satisfy the SEC's "audit committee financial expert" definition. The mean of IPO firm size (total assets) is 195 million dollars (pre-logged) and is comparable to other IPO studies. 11.5% of firms have foreign operations. IPO firms are 16 years old (pre-logged) on average. The CEOs hold 48.1% of shares. 20.6% of CEOs are financial experts. The majority (53.9%) of the IPO firms are backed by venture capitalists. On average, there are 7 directors on IPO boards and 73.2% of them are outside directors. For the two financial characteristic control variables, the leverage is 0.382 and 49.9% of sample firms report losses.

Panel B of Table 2 reports the difference in means of the variables between firms establishing ACs at the time of IPO (AC=1) and firms not doing so (AC=0). 80 out of the 659 sample firms do not have ACs at the time of IPO. Except for the means of CEO financial expertise, the means of all the other variables are statistically different between the two groups.

----------Insert Table 2 Here----------

Correlations

Table 3 presents Pearson correlations between the Model (1) dependent variable AC and the independent variables. The Spearman correlations are similar. AC is significantly and positively correlated with GRWOPP, CEOHD, CEOPOWER, VC, UWRANK, BDSIZE, and BDINDEP. AC is negatively correlated with LNAT, FIRMAGE, FREECF, HHI, and LEV. Since we use a reduced sample to test determinants of ACFE%, variable ACFE% is not presented in the correlation table. ACFE% is positively associated with LNAT, FOREIGN, GROWTHOPP, VC, UWRANK, BDSIZE, and BDINDEP, while it is negatively associated with FIRMAGE, FREECF, HHI, and CEOPOWER.

----------Insert Table 3 Here----------

Regression Results

Audit Committee Establishment

Table 4 reports the logistic regression results for Model (1). The model explains 66.2% of the dependent variable variance. Results show that the establishment of an audit committee is positively associated with foreign operations (p-value = 0.035). This finding suggests that foreign operating firms require the monitoring of the audit committee. Contrary to our prediction, the association between the dependent variable and firm size is significantly negative (p-value = 0.006). One explanation could be that small firms have less transparent financial information, thus investors and venture capitalists demand more monitoring of their financial information by audit committees. The associations between the establishment of an audit committee and firm age and growth opportunities are not significant.

For our agency cost hypothesis, results in Table 4 show that the establishment of an audit committee is positively associated with industry concentration and with CEO shareholdings (p-values = 0.065 and 0.043, respectively). The coefficient of free cash flow is not significant. The results are

consistent with H2a that the establishment of an audit committee is positively (negatively) associated with (inverse) proxies for agency cost.

With regard to the negotiation hypothesis, the coefficient on venture capital presence is positive and significant, which is consistent with our expectation that venture capitalists demand higher quality of accounting information (Morsfield and Tan 2006). The coefficient on underwriter reputation is also positive and significant, suggesting that underwriters with higher reputation require more monitoring on financial reports. The positive associations between AC and VC as well as UWRANK do not support the argument that the demand for audit committees decreases with the availability of substitute monitoring mechanisms (Klein 2002). The coefficients on CEO power and CEO financial expertise are not significant.

Results on control variables indicate that larger boards and boards with more outside directors are more likely to establish audit committees. The associations between audit committee and leverage and loss are not significant.

In summary, we find results supporting H2a and H3a that the establishment of an audit committee is positively associated with agency costs and negatively associated with CEO negotiation power. The results on H1a are somewhat mixed.

----------Insert Table 4 Here----------

Audit Committee Financial Expertise

Table 5 reports the OLS regression results for the determinants of audit committee financial expertise. The dependent variable is ACFE%. The sample is restricted to firms that have established audit committees. The model explains 12.9% of dependent variable variance. The proportion of

financial experts on audit committees is positively associated with firm size, growth opportunities, and foreign operations, which supports H1b. The coefficient on firm age is not significant. The differing results for firm size between Table 4 and Table 5 are interesting. Small IPO firms are more likely to have designated ACs, which suggests greater need for monitoring by ACs. However, large firms have greater proportions of FEs on ACs. Large companies have more resources and might be more attractive to financial experts than small companies.

Results in Table 5 show that the associations between the percentage of financial experts on audit committees and three measures of agency costs are not significant.

Consistent with H3b, the financial expertise of audit committees is negatively associated with CEO power and positively associated with venture capital presence and underwriter reputation. The coefficient on CEO financial expertise is not significant. Results on control variables indicate that outside directors are positively associated with financial expertise on audit committees. Board size, leverage, and loss have insignificant coefficients.

In summary, we find results supporting H1b and H3b: that the financial expertise on audit committees is positively associated with scope of operations, and is negatively associated with CEO negotiation power. We find no support for H2b.

----------Insert Table 5 Here----------

The Sarbanes-Oxley act of 2002 (SOX) effect

Finally, we expect SOX to play a role in the composition of audit committees. To improve financial reporting quality, it requires the SEC to adopt rules mandating audit committees to have at least one member who is a financial expert or to disclose reasons for not adopting this requirement.

We predict that financial expertise of IPO firms' boards increases in the post-SOX period. Results are presented in Table 6. POSTSOX equals 1 if company's IPO year is after 2002, 0 if company's IPO year is before 2002. In Table 6, the dependent variable is AC, coded as 1 if the firm has a designated audit committee. The result shows that the coefficient of POSTSOX is positive but insignificant. Table 7, with ACFE% as the dependent variable, shows that the coefficient of POSTSOX is positive and marginally significant (one-side p-value=0.08).

----------Insert Table 6 & 7 Here----------

Broadly defined financial expertise

While SOX suggested a narrow definition of financial expertise for audit committee members, the SEC and the major U.S. stock exchanges adopted a broader definition of financial expertise, which includes accounting expertise, or any experience in supervising employees with financial responsibilities, or experience overseeing the performance of companies. Prior literature has failed to find strong evidence that financial expertise under the broad definition positively influences audit committee effectiveness (Carcello and Neal 2003; Anderson et al. 2004; Lee et al. 2004 and DeFond et al. 2005). In additional analysis, we investigate whether the hypothesized operating and governance characteristics affect the choice of broadly defined financial expertise on audit committees. Therefore, we use the proportion of broadly defined financial experts to total AC members as dependent variable in model (2) in an alternative regression. Results in Table 8 show that financial expertise is negatively associated with firm age and CEO power, and is positively associated with foreign operations (marginally), underwriter ranking, board size and board independence. Other variables are not significant. Compared with those in Table 5, the proxies capturing operational demands (e.g. size and growth opportunities) largely lose significance, suggesting that complexity and scope of operations

require more accounting expertise rather than the broadly defined financial expertise. The presence of venture capitalists is not significant in Table 8, which indicates that venture capitalists prefer to include more accounting expertise rather than the broadly defined financial expertise in audit committee.

V. SUMMARY AND CONCLUSION

In this paper, we propose and test a model of the determinants of IPO firms' choices to establish audit committees and to select audit committee members with financial expertise. Our paper extends prior board structure research concerning the determinants of the effectiveness of corporate governance. In our sample, about 12 percent of companies do not have an audit committee, and among those that have audit committees, around 30 percent have less than one third of their AC members with financial expertise at the time of filing IPOs. Our results show that foreign operations, industry concentration, CEO shareholdings, venture capital presence, underwriter ranking, the board size, and the percentage of outside directors are positively associated with the likelihood that companies have audit committees established before IPOs. Firm size is negatively associated with designation of audit committees pre-IPO. Results also show that IPO firms that have larger size, foreign operations, greater growth opportunity, less CEO power, the presence of venture capital, higher underwriter ranking, and more independent board members have greater proportions of audit committee members with financial expertise. In summary, the audit committee formation results provide some support for the operational scope hypothesis and stronger support for the negotiation hypothesis. Our investigation of determinants of financial expertise on the audit committee provides support for the operational scope hypothesis and the negotiation hypothesis. These results provide new evidence on an important choice in the literature that seeks to understand factors related to audit committee formation.

Like any empirical study, this study has some limitations. Most notably, we focus only on IPO firms that report all the required information on the board and management in their S1 files, and also require they be covered by Compustat. To the extent that these disclosures are inaccurate or incomplete it introduces error in our measures of audit committee existence and financial expertise. We find little evidence that agency costs influence audit committee formation or financial expertise. Given the importance of agency costs in determining governance features in prior literature, we think these results deserve further study. We also recommend that additional study be devoted to the opposite effects of firm size on audit committee formation versus financial expertise.

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APPENDIX

- TEXAS ROADHOUSE, INC. Prospectus DATED OCTOBER 4, 2004 "*After the offering,* our board of directors will establish standing committees in connection with the discharge of

its responsibilities. These committees will include an audit committee, a compensation committee and a nominating and governance committee."

- KBR, Inc. Prospectus DATED NOVEMBER 15, 2006 "Our board of directors *plans to have an audit committee, a compensation committee, an executive committee and a special committee following this offering.* The independent directors we plan to appoint prior to the closing of this offering will serve as the initial members of the audit committee and the compensation committee of our board of directors. Following the transition periods permitted under applicable New York Stock Exchange and SEC requirements for independence of audit committee members, we intend that all of the members of our audit committee and compensation committee will be independent."
- Vanguard Natural Resources, LLC Prospectus dated October 11, 2007 "We currently contemplate that the audit committee will consist of up to three directors. *Immediately following the pricing of this offering,* we will have one member of the audit committee and such member will be independent under the independence standards established by NYSE Arca and SEC rules, and will be our "audit committee financial expert," as defined under SEC rules."

Table 1 Sample Selection Procedure

Sample Selection Procedure	Number of Observation
Initial Public Offering issued in US from SDC (2000-2010)	2155
Less:	
Financial and utility firms (SIC codes: 6000-6999 and 4900-4949)	(692)
Closed-end fund/trusts	(15)
Unit Issues	(13)
Spinoff (equity carveout)	(57)
Offer price (US$) less than 5	(77)
Non-US public marketplace	(220)
Foreign firms	(20)
Not covered by Compustat	(211)
Prospectus missing	(24)
Board and CEO information missing in Prospectus	(158)
Financial data missing	(9)
Final sample	**659**

Table 2 Descriptive Statistics

Panel A

Variable	Mean	Median	Minimum	Maximum	Std Dev
AC	0.879	1.000	0.000	1.000	0.327
ACFE%	0.607	0.667	0.000	1.000	0.318
LNAT	5.274	5.095	2.502	8.687	1.179
FOREIGN	0.115	0.000	0.000	1.000	0.320
GRWOPP	2.901	2.302	0.405	13.476	2.286
FMAGE	2.316	2.197	0.000	4.796	0.967
FREECF	-0.123	-0.039	-1.457	0.286	0.267
HHI	0.049	0.039	0.012	0.286	0.041
CEOHD	0.481	0.000	0.000	1.000	0.500
CEOPOWER	1.159	1.000	0.000	3.000	1.040
CEOFE	0.206	0.000	0.000	1.000	0.405
VC	0.539	1.000	0.000	1.000	0.499
UWRANK	0.574	1.000	0.000	1.000	0.495
BDNUM	6.863	7.000	2.000	11.000	1.847
BDIND	0.732	0.778	0.000	1.000	0.180
LEV	0.382	0.305	0.029	1.400	0.268
LOSS	0.499	0.000	0.000	1.000	0.500
N	**659**				

Variable definitions:

AC	=	an indicator variable that equals 1 if the firm has an audit committee, and 0 otherwise;
ACFE%	=	the proportion of financial experts on the audit committee;
LNAT	=	Natural logarithm of total assets;
FOREIGN	=	an indicator variable equal to 1 if a firm had pretax foreign income, and 0 otherwise.
GRWOPP	=	growth opportunity that equals to market value of equity plus book value of total debt (debt in current liability and long-term debt), divided by total assets;
FMAGE	=	Natural logarithm of firms' age;
HHI	=	The Herfindahl index;
CEOHD	=	an indicator variable that equals 1 if the percent of total shares held by the CEO is above the median, and 0 otherwise;
CEOPOWER	=	an indicator variable that equals 1 if CEO tenure (the number of years that a CEO is in the current position) is above the median; CEO is also the chairman of the board; the CEO is the founder of the firm, and 0 otherwise;
CEOFE	=	an indicator variable that equals 1 if CEO a financial expert, and 0 otherwise;
VC	=	an indicator variable that equals 1 if the IPO is backed by a venture capitalist, and 0 otherwise.
UWRANK	=	Ritter's updated Carter-Manaster (1990) underwriter reputation measure on the quality of the lead underwriter
BDNUM	=	the number of the board member(s);
BDIND	=	the percentage of independent member(s) on the board;
LEV	=	total liability divided by total assets;
LOSS	=	an indicator variable that equals 1 if income before extraordinary items is negative, and 0 otherwise;

Table 2 Descriptive Statistics (continued)

Panel B

	AC=0		AC=1		
Variable	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Ttest P-value**
AT(pre-logged)	717.900	913.900	376.900	631.000	<.0001
FOREIGN	0.025	0.157	0.128	0.334	0.007
GRWOPP	2.343	1.870	2.978	2.790	0.020
FMAGE(pre-logged)	21.788	28.241	15.993	20.094	0.023
FREECF	-0.069	0.218	-0.130	0.273	0.054
HHI	0.063	0.064	0.048	0.037	0.002
CEOHD	0.288	0.456	0.508	0.500	0.000
CEOPOWER	0.963	0.947	1.187	1.051	0.071
CEOFE	0.250	0.436	0.200	0.401	0.304
VC	0.150	0.359	0.592	0.492	<.0001
UWRANK	0.275	0.449	0.615	0.487	<.0001
BDNUM	4.675	1.777	7.166	1.643	<.0001
BDIND	0.492	0.305	0.765	0.122	<.0001
LEV	0.482	0.302	0.368	0.260	0.000
LOSS	0.388	0.490	0.515	0.500	0.033
	N=80		N=579		

Table 3 Correlations

	AC	ACFE	AT	FOREIGN	GRWOPP	FMAGE	FREECF	HHI	CEOHD	CEO POWER	CEOFE	VC	UW RANK	NUMBD	BDIND	LEV
ACFE																
AT	-0.164	0.083														
		(0.048)														
FOREIGN	0.105	0.127	0.102													
	(0.007)	(0.002)	(0.009)													
GRWOPP	0.091	0.081	-0.207	0.030												
	(0.020)	(0.053)	(0.000)	(0.443)												
FMAGE	-0.089	-0.059	0.159	0.074	-0.171											
	(0.023)	(0.156)	(0.000)	(0.057)	(0.000)											
FREECF	-0.075	-0.048	0.189	0.113	0.013	0.273										
	(0.054)	(0.250)	(0.000)	(0.004)	(0.736)	(0.000)										
HHI	-0.122	-0.034	0.134	-0.001	-0.112	0.294	0.189									
	(0.002)	(0.422)	(0.001)	(0.987)	(0.004)	(0.000)	(0.000)									
CEOHD	0.144	-0.034	-0.203	-0.005	0.103	-0.114	-0.030	-0.107								
	(0.000)	(0.418)	(0.000)	(0.892)	(0.008)	(0.003)	(0.447)	(0.006)								
CEOPOWER	0.070	-0.080	-0.121	0.013	0.016	-0.101	0.011	-0.107	0.486							
	(0.071)	(0.054)	(0.002)	(0.735)	(0.683)	(0.009)	(0.781)	(0.006)	(0.000)							
CEOFE	-0.040	0.027	0.107	0.027	-0.102	-0.012	0.009	-0.001	-0.063	-0.035						
	(0.304)	(0.512)	(0.006)	(0.486)	(0.009)	(0.750)	(0.825)	(0.988)	(0.105)	(0.371)						
VC	0.290	0.140	-0.333	-0.009	0.227	-0.393	-0.302	-0.272	0.166	0.156	-0.130					
	(0.000)	(0.001)	(0.000)	(0.818)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)					
UWRANK	0.224	0.199	-0.080	0.033	0.050	-0.035	-0.068	-0.091	0.099	0.041	-0.121	0.187				
	(0.000)	<.0001	(0.040)	(0.402)	(0.199)	(0.371)	(0.081)	(0.020)	(0.011)	(0.298)	(0.002)	(0.000)				
NUMBD	0.441	0.120	0.072	0.088	0.010	-0.098	-0.082	-0.075	-0.047	-0.046	0.066	0.174	0.186			
	(0.000)	(0.004)	(0.065)	(0.023)	(0.792)	(0.012)	(0.036)	(0.053)	(0.226)	(0.234)	(0.090)	(0.000)	<.0001			
BDIND	0.498	0.172	-0.014	0.119	0.052	-0.129	-0.068	-0.085	-0.019	-0.065	0.029	0.203	0.107	0.493		
	(0.000)	<.0001	(0.718)	(0.002)	(0.182)	(0.001)	(0.080)	(0.030)	(0.629)	(0.094)	(0.464)	(0.000)	(0.006)	(0.000)		
LEV	-0.139	0.052	0.433	0.135	-0.236	0.361	0.169	0.272	-0.170	-0.117	0.125	-0.439	-0.089	-0.004	-0.015	
	(0.000)	(0.212)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.001)	(0.000)	(0.022)	(0.922)	(0.699)	
LOSS	0.083	0.027	-0.191	-0.066	0.060	-0.269	-0.605	-0.227	0.011	0.005	-0.037	0.346	0.069	0.133	0.079	0.221
	(0.033)	(0.522)	(0.000)	(0.091)	(0.126)	(0.000)	(0.000)	(0.000)	(0.787)	(0.906)	(0.347)	(0.000)	(0.076)	(0.001)	(0.042)	(0.000)

Pearson (Spearman) correlations are presented above (below) the diagonal. p-value are in parenthesis.

Table 4 Determinants of the establishment of audit committees

	Predicted Sign	Variable Name	Estimate	P-value
		Intercept	-8.7686	<.0001
H1-operation hypo.				
Size	+	LNAT	-0.5500	0.0062
Foreign Operations	+	FOREIGN	3.5646	0.0354
Growth Opp	+	GRWOPP	-0.0688	0.2521
Firm age	+	FMAGE	0.0103	0.1223
H2- agency hypo.				
Free Cash Flow,	+	FREECF	0.5400	0.2989
Industry Concentration	+	HHI	8.2809	0.0647
CEO Shareholding	?	CEOHD	0.8180	0.0874
H3- negotiation hypo.				
CEO Power	-	CEOPOWER	0.1402	0.2706
CEO FE	?	CEOFE	-0.2033	0.6711
Venture Capital Presence	+	VC	1.1867	0.0122
Carter-Manaster Underwriter Rank	+	UWRANK	0.9124	0.0176
Control				
Board Size	+	NUMBD	4.1395	<.0001
Outside Director	+	BDIND	4.3309	0.0001
Leverage	?	LEV	0.0780	0.9236
Loss	?	LOSS	-0.0759	0.8741
INDUSTRYDUM		included		
Model P-value		0.0000		
Max-rescaled R-square		0.6620		
N		659		

Dependent variable is an indicator variable that equals 1 if the firm has an audit committee and 0 otherwise. See Table 2 for variable definitions. t-statistics are adjusted for heteroskedasticity. P-values are one-tailed for signed expectations, and two-tailed for unsigned expectations.

Table 5 Determinants of financial expertise on audit committee

	Predicted Sign	Variable Name	Estimate	P-value
		Intercept	-.17662	0.2792
H1-operation hypo.				
Size	+	LNAT	0.02779	0.0364
Foreign Operations	+	FOREIGN	0.11058	0.0009
Growth Opp	+	GRWOPP	0.00972	0.0381
Firm Age	+	FMAGE	-.00031	0.3413
H2- agency hypo.				
Free Cash Flow,	+	FREECF	-.07447	0.1158
Industry Concentration	+	HHI	0.24361	0.3166
CEO Shareholding	?	CEOHD	0.02291	0.4299
H3- negociation hypo.				
CEO Power	-	CEOPOWER	-.02601	0.0280
CEO FE	?	CEOFE	0.01681	0.6218
Venture Capital Presence	+	VC	0.12716	0.0001
Carter-Manaster Underwriter Rank	+	UWRANK	0.1024	0.0002
Control				
Board Size	+	BDNUM	0.03742	0.2671
Outside Director	+	BDIND	0.22986	0.0186
Leverage	?	LEV	0.08638	0.1987
Loss	?	LOSS	-.02236	0.5166
INDUSTRYDUM		included		

Model P-value	0.0000
Adj R-Sq	0.1286
N	576

Dependent variable is ACFE%. See Table 2 for other variable definitions.

t-statistics are adjusted for heteroskedasticity. P-values are one-tailed for signed expectations, and two-tailed for unsigned expectations.

Table 6 Additional Test for SOX: Determinants of the establishment of audit committee

	Predicted Sign	Variable Name	Estimate	P-value
		Intercept	-3.6221	0.0084
H1-operation hypo.				
Size	+	LNAT	-0.1254	0.4553
Foreign Operations	+	FOREIGN	1.6475	0.1240
Growth Opp	+	GRWOPP	-0.0076	0.9428
Firm Age	+	FMAGE	0.0077	0.3234
H2- agency hypo.				
Free Cash Flow,	+	FREECF	-0.0687	0.9517
Industry Concentration	+	HHI	-2.0625	0.6563
CEO Shareholding	+	CEOHD	0.7148	0.1352
H3- negociation hypo.				
CEO Power	-	CEOPOWER	0.1776	0.4343
CEO FE	?	CEOFE	-0.3515	0.4201
Venture Capital Presence	+	VC	1.2435	0.0178
Carter-Manaster Underwriter Rank	+	UWRANK	1.1006	0.0062
Control				
Board Size	+	BDNUM	0.5363	<.0001
Outside Director	+	BDIND	4.4108	<.0001
Leverage	?	LEV	0.3424	0.6855
Loss	?	LOSS	-0.2464	0.5970
PostSOX	+	POSTSOX	0.4426	0.3104

INDUSTRYDUM	included
Model P-value	0.0000
Adj R-Sq	0.2050
N	659

Dependent variable is an indicator variable that equals 1 if the firm has an audit committee and 0 otherwise. POSTSOX=1 if an IPO incurs in the year after 2002; 0 otherwise. See Table 2 for other variable definitions.t-statistics are adjusted for heteroskedasticity. p-values are two-tailed.

Table 7 Additional Test for SOX: Determinants of financial expertise on audit committee

	Predicted Sign	Variable Name	Estimate	P-value
		Intercept	0.7823	0.0410
H1-operation hypo.				
Size	+	LNAT	0.0081	0.7496
Foreign Operations	+	FOREIGN	0.0995	0.0721
Growth Opp	+	GRWOPP	0.0204	0.0491
Firm Age	+	FMAGE	-0.0029	0.9174
H2- agency hypo.				
Free Cash Flow,	+	FREECF	-0.0135	0.5806
Industry Concentration	+	HHI	-0.5790	0.4554
CEO Shareholding	+	CEOHD	-0.1475	0.0062
H3- negociation hypo.				
CEO Power	-	CEOPOWER	0.0302	0.1949
CEO FE	?	CEOFE	-0.0503	0.3310
Venture Capital Presence	+	VC	0.1270	0.0100
Carter-Manaster Underwriter Rank	+	UWRANK	0.0678	0.1116
Control				
Board Size	+	NUMBD	-0.0481	0.6113
Outside Director	+	BDIND	0.2937	0.1133
Leverage	?	LEV	0.1564	0.1218
Loss	?	LOSS	0.1687	0.1368
PostSOX	+	POSTSOX	0.0757	0.1643

INDUSTRYDUM	included
Model P-value	0.0000
Adj R-Sq	0.2050
N	576

Dependent variable is ACFE%. POSTSOX=1 if an IPO incurs in the year after 2002; 0 otherwise. See Table 2 for other variable definitions.

t-statistics are adjusted for heteroskedasticity. p-values are two-tailed.

Table 8 Additional Test for the broadly defined financial expertise: Determinants of financial expertise on audit committee

	Predicted Sign	Variable Name	Estimate	P-value
		Intercept	0.7733	<.0001
H1-operation hypo.				
Size	+	LNAT	-0.0050	0.6823
Foreign Operations	+	FOREIGN	0.0388	0.1988
Growth Opp	+	GRWOPP	0.0051	0.2499
Firm Age	+	FMAGE	-0.0010	0.1091
H2- agency hypo.				
Free Cash Flow,	+	FREECF	-0.0404	0.3846
Industry Concentration	+	HHI	-0.1880	0.6571
CEO Shareholding	+	CEOHD	-0.0048	0.8330
H3- negociation hypo.				
CEO Power	-	CEOPOWER	-0.0236	0.0256
CEO FE	?	CEOFE	-0.0265	0.2841
Venture Capital Presence	+	VC	0.0193	0.4441
Carter-Manaster Underwriter Rank	+	UWRANK	0.0418	0.0362
Control				
Board Size	+	NUMBD	0.0100	0.1202
Outside Director	+	BDIND	0.1741	0.0412
Leverage	?	LEV	0.0209	0.6733
Loss	?	LOSS	0.0004	0.9867
INDUSTRYDUM		included		

Model P-value	0.0000
Adj R-Sq	0.1558
N	576

Dependent variable is ACFE% (the broad definition) where financial expertise is coded as 1 if a AC member has experience of either one of category (1)-(4). See Table 2 for other variable definitions.

t-statistics are adjusted for heteroskedasticity. p-values are two-tailed.

Choice of Industry Expert Auditors by IPO Firms

Abstract: Industry specialist auditors are of great importance for firms at their initial public offerings because they monitor financial reporting. Research has investigated the effects of high-quality financial reporting on firms' performance at IPOs and in the post-IPO periods. In this paper, I propose and test a model of factors impacting IPO firms' choice of an industry expert audit. My results show that the presence of venture capital and proprietary costs are the most important factors, and that both factors decrease the likelihood of employing an industry expert auditor.

Choice of Industry Expert Auditors by IPO Firms

I. INTRODUCTION

This study investigates determinants of companies' choice of industry expert auditors prior to initial public offerings (IPOs). Auditor choice at IPOs is important because substantial information asymmetry exists between insiders and potential investors in IPO firms. High-quality audited financial statements are a primary means of reducing the information asymmetry. Industry expertise is a well-established determinant of audit quality, but no prior study has investigated the association of industry specialist auditors with companies issuing IPOs. Several likely determinants of auditor choice arguably are unique to the IPO setting (for example, whether a firm is backed by venture capital; whether the firm has a designated audit committee). For these and other reasons, I study IPO firms' choice to be audited by industry expert auditors.

Information asymmetry characterizes IPOs for several reasons. First, there is almost no news media coverage of firms before the IPO (Rao 1989). Second, private firms' financial reports usually are not filed with the Securities and Exchange Commission (SEC) and thus are unavailable to the public until the IPO. This contributes to a relatively poor information environment including lack of coverage of pre-IPO firms by financial analysts. The information asymmetry potentially enables managers of IPO firms to inflate earnings in the pre-IPO period (Teoh et al. 1998a; Teoh et al. 1998b). Entrepreneurs are under pressure to report high earnings to attract potential underwriters and investors. In the post-IPO period, insiders often wish to sell their personal holdings in the secondary market at the end of the lockup period.[11] To keep the aftermarket price from dropping below the offer price, and to maintain their reputation for reliability, managers of IPO firms have incentives to continue managing earnings upward (Brau

[11] Entrepreneurs are not allowed to sell their original holdings during a lockup period commonly lasting 180 days or longer immediately after the IPO.

and Johnson 2009). A shortfall in post-IPO earnings can disappoint investors and lead to lawsuits.[12] In summary, information asymmetry exists in the pre-IPO setting, coupled with incentives for managers to manipulate earnings and otherwise dress up financial reports.

High-quality audits are important for IPO firms to improve financial reporting quality and further reduce information asymmetry. Willenborg (1999, 225) states that "because [pre-IPO] asymmetries create a demand for information to help establish equity values and for market signaling to mitigate adverse selection, IPOs offer a natural setting for studying the importance of auditing". One key consideration for entrepreneurs planning to issue an IPO is which accounting firm to hire. Beatty (1989) shows that hiring nationally known auditors helps to reduce the effect of underpricing associated with IPOs. Menon and Williams (1991) find that investment bankers and their clients have a preference for Big 8 auditors. Hogan (1997) provides evidence that IPO firms consider the trade-off between the benefit (less underpricing) and the cost (higher audit fees) when selecting Big 6 auditors. Copley and Douthett (2002) and Mayhew et al. (2004) demonstrate that the demand for high-quality auditors (Big N auditors) increases with IPO firm risk and that auditor choice is a substitute for ownership retention as a signal of firm risk for an IPO. These prior studies suggest that auditor choice is a critical issue at IPOs. However, most of the studies focus on the choice between Big N versus other auditors. Evidence indicates that industry specialist auditors are associated with higher audit quality in non-IPO settings (Gul et al. 2009; Krishnan 2003; Reichelt and Wang 2010). This study extends prior literature by investigating choice of industry specialist auditors in the IPO setting.

To conduct my examination, I use a sample of 488 IPO firms that hire 'Big 7' audit firms (defined as the Big 5 at that time plus the two largest non-Big 5 audit firms) and that are in non-

[12] DuCharme et al. (2004) find evidence that sued IPO firms have more pronounced reversal in abnormal accrual earnings and lower stock returns than IPO firms not sued.

financial and non-utility industries during the period from 2000 to 2009. First, both logit and ordered logit models show that the presence of venture capitalists and proprietary costs are negatively associated with the likelihood that an IPO company will employ an industry expert auditor. I argue that the monitoring and industry expertise provided by venture capitalists serve as substitutes for industry expert auditors. Proprietary costs are particularly salient when IPO companies first begin to disclose financial information publicly, including to competitors who are more powerful and mature. My results are consistent with prior evidence that mature clients often prefer not to be audited by the same auditors who also serve their direct competitors. Second, IPO firm age is negatively associated with choice of industry expert auditors. I interpret this as evidence that information asymmetry between IPO companies and potential investors is reduced when IPO firms have extensive 'track records'. Third, results also show firms that have foreign operations are more likely to employ an industry expert auditor.

My paper contributes to research on audit firm selection. Early studies addressing questions related to auditor choice generally focus on auditor change among mature public companies (e.g. Francis and Wilson 1988; Johnson and Lys 1990; DeFond 1992). Later studies examine why companies choose large auditors or industry specialist auditors (e.g., Willenborg 1999; Abbott and Parker 2000). While this prior literature generally finds that audit firms differentiate themselves from competitors via brand name or industry specialization, I provide new evidence that in the IPO setting, firms select industry expert audit firms based on factors which are different from those affecting auditor choices by more mature public companies. My study also extends the literature on auditor choice in the IPO setting (Willenborg 1999; Hogan 1997; Beatty 1993) by focusing on choice of industry expert auditors. I know of no published research that has

been conducted on IPO firms' choice of industry expert auditors. My paper contributes to the literature by considering a broad range of factors which may affect this choice.

The remainder of the paper proceeds as follows. In Section II, I provide brief reviews of the literatures, and then turn to a discussion on how they impact auditor choice and audit fees in the IPO setting. This discussion provides the academic theory underlying the development of my conceptual model of IPO firms' choice to employ an industry expertise auditor, along with my formal hypothesis regarding the audit fees. I describe the research design in Section III and present the results in Section IV. Section V provides discussion on the results and concludes the paper.

II. BACKGROUND AND HYPOTHESES

Audit Industry Specialization

Audit industry specialization is one of the main factors impacting audit quality due to auditors' enormous investment in the knowledge and technology in specific industries of their clients. Prior literature finds that auditors' industry expertise provides an incremental contribution to audit quality beyond auditors' brand name (Big N versus non-Big N). Importantly for IPO firms, research indicates that earnings quality, as measured by earnings response coefficients and discretionary accruals, is higher for client firms audited by industry specialists than non-specialists (Balsam et al. 2003; Krishnan 2003; Chin and Chi 2009; and Reichelt and Wang 2010). Financial analysts rank clients of industry-specialist audit firms higher, in terms of disclosure quality, than clients of non-specialists (Dunn & Mayhew 2004). These findings suggest that an auditor's industry specialization has value to clients, and that capital markets view audits provided by industry specialists as having higher quality. Hence, the largest audit

firms use industry specialization as a differentiation strategy (Mayhew & Wilkins 2003). Elder (1999) finds that IPO underpricing is lower for companies that use industry specialist auditors, which suggests that industry specialist auditors mitigate information asymmetry for investors by increasing their financial reporting quality. Therefore, managers of some IPO firms may have strong incentives to employ industry specialist auditors. Although auditor industry expertise is an important factor which contributes to high audit quality, prior studies of IPO auditor choice focus on choice of brand name (Big N) auditors. This study remedies the omission by examining the choice of industry expert auditors by IPO firms.

Following prior studies which examine industry expertise as the variable of interest (Balsam et al. 2003; Krishnan 2003; Dunn and Mayhew 2004), I use an auditor portfolio definition for national and city industry expertise. Alternatively I define national and city industry expertise as the auditor having the largest market share in a given industry (Neal and Riley 2004; Behn et al. 2008). Results are similar using both types of measures.

Venture Capitalists

Venture capitalists reduce information asymmetry at IPOs through their value-added expertise and services. Prior research suggests that venture capitalists (VCs) are actively involved in the management of firms they finance and often take membership on the board of directors along with others holding concentrated equity positions. Thereby, they retain significant ownership and economic rights (Sahlman, 1994; Barry et al., 1990; Megginson and Weiss 1991). Gladstone (1989) suggests that some VCs maintain consulting staffs that participate in the management of portfolio companies. Sahlman (1990) argues that VC contracts are designed to provide staged financing at different points, which allows the VCs to terminate their involvement and cut their losses if the expected net present value of the project falls below

expectations. It also prevents the management from investing in non-value-maximizing activities and reduces the free cash flow problem. Further, VCs design compensation schemes which are directly linked to value creation and retain the option of replacing the entrepreneurs as managers unless certain key objectives are met. Such a stringent contractual relationship between VCs and entrepreneurs reduces agency costs by preventing managers from indulging in non-value-maximizing activities.

Consistent with VCs' monitoring role, prior studies document that VCs are associated with lower underpricing and higher earnings quality at IPOs (Barry et al. 1990; Morsfield and Tan 2006). Moreover, VCs usually specialize in particular industries and use their knowledge and contacts to help the company recruit key employees, develop supplier and customer relations, and assist in production and operations (Warne 1988). By focusing on a relatively narrow set of industries, VCs are able to provide the firms they back with greater industry expertise and more efficient monitoring. I predict that the presence of VCs reduces the demand for industry expert external auditors at IPOs. The first auditor choice hypothesis is stated as follows.

H1: IPO firms backed by VCs are less likely to hire auditors with industry specialization.

I code a dichotomous VC variable as one for IPO firms backed by VCs, and as zero otherwise.

Underwriter Reputation

Underwriters are another import player in an IPO setting. Underwriters (investment banks) provide a number of interrelated marketing, pricing, and distribution services for IPO issuers including approaching potential investors with offers to sell shares. These activities occur prior to the offer date (in the "premarket" period) and after the offer date (in the "aftermarket" period). An underwriter provides assurance to potential investors. Underwriters' knowledge about similar

securities and about likely views of potential investors helps to determine a price for the offering. Underwriters also assist in establishing and stabilizing the aftermarket (particularly in a firm commitment offering). Therefore, underwriters play a vital role in IPOs of companies that lack track records of financial information.

Underwriters provide different services than auditors. An auditor's attestation to financial statements included in the Prospectus assists investors and underwriters in estimating future cash flows. The value of the auditor's services is contingent on the extent to which an underwriter could substitute for auditors to reduce uncertainty (Hogan 1997). Therefore, the reputation of the investment bank may influence investors' opinions about the quality of an issuer and its long-term prospects as much as, or more than, the issuer's association with an industry expert auditor. In this view, better underwriter reputation reduces the demand for high audit quality as a means of reducing information asymmetry.

However, high prestige underwriters may require IPO firms to use high quality auditors. Underwriters suffer a decrease in their market value significantly in excess of estimated direct costs when overpricing IPOs (Nanda and Yun 1997). In addition to such reputation effects, mispriced offerings are expected to impose additional direct costs on managing underwriters due to price stabilization and potential legal liability (Lowry and Shu 2002; Hughes and Thakor 1992). Mispriced offerings can result from reliance on faulty financial information provided by IPO firms. Thus, underwriters having greater reputation to protect are likely to require higher quality auditors as a means of reducing information asymmetry and litigation risk. Given the conflicting scenarios outlined above, I state my second auditor choice hypothesis in null form:

H2: IPO firms' underwriter reputations are not related to the choice of auditors with industry specialization.

I use Jay Ritter's updated Carter-Manaster (1990) underwriter reputation rating to measure the quality of the lead underwriter.

Proprietary Costs

Another factor influencing firms' selection of auditors is proprietary costs. A potential proprietary cost is defined as any possible reduction in future cash flows attributable to a disclosure. Verrecchia (1983) states that accounting information about a firm can be useful to competitors, shareholders, or employees in a way which is harmful to a firm's prospects. This can be true even if (or perhaps especially if) the information is favorable. The larger the proprietary costs, the greater is the decrease in the firm's value upon disclosure, and the greater is the incentive not to disclose (Scott 1994). Bamber and Cheon (1998) provide evidence supporting this view; they demonstrate that companies with high proprietary information costs (i.e., those with few competitors) disclose less precise management earnings forecasts. Botosan and Stanford (2005) and Wang et al. (2011) find that firms withhold segment information when proprietary costs are high.[13] In summary, the accounting literature documents that proprietary costs are an important factor in managers' consideration of information disclosure.

Proprietary costs should be especially important in the IPO setting. In pre-IPO periods, non-listed firms enjoy a competitive advantage by not being required to disclose accounting information to their competitors, while benefitting from information that their publicly listed competitors must disclose. Subsequent to IPOs, companies have to meet the same information disclosure requirements as their public competitors. In addition, most IPO firms are smaller and less powerful than their publicly listed competitors. Thus they arguably are highly vulnerable to

[13] Managers have explicitly stated that proprietary costs are important factors in their willingness to reveal information. For instance, in comment letters written to the Financial Accounting Standards Board (FASB), prior to issuance of SFAS No. 131, managers of actual and prospective multi-segment firms expressed concerns that increased disclosure of segment information would prove useful to their competitors.

proprietary costs. It is important to note that the proprietary costs of information disclosure vary with firm and industry characteristics. Companies operating in highly competitive industries, in which many relatively small producers provide fairly standard "commoditized" products, are not subject to proprietary costs. Proprietary costs are prevalent in concentrated industries where a small number of powerful companies compete to offer products that they attempt to differentiate as higher quality, thus justifying higher prices.

Proprietary cost considerations could reduce demand for industry specialist auditors at IPOs. If clients consider their auditors to be a potential source of proprietary information transfer, then clients in concentrated industries may avoid having industry specialist auditors who are more likely to audit their competitors also. Kwon (1996) argues that clients desiring audit firms not associated with competitors are likely to select audit firms not engaged in the client's or potential client's industry. His findings suggest that clients from highly concentrated industries are less likely to hire industry expert auditors. In addition to clients' concerns about possible information transfer via audit firm personnel, clients also may perceive that industry specialist auditors require clients to disclose more information and more transparent information.[14] Although companies cannot avoid the increased proprietary costs arising at IPOs, they may seek to minimize such costs through their choice of auditors. I predict that greater proprietary costs decrease the demand for industry specialist auditors. My third hypothesis is:

H3: IPO firms' proprietary costs are negatively related to the choice of auditors with industry specialization.

I use three measures to proxy for proprietary costs: the Herfindahl industry concentration index; the four-firm industry concentration ratio; and an inverse proxy for proprietary costs,

[14] Dunn and Mayhew (2004) find that clients of industry-specialist audit firms are ranked higher in terms of disclosure quality by financial analysts.

capital intensity, measuring the barrier to entry (DeFond and Hung, 2003; Hou and Robinson, 2006).

CEO Power

Powerful CEOs usually influence the corporate governance structure by putting more insiders on the board and/or reducing the efficiency of audit committees (for example, Boone et al. 2007 and Carcello et al. 2011). CEO power refers to the potential for the CEO to leverage ownership or position to pursue her or his own goals. According to agency theory, CEOs are self-interested, risk averse, and possess goals that diverge from those of shareholders; the position of CEO confers considerable power over a firm's resources because shareholders are widely dispersed and no one shareholder can exert direct control. Thus, CEOs will engage in self-serving actions at shareholders' expense when given an opportunity (Jensen and Meckling 1976). In addition to the power granted by their position, many CEOs possess power through circumstances such as long tenure and chairing the board of directors (Daily and Johnson 1997).

There can be some positive benefits to firms of having powerful CEOs, such as clear lines of authority, faster strategic response times, and a focal point for external accountability (Cannella Jr and Monroe 1997; Finkelstein and D'Aveni 1994). However, a large body of literature documents adverse CEO entrenchment effects consistent with agency theory. For instance, a CEO whose power remains unchecked by outside directors is more likely to take self-serving actions that decrease shareholder wealth (Dunn 2004; Frankforter et al. 2000). Effective board monitoring can help prevent abuses of power and also ensure that CEO power is used to benefit the firm (Finkelstein and D'Aveni 1994). Powerful CEOs who have influence on the selection of audit committee members can reduce the monitoring role of an audit committee on their firms'

financial reports (Carcello et al. 2011). In addition, CEOs are more likely to have incentives than CFOs to get involved in material accounting manipulations (Feng et al. 2011).

As discussed above, managers of IPO firms have strong incentives to inflate their companies' earnings and are less exposed to external monitoring. Hence, if the CEO has strong bargaining power when negotiating with pre-IPO shareholders, regarding the choice of auditor at IPO, I expect that powerful CEOs are less likely to hire industry expert auditors. The hypothesis is stated as follows.

H4: IPO firms having more powerful CEOs are less likely to choose auditors with industry specialization.

I use four CEO characteristics to proxy for CEO power: whether a CEO is chair of the board; whether a CEO is the founder of an IPO firm; how long a CEO has held that position with an IPO firm; and the percentage of outstanding common shares a CEO holds prior to an IPO.

Audit Committee Designation and Financial Expertise of Audit Committee Members

A well-functioning Audit Committee (hereafter AC) safeguards the independence of the auditor and imposes discipline on the financial reporting process. Despite its important role in the assurance of corporate financial reporting, little is known about the AC's role in the choice of auditors at IPOs. This paper examines the effect of AC characteristics (AC existence and AC finance expertise) on external auditor choice.

One unique characteristic of IPO corporate governance is that some IPO companies do not have designated ACs during the IPO process. Companies completing an IPO have a one-year phase-in period in which to comply with major stock exchange requirements governing audit committees.[15] Venkataraman et al. (2008) report that 78.6 percent of 350 IPO firms during 2000-

[15] According to stock exchange rules (NYSE 303A.07 Audit Committee Additional Requirements; Nasdaq Listing Rule 5600 Series), there must be one independent member on the audit committee at the time of initial listing, a

2002 make reference to specific individuals as being current members of an audit committee in the prospectuses while the remaining 22.4 percent do not. Given the important monitoring role of ACs, I predict that IPO firms with designated ACs are more likely to choose industry specialist auditors than those without.

The financial expertise of audit committee members has been subjected to considerable attention following a wave of high-profile corporate scandals. Congress passed the Sarbanes-Oxley Act of 2002 to enhance financial reporting quality. This includes specific board guidelines promoting greater financial expertise among audit committee members. Section 407 of SOX requires that public firms' audit committees must include at least one member who is a financial expert or, otherwise, must disclose reasons for not doing so. The NYSE and NASD adopted this recommendation. The exchanges' rules provide that this requirement can be satisfied either by a member having knowledge of GAAP obtained from experience as an accountant or auditor, or by someone having experience in supervising or assessing the performance of accountants or auditors, such as CFOs or CEOs.[16]

The initial definition of financial expertise in Section 407 of SOX only referred to education and experience in accounting and auditing. Some observers argued that provision narrows the pool of candidates qualified to serve as financial experts. In response, the SEC adopted a broader definition of financial expert for its final rules, similar to the provisions of the exchange rules. In addition to experience in accounting and auditing, the SEC's definition of financial expert now allows for experience in finance (such as being CFO), as well as experience in supervising

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majority of independent audit committee members within 90 days thereafter, and a fully-independent audit committee within one year. The SEC specifies that if no AC is designated, the full board functions as the audit committee. Therefore, some IPO firms choose not to establish designated ACs until the completion of initial listing.

[16] The NYSE (2012, section 303A.07.a) now requires that each member of the AC be (or become) financially literate. The financial literacy qualification is interpreted by the listed company's board of directors. The standard of financial literacy clearly is less stringent that the standard for financial expertise.

employees with financial responsibilities and overseeing the performance of companies (such as being CEO).

Audit committees having greater financial expertise may be in favor of hiring industry specialist auditors to enhance financial reporting quality at IPOs. Reputation costs are arguably higher for AC members with financial expertise than for those without. Therefore, the assurance provided by industry specialist auditors safeguards their reputation better than non-industry-specialists. Financial experts know more about auditing procedures and arguably have more appreciation for external auditors' industry expertise. The literature documents that ACs having members with narrowly defined financial expertise (i.e. accounting or auditing education and experience) improve financial reporting quality. For example, a number of studies demonstrate that firms with narrowly defined financial expertise on the audit committee are less likely to restate earnings (Abbot et al. 2004), and less likely to manage earnings (Xie et al. 2003; Dhaliwal et al. 2006). However, research provides mixed evidence on the effectiveness of broadly defined financial expertise in promoting improved financial reporting (Carcello and Neal 2003; Defond et al. 2005; Park and Shin 2004; Goh 2009). Goh (2009) finds that ACs with greater nonaccounting financial expertise remediate internal control material weakness more rapidly, while several other studies fail to provide strong evidence that financial expertise under the broad definition positively influences AC effectiveness (Anderson et al. 2004; Carcello and Neal 2003; Lee et al. 2004; Defond et al. 2005). Therefore, I expect IPO firms with narrowly defined financial expert AC members are more likely to hire industry expert auditors. The hypotheses are stated as follow.

H5a: AC existence prior to IPOs is positively related to the choice of auditors with industry specialization.

H5b: AC members having narrowly defined financial expertise are positively related to the choice of auditors with industry specialization.

The existence of a designated AC is captured by a dichotomous variable coded as one if the prospectus reports any board member serves on the AC. Otherwise it is coded as zero. A dichotomous measure of AC financial expertise is set to equal to one if at least one audit committee member has narrowly defined financial expertise, and as zero otherwise.

Management Financial Expertise

Management financial expertise is another factor that can influence the decision of auditor selection by IPO firms. It directly impacts firms' financial accounting choices and reporting quality. Recent studies document that management fixed effects explain a significant portion of the cross-sectional variation in corporate outcomes such as investments (Bertrand and Schoar 2003), financial disclosure (Bamber et al. 2010), financial reporting (Ge et al. 2011), and tax planning (Dyreng et al. 2010). Their results conclude that individual executives have distinct qualities which influence their organizations' behavior and performance. Among these personal attributes, financial expertise arguably has an important impact on firms' outcomes and performance.

Several studies report a positive relation between management financial expertise and reporting quality. Aier et al. (2005) find that companies having CFOs who are CPAs are significantly less likely to have accounting restatements. Li et al. (2010) find that companies whose CFOs are CPAs or who have public accounting firm working experience are associated with lower likelihood of receiving adverse SOX 404 opinions. In an IPO setting, Chemmanur and Paeglis (2005) document that better management quality signals intrinsic value and private information to the market, therefore reducing information asymmetry costs borne by IPO firms. I

speculate that better management financial expertise can reduce information asymmetry by signaling lower firm risk and higher reporting quality for IPO firms. In this scenario, managerial financial expertise reduces the need for industry expert auditors.

Other studies suggest that managerial financial expertise may be associated with poor financial reporting and higher firm risk. Feng et al. (2011) find that CFOs of firms engaging in irregularities are more likely to be CPAs than those of control firms. They suggest that compliant CFOs who are CPAs are better able to come up with accounting schemes to boost earnings.[17] Ge et al. (2011) document that CFOs who are CPAs are more aggressive in their financial reporting practices, i.e. engage in more off-balance-sheet activities and smoothing of earnings. In this scenario, managers who are financial experts increase information asymmetry with potential investors and increase the need for industry specialist auditors.

As discussed above, managerial financial expertise could either increase or decrease investors' perceived need for greater external audit quality. In either case independent members of the board, especially those representing existing providers of equity capital, can make their preferences known regarding auditor choice. Given the contrasting scenarios, I state the hypothesis in null form.

H6: Managerial financial expertise is not related to IPO firms' choice of auditors with industry specialization.

For a CEO, a dichotomous measure for financial expertise is set to equal to one if she or he is a CPA, has prior work experience in public accounting, has work experience as a chief financial officer, vice-president of finance or controller or has work experience as an investment

[17] More broadly, Ge et al. (2011) study whether individual CFO characteristics, including CPA status, affect companies' financial reporting choices. They report (2010, 5) only "limited evidence of the impact of these observable CFO characteristics on CFOs' reporting choices, suggesting that these common and observable characteristics capture only a small portion of CFO styles" (Ge et al. (2011,1176)). Their results do not imply that CFO characteristics such as CPA status are irrelevant in specific situations, such as irregularities.

banker, financial analyst, venture capitalist, or any other financial management roles. It is coded as zero otherwise. For a CFO, a dichotomous measure for financial expertise is set to equal to one if she or he is a CPA, or has prior work experience in public accounting.

Company Characteristics

I control for a variety of company characteristics. One is financial leverage. As in Reynolds and Francis (2000), prior research has documented that managers of firms with high levels of debt have an incentive to manipulate earnings upwards. I expect that the higher a company's leverage is, the more important the credibility of the information communicated via the company's financial statmenents. As the demand for enhanced information credibility increases, I expect companies to be more likely to employ an industry expert auditor. I control for various other company characteristics including total assets, IPO gross proceeds, and firm age. Additional company characteristics include foreign operations, reporting a loss, and the extent of inventory and receivables. In general I expect that larger and more complex IPO firms are more likely to choose industry specialist auditors. However, given lack of prior research using industry specialist auditors as a dependent variable for IPO firms, I make no directional predictions regarding the association of these variables with companies' choice to employ an industry specialist auditor.

III. SAMPLE, DESCRIPTIVE STATISTICS, AND METHOD

Sample Selection

To determine whether the factors discussed above impact IPO firms' auditor choice, I require identification of IPO firms, their venture capitalists, underwriters, board members, management members, and their auditors in the year of their IPOs. I obtain the sample of IPO

firms from the Thomson Financial Securities Data Corporation (SDC)/Platinum New Issue database. I hand-collect corporate governance data, as well as CEO's and CFOs' background and experience data, from the prospectuses (S-1 files) filed by firms going public.[18] In particular, personal information about CEOs, CFOs and board members is obtained from the management section of the IPO prospectus. I obtain the identity of IPO firms' auditors from Audit Analytics. The financial information for IPO firms is from Compustat.

Table 1 shows the sample selection process. I start with all initial public offerings of common equity during the period January 1, 2000 to December 31, 2009. Similar to several prior IPO studies (Chemmanur and Paeglis 2005; Mayhew and Wilkins 2003),[19] I exclude REITs, closed-end funds, unit offerings, financial and utility firms (all firms with SIC codes: 6000-6999 and 4900-4949), leveraged buyouts (LBO), roll-ups, IPOs having offer prices less than five dollars, and foreign companies. I retain a list of 1,049 IPOs. I then delete 206 not covered by Compustat and Audit Analytics, and 58 firms that do not use the largest seven auditors. The largest seven auditors consist of the current Big 4, plus Arthur Andersen (prior to dissolution), Grant Thornton, and BDO Seidman.[20] For convenience I will refer to these as the Big 7. I also require observations for which management and board members' financial expertise information are not missing in the year of IPOs which further reduces the sample by 161. Finally, I eliminate 136 observations with missing financial and/or auditor data, yielding a maximum final sample of 488 IPO firms.

(Insert Table 1 about Here)

[18] The prospectuses (S-1 files) are obtained from the SEC's Edgar database. In the United States, all the firms seeking IPOs file Form S-1 to register securities with the U.S. Securities and Exchange Commission (SEC). The S-1 contains the basic business and financial information on an issuer with respect to a specific securities offering and disclose management and corporate governance information as well.

[19] I follow the selection process used by Chemmanur and Paeglis (2005) because they also investigate the role of management quality in the IPO setting.

[20] I limit my sample to IPO firms audited by the largest auditors to control for unobservable auditor-specific factors that affect audit pricing and audit industry expertise, similar to a prior study by Mayhew and Wilkins (2003).

Descriptive Statistics

Table 2 shows the year-by-year sample distribution of the number of IPOs. The years 2000, 2007 and 2004 have the highest numbers of IPOs, with 117 (24%), 73 (15 %) and 70 (14%) respectively. Table 3 shows that services and manufacturing industries comprise approximately 81% of the total IPO offerings in the sample. Industry classification is based on Standard Industrial Classification (SIC) two-digit codes. Panel B also summarizes the distribution of the IPO firms by auditor. The results show that of the 488 IPO firms, 35 percent hire Ernst & Young, 24% percent hire PwC, 17 percent hire Deloitte & Touche, and 13 percent hire KPMG. The remainder of the sample companies hire Arthur Andersen (prior to dissolution), Grant Thornton, and BDO Seidman.

(Insert Tables 2 and 3 about Here)

Research Methods

Explaining Choice of an Industry Specialist Auditor by an IPO firm

To examine the determinants of IPO firms' choice to hire an industry specialist auditor, I use both a logit model and an ordered logit model. For the logit model, the dependent variable is AUDindepx1, coded as one if a given IPO firm hires an industry expert auditor (defined at the national level, city-level or both the national and city-level), and as zero otherwise. For the ordered logit model, the dependent variable is AUDindepx2, which equals 3 if a given IPO firm hires an auditor that is both the national and city-level industry expert, equals 2 if an only the city-level industry expert, equals 1 if only the national industry expert, and equals 0 if the auditor is not the industry expert on any of these dimensions. Independent variables represent factors that I propose will affect IPO firms' choice to employ an industry specialist auditor, including characteristics of IPO firms, offerings, and corporate governance.

Audit Industry Expertise

Audit fees by client industry are a common measure of industry expertise, and the identification of the Big 7 expert in each industry is based on each Big 7 firm's share of industry audit fees for each two digit SIC in the sample (Hogan and Jeter 1999; Ferguson et al. 2003).[21] Following prior studies which examine industry expertise as the variable of interest (Balsam et al. 2003; Krishnan 2003; Dunn and Mayhew 2004), I use the portfolio definition for national and city industry expertise to capture different aspects of this construct.[22]

I define a national (city) industry specialist in a particular year (and in a particular city) as the auditor having the highest percentage of its fees in a given industry (Neal and Riley 2004; Behn et al. 2008). This measure captures investment in significant knowledge bases in particular industries by the smaller auditors (Grant Thornton and BDO Seidman), and computes an industry specialization measure based on each auditor's portfolio of clients.[23] I compute the portfolio industry expertise of an auditor by summing the auditor's fees from its clients in a two-digit SIC industry and dividing by the sum of total audit fees of all clients of the auditor. I perform this analysis at both the national level and the city level. Each two-digit SIC industry has one industry expert auditor at the national level and at the city level.

[21] The Big 4 National market shares, averaged across all 45 industries and the four years in the sample, are as follows: the top-ranked Big 4 firm per industry has an average market share of 41 per cent of audit fees, while the second-ranked firm has a market share of only 25 per cent. The third-ranked firm has an average market share of 17 per cent, the fourth-ranked firm a market share of 11 per cent. The Big 4 City market shares, averaged across all 45 industries, 68 cities and four years in the sample, are as follows: the top-ranked Big 4 firm has an average city-level industry market share of 68 per cent of audit fees and the second ranked firm has a 25 per cent market share. These results are comparable to those of Francis et al. (2005).

[22] I employ two market share definitions and the results are similar to the portfolio definition. The details are discussed in the additional tests.

[23] I also run all the tests with a larger sample of 520 IPO firms which includes auditors additional to the Big 7. In this sample, 32 IPO firms (6.15%) hire 16 non Big-7 auditors, such as Crowe Chizek & Company LLP, McGladrey & Pullen LLP, Virchow Krause & Company LLP and Eide Bailly LLP. The results are similar to those presented.

Venture Capital

To measure VC's monitoring role at IPOs, I employ a dichotomous variable VC equal to one if an IPO is backed by VC, and zero otherwise. Hochberg (2008) finds that venture-backed IPO firms have lower levels of earnings management than similar non-venture-backed firms and are less likely to engage in aggressive accounting practices. His findings suggest that IPO firms are less likely to reqire an industry specialist auditor due to the monitoring role of VC. Therefore, I expect a negative association between VC and the choice of an industry expert auditor.

Underwriters' Reputation

As discussed above, firms with more reputable underwriters are likely to choose industry expert auditors to protect the underwriters' high reputation costs. Alternatively, reputable underwriters' greater industry knowledge and understanding of proprietary costs could make an industry expert auditor less necessary. Therefore, I do not specify the direction of association between underwriter reputation and the choice of an industry expert auditor. I use Jay Ritter's updated Carter-Manaster (1990) underwriter reputation measures on the quality of the lead underwriter, UWrank.[24]

Proprietary Costs

I use two common measures of industry concentration to proxy for the level of proprietary costs, PropCost: a Herfindahl industry concentration index (HHI), and the four-firm industry concentration ratio (CON4). I also employ an inverse proxy for proprietary costs, capital intensity (CAPINTEN), measuring the barrier to entry (DeFond and Hung, 2003; Hou and Robinson, 2005).

[24] http://bear.warrington.ufl.edu/ritter/ipodata.htm.

To construct the first two measures, I follow two steps: 1) compute HHI and CON4 at the 2-digit SIC code level for each industry; 2) match the industry measure to each IPO firm's primary 2-digit SIC code.

Industry Herfindahl index $HHI_j = \sum_{n=1}^{i} \left(\frac{Sales_{ij}}{Sales_j}\right)^2$

Industry four-business concentration ratio ($CON4_j$) = $\sum_{i=1}^{m} \left(\frac{Sales_{ij}}{Sales_j}\right)^2$

where,

$Sales_{ij}$ = Business i's sales (segment i's sales for segments of multisegment firms and firm i's sales for single-segment firms) in industry j, as defined by 2-digit SIC code.

$Sales_j$ = The sum of sales for all businesses (including segments of multisegment firms) in industry j.

$Sales_{ij}$ / $Sales_j$ = Business i's market share

m = 4 (i.e. the ratios are accumulated over the four largest businesses in industry j

n = The number of businesses in industry j

Larger HHI_j and $CON4_j$ values correspond to greater industry concentration and to higher proprietary costs for industry j. I expect firms operating in such industries are less likely to choose industry expert auditors.

The third proxy is the firm's capital intensity (CAPINTEN), a proxy for barriers to entering an industry and an inverse proxy for proprietary costs. I measure capital intensity as the ratio of net property, plant and equipment divided by total assets. Prior studies document that as the threat of entry decreases firms are more likely to make voluntary disclosures to the capital market (Darrough and Stoughton, 1990; Wagenhofer, 1990). Therefore, I expect that IPO firms having higher capital intensity are more likely to choose industry expert auditors.

CEO Power

I employ four proxies for CEO power at IPOs. CEOchair is coded as one if the CEO chairs the board of directors, and zero otherwise. CEOtenure equals the number of years the incumbent has served as CEO of the IPO firm. Klein (2002) provides evidence that boards structured to be more independent of the CEO are more effective in monitoring the corporate financial accounting process. Therefore, I expect negative coefficients for CEOchair and CEOtenure. Dichotomous variable CEOfounder is coded as one if the CEO is a founder of the IPO firm, and zero otherwise. Prior research documents mixed results regarding the role of founding CEOs on firms' performance and financial reporting quality (Wang 2006; Billings and Lewis 2010). Therefore I make no directional predication for the sign of the coefficient of CEOfounder. CEOownership is defined as the aggregate number of shares held by the CEO, including restricted shares but excluding stock options (whether vested or unvested), expressed as a percentage of the IPO firm's total shares outstanding. Bergstresser and Philippon (2006) find that CEO ownership is positively associated with discretionary accruals. If CEOs having higher ownership prefer more leeway to manipulate earnings prior to IPOs, they are less likely to choose industry expert auditors. This scenario suggests a negative coefficient for CEOownership.

Audit Committee Designation and Manager/Director Financial Expertise

A dichotomous audit committee variable (AudCom) is coded as one if a firm has a designated audit committee prior to IPO, and as zero otherwise. Audit committee members' and managers' (CEO and CFO) financial expertise is measured in the fiscal year when the IPO occurs. I employ the following categories of financial expertise.[25] (1) CAT1 = 1 if the individual is a CPA or has prior work experience in public accounting, otherwise equals 0. (2) CAT2 = 1 if individual has work experience as a chief financial officer, vice-president of finance, or

[25] I follow the categories of financial expertise classified by Naiker and Sharma (2009).

controller, otherwise equals 0. (3) CAT3 = 1 if individual has other financial expertise: work experience as an investment banker, financial analyst, venture capitalist, or other financial management role, otherwise equals 0. (4) CAT4 = 1 if an individual has supervisory work experience as a chief executive officer or company president, otherwise equals zero. I use these categories to define the financial expertise of officers and directors as discussed below.

Dichotomous variable AudComfe equals one if any of the following categories equals one for at least one member of a designated audit committee: CAT1, CAT2, or CAT3. Otherwise AudComfe equals zero. I exclude CAT4 because that definition of financial expertise is too broad to facilitate better financial reporting (Anderson et al. 2004; Carcello and Neal 2003; Lee et al. 2004; Defond et al. 2005). Dichotomous variable CEOfe equals one if any of the following categories equals one for the CEO, and zero otherwise: CAT1, CAT2, or CAT3. I exclude CAT4 because that definition of financial expertise is too broad and because all CEOs have experience equivalent to company presidents. Dichotomous variable CFOfe is coded as one if CAT1 or CAT3 equals one for the CFO, and as zero otherwise. I exclude CAT4 because that definition of financial expertise is too broad, and CAT2 because all CFOs have experience as CFOs.

When variable AudCom is used by itself (without AudComfe) to explain choice of an industry expert auditor, its coefficient captures the effect of a designated audit committee of average expertise on that choice. In other models, I employ both AudCom and AudCom interacted with AudComfe. In those models, AudCom captures the effect of a designated audit committee containing no financial experts. AudCom*AudComfe captures the incremental effect of a designated audit committee that has one or more financial experts. I expect the coefficients of both variables to be positive. I do not specify directional expectations for the two measures of managers' financial expertise, CEOfe and CFOfe.

Firm Characteristics and Offerings

In the absence of prior studies of IPO choice of industry specialist auditors, I generally expect such choice to be positively associated with greater IPO firm size, complexity and risk. I include the log of pre-IPO total assets (lnAT) to proxy for firm size. The log of the gross issue proceeds (lnPROCEEDS) provides an alternative proxy for size.[26] The remaining variables serve as proxies for risk and complexity. DEBT is a measure of financial leverage, equal to total liabilities divided by total assets. I expect its coefficient to be positive. The natural logarithm of IPO firm age in years, lnFMAGE, can be viewed as an inverse proxy for information asymmetry. The longer an IPO company has existed, the more time there has been for investors and others to obtain information about it through means other than financial reports.[27] I expect firm age to be negatively associated with demand for an industry expert auditor. I include FOREIGN to control for the complexities associated with IPO firms having foreign operations (proxied by the disclosure of foreign income taxes).[28] Dichotomous variable LOSS is coded one if the client reports a loss in the IPO year, and as zero otherwise. Variable INVREC represents the firm's inventories and accounts receivable scaled by total assets in the year prior to the IPO.

I use the logit model and ordered logit model to test the choice of an industry specialist auditor as specified in Model (1) and Model (2):

$$AUDindexp_{1,2} = \beta 0 + \beta_1 VC + \beta_2 UWRank + \beta_3 PropCost + \beta_4 CEOownership + \beta_5 CEOchair$$

[26] When in a model that includes lnAT, lnPROCEEDS arguably could control for the incremental implicit insurance coverage provided by an industry expert auditor (Willenborg 1999).

[27] For example, an IPO firm that has been in existence for twenty years has established its economic viability in way that an IPO firm in existence for only three years has not.

[28] Studies of audit fee determinants suggest that foreign operations proxy for complexity and or risk, and are priced in audit fees (Willenborg 1999; Fargher et al. 2000; Mayhew and Wilkins 2003). This characteristic arguably could increase demand for an industry expert auditor.

$$+ \beta_6 CEOtenure + \beta_7 CEOfounder + \beta_8 AudCom + \beta_9 AudComfe + \beta_{10} CEOfe + \beta_{11} lnAT + \beta_{12} PROCEEDS + \beta_{13} DEBT + \beta_{14} lnFMAGE + \beta_{15} FOREIGN + \beta_{16} FOREIGN + \beta_{17} LOSS + \beta_{18} INVREC + \varepsilon. \quad (2)$$

$$AUDindexp_{1,2} = \beta 0 + \beta_1 VC + \beta_2 UWRank + \beta_3 PropCost + \beta_4 CEOownership + \beta_5 CEOchair + \beta_6 CEOtenure + \beta_7 CEOfounder + \beta_8 AudCom + \beta_9 AudComfe + \beta_{10} AudComfe*AudCom + \beta_{11} CEOfe + \beta_{12} lnAT + \beta_{13} PROCEEDS + \beta_{14} DEBT + \beta_{15} lnFMAGE + \beta_{16} FOREIGN + \beta_{17} FOREIGN + \beta_{18} LOSS + \beta_{19} INVREC + \varepsilon. \quad (2)$$

Models (1) and (2) are the same except for the addition of the interaction term AudComfe*AudCom in model (2). Models (1) and (2) are estimated using both a two-level dependent variable, AUDindepx1, and a four-level dependent variable, AUDindexp2. The variables are defined as follows. The models explaining the two-level dependent variable are estimated using logistic regression. The models explaining the four-level dependent variable are estimated using ordered logit. Variables are defined as follow.

AUDindepx1	= 1 if the auditor is an industry expert at the national level, city level or both; 0 otherwise.
AUDindexp2	= 3 if the auditor is a both national and city-level industry specialist; =2 if only a city-level industry specialist; =1 if only a national industry specialist; 0 otherwise.
VC	= 1 if the IPO is backed by venture capital; 0 otherwise.
UWrank	= Ritter's updated Carter-Manaster (1990) underwriter reputation measure on the quality of the lead underwriter
PropCost	= a measure of proprietary cost: HHI, CON4, or CAPINTEN (proxies defined in text)
CEOchair	= 1 if the CEO is the chair of the board; 0 otherwise.
CEOtenure	= the number of years the CEO has held that position
CEOfounder	= 1 if the CEO is the founder of the IPO firm; 0 otherwise.
CEOownership	= the proportion of the firms' outstanding shares owned by the CEO prior to IPO

AudCom	= 1 if a designated audit committee exists prior to an IPO; 0 otherwise.
AudComfe	= 1 if at least one AC member is a CPA, worked in public accounting firms, is an Accounting Expert (AE) or is a Financial Expert (FE); 0 otherwise.
CEOfe	= 1 if the CEO is a financial expert (defined in text); 0 otherwise
CFOfe	= 1 if the CFO is a financial expert (defined in text); 0 otherwise
lnAT	=ln of (pre-IPO total assets)
lnPROCEEDS	=ln of (IPO issue proceeds)
DEBT	=total liabilities/total assets
FOREIGN	=1 if foregin subsidariy present; 0 otherwise.
lnFMAGE	=ln of (IPO firm age)
LOSS	=1 if negative net income; 0 otherwise.
INVREC	=(inventory + accounts receivable)/total assets

IV. RESULTS

Results Explaining Choice of an Industry Expertise Auditor (Model 1&2)

Table 4 reports the descriptive statistics for the variables used in estimating Model (1) and (2). About 12.5 percent of the sample employs an industry expert auditor (under any definition). Venture capital backing is obtained by 57.5 percent of the sample firms. IPO firms belong to moderately concentrated industries on average. CEOs of sample IPO firms tend to be powerful, with 32.1 percent being founders of the firms, 46.9 percent serving as chairs of their boards of directors, and having mean share ownership of 11.1 percent. The mean tenure of CEOs is about 4.7 years. A strong majority of sample companies (91.5 percent) have designated audit committees prior to IPO. Of these, 19.2 percent have members who are financial experts. Financial expertise is somewhat common among CEOs (19.2 percent) and is more common among CFOs (45.3 percent). The mean (median) value for total assets (pre-logged) is about 353 (593) million in US dollars. The mean (median) value for IPO proceeds (pre-logged) is about 125 (129) million US dollars. Financial leverage is moderate with a mean liability-to-asset ratio

of 0.375. A minority of firms pay taxes on foreign income (37.9 percent). IPO firms are not very profitable, with about one half reporting losses in the IPO year.

(Insert Table 4 about Here)

Table 5 presents the logit regression results of estimating Model (1), which examines the relation between the various factors and IPO firms' choice to employ an industry expert auditor, with expertise measured as a dichotomous variable. The results show that the presence of a VC is negatively related to the choice of an industry expert auditor when proprietary costs are proxied by the Herfindahl index and a four-firm concentration (p-value=0.004). This relation is not significant when proprietary cost is proxied by capital intensity. I argue that the Herfindahl index and four-firm concentration ratios are more reliable proxies for powerful competitors. All three proprietary cost proxy coefficients have signs consistent with the prediction that IPO firms are less likely to hire industry expert auditors when proprietary costs are present. CEO and CFO characteristics are not associated with industry expert auditor choice in Table 5. Somewhat surprisingly, existence of a designated audit committee is not associated with choice of industry expert auditors. Natural log of firm age is negatively and significantly associated with choice of expert auditor, consistent with the idea that it proxies for a 'track record' of economic viability. Two other company characteristics are associated with auditor choice at marginal levels of significance. Choice of an industry expert is more likely for firms having greater financial leverage, and those having foreign operations.

(Insert Table 5 about Here)

Table 6 presents the logit regression results of estimating Model (2). Most of the results are similar to those presented in Table 5. Table 6 shows that at IPOs, AC members' financial expertise is not related to the company's choice of industry expert auditors.

(Insert Table 6 about Here)

Table 7 and Table 8 present the ordered logit regression results of estimating model (1) and model (2) respectively. Results are highly consistent with those shown in Tables 5 and 6. One difference is that the coefficients of DEBT are positive and significant in Tables 7 and 8 but not in Tables 5 and 6.

(Insert Tables 7 and 8 about Here)

Additional Tests

Audit industry specialist

I also employ two market share measures of audit industry specialist. One identifies a national (city) level industry specialist if in a particular year the auditor has the largest market share in a two-digit SIC industry in the nation (or in the particular city). Market shares are based on audit fees (Francis et al. 2005; Ferguson et al. 2003).[29] IPO companies' auditors' cities are identified by Audit Analytics from audit reports found in Form 10-K filings. I find that 10.0 percent of IPO firms are audited by joint national and city industry specialists, 16.6 percent by city-only industry specialists, and 15.6 percent by national-only industry specialists. In untabulated data, Ernst & Young (EY) is the national level leader in more two digit industries than any other auditor (N = 13 two-digit SIC industries). PriceWaterhouseCoopers (PWC) is the second place national level leader, with N = 11. At the city level, Ernst & Young (EY) is again the leader with N=15, and PriceWaterhouseCoopers (PWC) is again the second with N=14.

The second market share measure identifies a national level (city level) industry specialist in a particular year if the auditor has the largest market share in a two-digit SIC industry in the nation (in the city), and if its market share is at least ten percentage points greater than the

[29] I also measure the market share using client sales revenue and total assets. The results are similar to those discussed and presented.

second largest in the national (city) audit market. Market shares again are based on audit fees. Using this more stringent definition, I find that 5.1 percent of IPO firms are audited by joint national and city specialists, 15.4 percent by city-only industry specialists, and 7.0 percent by national-only industry specialists. In untabulated data, PriceWaterhouseCoopers (PWC) is the national level leader in more two digit industries than any other auditor (N = 18 two-digit SIC industries). Ernst & Young (EY) is the second place national level leader, with N = 14. At the city level, Ernst & Young (EY) is the leader with N=16, and PriceWaterhouseCoopers (PWC) is the second with N=14. Among the Big 7, the market shares in joint national and city specialists, national-level industry specialists, and city-level specialists, are similar to those reported for the first definition. The untabulated regression results are similar to the results using the portfolio measure and previously presented.

V. CONCLUSIONS

In this paper, I propose and test a model of the determinants of IPO firms' choice to employ industry expert auditors. My paper extends prior research concerning the determinants of industry specialist auditor choice by mature companies. I find that venture capital backing, and proprietary costs, are negatively associated with choice of industry expert auditors at IPOs. I argue that the monitoring and industry expertise provided by venture capitalists serve as substitutes for industry expert auditors. Proprietary costs are particularly salient when IPO companies first begin to disclose financial information publicly, including to competitors who are more powerful and mature. My results are consistent with prior evidence that mature clients often prefer not to be audited by the same auditors who also serve their direct competitors. IPO firm age is negatively associated with choice of industry expert auditors. I interpret this as

evidence that information asymmetry between IPO companies and potential investors is reduced when IPO firms have extensive 'track records'. Several factors prove to be surprisingly (in my view) unimportant in IPO auditor choice. These include measures of CEO power, CEO and CFO financial expertise, and existence or non-existence of a designated audit committee at IPO. In addition, several measures of IPO firm size, complexity and risk are not associated (or only marginally associated) with industry expert auditor choice.

Like any empirical study, this study has some limitations. Most notably, although I use three measures of auditor industry expertise, and obtain similar results, all three are subject to measurement errors which could influence the interpretation of my results. Another limitation arises when operationalizing the measures of CEO and CFO financial expertise. I focus on IPO firms that disclose detailed backgrounds for top managers and board members. The extent to which these disclosures are inaccurate or incomplete will introduce error in my measures of financial expertise. Finally, as with any empirical study, the possibility exists that important explanatory variables have been omitted. This possibility is greater in studies (such as this one) for which prior literature provides limited guidance.

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Table 1: Sample Selection

Data screening procedures:	Number of Observation
Initial Public Offering issued in US (2000-2010)	2,155
Less:	
Financial and utility firms	692
(SIC codes: 6000-6999 and 4900-4949)	
Exclude All Closed-end Fund/Trusts	15
Unit Issues	13
Spinoff (Equity Carve-out)	57
Offer Price < 5 (US$)	77
Non-US Public Marketplace	208
Foreign Firms	20
Prospectus Missing	24
Observations not covered by Compustat and Audit Analytics	206
Observations not using 'Big 7' auditors	58
Observations with missing values for Management and/or Board	161
Observations with missing values for variables	136
IPO offerings sample	**488**

Note: In this study 'Big 7' describes the former Big 5 plus Grant Thornton and BDO Seidman

Table 2: Sample Distribution by Year

Fiscal year	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2000	117	23.98	117	23.98
2001	25	5.12	142	29.10
2002	30	6.15	172	35.25
2003	28	5.74	200	40.98
2004	70	14.34	270	55.33
2005	52	10.66	322	65.98
2006	66	13.52	388	79.51
2007	73	14.96	461	94.47
2008	9	1.84	470	96.31
2009	18	3.69	488	100.00

Table 3: Distribution of IPO Firms by Industry and Auditor (for all sample years)

SIC code	Industry Description	Auditor							Total
		Pricewaterhouse Coopers	Ernst & Young	Deloitte & Touche	KPMG	Arthur Andersen	Grant Thornton	BDO Seidman	Number Percent
		Number of IPO clients / Percent of IPO sample							
12	Coal mining	1	1	0	1	0	0	0	3
		0.2	0.2	0	0.2	0	0	0	0.61
13	Oil and gas extraction	0	4	2	3	1	6	0	16
		0	0.82	0.41	0.61	0.2	1.23	0	3.28
15	General building contractors	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2
17	Special trade contractors	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2
20	Food and kindred products	0	0	2	0	0	0	0	2
		0	0	0.41	0	0	0	0	0.41
24	Lumber and wood products	0	1	0	0	0	0	0	1
		0	0.2	0	0	0	0	0	0.2
25	Furniture	0	1	1	0	0	0	0	2
		0	0.2	0.2	0	0	0	0	0.41
27	Printing and publishing	1	2	0	1	0	0	0	4
		0.2	0.41	0	0.2	0	0	0	0.82
28	Chemicals and allied products	19	36	4	3	3	1	1	67
		3.89	7.38	0.82	0.61	0.61	0.2	0.2	13.73
29	Petroleum and coal products	0	0	1	0	0	0	0	1
		0	0	0.2	0	0	0	0	0.2
30	Rubber and other plastic products	2	1	1	1	0	0	0	5
		0.41	0.2	0.2	0.2	0	0	0	1.02
31	Leather products	0	0	1	0	0	0	0	1
		0	0	0.2	0	0	0	0	0.2
32	Glass products	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2
33	Primary metal industries	0	0	2	1	0	1	0	4
		0	0	0.41	0.2	0	0.2	0	0.82
35	Industrial machinery and equipment	5	4	3	2	1	0	1	16
		1.02	0.82	0.61	0.41	0.2	0	0.2	3.28
36	Electrical and electronic equipment	18	15	7	4	4	2	0	50
		3.69	3.07	1.43	0.82	0.82	0.41	0	10.25
37	Transportation equipment	0	3	3	0	0	0	0	6
		0	0.61	0.61	0	0	0	0	1.23
38	Instruments and related products	13	18	6	2	3	4	0	46
		2.66	3.69	1.23	0.41	0.61	0.82	0	9.43
39	Other manufacturing industries	0	2	0	0	0	0	0	2
		0	0.41	0	0	0	0	0	0.41
41	Passage transit	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2

42	Motor freight transportation	2	0	0	1	0	0	0	3
		0.41	0	0	0.2	0	0	0	0.61
44	Water transportation	0	1	0	0	0	0	0	1
		0	0.2	0	0	0	0	0	0.2
45	Transportation by air	0	2	0	0	0	0	0	2
		0	0.41	0	0	0	0	0	0.41
46	Pipelines, except natural gas	0	0	0	1	0	0	0	1
		0	0	0	0.2	0	0	0	0.2
47	Transportation	1	0	0	1	0	0	0	2
		0.2	0	0	0.2	0	0	0	0.41
48	Communications	4	5	4	3	2	0	1	19
		0.82	1.02	0.82	0.61	0.41	0	0.2	3.89
49	Electric, gas, and sanitary services	0	0	1	3	0	1	0	5
		0	0	0.2	0.61	0	0.2	0	1.02
50	Wholesale trade –durable goods	0	1	1	1	0	0	0	3
		0	0.2	0.2	0.2	0	0	0	0.61
53	General merchandise stores	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2
54	Retail – food and groceries	0	1	1	0	0	0	0	2
		0	0.2	0.2	0	0	0	0	0.41
55	Retail – auto and home supplies	0	1	1	0	0	0	0	2
		0	0.2	0.2	0	0	0	0	0.41
56	Retail - apparel and accessary stores	0	0	0	1	0	0	0	1
		0	0	0	0.2	0	0	0	0.2
57	Retail – consumer electronics	0	0	0	1	0	0	0	1
		0	0	0	0.2	0	0	0	0.2
58	Eating and drinking places	2	1	2	4	1	0	0	10
		0.41	0.2	0.41	0.82	0.2	0	0	2.05
59	Miscellaneous retail	3	5	5	2	0	0	0	15
		0.61	1.02	1.02	0.41	0	0	0	3.07
70	Hotel, rooming houses, camps, etc.	0	0	1	0	0	0	1	2
		0	0	0.2	0	0	0	0.2	0.41
72	Personal services	1	0	0	0	0	0	0	1
		0.2	0	0	0	0	0	0	0.2
73	Business services	27	44	24	22	11	4	4	136
		5.53	9.02	4.92	4.51	2.25	0.82	0.82	27.87
78	Motion pictures	0	0	1	1	0	0	0	2
		0	0	0.2	0.2	0	0	0	0.41
79	Amusement and recreational services	1	0	2	0	0	0	0	3
		0.2	0	0.41	0	0	0	0	0.61
80	Health services	3	13	1	1	0	0	1	19
		0.61	2.66	0.2	0.2	0	0	0.2	3.89
82	Educational services	1	3	1	0	0	0	1	6
		0.2	0.61	0.2	0	0	0	0.2	1.23
87	Engineering and management services	7	6	3	2	1	2	0	21
		1.43	1.23	0.61	0.41	0.2	0.41	0	4.3
Total	**Number**	**116**	**171**	**81**	**62**	**27**	**21**	**10**	**488**
	Percent	**23.77**	**35.04**	**16.6**	**12.7**	**5.53**	**4.3**	**2.05**	**100**

Table 4: Descriptive Statistics for Variables Used in Models (1) and (2) (N=488)

Variable name	Mean	Median	Std Dev	Minimum	Maximum
AUDindepx1	0.125	0.000	0.331	0.000	1.000
AUDindexp2	0.248	0.000	0.676	0.000	3.000
VC	0.575	1.000	0.495	0.000	1.000
UWrank	3.937	8.001	7.524	-9.000	9.001
HHI	476.712	390.748	374.206	122.674	2949.600
CON4	0.375	0.361	0.125	0.180	0.903
CAPINTEN	0.178	0.090	0.197	0.045	0.813
CEOfounder	0.321	0.000	0.467	0.000	1.000
CEOchair	0.469	0.000	0.500	0.000	1.000
CEOownership	0.111	0.049	0.168	0.000	0.995
CEOtenure	4.733	4.000	4.769	0.000	40.000
AudCom	0.915	1.000	0.279	0.000	1.000
AudComfe	0.225	0.000	0.418	0.000	1.000
CEOfe	0.192	0.000	0.394	0.000	1.000
CFOfe	0.963	1.000	0.188	0.000	1.000
lnAT	4.386	4.104	1.472	1.401	8.110
INVREC	0.170	0.133	0.154	0.000	0.742
lnPROCEEDS	0.375	0.298	0.262	0.029	1.400
DEBT	4.521	4.411	0.780	2.773	6.867
lnFMAGE	2.325	2.197	0.907	0.000	4.796
FOREIGN	0.379	0.000	0.486	0.000	1.000
LOSS	0.512	1.000	0.500	0.000	1.000

AUDindepx1	= 1 if the auditor is an industry expert at the national level, city level or both; 0 otherwise.
AUDindexp2	= 3 if the B4auditor is a both national and city-level industry specialist; =2 if only a city-level industry specialist; =1 if only a national industry specialist; 0 otherwise.
VC	= 1 if the IPO is backed by venture capital; 0 otherwise.
UWrank	= Ritter's updated Carter-Manaster (1990) underwriter reputation measure on the quality of the lead underwriter.
HHI	=Herfindahl Index (Proprietary Cost proxy defined in text).
CON4	=Four-firm concentration ratios (Proprietary Cost proxy defined in text).
CAPINTEN	= Capital Intensity (Proprietary Cost proxy defined in text).
CEOfounder	= 1 if the CEO is the founder of the IPO firm; 0 otherwise.
CEOchair	= 1 if the CEO is the chair of the board; 0 otherwise.
CEOownership	= the proportion of the firms' outstanding shares owned by the CEO prior to IPO
CEOtenure	= the number of years the CEO has held that position
AudCom	= 1 if a designated audit committee exists prior to an IPO; 0 otherwise.
AudComfe	= 1 if at least one AC member is a CPA, worked in public accounting firms, is an Accounting Expert (AE) or is a Financial Expert (FE); 0 otherwise.
CEOfe	= 1 if the CEO is a financial expert (defined in text); 0 otherwise

CFOfe	= 1 if the CFO is a financial expert (defined in text); 0 otherwise
lnAT	=ln of (pre-IPO total assets)
INVREC	=(inventory + accounts receivable)/total assets
lnPROCEEDS	=ln of (IPO issue proceeds)
DEBT	=total liabilities/total assets
lnFMAGE	=ln of (IPO firm age)
FOREIGN	=1 if foregin subsidariy present; 0 otherwise.
LOSS	=1 if negative net income; 0 otherwise.

Table 5: Determinants of Employing an Industry Specialist Auditor (Model 1 logit regression)

Independent Variable	Prediction Sign	Estimate	P-value	Estimate	P-value	Estimate	P-value
Intercept	?	1.490	0.253	2.457	0.076	0.395	0.757
VC	-	-0.816	0.016	-0.822	0.016	-0.414	0.243
UWrank	+/-	-0.004	0.832	-0.001	0.940	-0.006	0.765
HHI	-	-0.003	0.096				
CON4	-			-6.753	0.004		
CAPINTEN	+					2.110	0.010
CEOfounder	+/-	-0.277	0.411	-0.307	0.362	-0.262	0.452
CEOchair	-	-0.434	0.148	-0.360	0.239	-0.447	0.145
CEOownership	-	1.170	0.162	1.152	0.165	1.129	0.118
CEOtenure	-	0.025	0.529	0.024	0.553	0.028	0.450
AudCom	+	0.354	0.543	0.407	0.483	0.352	0.485
CEOfe	+/-	-0.404	0.301	-0.395	0.319	-0.371	0.332
CFOfe	+/-	-0.723	0.341	-0.655	0.395	-0.829	0.189
lnAT	+	-0.109	0.537	-0.133	0.454	-0.194	0.298
INVREC	+	0.813	0.444	1.174	0.269	1.155	0.279
DEBT	+	1.146	0.123	1.132	0.125	0.981	0.171
lnPROCEEDS	+	-0.058	0.817	-0.050	0.843	-0.082	0.745
lnFMAGE	-	-0.708	0.001	-0.677	0.002	-0.817	0.000
FOREIGN	+	0.461	0.110	0.528	0.073	0.591	0.044
LOSS	+	0.250	0.408	0.257	0.404	0.382	0.199
Observations		488		488		488	
Pseudo-R square		15.2%		16.73%		13.41%	

Note: Three models are presented: one for each of the three measures of proprietary cost (HHI, CON4, CAPINTEN). See Table 3 variable definitions. P-values are two-tailed.

Table 6: Determinants of Employing an Industry Specialist Auditor
(Model 2 logit regression)

Independent Variable	Prediction Sign	Estimate	P-value	Estimate	P-value	Estimate	P-value
Intercept	?	1.565	0.248	2.533	0.077	0.491	0.929
VC	-	-0.795	0.024	-0.802	0.024	-0.397	0.347
UWrank	+/-	-0.003	0.884	0.000	0.994	-0.004	0.856
HHI	-	-0.003	0.098				
CON4	-			-6.750	0.004		
CAPINTEN	+					2.180	0.007
CEOFounder	+/-	-0.265	0.443	-0.299	0.389	-0.237	0.505
CEOchair	-	-0.427	0.156	-0.351	0.252	-0.442	0.153
CEOownership	-	1.164	0.171	1.148	0.172	1.086	0.132
CEOtenure	-	0.025	0.546	0.024	0.568	0.030	0.435
AudCom	+	0.193	0.781	0.241	0.731	0.146	0.785
AudComfe	+	-0.711	0.552	-0.731	0.544	-0.924	0.445
AudCom*AudComfe	+	0.473	0.704	0.497	0.693	0.607	0.632
CEOfe	+/-	-0.421	0.283	-0.413	0.300	-0.379	0.319
CFOfe	+/-	-0.694	0.372	-0.625	0.427	-0.780	0.221
lnAT	+	-0.112	0.530	-0.139	0.441	-0.206	0.274
INVREC	+	0.810	0.450	1.166	0.279	1.207	0.262
DEBT	+	1.135	0.142	1.130	0.142	0.979	0.179
lnPROCEEDS	+	-0.036	0.892	-0.025	0.924	-0.050	0.852
lnFMAGE	-	-0.704	0.001	-0.674	0.002	-0.824	0.000
FOREIGN	+	0.472	0.102	0.539	0.068	0.605	0.041
LOSS	+	0.229	0.460	0.234	0.459	0.364	0.227
Observations		488		488		488	
Pseudo-R square		15.45%		16.97%		13.84%	

Note: Three models are presented: one for each of the three measures of proprietary cost (HHI, CON4, CAPINTEN). See Table 3 variable definitions. P-values are two-tailed.

Table 7: Determinants of Employing an Industry Specialist Auditor (Model 1 Ordered Logit Regression)

Independent Variable	Prediction Sign	Estimate	P-value	Estimate	P-value	Estimate	P-value
Intercept3	?	-0.649	0.641	0.321	0.824	-1.832	0.192
Intercept2	?	1.845	0.173	2.830	0.045	0.659	0.628
Intercept1	?	1.986	0.142	2.973	0.035	0.800	0.556
VC	-	-0.763	0.029	-0.768	0.031	-0.357	0.336
UWrank	+/-	0.000	0.999	0.003	0.887	-0.002	0.902
HHI	-	-0.003	0.003				
CON4	-			-6.946	0.000		
CAPINTEN	+					2.090	0.006
CEOfounder	+/-	-0.323	0.337	-0.355	0.292	-0.312	0.362
CEOchair	-	-0.419	0.192	-0.348	0.283	-0.439	0.174
CEOownership	-	1.256	0.133	1.248	0.139	1.193	0.167
CEOtenure	-	0.024	0.498	0.022	0.529	0.025	0.467
AudCom	+	0.258	0.643	0.309	0.582	0.256	0.645
CEOfe	+/-	-0.348	0.378	-0.338	0.395	-0.325	0.411
CFOfe	+/-	-0.826	0.185	-0.765	0.222	-0.879	0.157
lnAT	+	-0.117	0.540	-0.144	0.455	-0.190	0.321
INVREC	+	0.793	0.446	1.159	0.271	1.014	0.341
DEBT	+	1.398	0.047	1.401	0.047	1.164	0.091
lnPROCEEDS	+	-0.138	0.623	-0.129	0.645	-0.160	0.562
lnFMAGE	-	-0.716	0.001	-0.684	0.001	-0.825	<.0001
FOREIGN	+	0.474	0.098	0.542	0.062	0.600	0.039
LOSS	+	0.254	0.451	0.265	0.441	0.384	0.255
Observations		488		488		488	
Pseudo-R square		13.94%		15.32%		12.13%	

Note: Three models are presented: one for each of the three measures of proprietary cost (HHI, CON4, CAPINTEN). See Table 3 variable definitions. P-values are two-tailed.

Table 8: Determinants of Employing an Industry Specialist Auditor (Model 2)

Independent Variable	Prediction Sign	Estimate	P-value	Estimate	P-value	Estimate	P-value
Intercept3	?	-0.532	0.705	0.442	0.762	-1.683	0.238
Intercept2	?	1.969	0.151	2.959	0.039	0.818	0.555
Intercept1	?	2.110	0.124	3.101	0.030	0.960	0.489
VC	-	-0.745	0.035	-0.750	0.037	-0.347	0.354
UWrank	+/-	0.002	0.925	0.005	0.808	0.000	0.981
HHI	-	-0.003	0.003				
CON4	-			-6.956	0.000		
CAPINTEN	+					2.167	0.005
CEOFounder	+/-	-0.317	0.349	-0.354	0.297	-0.292	0.397
CEOchair	-	-0.405	0.209	-0.332	0.308	-0.430	0.184
CEOownership	-	1.255	0.137	1.247	0.143	1.142	0.191
CEOtenure	-	0.024	0.497	0.022	0.526	0.028	0.414
AudCom	+	0.016	0.980	0.055	0.930	-0.015	0.980
AudComfe	+	-1.007	0.440	-1.052	0.425	-1.164	0.359
AudCom*AudComfe	+	0.737	0.589	0.784	0.570	0.814	0.541
CEOfe	+/-	-0.374	0.349	-0.365	0.363	-0.336	0.401
CFOfe	+/-	-0.799	0.203	-0.735	0.245	-0.840	0.178
lnAT	+	-0.125	0.518	-0.154	0.427	-0.205	0.289
INVREC	+	0.799	0.443	1.159	0.271	1.088	0.307
DEBT	+	1.380	0.055	1.391	0.054	1.165	0.096
lnPROCEEDS	+	-0.102	0.721	-0.089	0.756	-0.119	0.674
lnFMAGE	-	-0.715	0.001	-0.685	0.001	-0.843	<.0001
FOREIGN	+	0.494	0.085	0.561	0.054	0.622	0.034
LOSS	+	0.236	0.488	0.245	0.479	0.369	0.275
Observations		488		488		488	
Pseudo-R square		14.13%		15.70%		12.69%	

Note: Three models are presented: one for each of the three measures of proprietary cost (HHI, CON4, CAPINTEN). See Table 3 variable definitions. P-values are two-tailed.

An Investigation of Financial Expertise Improvement among CFOs Hired Following Restatements

Abstract: We examine whether restatement companies experiencing chief financial officer (CFO) turnover hire new CFOs with more financial expertise. Our study is motivated by recent high-profile financial scandals and increasing instances of restatements which focus public attention on the role of CFOs in maintaining the integrity and quality of corporate financial reporting. Our results provide some (albeit weak) support that restating firms are more likely to hire new CFOs with greater accounting knowledge and overall CFO qualification (both accounting knowledge and CFO work experience) than non-restating firms. Furthermore, we also find that the number of restating years has a positive effect on CFO qualification improvement. Although we fail to find strong evidence for our hypotheses, we provide the first evidence on the relation between CFO qualification improvement and restatement. The results extend our understanding of companies' strategies for regaining reporting credibility in the wake of restatements.

I. INTRODUCTION

We examine whether restatement companies experiencing chief financial officer (CFO) turnover hire new CFOs with more financial expertise. The results extend our understanding of companies' strategies for regaining reporting credibility in the wake of restatements. Restatements of erroneous accounting numbers (primarily earnings) have led to significant losses for investors, contributed to a series of corporate governance reforms and legislative changes including SOX 2002, and prompted efforts to identify the remedies restating firms take to improve reporting quality and restore credibility (Farber 2005; Hennes et al. 2011; Ettredge et al. 2012).

Substantial prior research investigates the role of CFOs in the misstatement and restatement context. CFOs appear to engage in earnings manipulation primarily as a result of pressure from CEOs (Feng et al. 2011). Companies whose CFOs are more financially literate are less likely to generate misstatements (Aier et al.2005). CFOs whose companies restate financial reports are more likely to be replaced (Aier et al. 2005; Feng et al. 2011), especially if the misstatements consist of irregularities rather than errors (Hennes et al. 2008). CFOs of restating firms suffer more severe labor market penalties when they lose their jobs, than those of non-restating firms (Agrawal and Cooper 2007; Arthaud-Day et al. 2006). Prior research has not investigated the financial expertise of new CFOs hired subsequent to restatements.

In a different but related context, Li et al.(2010) find that companies whose auditors report they have internal control material weaknesses under SOX Section 404 experience greater CFO turnover.[30] They also find that the newly hired CFOs often have better financial qualifications

[30] Material weakness is the key concept in evaluating the effectiveness of the companies' internal control over financial reporting (ICOFR). A material weakness is a deficiency, or a combination of deficiencies, that results in a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected (PCAOB Auditing Standard No. 5, 2007).

than the CFOs they replace. Furthermore, on average, only companies with new CFOs who have greater financial expertise than their predecessors experience subsequent improvement in auditors' SOX 404 reports. The Li et al. (2010) results suggest that a different type of blow to the credibility of a company's financial reporting (a restatement) is likely to be accompanied by CFO turnover, that the new CFOs hired often will have greater financial expertise than those they replace, and that hiring improved CFOs could enable restatement companies to more successfully mitigate the effects of restatements in the future.

CFOs typically are responsible for their companies' financial reporting (Li et al.2010). Specifically, CFOs oversee the implementation of accounting principles and procedures, oversee the preparation of financial reports, and make accounting related decisions (such as choosing accounting methods and overseeing accounting adjustments). Their financial expertise likely affects their capability to carry out such critical tasks. For instance, accounting literacy probably impacts CFOs' understanding and application of accounting principles. Financial working experience potentially affects CFOs' ability to effectively monitor accounting personnel and maintain internal controls, and to work closely with the audit committee and external auditors.

On the other hand, some evidence suggests that in the late 1990s, even as the environment and nature of corporate accounting became increasingly complicated, and as numbers of accounting restatements increased, the accounting knowledge of CFOs became less important to corporate employers (McCarty, 1999; Jones, 2000; Kahn, 2002). A 2001 survey by Spencer Stuart (a headhunting firm) showed that only 20 percent of CFOs at Fortune 500 companies held Certified Public Accountant (CPA) certificates, 35 percent had M.B.A.s, and five percent had both (Economist 2002).[31] Given the responsibility of CFOs for financial reporting, and the trend

[31] Aier *et al*. (2005) provide a discussion of the trend toward decreased CFO financial expertise in the late 1990s and early 2000s.

of decreased CFOs' financial expertise, Aier et al. (2005) suggest that this trend may have contributed to the increased number of restatements. In addition, Aier et al. (2005) report that companies whose CFOs have greater financial expertise are less likely to experience misstatements and restatements. Thus, it is interesting to explore whether restating firms will remedy financial reporting problems by hiring better qualified CFOs.

Based on prior research, we argue that restating companies experiencing CFO turnovers are more likely to hire new CFOs with greater financial expertise than those they replace as compared to new CFOs hired by non-restating firms. Restating firms have a stronger motivation to hire CFOs with greater financial expertise to improve financial reporting than do non-restating firms.

We focus on the financial expertise of restatement firms' successor CFOs for the following reasons. As discussed above, CFOs typically are responsible for the quality of their firms' financial reports. Compared to other top corporate officers, CFOs are in a unique position to resist CEO pressure to carry out accounting manipulations (e.g., structuring transactions to window dress financial numbers, applying accounting methods incorrectly, and using biased estimates to achieve earnings benchmarks). CFOs also are well placed to reduce the probability of reporting errors and irregularities. We argue that the mere replacement of CFOs will not necessarily improve reporting quality or convince investors that it has improved. Instead, CFOs having greater financial expertise than their predecessors are more likely to have the credibility, professional reputation, and technical knowledge to prevent errors and to resist CEO pressure to commit irregularities.

This study contributes to both the restatement and management turnover literatures. Prior restatement studies mostly focus on the causes and consequences of restatements. Studies

devoted to whether and how restating firms improve their financial reporting credibility document that they make improvements to their boards of directors, audit committees, and other governance characteristics (Farber, 2005). Restating companies also replace CEOs (Desai et al., 2006), and reduce option-based compensation of CEOs (Qiang and Farber 2008). Prior restatement studies have not investigated changes in qualifications of the officer directly responsible for financial reporting, the CFO. This study examines changes in CFO financial expertise, and also investigates whether companies' tendency to hire improved CFOs is influenced by the seriousness of the misstatements corrected.

Restatements are events that correct accounting errors and irregularities made by companies reporting under U.S. GAAP. Our analysis focuses on restatements announced from 2003 to 2010. This period begins in the year immediately following the Sarbanes Oxley Act (2002).[32] The sample consists of 160 companies experiencing CFO turnover: 80 restating firms and 80 matched non-restating firms. Our empirical results are summarized as follows. First, we find some evidence that restating companies experiencing CFO turnover are more likely than non-restatement control firms to hire new CFOs with greater financial expertise (in terms of accounting knowledge and overall CFO qualifications).[33] Second, the results suggest that, among restating companies experiencing CFO turnover, the number of periods restated is positively associated with the likelihood of hiring CFOs with greater financial expertise. Nevertheless, our results do not provide strong support for our hypotheses. This could be due in part to the small

[32] The number of restatements correcting accounting errors dramatically increased around 2002, the year SOX was passed (GAO-06-678 [GAO 2006], GAO-06-1053R [GAO 2007]). We start our sample period after SOX to avoid its effect on the results.

[33] Overall CFO qualifications improvement (CFOIMPORVE) is defined as greater accounting knowledge and more work experience as a CFO.

number of sample firms meeting our data requirements. Alternatively, it is possible that boards of directors of restating companies do not focus on the financial expertise of newly hired CFOs.

The remainder of the study is organized as follows. Section II reviews relevant past literature on restatement and management turnover and our hypotheses. Section III discusses the data and our regression models. Empirical results are discussed in Section IV. Section V concludes the paper.

II. PRIOR RESEARCH AND HYPOTHESES

Restatement companies experience adverse consequences following restatement announcements. These consequences, including loss of credibility and lower earnings quality perceived by investors, are accompanied by a variety of adverse effects. For example, Karpoff et al. (2008) and Wu (2002) report that stock prices decrease when financial misrepresentations are publicly disclosed. Investors likely require higher compensation for holding stocks of restating firms because they are concerned about quality of future financial statements, and the perceived credibility and competence of management. Consistent with this scenario, Hribar and Jenkins (2004) find increased cost of equity capital after restatements. Similarly, from the analyst perspective, accounting restatements represent both diminished company prospects and increased risk/uncertainty, which lead to more dispersed analyst earnings forecasts and more negative forecast revisions (Palmrose et al. 2004). In all these situations, shareholders lose confidence in the company.

The loss of credibility can have even more serious consequences to restating firms. Stockholders can resort to the legal system to regain the stock losses due to misstatements. Palmrose and Scholz (2004) find greater frequency of shareholder lawsuits following

restatements, accompanied by higher settlement amounts. Karpoff et al. (2008) document that penalties from shareholder lawsuits reach 23.6 million dollars per restating firm on average.

The adverse consequences discussed above should provide strong motivation for restating firms to improve earnings quality and restore their reporting credibility. The existing literature documents various actions restatement companies take to improve performance and restore trust. Restating firms make various changes, ranging from altering their accounting policies to restructuring corporate governance. For instance, restating firms voluntarily switch to more conservative income recognition methods in the post-restatement period (Ettredge et al. 2012). In addition, the boards of directors of restating firms strengthen their monitoring of executives. Farber (2005) reports that firms fraudulently manipulating their financial reports subsequently increase the numbers and percentages of outside directors on their boards. Investors appear to react positively to such changes. Qiang and Farber (2008) find that firms that restate their earnings re-contract with their CEOs by reducing their option-based compensation. This reduction results in improved firm performance.

While restating firms have strong incentives to improve CFO expertise that might prevent future earnings errors or irregularities, prior research has yet to examine whether firms hire CFOs with more financial expertise as an attempt to re-establish financial reporting credibility, to improve earnings quality, and/or to mitigate and prevent financial reporting problems. Hennes et al. (2008) find that CFO turnover increases among restatement companies in the post-SOX period, but only for companies correcting irregularities (intentional misstatements) as opposed to errors (unintentional misstatements). Collins et al. (2009) document increased involuntary turnover among CFOs of restating firms that is not affected by passage of SOX, and they report

that such departing CFOs experience reduced employment opportunities. Neither of these studies, however, examines the financial qualifications of departing or newly hired CFOs.

One purpose of this study is to investigate the financial expertise of CFOs hired following earnings restatements and compare it to the expertise of departing CFOs. As such, it contributes to more complete understanding of the various steps companies take to repair their reputations for providing credible financial information following restatements.

We predict that, in addition to the changes outlined above, restating companies often attempt to improve the financial expertise of their CFOs. Aier et al. (2005) provide evidence that companies whose CFOs have greater financial expertise are less likely to restate their financial reports. In a different setting, Li et al. (2010) document that firms whose auditors assess internal control material weakness under SOX Section 404 are more likely to terminate their CFOs and hire new CFOs with greater financial expertise, compared to companies receiving favorable SOX 404 reports. Among firms hiring new CFOs, they observe improvement in SOX 404 internal control opinions only when the new CFOs have better financial expertise than their predecessors. Therefore, we expect to observe that restating firms are likely to hire new CFOs with greater financial expertise as a means to improve reporting quality and restore credibility. Our first hypothesis is stated as follows.

H1: Restating companies experiencing CFO turnover are more likely to hire new CFOs with greater financial expertise, compared to their predecessors, than are control firms hiring new CFOs.

We test H1 by contrasting the subset of restatement companies having CFO turnover with a control sample of non-restatement companies having CFO turnover. CFO turnover sometimes occurs prior to the initiation of misstatements, presumably because the former CFO resists CEO

pressure to misstate (Feng et al. 2011). We view the CFOs in place when restatements are announced as responsible for the misstatements. We treat CFO turnover occurring within one year after restatements as likely motivated by the restatements.

Our second hypothesis examines the characteristics of restatements that are more likely to trigger firms to hire new CFOs with greater financial expertise. Palmrose et al.(2004) and Wu (2002) report that restatement materiality is negatively related to stock return around the announcement of restatements. Palmrose and Scholz (2004) find that greater materiality increases the likelihood of shareholder lawsuits. We predict that more material restatements, given their adverse consequences, are more likely to cause boards to hire a new CFO with better qualifications. Therefore, our second hypothesis is:

> H2: Restating companies experiencing CFO turnover and having more material restatements are more likely to hire new CFOs with greater financial expertise, than are restating companies experiencing CFO turnover and having less material restatements.

We test H2 using only the sample of restatement companies having CFO turnover. Our explanatory test variables include six proxies for materiality of misstatements, including restated amount (AMOUNT), revenue restatement (REVENUE), the number of accounts restated (NACCOUNTS), the number of restated years (YRS), press-release disclosed restatement (PRESS) and regulatory investigation (REVINVEST).

Next, we examine whether incentives to hire new CFOs with greater financial expertise differ for firms with different types of misstatements (i.e., irregularities vs. errors).[34] Hennes et al. (2008) highlight the importance of distinguishing between intentional financial misstatements and unintentional ones because combining the two types of misstatements can lead to incorrect

[34] Irregularities refer to intentional misstatements while errors refer to unintentional misapplications of GAAP. See AU Section 316 (PCAOB, 2002).

inferences. For example, greater CFO financial expertise might be more effective in preventing errors than irregularities. Accordingly, we separately examine the improvement of financial expertise for new CFOs of firms restating errors versus irregularities. We predict that restating firms can reduce the likelihood of future errors by hiring CFOs having better financial expertise. Errors arguably occur because CFOs lack accounting knowledge or because their supervision of internal control over financial reporting is weak (Aier et al. 2005; Li et al. 2010). Greater CFO financial expertise can lead to appropriate implementation of accounting rules and effective monitoring of accounting systems, thereby preventing unintentional misreporting.

H3: Restating companies experiencing CFO turnover and correcting accounting errors are more likely to hire new CFOs with greater financial expertise than are control firms hiring new CFOs.

We test H3 by contrasting the subset of restatement companies having CFO turnover and correcting accounting errors with a control sample of non-restatement companies having CFO turnover.

It is an open question whether firms restating irregularities can benefit, to the same extent as firms restating errors, by hiring new CFOs having better financial expertise. Lack of CFO financial expertise is not the underlying cause of intentional earnings manipulations. Feng et al. (2011) investigate a sample of companies sanctioned for accounting irregularities in SEC accounting and auditing enforcement releases (AAERs) and conclude that irregularities typically occur when CFOs yield to pressure from CEOs. Feng et al. (2011) also find that CFOs of firms engaging in material accounting manipulations are more likely to be CPAs than those of control firms. They suggest that compliant CFOs who are CPAs are better able to come up with

accounting schemes to boost earnings.[35] If irregularities are disproportionately committed by CFOs having high financial expertise, we might not observe improved expertise among CFOs newly hired by such companies. However, Feng et al. (2011) do not focus on CFO financial expertise, they report their CPA results in a footnote (fn. 29), and they do not study the expertise of CFOs hired by companies following public disclosure that they have corrected accounting irregularities.

Accounting irregularities are associated with increased uncertainty and risk among investors and analysts (Palmrose et al. 2004; Wu 2002). As a result, these companies are likely to desire to repair their reputations and to reduce the likelihood of future irregularities. We argue that one way restatement firms can achieve this goal is by hiring CFOs having better financial expertise. CFOs with greater financial expertise may have better knowledge of and commitment to professional ethics and might suffer more reputational costs if caught in earnings manipulations. CFOs having better reputations to protect are likely to be more resistant to pressure from CEOs. These factors could result in less aggressive financial reporting by CFOs with more financial expertise. Given the countervailing arguments regarding the association between CFO financial expertise and irregularities, we do not have a strong directional expectation. Therefore, our hypothesis in null form is:

H4: Restating companies experiencing CFO turnover and correcting accounting irregularities are not more or less likely to hire new CFOs with greater financial expertise than are control firms hiring new CFOs.

[35] More broadly, Ge et al. (2011) study whether individual CFO characteristics, including CPA status, affect companies' financial reporting choices. They report only "limited evidence of the impact of these observable CFO characteristics on CFOs' reporting choices, suggesting that these common and observable characteristics capture only a small portion of CFO styles" (Ge et al. (2011, 1176)). Their results do not imply that CFO characteristics such as CPA status are irrelevant in specific situations, such as irregularities.

We test H4 by contrasting the subset of restatement companies having CFO turnover and correcting accounting irregularities with a control sample of non-restatement companies having CFO turnover.

III. SAMPLE AND MODELS

The restatements studied in our paper are limited to those correcting accounting errors and irregularities made by companies reporting under U.S. GAAP.[36] Multiple disclosures concerning one restatement event are treated as one restatement. Since the restatement characteristics are an important consideration in our analyses, we begin with restatements available in Audit Analytics, i.e., companies trading on the NYSE, AMEX and NASDAQ. These publicly traded companies are also likely to be included in Compustat, which we need for several control variables.

Our sample period begins with restatements announced by U.S. companies in 2003, after SOX was enacted, and continues through 2010. Our choice of starting date tends to bias against the results we hypothesize because misstatements corrected post-SOX tend to be less serious, and the restatements generate smaller market responses, than pre-SOX restatements.[37] Subject to these criteria, we identify 5,605 restatement announcements; 744 with other restatement data necessary for our analyses and with a CFO turnover within 12 months following restatement announcements for our analyses. We identify CFO turnover within 12 months following the announcement of the restatement for the treatment sample.[38]

[36] Restatements that are made to correct content other than errors or irregularities in financial statements are eliminated from our sample. For example, some companies use the word "restate" to present changes in accounting principles or retrospective revisions to enhance the consistency of their financial information. Those observations are not the focus of this study and, therefore, are eliminated from our sample. Restatements made by foreign filers to reformulate financial information under U.S. GAAP also are eliminated.

[37] Post-SOX restatements commonly involve lower dollar amounts, unintentional errors, and noncore accounts, compared to pre-SOX restatements (Scholz 2008).

[38] Prior restatement studies use different turnover windows surrounding restatements and lack a consensus on the preferred turnover window. Hennes *et al*. (2008) use a 13-month window (six months before through six months

Similar to Collins et al. (2009) and Desai et al. (2006), we adopt a matched-pairs design to conduct our analyses.[39] We use propensity score matching in order to obtain an appropriate control sample for our treatment sample. As our study focuses on improvement in CFO characteristics after a restatement announcement, the appropriate control group would be those firms that experience a CFO turnover and have similar predicted probabilities of a restatement as our treatment sample. We use the following logistic regression model to predict the probability of a restatement based on commonly used determinants found in the accounting literature:

$$RES = \beta_0 + \beta_1 LNASSET + \beta_2 EMPLOY + \beta_3 LOSS + \beta_4 ROA + \beta_5 SPECIAL + \beta_6 FNDSRSED + \beta_7 ACQUIS + \beta_8 BKMKT + \beta_9 IINTCOV + \beta_{10} LEVRG + \beta_{11} BIGN + \varepsilon;$$

RES	Equals 1 if the restatement is announced in year t.
LNASSET	Natural logarithm of total assets in year t;
EMPLOY	Total number of employees in thousands, as an additional measure of firm size in year t;
LOSS	Equals 1 if income before depreciation of restating firm is less than 0 in the fiscal year-end prior to restatement announcements, 0 otherwise;
ROA	Return on Assets = Operating Income Before Depreciation/[(Total assets in year t + Total assets in year t-1)/2];
SPECIAL	Special items in year t/ Total assets in year t;
FNDSRESED	Measure of the need for financing that equals 1 if the sum of new long term debt plus new equity exceeds 20% of total assets, and 0 otherwise;

after the restatement month) in their primary analysis and six months before through two years after in their other tests. Collins *et al*. (2010) adopt a 24-month window after the restatement. We do not use long windows due to concern about introducing noise into the analysis via mis-classification of non-restatement related turnover as restatement-related.

[39] We match each restatement company having CFO turnover with a similar non-restatement company having CFO turnover. We employ a matched sample rather than a larger control sample due to the cost of hand-collecting data on CFO characteristics.

ACQUIS	Equals 1 if the sales contribution from acquisitions represents 20% or more of total sales, 0 otherwise.
BKMKT	The ratio of the book value of equity to the market value of equity;
IINTCOV	The inverse of the interest coverage ratio calculated as interest expense divided by operating income before depreciation with the ratio capped at a value of 2;
LEVRG	Total debt divided by total assets;
BIGN	Equals 1 for Big-N auditor during the year t, and 0 otherwise.

We use all available observations from Audit Analytics and Compustat for years 2003 to 2010. Once we obtain the predicted probabilities of a restatement, we sort the predicted probabilities into two groups: 1) restatement firms that experience a CFO turnover within 12 months after announcement (treatment group) and 2) firms that experience a CFO turnover, but have not been associated with a restatement (control group). We then do a one to one match based on the year of the new CFO appointment and whether the predicted probabilities between the two groups are within five percent. Untabulated results indicate that the difference in means and medians of the predicted probability of a restatement for the treatment and control groups are not statistically significant. The propensity score matching process allows us to have treatment and control samples that have both experienced CFO turnovers and have the same predicted probability of a restatement. This enables us to test the impact of an actual restatement on a firm's decision to appoint a new CFO with increased accounting and/or finance qualifications.

Table 1 provides a reconciliation of our sample. We exclude a number of firms for several reasons. Specifically, we exclude 382 observations having no match with non-restatement firms

that had CFO turnovers; 136 observations for which we could not find background information for their departing CFOs; 44 observations with missing variables in Compustat; and 102 observations with missing data in CRSP. After these screens, our final sample is composed of 80 restating firms, which we then match with 80 non-restating firms having CFO turnover.

(Insert Table 1 here.)

To examine the association between earnings restatements and the likelihood of CFO qualification improvement (H1), we use logistic regression to estimate the likelihood of financial expertise improvement; the dependent variable takes on a value of 1 for financial expertise improvement of newly-hired CFOs compared to those whom they replace and 0 otherwise. We model CFO financial expertise improvement as a function of a dichotomous restatement variable and control variables which prior research identifies as important determinants of CFO improvement. Our model can be summarized as follows:

$$\begin{aligned}\Pr(\text{CFO\_QUAL\_IMPROVE}) = {} & \beta_0 + \beta_1\,\text{RESTATEMENT} + \beta_2\text{LnASSET} + \beta_3\text{LEVERAGE} \\ & + \beta_4\text{ROA} + \beta_5\text{GROWTH} + \beta_6\,\text{EWRETD\_BF} \\ & + \beta_7\text{OLDCFOEXP} + \varepsilon. \qquad (1)\end{aligned}$$

The dependent variable, CFO qualification improvement (CFO_QUAL_IMPROVE), is tested separately using each of the following three proxy dependent variables.[40]

ACCTIMPROVE	= 1 if a new CFO is hired and has more accounting knowledge than the CFO replaced (i.e. has a CPA license or has public accounting firm working experience), 0 otherwise;
EXPIMPROVE	= 1 if a new CFO is hired and has more CFO working experience than the CFO replaced, 0 otherwise;

[40] The three measures of CFO qualification improvement are drawn from Li *et al*. (2010), model (3).

CFOIMPROVE	= 1 if a new CFO is hired and has both more accounting knowledge and more CFO working experience than the CFO replaced, 0 otherwise.

The control variables are defined as follows:

RESTATEMENT	= 1 if company restates its financial statements in year t, 0 otherwise;
LnASSET	Natural logarithm of total assets at the end of fiscal year t-1;
LEVERAGE	Total debt divided by total assets at the end of fiscal year t-1;
ROA	Return on assets for the fiscal year t-1;
GROWTH	Sales growth from t-2 to t-1, i.e., $(sales_{t-1}–sales_{t-2})/sales_{t-2}$;
EWRETD_BF	Market-adjusted buy and hold return for fiscal year t-1;
OLDCFOEXP	Natural logarithm of the number of years (working experience) the old CFO has held a CFO position.

Under H1, we expect a positive sign for the coefficient of our test variable RESTATEMENT, consistent with our hypothesis that restatement firms have a strong incentive to restore credibility by hiring CFOs having improved financial expertise. For control variables, we expect companies to be better able to improve their CFO qualification if they are larger (LnASSET), and financially stronger (small LEVERAGE, greater ROA, GROWTH and EWRETD_BF). Companies having more qualified predecessor CFOs (OLDCFOEXP) are less likely to be able to hire improved CFOs, leading to a negative expected coefficient for this variable.

To examine the influence on CFO qualification improvement of the materiality of earnings restatements (H2), we restrict our analysis to restating firms only. The logistic regression model for testing H2 is as follows:

$$\Pr(\text{CFO\_QUAL\_IMPROVE}) = \beta_0 + \beta_1\text{AMOUNT} + \beta_2\text{REVENUE} + \beta_3\text{NACCOUNTS} + \beta_4\text{YRS} + \beta_5\text{INCOME} + \beta_6\text{PRESS} + \beta_7\text{REGINVEST} +$$

$$\beta_8 LnASSET + \beta_9 LEVERAGE + \beta_{10} ROA + \beta_{11} GROWTH +$$

$$\beta_{12} EWRETD\_BF + \beta_{13} OLDCFOEXP + \varepsilon. \quad (2)$$

The dependent variable, representing CFO qualification improvement, consists of the same three variants as in model (1). The new explanatory variables are as follow.[41]

AMOUNT	= Restated net income (loss) minus originally reported net income (loss) over the restated period, scaled by total assets reported at fiscal year-end prior to the restatement announcement;
REVENUE	= 1 if a restatement involves revenue recognition issues, and 0 otherwise;
NACCOUNTS	= Number of account groups restated in a restatement. The seven account groups are revenue, cost of goods sold, operating expenses, one-time/special items, merger-related, non-operating expenses and other items;
YRS	= Number of years restated, where a fiscal year equals 1 and each additional quarter equals 0.25;
PRESS	= 1 if a restatement is first disclosed by press releases or 8-K, and 0 otherwise;
REGINVEST	= 1 if the SEC, PCAOB or other regulatory body is investigating the restating company, 0 otherwise.

We conjecture that more material restatements motivate firms to hire new CFOs with greater financial expertise because more material restatements are associated with more negative outcomes for restating companies, such as negative returns and lawsuits (Palmrose et al. 2004; Palmrose and Scholz 2004). We use three variables (AMOUNT, NACCOUNTS, and YRS) to proxy for restatement materiality and expect positive coefficients for all of them. Prior restatement studies (Desai et al. 2006) have shown that revenue recognition restatements are associated with more negative returns so we include a dichotomous variable proxying for the

[41] The other control variables such as LnASSET, LEVERAGE and GROWTH are previously defined.

type of misstatement (REVENUE). We also control for whether sources external to the firm identified misstatements, proxied by PRESS and REGINVEST. Prior work suggests that external identification of a misstatement indicates management's inability to properly monitor and control the company. Thus, we expect positive coefficients for PRESS and REGINVEST.

To examine the influence on CFO qualification improvement of the nature of the misstatements corrected (errors under H3 versus irregularities under H4), we estimate the following logit regression:

$$\Pr(\text{CFO\_QUAL\_IMPROVE}) = \beta_0 + \beta_1\,\text{TYPE} + \beta_2\text{LnASSET} + \beta_3\text{LEVERAGE} + \beta_4\text{ROA} + \beta_5\text{GROWTH} + \beta_6\,\text{EWRETD\_BF} + \beta_7\text{OLDCFOEXP} + \varepsilon. \quad (3/4)$$

TYPE represents the type of misstatement, error or fraud, as defined below. To test H3, we employ the following variable as TYPE:

TYPE = 1 if a company discloses in its filings or press release that the misstatements are due to errors, and 0 otherwise;

To test H4, the TYPE variable is:

TYPE = 1 if a company discloses in its filings or press release that the misstatements are due to fraud or irregularities, and 0 otherwise;

In Model (3), we expect the positive sign of TYPE's coefficient while in Model (4) we do not predict the sign of TYPE's coefficient due to competing theories with opposite implications. The control variables have been described previously.

IV. RESULTS

Descriptive Statistics

Descriptive statistics are reported in Table 2. To mitigate the impact of outliers, all variables are winsorized at the bottom and top one percent. All variables are measured one year prior to

the restatement announcement.[42] Panel A of Table 2 compares the 80 restating firms to the control sample. The variables listed are employed in model (1) to test H1. The mean tests indicate restating firms have less qualified CFOs, as proxied by less working experience as CFOs (OLDCFOEXP). The proportions of restating companies hiring better qualified CFOs, as proxied by more accounting knowledge (ACCTIMPROVE) and overall better qualification (CFOIMPROVE), are both 0.268 compared to 0.192 for the control firms. However, the difference in means is not significant. This does not provide support to H1. Moreover, the proportion of restating companies hiring better qualified CFOs, proxied by more working experience (EXPIMPROVE), is 0.342 compared to 0.423 for the control sample. While this is contradictory to H1, this difference is not significant.

Panel B of Table 2 compares restatement characteristics of 20 restating firms hiring better qualified new CFOs (i.e., CFOs with both better accounting credentials and more experience as a CFO) to 60 restating firms whose new CFOs are less improved. The variables listed are employed in models (2), (3) and (4) to test H2-H4. Univariate analysis indicates that the number of restated accounts (NACCOUNTS) is positively related to hiring better qualified new CFOs among restating firms, which is consistent with H2. Regulatory investigation (REGINVEST) is negatively related to hiring better qualified CFOs among restating firms, which is unexpected.

The effect of restatement on change in CFO qualifications (H1)

Table 3 reports model (1) tests of determinants of qualifications improvement among newly hired CFOs. The models are estimated using a matched-pairs sample (matched on the likelihood of a restatement) of 160 companies that have CFO turnover from 2003 to 2010 and for which

[42] We also test our analysis with all variables measured in the year of the restatement announcement. The results remain similar.

required data are available. RESTATE, the test variable, is positively and marginally associated with two measures of CFO improvement, accounting knowledge (ACCTIMPROVE) and overall CFO qualification (CFOIMPROVE) ($p < 0.10$). However, the result is not significant for the measure of CFO working experience improvement (EXPIMPROVE). The results provide modest support for our H1 that restating companies are more likely to hire improved CFOs than are non-restating companies experiencing CFO turnover.

The effect of restatement characteristics on change in CFO qualifications (H2-H4)

Table 4 reports logistic regression results for the test of hypothesis H2. The analysis uses the sample of 80 restating companies for which required data is available. In model (2), with CFOIMPROVE as the dependent variable, our test variables are AMOUNT, NACCOUNTS, and YRS, none of which have significant coefficients. In fact, the coefficient for REVENUE has a negative sign ($p < 0.01$), which is contradictory to H2. Thus, we find no support for H2 that firms restating more material restatement are more likely to hire new CFOs with greater accounting credentials and more CFO experience (CFOIMPROVE). ROA and OLDCFOEXP both have significantly negative coefficients ($p < 0.01$ and $p < 0.05$, respectively), suggesting that, as predicted, CFO improvement is negatively associated with firm performance and prior CFO experience. The results also indicate that GROWTH has a significant negative coefficient ($p < 0.10$) suggesting that faster growing firms are less likely to experience CFO improvement. EWRETD_BF is significantly positive ($p < 0.01$), suggesting that firms with better stock market performance are more likely to experience CFO improvement.

Table 5 reports logistic regression results for the test of hypotheses H3 and H4. In model (3), TYPE (ERROR) has a positive coefficient but is not statistically significant. In model (4), we fail to find TYPE (FRAUD) to be significantly related to CFO overall qualification improvement

(CFOIMPROVE). As a result, we find no evidence supporting H3 and H4 that firms restating for accounting errors/irregularities are more/less motivated to hire new CFOs with greater financial expertise in accounting experience and CFO work experience (CFOIMPROVE). The pattern of the results for the control variables is similar to that of model two except that GROWTH is no longer significant and the significance levels are generally lower in models (3) and (4) than in model (2).

V. CONCLUSIONS

In this paper, we examine CFO qualification improvement associated with restatements and restatement characteristics (restatement materiality). Our study is motivated by recent high-profile financial scandals and increasing instances of restatements which focus public attention on the role of CFOs in maintaining the integrity and quality of corporate financial reporting. Our results provide some (albeit weak) support that restating firms are more likely to hire new CFOs with greater accounting knowledge and overall CFO qualification (both accounting knowledge and CFO work experience) than non-restating firms. Furthermore, we also find that the number of restating years has a positive effect on CFO qualification improvement. Although we fail to find strong evidence for our hypotheses, we provide the first evidence on the relation between CFO qualification improvement and restatement.

The study has limitations, suggesting future research. The study is exploratory in nature and is an early attempt to lay out the empirical relations between variables that are likely to be important. Future research could explore the relation using additional control variables and modeling methods. Second, we examine the years in the post-SOX period. Further research can examine the relation in the pre-SOX period. As we discuss above, the evidence may be stronger since the restatements are more severe in the pre-SOX period than in the post period. Finally, due

to data availability, our sample size is small. Future research could extend the sample to perform gain more powerful tests.

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Table 1 Sample Selection

Sample reconciliation	
Restatements with CFO turnover within 12 months of the restatement	744
Less:	
Observations having no match with non-restatement firms that had CFO turnovers	382
Observations for which no or incomplete background information for leaving CFOs was found	136
Observations not in the Compustat Databases	44
Observations not in the CRSP Databases	102
Final Sample	**80**

Table 2
Descriptive statistics

Panel A: Restating vs. Non-restating Companies

	Restate 1=restated N=80 Mean	(1,0) 0=did not restate N=80 Mean	t-stat.	Restate 1=restated N=80 Median	(1,0) 0=did not restate N=80 Median	z-stat.[a]
ACCTIMPROVE	0.268	0.192	1.14			
EXPIMPROVE	0.342	0.423	-1.06			
CFOIMPROVE	0.268	0.192	1.14			
LnASSET	6.254	5.505	2.41**	6.132	5.375	2.84***
LEVERAGE	0.230	0.192	0.93	0.223	0.092	1.89**
ROA	0.051	0.011	1.06	0.094	0.045	2.21**
GROWTH	0.070	0.137	-0.57	0.055	0.101	1.58
EWRETD_BF	0.008	0.040	-0.34	-0.049	-0.006	0.95
OLDCFOEXP	1.185	1.429	-1.65*			

Panel B: Restating Companies changing CFOs: new CFOs do/do not have clearly improved qualifications

	CFOIMPROVE 1=Improved N=20 Mean	(=1,0) 0=Not improved N=60 Mean	t-stat.	CFOIMPROVE 1=Improved N=20 Median	(=1,0) 0=Not improved N=60 Median	z-stat.
AMOUNT	0.7727	0.7667	0.06	0.773	0.767	1.23*
REVENUE	0.1818	0.2167	0.34			
NACCOUNTS	1.0000	0.9333	-2.05**	1.000	1.000	0.06
YRS	0.6364	0.5500	0.70	0.636	0.550	-0.70
PRESS	0.0909	0.1167	- 0.33			
REGINVEST	0.0000	0.1167	-2.79***			
FRAUD	0.0455	0.0333	0.24			
LnASSET	5.943	6.369	-0.82	5.696	6.297	-0.99
LEVERAGE	0.252	0.222	0.48	0.245	0.217	0.50
ROA	-0.037	0.083	-2.35**	0.013	0.115	-2.97***
GROWTH	0.021	0.087	-0.97	0.035	0.056	0.00
EWRETD_BF	0.086	-0.021	0.74	0.146	-0.069	1.49*
OLDCFOEXP	0.948	1.272	-1.65*			

[a] Tests of differences in medians are not presented for dichotomous variables.

ACCTIMPROVE	= 1 if a new CFO is hired and has more accounting knowledge than the CFO replaced (i.e. has a CPA license or has public accounting firm working experience), 0 otherwise;
EXPIMPROVE	= 1 if a new CFO is hired and has more CFO working experience than the CFO replaced, 0 otherwise;
CFOIMPROVE	= 1 if a new CFO is hired and has both more accounting knowledge and more CFO working experience than the CFO replaced, 0 otherwise.
RESTATEMENT	=1 if company restates its financial statements in year t, 0 otherwise;
LnASSET	Natural logarithm of total assets at the end of fiscal year t-1;
LEVERAGE	Total debt divided by total assets at the end of fiscal year t-1;
ROA	Return on assets for the fiscal year t-1;
GROWTH	Sales growth from t-2 to t-1, i.e., (salest-1–salest-2)/salest-2;
EWRETD_BF	Market-adjusted buy and hold return for fiscal year t-1;
OLDCFOEXP	Natural logarithm of the number of years the old CFO has held a CFO position.
AMOUNT	= Restated net income (loss) minus originally reported net income (loss) over the restated period, scaled by total assets reported at fiscal year-end prior to restatement announcements;
REVENUE	= 1 if a restatement involves revenue recognition issues, and 0 otherwise;
NACCOUNTS	= Number of account groups restated in a restatement. The seven account groups are revenue, cost of goods sold, operating expenses, one-time/special items, merger-related, non-operating expenses and other items;
YRS	= Number of years restated, where a fiscal year = 1 and each additional quarter = 0.25;
PRESS	= 1 if a restatement is first disclosed by press releases or 8-K, and 0 otherwise;
REGINVEST	= 1 if the SEC, PCAOB or other regulatory body is investigating the restating company, 0 otherwise.

Table 3
Logistic regression results explaining new CFO qualifications improvement.

Variables	+/-	Model (1a) DepVar= ACCTIMPROVE(H1)		Model (1b) DepVar= EXPIMPROVE(H1)		Model (1c) DepVar= CFOIMPROVE(H1)	
		Coefficient	Wald X^2	Coefficient	Wald X^2	Coefficient	Wald X^2
Intercept	?	-1.205	2.664	-0.242	0.139	0.738	2.664
RESTATE	+	0.490	1.530*	-0.368	1.100	0.396	1.530*
LnASSET	+	-0.044	0.160	0.020	0.044	0.110	0.160
LEVERAGE	+	0.015	0.000	-1.113	1.765*	0.885	0.000
ROA	-	-0.141	0.043	0.458	0.398	0.679	0.043
GROWTH	?	-0.098	0.113	-0.244	0.500	0.292	0.113
EWRETD_BF	?	0.161	0.275	0.866	6.363***	0.306	0.275
OLDCFOEXP	-	0.005	0.001	0.022	0.014	0.209	0.001
Total Obs		160		160		160	
CFO Improvement Obs		37		61		37	
Chi-square		1.912		10.083		1.912	
Psuedo R^2		0.018		0.106		0.018	

***, **, *, designates significant at the 0.01, 0.05, 0.10 levels, respectively (one-tailed for signed expectations and two-tailed for unsigned expectations). See table 2 for variable definitions.

Table 4

Logistic regression results explaining restatement characteristics on new CFO qualifications improvement.

		Model (2) DepVar=CFOIMPROVE(H2)	
Variables	+/-	Coefficient	Wald X^2
Intercept	?	-15.616	0.001
AMOUNT	+	0.194	0.047
REVENUE	+	-2.919	6.529
NACCOUNTS	+	15.491	0.001
YRS	+	0.981	1.563
PRESS	+	1.515	1.191
REGINVEST	+	-22.849	0.004
FRAUD	?		
LnASSET	+	0.181	0.980
LEVERAGE	+	-1.751	0.921
ROA	-	-11.028	9.484
GROWTH	+	-3.207	3.343
EWRETD_BF	-	2.430	6.811
OLDCFOEXP	-	-0.854	3.981
Total Obs		80	
CFO Improvement Obs		20	
Chi-square		15.903	
Psuedo R^2		0.504	

***, **, *, designates significant at the 0.01, 0.05, 0.10 levels, respectively (one-tailed for signed expectations and two-tailed for unsigned expectations). See table 2 for variable definitions.

Table 5
Logistic regression results explaining errors vs. fraud on new CFO qualifications improvement.

Variables	+/-	Model (3) DepVar= CFOIMPROVE(H2) Coefficient	Wald X^2	+/-	Model (4) DepVar= CFOIMPROVE(H4)) Coefficient	Wald X^2
Intercept	?	-1.406	2.976	?	-1.283	2.444
TYPE	+	0.430	1.133	?	0.732	0.329
LnASSET	+	-0.011	0.008	+	0.010	0.007
LEVERAGE	+	0.107	0.023	+	0.212	0.095
ROA	-	-0.757	0.408	-	-0.757	0.429
GROWTH	+	0.066	0.126	+	0.050	0.068
EWRETD_BF	-	0.241	0.662	-	0.240	0.637
OLDCFOEXP	-	0.020	0.005	-	-0.026	0.007
Total Obs		160			160	
CFO Improvement Obs		37			37	
Chi-square		2.218			1.322	
Psuedo R^2		0.021			0.012	

***, **, *, designates significant at the 0.01, 0.05, 0.10 levels, respectively (one-tailed for signed expectations and two-tailed for unsigned expectations). See table 2 for variable definitions.