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Is Audit Committee Compensation associated with Restatements? How Does the Market React to it?

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Abstract

Recent financial frauds and scandals raise questions about the effectiveness of audit committee in fulfilling its oversight role. Such concerns have led to SOX's regulations of the audit committee functions. While prior studies have addressed audit committee in various aspects, few attempts have been made to examine the association between audit committee compensation and financial reporting failure and how the capital market reacts to such an association before and after the SOX. This study examines this association and documents several important findings. First, larger amounts and higher portion of option (cash) compensation are associated with higher (lower) likelihood of restatements. Second, market reacts negatively to option compensation, implying that market participants perceive option grants as a threat that impairs audit committee independence. This negative reaction becomes even stronger for severer restatements. Notably, stock awards are not associated with higher restatement likelihood and negative market reactions.

Keywords: Audit committee, Compensation, Financial reporting failure, Restatements

1. INTRODUCTION

Due to the separation of corporate management and ownership, board of directors exists to protect the interests of the shareholders. However, agency theory also suggests that shareholders require protection because managers may not always act in the best interests of the owners (Jensen and Meckling 1976). To deal with this agency problem, the board assumes an oversight role that typically involves monitoring the top management, approving major strategies, and monitoring the internal control system. Given its diverse responsibilities, the board delegates some of its oversight functions to various committees of the board. Audit committee is a subcommittee that is composed of independent outside directors to independently oversight managers' financial reporting, internal controls, and auditor-related activities (e.g., appointment, compensation, and oversight). In fact, an audit committee acts as an independent check on management and assures that financial statement accurately portray the company's economic activities (Laux and Laux 2008). Nonetheless, the audit committee's ability to achieve effective oversight is inherently limited given the nature of the function (e.g., meet infrequently, deal with complex but limited second-hand information, include members with less knowledge of company's operations, controls, and reporting). Recent financial frauds and scandals raise questions about the effectiveness of audit committee in fulfilling its oversight role. Such concerns have led to SOX's regulations of the audit committee function in a number of areas, including its duties, composition, and independence (Section 301), professional expertise (Section 407), and communications with the auditors (Section 204).

Motivated by the provisions stipulated in the SOX, several recent studies have examined issues related to audit committee.[1] For example, Krishnan (2005) uses the event of auditor change (under which communications of internal control problems and their severity should be made publicly available in Forms 8-K) as a vehicle to investigate whether audit committee quality influences internal

[1]See DeZoort et al. (2002) for a comprehensive review of the audit committee literature.

control quality. The empirical results show that audit committee members' independence and their financial expertise significantly reduce the incidence of companies' internal control problems. This finding is consistent with SOX's emphasis on the independence and expertise of audit committee members. In contrast, Karamanou and Vafeas (2005) inspects how audit committees are associated with voluntary financial disclosure (proxied by management earnings forecasts). The empirical results indicate that managers are more likely to make or update an earnings forecast (which is more accurate and elicits more favorable market reaction) if the audit committees are more effective. This finding supports the general notion that effective corporate governance is associated with higher financial disclosure quality. Different from these two studies, DeFond et al. (2005) adopts the event study approach to empirically examine whether the SOX should define "financial experts" narrowly to include accounting financial experts or more broadly to include non-accounting financial experts. The authors found positive market reaction to the appointment of accounting financial experts assigned to the audit committees but no reaction to non-accounting financial expert assigned to the audit committees. This result suggests that it is the accounting-based financial skills that are perceived to improve the audit committee's ability to ensure high-quality financial reporting.

While these prior studies have addressed audit committee in various aspects, few attempts have been made to examine the association between audit committee compensation and financial reporting failure and how the capital market reacts to such an association before and after the SOX. My motivation to address these two research issues arises from two sources. First, even though the SOX explicitly requires that all audit committee members be fully independent, it does not provide rules governing how a company should compensate its audit committee. Therefore, a company's top management may grand stock and stock-option types of compensation to its audit committee members to align the interests of both parties, resulting in audit committee's independence *in appearance* but not independence *in fact*. This could be potentially detrimental to the efficacy of the

new regulatory changes in the long-run. Some research has explored indirect incentives and *ex post* penalties for audit committees (e.g., Klein 2002; Srinivasan 2005), but does not provide in-depth empirical evidence regarding whether certain types of compensation are more likely to be associated with companies' financial failures.

Second, the capital market generally views the audit committee of a public company as serving two conflict roles: supervising the business operations and overseeing financial reporting (Laux and Laux 2008). Being directors of the company, prior research has suggested that it could be preferable to have audit committee members to own stocks so that they will behave in the best interest of the shareholders (e.g., Fama and Jensen, 1983; Williamson, 1984; Monks and Minow 2001). On the other hand, audit committee's independent function of overseeing management's financial reporting may be compromised if committee members own the company's stocks (Klein 1998, 2002). Therefore, it is not only imperative to examine how audit committee compensation influences its joint responsibilities, but also necessary to investigate how the capital market reacts to audit committee's dual roles when real financial failures occur. The latter issue is of particular importance to the regulators because of recent variations of audit committee compensation in practice (Myerson 2006) and the common use of audit committee as an internal corporate governance mechanism.

Two most recent studies that have examined the interactions between audit committee compensation and managers' financial reporting are Engel, Hayes, and Wang (2009) and Magilke, Mayhew, and Pike (2009). Engel et al. (2009) explores the changes and determinants of audit committee compensation during the pre-SOX and post-SOX periods. Based on the agency theory, the authors predict that companies are more likely to structure audit committee compensation toward a fixed pay when there is a high demand for monitoring of the financial reporting process. The empirical results generally support the prediction. Particularly, the compensation mix is negatively related to proxies for the demand for monitoring of the financial reporting process. Notably, the level

of audit committee compensation has increased substantially in the post-SOX period. By contrast, Magilke et al. (2009) adopts the experimental economics approach to investigate the impacts of a stock-equivalent compensation on audit committee members' financial reporting objectivity. The experimental results from three compensation regimes indicate that audit committee members are most objective when there is no stock-equivalent compensation. The audit committee members prefer overly aggressive (or conservative) financial reporting when they are compensated with stock-equivalent compensation linked to current (or future) shareholders.

While Engel et al. (2009) finds that the demand for monitoring of the financial reporting process is an important determinant of audit committee compensation, they do not explicitly examine whether and how different types of audit committee compensation affect the quality of companies' financial reporting. Even though Magilke et al. (2009) experimentally explores this issue, their experimental setting prevents them from testing the capital market's reaction toward the association between audit committee compensation and financial reporting failures. My study thus contributes to the auditing and compensation literature by providing a first-step understanding about how audit committee incentives interact with its oversight function to impact the effectiveness of the audit committee in enhancing the credibility of financial reporting.

I will use companies' *voluntary* restatements as the measure of financial reporting failure for three reasons.[2] First, restatements by themselves represent an acknowledgement that the financial statements, as originally released to the stock market and filed to the SEC, are not in accordance with GAAP (Palmrose et al. 2004; Srinivasan 2005). Also, the POB's Panel of Audit Effectiveness (2000)

[2]While prior studies have relied heavily on measures of earnings management (e.g., the magnitude of accruals or companies' tendency to avoid small losses) to proxy for earnings quality (e.g., Burgstahler and Dichev 1997; Degeorge et al. 1999; Healy and Wahlen 1999; Dechow and Skinner 2000; Lang et al. 2003; Leuz et al. 2003; Burgstahler et al. 2006; Lang et al. 2006; Wysocki 2006), the appropriateness of using these measures to capture financial reporting quality is still unclear. For example, Subramanyam (1996) points out that accruals may be used to signal inside information rather than earnings management. Market participants could conceivably regard smaller discretionary accruals as a reduction in the amount of inside information disclosed by the managers, leading to market participants' perception of higher level of information asymmetry.

and GAO (2002) both suggest the use of the number of restatements to capture financial reporting quality because restatements are "… the most visible indicator of improper accounting and source of new investigations." (Schroeder 2001). Second, as compared with the auditor-attributed and SEC-attributed restatements, company-attributed restatements are more susceptible to the numerous provisions imposed by the SOX on the management[3]. Therefore, company-attributed restatements can better capture the overall effects of SOX on companies' financial reporting. Finally, different from the auditor-attributed and SEC-attributed restatements, company-attributed restatements are more likely to result from misstatements not originally found by the predecessor audit committees (due to their ineffective oversight of the financial statements) but subsequently detected by the successor audit committees (due to their effective monitoring and scrutiny of the financial reporting process).

The remainder of this research proposal is organized as follows. Section 2 describes the basic research design, including the measures of dependent and independent variables, the econometric models, and the sample selection. Section 3 lists tasks to be finished if this research proposal is approved.

2. RESEARCH DESIGN

2.1 The Association Models:

To examine the association between audit committee compensation and financial reporting failure, I will first estimate the following logit model:

$$\begin{aligned} FAILURE_{i,t} = {} & \alpha_0 + \alpha_1 COMPENSATION_{i,t-1} + \alpha_2 DA_{i,t-1} + \alpha_3 LnASSET_{i,t-1} + \alpha_4 GOING_{i,t-1} + \alpha_5 BIG5_{i,t-1} \\ & + \alpha_6 ROA_{i,t-1} + \alpha_7 LOSS_{i,t-1} + \alpha_8 M\&A_{i,t-1} + \alpha_9 IPO_{i,t-1} + \alpha_{10} SALES\%_{i,t-1} \\ & + \alpha_{11} BOARD_{i,t} + \alpha_{12} AC_{i,t} + \alpha_{13} INDBOARD_{i,t} + \alpha_{14} INDAC_{i,t} + \alpha_{15}[Fixed\ Effects] + \varepsilon_{i,t}. \end{aligned} \quad (1)$$

where

[3]Usually, a restatement can be initiated by (or attributed to) a company's voluntary disclosure of correcting previously issued financial statements, the SEC's requests after reviewing companies' annual or quarterly filings, and the auditors' advice due to material misstatements in the financial statements. In some cases, however, the restatements may not be attributed to any party. See Palmrose et al. (2004) for detailed discussions about the attribution of restatements. In this study, I use "voluntary" and "company-attributed" interchangeably.

FAILURE = 1 if a restatement is attributed to the company, and 0 if there is no restatement;

COMPENSATION = Natural log of the annual total compensation for audit committee, which is the sum of five components: cash retainer, equity retainer, stock grants, option grants, and meeting fees;

DA = Cross-sectional Jones (1991) abnormal accruals at year end prior to restatement announcement;

LnASSET = Natural log of book value of total assets reported at year end prior to restatement announcement;

GOING = 1 if the company receives a going concern opinion at year end prior to restatement announcement and 0 otherwise;

BIG5 = 1 if the company's auditor is a Big 5 firm at year end prior to restatement announcement, and 0 otherwise;

ROA = Net income divided by book value of total assets, both reported at year end prior to restatement announcement;

LOSS = 1 if operating income is less than zero reported at year end prior to restatement announcement, and 0 otherwise;

M&A = 1 if the company experiences a merger or acquisition at year end prior to restatement announcement, and 0 otherwise;

IPO = 1 if the company experiences the initial public offering at year end prior to restatement announcement, and 0 otherwise;

SALES% = One-year percentage change in sales (a measure of sales growth reported at year end prior to restatement announcement);

BOARD = Number of directors on the board at the restatement year;

AC = Number of directors on the audit committee at the restatement year;

INDBOARD = Number of independent directors on the board divided by the total board size at the restatement year;

INDAC = Number of independent director on the audit committee divided by the total audit committee size at the restatement year;

Fixed Effects = Dummy variables controlling for fixed effects of industries and calendar years;

ε = the residual term.

The test variable *COMPENSATION* denotes each company's total annual compensation paid to its audit committee, which is calculated by the sum of five components: cash retainer, equity retainer, stock grants, option grants, and meeting fees. Following Engel et al. (2009), I use a logarithmic

transformation for *COMPENSATION* because all the compensation components are usually right-skewed.

The control variables include major determinants affecting companies' voluntary restatement decisions. For example, companies receiving qualified opinions are more likely to restate their financial statements afterwards (DeFond and Jiambalvo 1991; Kinney and McDaniel 1989; Sennetti and Turner 1999). Hence, I include going concern opinion as an indicator variable (denoted by *GOING*) and predict its coefficient to be positive. In addition, Farber (2004) reports a smaller proportion of brand-name audit firms in fraud companies compared with control companies. Therefore, I include Big 5 CPA firms (denoted by *BIG5*) to control for auditors' industry leadership and predict its coefficient to be positive. I also posit that companies' earnings management behavior is more likely to lead to subsequent restatements. Thus, I include abnormal accruals to proxy for the extent of a company's earnings management (denoted by *DA*) and predict its coefficient to be positive. Similar to previous studies (e.g., Dechow et al. 1996; Richardson et al. 2002; Desai et al. 2006), I control for company's size effect (denoted by *LnASSET*) and predict its coefficient to be negative because company size might capture firm-specific risk (Fama and French 1992). Also, controlling for size can potentially mitigate the problem of correlated omitted variables (Myers et al., 2005; Ahmed and Goodwin 2007).

Since the financial condition of a company usually affects the likelihood that it will release restatement announcement (DeFond and Jiambalvo 1991; Kinney and McDaniel 1989; Sennetti and Turner 1999), I consider three proxies for a company's financial condition: *ROA*, *LOSS*, and *SALES%*. I predict that the coefficient of *ROA* (or *LOSS*) to be negative (or positive) because profitable (or unprofitable) companies are less (or more) likely to be financially-distressed.[4] Similarly, I expect the

[4]The consideration of both *ROA* and *LOSS* has been used in prior auditing studies such as Ferguson et al. (2004), Frankel et al. (2002), Landsman et al. (2006), and Whisenant et al. (2003). Since *ROA* and *LOSS* could capture the same information about a company's profitability, I will also conduct a sensitivity test in which variable *LOSS* is excluded from the first-stage regression model.

coefficient of *SALES%* to be positive because high sales growth is generally associated with lower audit quality and higher litigation risk for all CPA firms (Stice 1999; Chaney and Philipich 2002), leading to a high likelihood that companies will restate their financial statements. Following Cahan and Zhang (2006), I use a one-year percentage change in sales to measure *SALES%*.

Corporate boards are responsible for monitoring managerial performance in general, and financial reporting in particular, a task that is delegated to the audit committees. Accordingly, we include four measures to proxy for a company's governance environment: *BOARD*, *AC*, *INDBOARD*, and *INDAC*. Dechow et al. (1996) and Beasley (1996) find that outside independent directors are effective monitors of managerial actions. Beasley and Salterio (2001) and Klein (2002a) shows that audit committee independence is positively associated with board size and board independence. Klein (2002b) further indicates that audit committee independence is negatively associated with the level of earnings management. Drawing from these studies, we expect that companies whose boards and audit committees are larger and more independent will be more likely to voluntarily restate their financial statements, given material misstatements have been discovered and restatements are deemed necessary.

Finally, empirical evidence has shown that acquisitions and initial public offerings (IPOs) may increase the probability of restatements due to new, difficult, or contentious accounting issues, and possible business integration problems (Kinney et al. 2004). As a result, I include two measures to proxy for a company's acquisition and IPO activities: *M&A* and *IPO*. Following Myers et al. (2003) and Kinney et al. (2004), I use Compustat footnote code 1 to identify companies undergoing mergers and acquisitions in the preceding one year before restatement announcements.

Since the annual total compensation paid to the audit committee is composed of a fixed cash-based component (i.e., the cash retainer) and a variable equity-based component (i.e., the sum of equity retainer, stock grants, and option grants), I further decompose *COMPENSATION* into these two

parts and estimate the following two logit models:

$$\begin{aligned} FAILURE_{i,t} = {} & \alpha_0 + \alpha_1 FIX_{i,t-1} + \alpha_2 VAR_{i,t-1} + \alpha_3 DA_{i,t-1} + \alpha_4 LnASSET_{i,t-1} + \alpha_5 GOING_{i,t-1} + \alpha_6 BIG5_{i,t-1} \\ & + \alpha_7 ROA_{i,t-1} + \alpha_8 LOSS_{i,t-1} + \alpha_9 M\ \&\ A_{i,t-1} + \alpha_{10} IPO_{i,t-1} + \alpha_{11} SALES\%_{i,t-1} \\ & + \alpha_{12} BOARD_{i,t} + \alpha_{13} AC_{i,t} + \alpha_{14} INDBOARD_{i,t} + \alpha_{15} INDAC_{i,t} + \alpha_{16}[Fixed\ Effects] + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

$$\begin{aligned} FAILURE_{i,t} = {} & \alpha_0 + \alpha_1 MIX_{i,t-1} + \alpha_2 DA_{i,t-1} + \alpha_3 LnASSET_{i,t-1} + \alpha_4 GOING_{i,t-1} + \alpha_5 BIG5_{i,t-1} \\ & + \alpha_6 ROA_{i,t-1} + \alpha_7 LOSS_{i,t-1} + \alpha_8 M\ \&\ A_{i,t-1} + \alpha_9 IPO_{i,t-1} + \alpha_{10} SALES\%_{i,t-1} \\ & + \alpha_{11} BOARD_{i,t} + \alpha_{12} AC_{i,t} + \alpha_{13} INDBOARD_{i,t} + \alpha_{14} INDAC_{i,t} + \alpha_{15}[Fixed\ Effects] + \varepsilon_{i,t}. \end{aligned} \quad (3)$$

where

FIX = Natural log of the total annual cash retainer paid to the audit committee;

VAR = Natural log of the variable component of total annual compensation paid to the audit committee, which is the sum of equity retainer, stock grants, and option grants;

MIX = Ratio of the variable component to the fixed component of the annual total compensation for audit committee;

All other variables are defined as in Model (1).

Finally, I include the five components of *COMPENSATION* separately into the following model to test their explanatory power for companies' voluntary restatements:

$$\begin{aligned} FAILURE_{i,t} = {} & \alpha_0 + \alpha_1 CASH_{i,t-1} + \alpha_2 EQUITY_{i,t-1} + \alpha_3 OPTION_{i,t-1} + \alpha_4 MEETING_{i,t-1} + \alpha_5 DA_{i,t-1} \\ & + \alpha_6 LnASSET_{i,t-1} + \alpha_7 GOING_{i,t-1} + \alpha_8 BIG5_{i,t-1} + \alpha_9 ROA_{i,t-1} + \alpha_{10} LOSS_{i,t-1} \\ & + \alpha_{11} M\ \&\ A_{i,t-1} + \alpha_{12} IPO_{i,t-1} + \alpha_{13} SALES\%_{i,t-1} + \alpha_{14} BOARD_{i,t} + \alpha_{15} AC_{i,t} \\ & + \alpha_{16} INDBOARD_{i,t} + \alpha_{17} INDAC_{i,t} + \alpha_{18}[Fixed\ Effects] + \varepsilon_{i,t}. \end{aligned} \quad (4)$$

where

CASH = Natural log of the total cash retainer paid to the audit committee;

EQUITY = Natural log of the total equity retainer paid to the audit committee;

OPTION = Natural log of the total option grants paid to the audit committee;

MEETING = Natural log of the total meeting fees paid to the audit committee;

All other variables are defined as in Model (1).

2.2 The Market Reaction Models:

Practically speaking, the decision as to whether a restatement is necessary may be a judgment call on the company's behalf, driven by interpretation of accounting principles rather than a mandate or

clear-cut requirement. In other words, companies' voluntary restatements are generally determined by their top management. To control for this endogenity problem, I will adopt Heckman's (1979) two-stage estimation procedure for examining market reactions to pre- and post-SOX restatements.

2.2.1 The first stage —voluntary restatement model

At the first stage, I estimate the following probit model for companies' voluntary restatement decisions:

$$\begin{aligned} VOL\_RESTATED_{i,t} = {} & \alpha_0 + \alpha_1 DA_{i,t-1} + \alpha_2 LnASSET_{i,t-1} + \alpha_3 GOING_{i,t-1} + \alpha_4 BIG5_{i,t-1} + \alpha_5 ROA_{i,t-1} \\ & + \alpha_6 LOSS_{i,t-1} + \alpha_7 M\&A_{i,t-1} + \alpha_8 IPO_{i,t-1} + \alpha_9 SALES\%_{i,t-1} + \alpha_{10} BOARD_{i,t} \\ & + \alpha_{11} AC_{i,t} + \alpha_{12} INDBOARD_{i,t} + \alpha_{13} INDAC_{i,t} + \alpha_{14}[Fixed\ Effects] + \varepsilon_{i,t}. \end{aligned} \quad (5)$$

where

VOL_RESTATED = 1 if a restatement is attributed to the company, and 0 if a restatement is attributed to the auditor, the SEC, or unattributed;

All the variables are defined as in Model (1).

In Model (5), the dependent variable, *VOL_RESTATED*, is a dummy variable which equals one if restatements are attributed to the companies and zero for restatements that are attributed to the auditors, the SEC, or unattributed. Different from Model (1), I will not use a comparison group that contains no-restatement companies in Model (5) because we adopt Model (5) to control for the self-selection bias by estimating the *conditional* probability that, given a restatement has been publicized, the announcement is made voluntarily by the company rather than by outside parties.

2.2.2 The second stage —market reaction models

To examine the market reactions to restatements before and after SOX, I will proceed to estimate eight market reaction models at the second stage with an addition of the inverse Mills ratios obtained from Model (5), a variable that is denoted by *LAMBDA*.

$$
\begin{aligned}
CAR_{i,t} = {} & \alpha_0 + \alpha_1 COMPENSATION_{i,t} + \alpha_2 FRAUD_{i,t} + \alpha_3 CORE_{i,t} + \alpha_4 AMOUNT_{i,t} \\
& + \alpha_5 ACCOUNT_{i,t} + \alpha_6 RYEAR_{i,t} + \alpha_7 QUAL_{i,t} + \alpha_8 REVERSE_{i,t} + \alpha_9 REPEAT_{i,t} \\
& + \alpha_{10} Mix/Pure_{i,t} + \alpha_{11} SOX_{i,t} + \alpha_{12} LEV_{i,t-1} + \alpha_{13} MB_{i,t-1} + \alpha_{14} SHAREDECR_{i,t-1} \\
& + \alpha_{15} SHAREINCR_{i,t-1} + \alpha_{16} LAMBDA_{i,t} + \varepsilon_{i,t}.
\end{aligned} \tag{6}
$$

$$
\begin{aligned}
CAR_{i,t} = {} & \alpha_0 + \alpha_1 COMPENSATION_{i,t} + \alpha_2 FRAUD_{i,t} + \alpha_3 CORE_{i,t} + \alpha_4 AMOUNT_{i,t} \\
& + \alpha_5 ACCOUNT_{i,t} + \alpha_6 RYEAR_{i,t} + \alpha_7 QUAL_{i,t} + \alpha_8 REVERSE_{i,t} + \alpha_9 REPEAT_{i,t} \\
& + \alpha_{10} Mix/Pure_{i,t} + \alpha_{11} SOX_{i,t} + \alpha_{12} LEV_{i,t-1} + \alpha_{13} MB_{i,t-1} + \alpha_{14} SHAREDECR_{i,t-1} \\
& + \alpha_{15} SHAREINCR_{i,t-1} + \alpha_{16} LAMBDA_{i,t} + \alpha_{17} COMPENSATION_{i,t} \times SOX_{i,t} + \varepsilon_{i,t}.
\end{aligned} \tag{7}
$$

where

CAR = Two-day's [0,1] cumulative abnormal return;

FRAUD = 1 if the SEC issued an enforcement action (AAER) or the company admitted the misstatement was due to fraud/irregularities, and 0 otherwise;

CORE = 1 if a restatement involves revenue, cost of sales or on-going operating expenses, and 0 otherwise;

AMOUNT = Restated income (loss) less originally reported income (loss) over restated period, scaled by book value of assets reported at year end prior to restatement announcement;

ACCOUNT = Number of account groups affected in a restatement. The seven account groups are revenue, cost of sales, operating expenses, one-time/special items, merger-related, non-operating expenses, and other items;

RYEAR = Sum of years restated, where a fiscal year = 1 and each additional quarter = 0.25;

QUAL = 1 if a company provides only qualitative information in a restatement announcement, and 0 if a company provides quantification of a restatement's impact on net income in the initial announcement.

REVERSE = 1 if a restatement reverses originally reported income (loss), and 0 otherwise;

REPEAT = 1 if the company restates the financial statements of a given year more than one time in subsequent multiple years, and 0 otherwise;

Mix/Pure = 1 if restatements are announced together with earnings releases, and 0 otherwise;

SOX = 1 if the announcement date is after August 1, 2002, and 0 otherwise;

LEV = Book value of long-term debt divided by book value of total assets, both reported at year end prior to a restatement announcement;

MB = Market value to book value of equity reported at year end prior to a restatement announcement;

SHAREDECR = 1 if a company experiences a decline of more than 10 percent of total outstanding shares during the restatement year, and 0 otherwise;

SHAREINCR = 1 if a company experiences an increase of more than 10 percent of total outstanding shares during the restatement year and 0 otherwise;

LAMBDA = Inverse Mills ratio obtained from Equation (1);

ε = the residual term;

All other variables are defined as in Model (1).

Note that I only consider each company's first release of its restatement announcement at a given year. In estimating the dependent variable *CAR*, I use the market-adjusted model based on an equally weighted index (with dividends) to estimate the abnormal returns. This model subtracts the Datastream Advance Market Index return from a company's daily return to obtain the market-adjusted abnormal return (AR) for each day per company. The cumulative abnormal returns (CARs) over a 2-day reaction window 0 to +1 are then calculate for a given time period.[5]

I include nine control variables that capture the restatement characteristics from different perspectives. The first variable is an indicator variable for fraud (denoted by *FRAUD*), which equals one if a restatement involves SEC enforcement action (e.g., AAER) or fraud/irregularities, and zero otherwise. This variable is included because fraud usually implies an intentional violation of GAAP during the financial reporting process resulting from a lack of management integrity.

Second, *AMOUNT* measures the size (magnitude) effect of a restatement and its directional impacts on net income. Following Palmrose et al. (2004), Myer et al. (2005) and Lev et al. (2007), I compute *AMOUNT* as the restated income (loss) less originally reported income (loss), scaled by the book value of assets at year-end immediately preceding the restatement announcement.

Third, I use two measures to proxy for the pervasiveness of a restatement: impacts on core

[5]I adopt a 2-day window mainly because prior event studies have indicated that short-horizon captures the immediate market reactions to an event (e.g., Demirkan 2007; Fama 1991; Hribar and Jenkins 2004; McWilliams and Seigel 1997) and, therefore, provides the cleanest evidence on how market participants react to companies' restatement announcements. As a sensitivity test, I will also change the width of the reaction window.

earnings (denoted by *CORE*) and numbers of account groups affected (denoted by *ACCOUNT*). According to Penman (2001), core earnings in an income statement includes sales revenue, cost of sales, and on-going operating expenses. I include *CORE* (which equals one if a restatement involves core earnings and zero otherwise) because prior studies have shown that market participants regard restatements of core earnings as more serious due to their potential litigations and react negatively (Palmrose and Scholz 2004; Palmrose et al. 2004). In contrast, variable *ACCOUNT* measures the number of account groups involved in a restatement. I follow Palmrose et al. (2004) by focusing on seven account groups in the income statement (i.e., revenue, cost of sales, operating expenses, one-time/special items, merger-related, non-operating expenses, and other items).

Fourth, duration (denoted by *RYEAR*) is measured by the number of years' financials restated in a single restatement (where a fiscal year = 1 and a quarter = 0.25). Therefore, *RYEAR* captures the "cumulative compromise" of financial reporting quality over a specific length of time.

Fifth, insufficiency (denoted by *REPEAT*) is an indicator variable that equals one if a company restates its financial statements of a given year more than one time in subsequent multiple restatements, and zero otherwise. By definition, *REPEAT* represents the "extent of insufficiency" of restating a specific year's financial statements.

Sixth, I use two measures to proxy for the disclosure format of a restatement: whether quantification of a restatement's impact on net income is disclosed (denoted by *QUAL*) and whether a restatement is announced together with earnings releases (denoted by *Mix/Pure*). I include *QUAL* (which equals one if a restatement is disclosed using qualitative information and zero otherwise) because quantification in initial restatement announcement likely provides more comprehensive information available to the market due to market participants' lack of information about the exact dollar impact of a restatement until the company files adjusted financial statements (Palmrose et al. 2004). On the other hand, I include *Mix/Pure* (which equals one if a restatement is announced

together with earnings releases, and zero otherwise) to examine whether market participants will react differently to restatement announcements with and without earnings releases. Palmrose et al. (2004) finds that companies announcing restatements without earnings releases suffer more negative returns than those with earnings releases.

The last control variable, *REVERSE*, is an indicator variable which equals one if a restatement reverses the originally reported income (loss) to loss (income), and zero otherwise. Palmrose et al. (2004) finds that there appears to be an incrementally negative effect when restatements cross the income/loss threshold.

I also include five variables to control for company characteristics that might affect market reactions to restatements. I control for companies' financial leverage (denoted by *LEV*) because market reactions differ across debt levels (Billings 1999; Core and Schrand 1999). I further incorporate the market-to-book ratio (denoted by *MB*) to control for companies' growth opportunity (Frankel et al. 2002; Cahan and Zhang 2006). Since stock trading volume contains the differences among traders which are averaged out in the returns data, the use of volume in conjunction with returns could identify systematic differences in investors' knowledge or other characteristics which result in different reactions to public announcements across firms or across types of announcements (Kim and Verrecchia 1991). To consider the effects of trading volumes on stock returns, I include two indictor variables, *SHAREINCR* and *SHAREDECR*, to control for larger increases/decreases in outstanding shares (Becker et al. 1998). Finally, I control for self-selection bias by including *LAMBDA* obtained from Model (5).

By decomposing *COMPENSATION* into its fixed and variable components, I will extend Models (6) and (7) into the following Models (8)~(11):

$$CAR_{i,t} = \alpha_0 + \alpha_1 FIX_{i,t} + \alpha_2 VAR_{i,t} + \alpha_3 FRAUD_{i,t} + \alpha_4 CORE_{i,t} + \alpha_5 AMOUNT_{i,t} + \alpha_6 ACCOUNT_{i,t} + \alpha_7 RYEAR_{i,t} + \alpha_8 QUAL_{i,t} + \alpha_9 REVERSE_{i,t} + \alpha_{10} REPEAT_{i,t} + \alpha_{11} Mix/Pure_{i,t} + \alpha_{12} SOX_{i,t} + \alpha_{13} LEV_{i,t-1} + \alpha_{14} MB_{i,t-1} + \alpha_{15} SHAREDECR_{i,t-1} + \alpha_{16} SHAREINCR_{i,t-1} + \alpha_{17} LAMBDA_{i,t} + \varepsilon_{i,t}. \quad (8)$$

$$CAR_{i,t} = \alpha_0 + \alpha_1 FIX_{i,t} + \alpha_2 VAR_{i,t} + \alpha_3 FRAUD_{i,t} + \alpha_4 CORE_{i,t} + \alpha_5 AMOUNT_{i,t} + \alpha_6 ACCOUNT_{i,t} + \alpha_7 RYEAR_{i,t} + \alpha_8 QUAL_{i,t} + \alpha_9 REVERSE_{i,t} + \alpha_{10} REPEAT_{i,t} + \alpha_{11} Mix/Pure_{i,t} + \alpha_{12} SOX_{i,t} + \alpha_{13} LEV_{i,t-1} + \alpha_{14} MB_{i,t-1} + \alpha_{15} SHAREDECR_{i,t-1} + \alpha_{16} SHAREINCR_{i,t-1} + \alpha_{17} LAMBDA_{i,t} + \alpha_{18} SOX_{i,t} \times FIX_{i,t} + \alpha_{19} SOX_{i,t} \times VAR_{i,t} + \varepsilon_{i,t}. \quad (9)$$

$$CAR_{i,t} = \alpha_0 + \alpha_1 MIX_{i,t} + \alpha_2 FRAUD_{i,t} + \alpha_3 CORE_{i,t} + \alpha_4 AMOUNT_{i,t} + \alpha_5 ACCOUNT_{i,t} + \alpha_6 RYEAR_{i,t} + \alpha_7 QUAL_{i,t} + \alpha_8 REVERSE_{i,t} + \alpha_9 REPEAT_{i,t} + \alpha_{10} Mix/Pure_{i,t} + \alpha_{11} SOX_{i,t} + \alpha_{12} LEV_{i,t-1} + \alpha_{13} MB_{i,t-1} + \alpha_{14} SHAREDECR_{i,t-1} + \alpha_{15} SHAREINCR_{i,t-1} + \alpha_{16} LAMBDA_{i,t} + \varepsilon_{i,t}. \quad (10)$$

$$CAR_{i,t} = \alpha_0 + \alpha_1 MIX_{i,t} + \alpha_2 FRAUD_{i,t} + \alpha_3 CORE_{i,t} + \alpha_4 AMOUNT_{i,t} + \alpha_5 ACCOUNT_{i,t} + \alpha_6 RYEAR_{i,t} + \alpha_7 QUAL_{i,t} + \alpha_8 REVERSE_{i,t} + \alpha_9 REPEAT_{i,t} + \alpha_{10} Mix/Pure_{i,t} + \alpha_{11} SOX_{i,t} + \alpha_{12} LEV_{i,t-1} + \alpha_{13} MB_{i,t-1} + \alpha_{14} SHAREDECR_{i,t-1} + \alpha_{15} SHAREINCR_{i,t-1} + \alpha_{16} LAMBDA_{i,t} + \alpha_{17} MIX_{i,t} \times SOX_{i,t} + \varepsilon_{i,t}. \quad (11)$$

Finally, I include the five components of *COMPENSATION* separately into Models (6) and (7) and estimate the following Models (12) and (13):

$$CAR_{i,t} = \alpha_0 + \alpha_1 CASH_{i,t-1} + \alpha_2 EQUITY_{i,t-1} + \alpha_3 OPTION_{i,t-1} + \alpha_4 MEETING_{i,t-1} + \alpha_5 FRAUD_{i,t} + \alpha_6 CORE_{i,t} + \alpha_7 AMOUNT_{i,t} + \alpha_8 ACCOUNT_{i,t} + \alpha_9 RYEAR_{i,t} + \alpha_{10} QUAL_{i,t} + \alpha_{11} REVERSE_{i,t} + \alpha_{12} REPEAT_{i,t} + \alpha_{13} Mix/Pure_{i,t} + \alpha_{14} SOX_{i,t} + \alpha_{15} LEV_{i,t-1} + \alpha_{16} MB_{i,t-1} + \alpha_{17} SHAREDECR_{i,t-1} + \alpha_{18} SHAREINCR_{i,t-1} + \alpha_{19} LAMBDA_{i,t} + \varepsilon_{i,t}. \quad (12)$$

$$CAR_{i,t} = \alpha_0 + \alpha_1 CASH_{i,t-1} + \alpha_2 EQUITY_{i,t-1} + \alpha_3 OPTION_{i,t-1} + \alpha_4 MEETING_{i,t-1} + \alpha_5 FRAUD_{i,t} + \alpha_6 CORE_{i,t} + \alpha_7 AMOUNT_{i,t} + \alpha_8 ACCOUNT_{i,t} + \alpha_9 RYEAR_{i,t} + \alpha_{10} QUAL_{i,t} + \alpha_{11} REVERSE_{i,t} + \alpha_{12} REPEAT_{i,t} + \alpha_{13} Mix/Pure_{i,t} + \alpha_{14} SOX_{i,t} + \alpha_{15} LEV_{i,t-1} + \alpha_{16} MB_{i,t-1} + \alpha_{17} SHAREDECR_{i,t-1} + \alpha_{18} SHAREINCR_{i,t-1} + \alpha_{19} LAMBDA_{i,t} + \alpha_{20} SOX_{i,t-1} \times CASH_{i,t-1} + \alpha_{21} SOX_{i,t-1} \times EQUITY_{i,t-1} + \alpha_{22} SOX_{i,t-1} \times OPTION_{i,t-1} + \alpha_{23} SOX_{i,t-1} \times MEETING_{i,t-1} + \varepsilon_{i,t}. \quad (13)$$

2.3 Data and Sample Selection:

I will hand-collect data about the dates of initial restatement announcements and the characteristics of these restatements from the *Lexis-Nexis News Library*, covering all interim and annual restatements announced from January 1, 2000, through December 31, 2005. Similar to Palmrose et al. (2004) and Kinney et al. (2004), my search will use key word searches for restatements such as “restate,” “restatement,” “revise,” “revision,” “adjust,” and “error.” The event day is determined by the first restatement announcement date identified in the *Lexis-Nexis News Library*. I will also search the EDGAR database to cross-check whether these event days are correct. Finally, I will adjust restating companies mentioned in other sources discussing restatements such as GAO’s (2002) report, *SEC Filing Library*, *Accounting Today News*, *Compliance Week News* and *Audit analytics* database.

I will identify outside directors using ExecuComp firms covering the period from 2000 to 2005. Information on board size, audit committee size, board independence and audit committee independence is also hand-collected from the appointing companies’ proxy statements. Firm-level accounting data are obtained from the *COMPUSTAT* Annual Industrial, Research, and Full Coverage files, and stock returns are collected from the *Datastream Advance* daily return file. To control for the homogeneity to comply with the SEC disclosure rules and avoid any exchange-market effect, we restrict our sample to companies traded on NASDAQ and NYSE only.

Following previous studies on outside directors (e.g., Adams 2003; Yermack 2004), I will exclude utilities (2-digit SIC 49) and financial institutions (1-digit SIC 6) from the sample because of two reasons. First, these firms tend to have different corporate governance structures from firms in non-regulated industries. Second, these firms have unique operating environment and differences in accounting classifications that make inferences difficult in subsequent analyses. I will also restrict my sample to companies whose fiscal year ends on December 31 to make the sample companies as

homogenous as possible. To control for outlier problem, I will winsorize observations that fall in the top and bottom 1 percent of the empirical distribution for both the dependent and independent variables (Bulter et al. 2005; Fan and Wong 2005).

3. EMPIRICAL RESULTS

See the attached Tables.

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TABLE 1
Sample Selection Procedure

All restatements during fiscal year 2004 to 2008 collected in the *Audit analytics* database	6,289
Less: repeat restatements in the same fiscal year	(2,361)
Less: financial institutions (SIC codes 6000-6999)[a]	(1,292)
Less: companies not traded on NASDAQ and NYSE	(1,505)
Less: observations not being S&P 500	(481)
Less: observations with missing data	(516)
Final Sample[b]	134

[a]Financial institutions (SIC codes 6000-6999) are not included in our sample.

[b]All sample firms have complete data on Compustat and CRSP.

TABLE 2

Descriptive Statistics

Panel A：Difference between two subsamples

	Restatements(n=134)			No restatements(n=1,601)			Differences	
Variables	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Parametric *t* tests[b]	Mann-Whitney *z* tests[b]
AB_DA	0.548	0.511	0.351	0.527	0.418	0.367	-0.650	-0.822
LnASSET	9.053	9.217	1.265	9.036	8.988	1.172	-0.161	-0.010
GOING	0.052	0.000	0.223	0.003	0.000	0.055	-6.846***	-6.761***
BIG4	0.933	1.000	0.251	0.991	1.000	0.094	5.719***	5.670***
ROA	0.055	0.047	0.073	0.069	0.067	0.075	2.203**	3.708***
LOSS	0.149	0.000	0.358	0.078	0.000	0.268	-2.871***	-2.866***
M&A	0.246	0.000	0.432	0.224	0.000	0.417	-0.603	-0.604
IPO	0.030	0.000	0.171	0.021	0.000	0.143	-0.688	-0.689
SALES	0.120	0.089	0.223	0.135	0.099	0.206	0.779	1.131
BOARD	7.045	7.000	1.810	6.660	7.000	1.743	-2.454**	-2.551**
AC	4.000	4.000	1.137	4.160	4.000	1.127	1.579	1.199
MEETINGTIMES	9.493	9.000	4.340	8.800	9.000	3.451	-2.188**	-1.960*
OVERLAPCOM	0.311	0.250	0.291	0.282	0.250	0.290	-1.089	-1.254
ACCEXPERTISE	0.057	0.000	0.111	0.085	0.000	0.148	2.179**	1.935*
LnMEETINGFEE	5.374	8.835	4.662	6.252	9.105	4.539	2.147**	2.936***
EQUITYRATIO	0.585	0.574	0.280	0.513	0.539	0.250	-3.202***	-2.760***
CASHCOM	11.329	12.271	3.310	11.785	12.341	2.562	1.936*	1.050
STOCKCOM	8.087	11.701	5.908	8.498	11.724	5.712	0.801	0.675
OPTIONCOM	10.086	12.215	4.923	8.599	0.000	6.192	-2.708***	-2.401***
Panel B：restatement characteristics								
CAR	-0.367	-0.386	1.608					

FRAUD	0.037	0.000	0.190
CORE	0.187	0.000	0.391
AMOUNT	-0.032	0.000	0.238
ACCOUNT	2.791	3.000	1.327
RYEAR	3.382	3.000	2.491
REVERSE	0.157	0.000	0.365
PostPost	0.306	0.000	0.463
Mix/Pure	0.216	0.000	0.413
SEVERITY	3.492	3.000	1.611

TABLE 3

The Association between Audit Committee Compensation and Restatements

	Pro(FAILURE)		*Pro(FAILURE)*	
	Model (1)		Model (2)	
	Natural log of amounts		*Compensation ratio*	
Variables	Coef.	z	Coef.	z
Intercept	-4.289	-3.56 ***	-4.032	-3.38 ***
AB_DA	0.892	2.45 ***	0.959	2.73 ***
LnASSET	0.149	1.45	0.184	1.86 *
GOING	2.199	2.83 ***	2.405	3.30 ***
BIG4	-1.242	-1.95 *	-1.308	-2.18 **
ROA	0.984	0.50	0.462	0.24
LOSS	0.564	1.40	0.468	1.21
M&A	0.160	0.63	0.150	0.60
IPO	0.314	0.48	0.440	0.70
SALES	-0.506	-0.98	-0.608	-1.25
BOARD	0.193	2.75 ***	0.182	2.65 ***
AC	-0.294	-2.55 ***	-0.182	-1.65 *
MEETINGTIMES	0.024	0.87	0.034	1.23
OVERLAPCOM	0.245	0.71	0.364	1.09
ACCEXPERTISE	-2.253	-2.83 ***	-2.115	-2.64 ***
CASHCOM	-0.089	-2.17 **	-0.749	-1.65 *
STOCKCOM	0.019	0.98	-1.337	-1.02
OPTIONCOM	0.159	7.58 ***	1.743	2.40 **
Fixed Effects	included		included	

N	1735	1735
LR chi^2	199.46	161.83
Pseudo R^2	0.2114	0.1714

TABLE 4

The Market Reaction to Restatements

	First-Stage		Second-Stage			
	Model (3)		Model (4)		Model (5)	
	VOL_RESTATED		CAR(0,1)		CAR(0,1)	
			Natural log of amounts		*Compensation ratio*	
Variables	Coef.	z	Coef.	t	Coef.	t
Intercept	-27.526	-2.98 ***	2.266	2.00 **	1.699	1.74 *
AB_DA	11.111	3.44 ***				
LnASSET	0.425	1.36				
GOING	-5.884	-2.71 ***				
BIG4	-0.948	-0.53				
M&A	1.018	1.07				
IPO	4.912	0.01				
BOARD	1.290	3.25 ***				
AC	1.642	2.52 ***				
CASHCOM			0.034	0.57	0.083	0.09
STOCKCOM			-0.029	-0.84	-1.696	-1.41
OPTIONCOM			-0.076	-1.72 *	-2.117	-2.07 **
FRAUD			-0.821	-1.01	-0.875	-1.10
CORE			-1.083	-2.84 ***	-1.002	-2.71 ***
AMOUNT			0.813	1.19	1.187	1.82 *
ACCOUNT			-0.224	-1.84 *	-0.252	-2.17 **
RYEAR			-0.151	-2.23 **	-0.144	-2.15 **
REVERSE			-0.313	-0.67	-0.088	-0.20
Mix/Pure			-1.089	-3.05 ***	-1.100	-3.16 ***

PostPost		-0.081	-0.18	-0.066	-0.16
LEV		-0.864	-1.10	-0.013	-0.02
MB		0.118	2.27 **	0.080	1.73 *
R&D		0.113	1.84 *	0.116	1.93 *
LAMBDA		-1.150	-1.96 *	-1.610	-2.25 **
Fixed Effects		included		included	
N	134	134		134	
LR $chi^2(11)$	140.11 ***	2.26 ***		2.97 ***	
Pseudo R2/Adj R	0.8331	0.232		0.241	

TABLE 5

The Market Reaction to Restatements — The Severity of Restatements

	Second-Stage							
	Model (6)		Model (7)		Model (8)		Model (9)	
	CAR(0,1)		CAR(0,1)		CAR(0,1)		CAR(0,1)	
	Natural log of amounts		*Compensation ratio*		*Natural log of amounts*		*Compensation ratio*	
Variables	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Intercept	2.097	1.72 *	-1.221	-0.57	1.230	1.30	-2.218	-1.09
CASHCOM	0.050	0.79	0.067	0.45	0.630	0.82	2.504	0.96
STOCKCOM	-0.053	-1.45	0.106	1.35	-2.171	-2.04 **	4.276	1.58
OPTIONCOM	-0.094	-1.97 *	-0.030	-0.23	-1.846	-1.92 *	0.406	0.28
SEVERITY	-0.298	-2.66 ***	0.270	0.52	-0.309	-2.87 ***	0.494	1.19
SEVERITY CASHCOM*			-0.011	-0.27			-0.529	-0.87
SEVERITY STOCKCOM*			-0.010	-0.32			-1.636	-2.40 **
SEVERITY OPTIONCOM*			-0.041	-2.10 **			-0.396	-1.69 *
Mix/Pure	-0.642	-1.78 *	-0.673	-1.96 *	-0.644	-1.85 *	-0.678	-2.01 **
LEV	-1.428	-1.73 *	-0.716	-1.06	-0.705	-1.10	-0.386	-0.60
MB	0.129	2.38 **	0.086	1.69 *	0.087	1.83 *	0.062	1.34
R&D	0.113	1.87 *	0.122	2.05 **	0.114	1.96 *	0.132	2.30 **
LAMBDA	-0.019	-0.36	0.248	0.49	-0.014	-1.86 *	-0.449	-1.86 *
Fixed Effect	Included		Included		Included		Included	
N	134		134		134		134	
F	2.120 ***		2.093 ***		1.530 *		2.170 ***	
Adj R-squared	0.113		0.121		0.165		0.149	

Does Non-Big 4's Audit Quality Increase after SOX? – Evidence from Voluntary Auditor Dismissals*

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Does Non-Big 4's Audit Quality Increase after SOX? – Evidence from Voluntary Auditor Dismissals

Abstract

This study examines whether the non-Big 4's audit quality increases after SOX. A sample of 1,764 auditor dismissals between fiscal years 2001 and 2007 is collected and analyzed. Audit quality is measured by auditors' ability to suppress companies' earnings management across five measures. Descriptive statistics show that downgrade and changes within the non-Big 4 account for more than 70 percent of all auditor dismissals after SOX. Three important findings are documented. First, SOX itself is not enough to mitigate companies' earnings management. Rather, it is the auditing profession that effectively suppresses companies' use of various methods to manage earnings. Second, when compared to companies without auditor changes and companies whose successor auditors are Big 4, non-Big 4 successfully suppress their new clients' earnings management after SOX, no matter what methods these new clients use. Finally, there is no notable change in Big 4's audit quality before and after SOX. Overall, the empirical results show that non-Big 4's audit quality increases substantially after SOX. Policy and research implications are discussed.

Keywords: Audit quality, Auditor change (dismissal), Earnings management, Earnings quality.

Data Availability: All data are gathered from the *Audit Analytics* and *Compustat* databases.

1. INTRODUCTION

This study examines whether the non-Big 4's audit quality increases after the passage of the Sarbanes-Oxley Act (hereafter called SOX).[1] This research issue is important to auditing academics for three reasons. First, even though audit quality has received much attention in the auditing literature for many decades,[2] the adoption of the "Big 4 vs. non-Big 4" dichotomy has been extensively used to proxy for audit quality in empirical auditing studies (e.g., Becker et al. 1998; Behn et al. 2008; Davidson and Neu 1993; DeAngelo 1981; Khurana and Raman 2004; Mansi et al. 2005; Palmrose 1988). The use of such a dichotomy not only overly simplifies the major dimensions of audit quality (Watkins et al. 2004), but also leads to a "research bias" in which the non-Big 4's audit quality is often overlooked because it is traditionally deemed low (DeFond and Francis 2005). This bias exists even though recent studies have suggested many other measures of audit quality, such as the magnitude of accounting accruals (e.g., Ashbaugh et al. 2003; Becker et al. 1998; Frankel et al. 2002), frequency of restatements (e.g., Kinney et al. 2004), perceived audit quality (e.g., Chaney and Philipich 2002; Khurana and Raman 2004), and industry expertise (e.g., Francis et al. 2005).

Second, several recent studies have found that the Big 4 may not provide higher service quality to their clients. For example, Nelson et al (2002) indicates that Big 4 tend to allow their large clients to do earnings management. Louis (2005) shows that, during mergers, acquirers audited by the non-Big 4 outperform those audited by the Big 4 because non-Big 4 are more willing to provide customized services done by experienced staff. In contrast, the stock market appears not to view non-Big 4 as low quality auditors because Chang et al. (2008) documents that companies switching from Big 4 to non-Big 4 enjoy higher market reactions. In light of these, there is a real need for auditing academics to provide empirical evidence about non-Big 4's audit quality (DeFond and Francis 2005). Currently, such evidence is rare.

[1]To facilitate the following discussions, I will use Big 4 to represent the Big N whenever it is applicable.
[2]See Watkins et al. (2004) for a comprehensive review of prior studies that examine the audit quality issues.

Finally, a *Wall Street Journal* article reports that non-Big 4 have gained market share in terms of the absolute numbers of clients in 2004. In particular, the Big 4 have a net loss of 400 audits while the second tier firms have a net gain of 117 audits (Gullapalli 2005). Since companies usually use auditor changes to signal that they have strong inclination to enhance the quality of their financial statements (Plitch and Wei 2004), they may have weak incentive to change their auditors downward, especially in the post-SOX periods. Academic research is thus necessary to understand why these downgrade auditor changes are more prevalent in the post-SOX period than in the pre-SOX period.

The research issue is also important to securities regulators for two reasons. First, one of the ultimate goals of SOX is to improve audit quality to prevent deceptive accounting practices and, therefore, improve the quality of corporate financial reporting. Since prior research has consistently documented that the Big 4 are associated with high audit quality (e.g., Becker et al. 1998; Craswell et al. 1995; Davidson and Neu 1993; DeFond and Jiambalvo 1991; Francis et al. 1999; Palmrose 1986, 1988), the efficacy of SOX in improving audit quality shall be greater for non-Big 4 than for Big 4. Therefore, an examination of the change in non-Big 4's audit quality before and after SOX provides more prominent evidence about the regulatory consequence of SOX.[3]

Second, while regulators have expressed their concerns about the high concentration in US' audit market (e.g., Olson 2006) and encourage public companies to switch to non-Big 4 (e.g., Cox 2005; Gillian 2005; McDonough 2005), one of the major concerns to the companies is that the stock market may interpret such auditor changes as signals of poorer performance (Dhaliwal et al. 1993), greater agency problems (DeFond 1992), and greater likelihood of violating debt-covenants (DeFond and

[3]Recent studies have examined the impacts of the potential benefits and costs brought by the SOX on companies' behavior and market performance. For example, Zhang (2007) investigates the economic consequences of the SOX by examining market reactions to related legislative events prior and subsequent to the passage of SOX. The empirical results report significantly negative cumulative abnormal returns around key SOX events, suggesting that SOX imposes net costs on complying companies. In another study, Engel et al. (2007) uses a sample of going-private companies from 1998 to 2004 to test the hypothesis that companies go private in response to SOX only if the SOX-imposed costs to the companies exceed the SOX-induced benefits to shareholders, and this difference swamps the net benefit of being a public company prior to the passage of SOX. The empirical findings support the hypothesis and, thus, are consistent with the notion that SOX has affected firms' going-private decisions. Finally, DeFond et al. (2007) examines the influences of SOX on bondholders and finds that bond values decline around the announcement of events leading up to the passage of SOX. This result is consistent with bondholders expecting SOX to impose net costs on them.

Jiambalvo 1994) and opinion shopping (Lennox 2000; Teoh 1992). In light of these, regulators and companies need empirical evidence to justify their argument and convince the stock market that many non-Big 4 distinguish themselves professionally and competitively by performing high-quality audits.

To address the research issue, I first use measures developed in the earnings management literature to capture audit quality. Earnings management measures are used to proxy for audit quality because prior studies have found that higher audit quality can effectively mitigate (or suppress) companies' earnings management (e.g., Ashbaugh et al. 2003; Becker et al. 1998; Frankel et al. 2002). Five earnings management measures are adopted in this study: a traditional measure in which the modified Jones model (1995) is used to calculate the performance-adjusted discretionary accruals (Cohen et al. 2008; Cahan and Zhang 2006; Ferguson et al. 2004; Francis et al. 2005;Ghosh and Moon 2003; Gul et al. 2003; Johnson et al. 2002; Kothari et al. 2005; Myers et al. 2003), a measure that capture managers' real earnings management activities (Cohen et al. 2008; Roychowdhury 2006), the smoothness of earnings (Grant et al., 2009; Lang et al. 2006; McInnis 2010), companies' use of positive discretionary accruals to meet or beat analyst forecasts (Davis et al. 2009; Degeorge et al. 1999; Heninger 2001), and accrual quality (Francis et al. 2005; Dechow and Dichev 2002; Doyle et al. 2007; Srinidhi and Gul 2007). I consider multiple earnings management measures because Xu et al. (2007) indicates that firms usually use multiple methods to manage their earnings. Also, recent studies tend to use multiple measures for audit quality (e.g., Carey and Simnett 2006;. Lim and Tan 2008). To better understand the association between auditor changes and audit quality, this study thus adopts these five constructs to test if non-Big 4's audit quality indeed increase across multiple aspects.

I then evaluate whether there are significant differences in these four measures before and after SOX when companies change their auditors. I choose auditor changes because previous research has shown that auditor changes may be initiated to manage earnings (e.g., Davidson et al. 2005; DeFond and Subramanyam 1998; Kim et al. 2003; Lu 2006). Arguably, if auditor changes are triggered for

earnings management purpose, then given the effectiveness of SOX's provisions, taking as a package, in preventing deceptive accounting practices and the empirical finding that switching costs usually outweigh the agency benefits of changing auditors (Blouin et al. 2007), companies should have weak incentive to switch their auditors. However, Glass Lewis' research report indicates that more than 1,600 U.S. companies change their auditors in 2004, a 78% jump from 914 companies in 2003. More importantly, the total of 2,514 auditor changes during 2003 and 2004 represent more than one-fourth of the publicly listed companies in the U.S. (Williams 2005). Therefore, this high jump in auditor changes provides a fertile ground to explore the impacts of SOX on the association between auditor changes and earnings management.[4]

I focus on auditor dismissals (rather than resignations) for two reasons. First, because dismissals represent companies' voluntary switching their auditors, the association between auditor changes and earnings management shall be stronger. Second, there are four distinct types of auditor dismissals occurred in practice: changes within Big4, changes within non-Big4, upgrade from non-Big4 to Big 4, and downgrade from Big4 to non-Big4 (Craswell and Francis 1999). Therefore, I can evaluate the change in a non-Big 4's audit quality before and after SOX by examining whether there are significant differences in earnings management measures when this non-Big 4 becomes the successor auditor under the "downgrade" and "changes within non-Big 4" categories.

I use a comprehensive sample of 1,764 auditor dismissals between fiscal years 2001 and 2007, during which auditor dismissals occurred before and after SOX are both included. Descriptive statistics show that downgrade and changes within the non-Big 4 account for more than 70% of all auditor dismissals occurred after SOX. In addition, auditor dismissal companies are generally smaller, having more debts and higher growth opportunities, engaging in more merger and acquisition activities, suffering lower operating cash flows and more operating losses, and receiving more going-concern

[4]Several recent working papers have examined the association between auditor changes and audit fees before and after the SOX (e.g., Griffin and Lont 2005; Ho and Wang 2006). To the best of my knowledge, this study is the first one that investigates the impact of SOX on the association between auditor changes and managers' earnings management behavior.

opinion than companies that do not dismiss auditors.

To control for potential self-selection bias of auditor dismissals, the Heckman (1979) two-stage estimation procedure is employed. I begin the analyses by using a single dummy variable to proxy for the occurrence of auditor dismissals. The empirical results indicate SOX itself is not enough to mitigate companies' earnings management. Rather, it is the auditing function that effectively suppresses companies' use of various methods to distort earnings. I then decompose auditor dismissals into four categories (i.e., upgrade, downgrade, within Big 4, and within non-Big 4) to test whether non-Big 4's audit quality increase after SOX. The empirical results show that, when compared to companies without auditor changes, non-Big 4 appear to allow their new clients to manage earnings using various methods before SOX. After SOX, however, non-Big 4 successfully suppress their new clients' earnings management behavior, no matter what methods these new clients use. When compared to companies switching auditors within Big 4 or upgrading auditors to Big 4, non-Big 4 are still effective in mitigating new clients' earnings management across most earnings management measures after SOX. Finally, the empirical results do not show a notable change in Big 4's audit quality before and after SOX.

The remainder of this paper proceeds as follows. Section 2 describes the sample selection procedures and research design. Section 3 reports the empirical results and discusses their implications. The paper concludes with a summary of findings in Section 4.

2. RESEARCH DESIGN

2.1 Measures of Earnings Management:

2.1.1 Artificial earnings management activities – Discretionary accruals

I first use the traditional discretionary accruals to proxy for managers' earning management. In Cohen et al.'s (2008) term, this is called the *artificial earnings management activities*. The procedures for estimating the discretionary accruals are as follows. First, I follow Collins and Hribar (2002) by

adopting the cash flow statement approach to compute the total accruals (*TACC*). That is, the total accruals equal income before extraordinary items (Compustat item #123) less operating cash flows adjusted for discontinued operations and extraordinary items (#308 – #124). This approach reduces measurement errors resulting from the use of balance sheet data to estimate *TACC*. Second, I estimate the modified Jones model (1995) on a cross-sectional basis for each Fama and French (1997) industry with 20 or more firms in year *t*:

$$TACC_{i,t} / A_{i,t-1} = \alpha_1 + \beta_1(\Delta SALES_{i,t} / A_{i,t-1} - \Delta REC_{i,t} / TA_{i,t-1}) + \beta_1(PPE_{i,t} / TA_{i,t-1}) + \varepsilon \,, \quad (1)$$

where

TACC = Operating income less operating cash flows;
ΔSALES = Change in sales from the previous year to the current year;
ΔREC = Change in accounts receivable from the beginning to the end of the year*;*
PPE = Year-end property, plant and equipment;
TA = Total Assets at the end of year *t-1*;
ε = the residual term.

Third, I compute the performance-adjusted discretionary accruals based on Cahan and Zhang (2006), an alternative approach to control for companies' performance effect. That is, for each Fama and French (1997), I divide the sample into deciles based on sample companies' return on assets (*ROA*). I then adjust each discretionary accrual estimated from Equation (1) by subtracting the median discretionary accruals for the firm's industry-ROA deciles. Variable *DA* is measured by the absolute values of these performance-adjusted discretionary accruals.

2.1.2 Real Earnings Management Activities

Managers may have employed real activities to manipulate earnings numbers as well (Cohen et al. 2008; Roychowdhury 2006). Roychowdhury (2006) identifies three major real manipulation activities that are relatively free of the effects of pure accrual manipulation: (1) accelerate the timing of sales and/or generate additional unsustainable sales through increased price discounts or more lenient credit terms, (2) reduce discretionary expenditures to report higher margins, and (3) overproduce or increase

production to report lower cost of goods sold. To detect these real earnings management activities, I use the proxy developed by Roychowdhury (2006), the abnormal production costs (denoted by *RPROD*), to measure real earnings management. To compute *RPROD*, I first estimate the following cross-sectional regressions for each Fama and French (1997) industry and year:

$$RPROD_{i,t} / A_{i,t-1} = \alpha_0 + \beta_1(1 / A_{i,t-1}) + \beta_2(SALE_{i,t} / A_{i,t-1}) + \beta_3(\Delta SALE_{i,t} / A_{i,t-1}) + \beta_4(\Delta SALE_{i,t-1} / A_{i,t-1}) + \varepsilon_{i,t} \quad (2)$$

where *RPROD* denotes the production costs in year *t*, which is defined as the sum of the cost of goods sold and the change in inventories. The abnormal production costs are computed as the difference between the actual values and the normal levels predicted from equations (2).

2.1.3 Smoothness of earnings

A survey report done by Graham et al. (2005) indicates that corporate executives prefer earnings smoothness, holding cash flow volatility constant, because doing so may convince investors that firms are less risky, leading to lower cost of equity capital. Therefore, earnings smoothness can be one major motivation for managers' earnings management (Grant et al., 2009; Lang et al. 2006). I follow McInnis (2010) by computing the earnings smoothness measure *SMOOTH* as the standard deviation of net income before extraordinary items (scaled by average total assets) divided by the standard deviation of cash flows from operations (scaled by average total assets), both calculated over a three-year and five-year intervals. A higher value of *SMOOTH* thus implies more earnings volatility.

2.1.4 Meet or beat analysts' earnings forecasts

Prior studies generally use the existence of large discretionary accruals or earnings surprises as evidence of earnings management (e.g., Frankel et al. 2002; Heninger 2001; Jiang 2008). However, this measure only captures the desired reporting outcome, but not the incentive and means to successfully achieve it. Therefore, I adopt a more restrictive definition proposed by Davis et al. (2009), in which firms must have nondiscretionary earnings (defined as net income less discretionary accruals) that are below the consensus analyst forecasts. Firms satisfying this condition must then report

sufficient positive discretionary accruals that, when added to nondiscretionary earnings, give rise to reported income numbers that can meet or beat the analyst forecasts. Because the managers have incentives to use income-increasing accrual only when the original earnings before discretionary accruals are below the earnings forecasts, this measure can capture the earnings-meeting or -beating activities previously. Following Davis et al. (2009), I use a dummy variable *BENCH* with a value of one if positive discretionary accruals are used to meet or beat analyst forecasts and zero otherwise.

2.1.5 Accrual quality

According to Dechow and Dichev (2002), accrual quality is the extent to which current accruals (whose precision depends on certain accounting assumptions and estimations) map into current and future cash flow realizations. Because accruals are temporary adjustments that shift cash flows across time periods, managers may use accruals to provide inaccurate picture of firms' performance, leading to worse match between accruals and cash flow realizations. Recent studies suggest the use of accrual quality as the proxy for audit quality because high quality auditors have the ability to reduce the estimation errors in accruals when managers attempt to use discretionary accruals opportunistically (e.g., Srinidhi and Gul 2007). I measure *ACCQUAL* by the absolute values of the accrual estimation errors employed by Francis et al. (2005) and Doyle et al. (2007), which is a modification of the original Dechow and Dichev (2002) model:

$$TCA_t = \beta_0 + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \beta_4 \Delta REV_t + \beta_5 PPE_t + \varepsilon_t, \quad (3)$$

where

TCA = (Δ*CA* -Δ*Cash* - (Δ*CL* - Δ*STDebt*);
Δ*CA* = change in current assets (COMPUSTAT #4);
Δ*Cash* = change in cash balance (COMPUSTAT #1);
Δ*CL* = change in current liabilities (COMPUSTAT #5);
Δ*STDebt* = change in short-term debt included in current liabilities;
OCF = operating cash flow from the cash flow statement (COMPUSTAT #308);
Δ*Rev* = change in revenues (COMPUSTAT #12);
PPE = gross value of property, plant, and equipment (COMPUSTAT #7).

All changes are between period *t* and period *t* -1 unless otherwise specified and all variables are scaled by the average total assets.

2.2 First-Stage Model – Auditor Choice

Because an auditor change decision is usually endogenously determined by the managers (Kim et al. 2003; Cahan and Zhang 2006), I adopt Heckman's (1979) two-stage estimation procedure to control for the self-selection bias. In the first stage, I estimate the following probit model of auditor changes:

$$\begin{aligned} CHANGE_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 LOSS_{i,t} \\ & + \alpha_6 GC_{i,t} + \alpha_7 FEE_{i,t} + \alpha_8 INDSHARE_{i,t} + \alpha_9 M\,\&\,A_{i,t} + \varepsilon, \end{aligned} \tag{4}$$

where

CHANGE = 1 if a company changes its auditor in year *t* and 0 otherwise;

SIZE = Natural log of total assets at end of year *t*;

MB = Market value to book value of equity;

LEVERAGE = Total debt divided by total assets;

ROA = Return on assets, defined as net income before extraordinary items divided by total assets;

LOSS = 1 if operating income is less than 0 in year *t* and 0 otherwise;

GC = 1 if the company receives a going concern opinion in the preceding one year and 0 otherwise;

FEE = Audit fee divided by total fees

INDSHARE = Auditor's market share in the client's industry, based on the percentage of the square root of total assets that the auditor audits for all companies in the client's industry;

M&A = 1 if the company experiences a merger or acquisition in the preceding two years and 0 otherwise;

ε = the residual term.

In estimating Equation (4), the dependent variable, *CHANGE*, is a dummy variable which equals one if a company changes its auditor during the sample period and zero otherwise. The independent variables include major determinants of voluntary auditor changes documented in prior studies. For example, Francis and Wilson (1988) and Krishnan (1994) find that the costs of changing auditors are higher for larger-size companies. Therefore, they are less likely to dismiss their auditors. I measure a company's size by the natural log of its total assets (denoted by *SIZE*) and predict its coefficient to be

negative. In addition, Woo and Koh (2001) reports evidence that growing companies are more likely to switch their auditors. Thus, I use the market-to-book ratio (denoted by *MB*) to control for companies' growth opportunity and predict the coefficient of *MB* to be positive.

Since the financial condition of a company usually affects the likelihood that it will change auditor (Krishnan and Stephens 1995), I include three measures to proxy for a company's financial condition: *ROA*, *LOSS*, and *LEVERAGE*. I predict that the coefficient of *ROA* (or *LOSS*) to be negative (or positive) because profitable (or unprofitable) companies are less (or more) likely to be financially-distressed. Similarly, I expect the coefficient of *LEVERAGE* to be negative because higher debt levels increase the possibility of financial difficulty.

Previous empirical evidence has shown that companies receiving qualified opinions are more likely to change their auditors (e.g., Chow and Rice 1982; Geiger et al. 1998). Hence, I include going concern opinion as an indicator variable (denoted by *CG*) and predict its coefficient to be positive. Moreover, companies may have incentives to switch their auditors to reduce audit fees (Schwartz and Menon 1985) because prior research indicates that audit fees tend to be lower in the year of an auditor change than in the prior year (Deis and Giroux 1996). This audit fee-reduction incentive could be even stronger after the SOX because Section 404 requires the auditors to attest on companies' internal controls over financial reporting during annual audits. As Clark (2005) points out that, on average, public companies have to pay Section 404-type fees to their auditors that are 50 to 100 percent as large as the regular audit fees. Therefore, I control for the possible effect of higher audit fees on companies' auditor change decision by including a fee ratio variable (denoted by *FEE*), which is measured by audit fee divided by total fees and predict that companies with higher audit fees in the prior year are more likely to switch their auditors to reduce their audit fee payments.

Auditing studies have documented that companies are less likely to dismiss their auditors who are industry experts or specialists (Williams 1988; Carcello and Neal 2003). I follow Carcello and Neal

(2003) by using auditor's industry share (*INDSHARE*) as the proxy for industry specialization, which is measured by the percentage of the square root of total assets that the auditor audits for all companies in the client's industry. Finally, empirical evidence has reported that mergers and acquisitions usually lead to auditor changes (Landsman et al. 2005). Accordingly, I employ *M&A* as an indicator variable for merger and acquisition activities. Following Collins and Hribar (2002) and Myers et al. (2003), I use Compustat footnote code 1 to identify companies undergoing mergers and acquisitions in the preceding two years before auditor changes.

2.3 Second-Stage Model – Earnings Management:

I estimate five earnings management models at the second stage to compare companies with and without auditor dismissals. I first use a single dummy variable *CHANGE* to test the "overall" association between auditor dismissals and earnings management (to be discussed in section 2.3.1). I then decompose the *CHANGE* variable into four categories (i.e., upgrade, downgrade, within Big 4, and within non-Big 4) to test whether the association between auditor changes and earnings management vary with the type of auditor switching (to be discussed in section 2.3.2).

2.3.1 Models to test the association between auditor changes and earnings management

In the following equation (5-1), the dependent variable is measured by *DA*, *RPROD*, *SMOOTH*, and *BENCH*:

$$\begin{aligned} EM\ Measure_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 CHANGE_{i,t} \\ & + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times CHANGE_{i,t} + \alpha_9 LEADER + \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} \\ & + \alpha_{11} Lambda_{i,t} + \varepsilon, \end{aligned} \quad (5\text{-}1)$$

where

EM Measures = *DA*, *RPROD*, *SMOOTH*, and *BENCH*;

SIZE = Natural log of total assets at the end of year t;

MB = Market value to book value of equity at the end of year t;

LEVERAGE = Total debt dividend by total assets at the end of year t;

OCF = Cash flows from operating activity deflated by beginning total assets;

OVERVALUED = Each firm's extent of equity overvaluation, measured by its annual

abnormal return in year *t*;

CHANGE = 1 if a company changes audit firm in year *t* and 0 otherwise;

SOX= 1 for firm-year observations in 2003 and latter and 0 for observations in 2002 and 2001;

SOX×*CHANGE* = 1 if a company changes audit firm in the post-SOX period and 0 otherwise;

LEADER = 1 if the successor (or incumbent) auditor's industry expertise falls into the classification presented in Hogan and Jeter (1999), and 0 otherwise;

SHAREDECR = 1 if the company has a decline of more than 10 percent of total outstanding shares during the year and 0 otherwise;

SHAREINCR = 1 if the company has a increase of more than 10 percent of total outstanding shares during the year and 0 otherwise;

Lambda = Inverse Mills ratio variable from the Equation (4) regression;

ε = the residual term.

To address the first research issue, I focus on *CHANGE* (which captures managers' earnings management behavior for companies changing their auditors in the pre-SOX periods) and the interaction term *SOX*×*CHANGE* (which captures managers' earnings management activities for companies changing their auditors in the post-SOX periods).

I also include several control variables that have been found in prior studies to have significant impacts on managers' earnings management decisions (e.g., DeFond and Jiambalvo 1994; Frankel et al. 2002; Matsumoto 2002). For example, I consider company size (denoted by *SIZE*), which is measured by the natural log of total assets, because larger companies generally face greater political costs and, therefore, have less flexibility and weaker incentives to overstate earnings (Watts and Zimmerman 1978). In addition, empirical evidence shows that managers use discretionary accruals to avoid the violation of debt convents (DeFond and Jiambalvo 1994; Dichev and Skinner 2002). Thus, I control for companies' financial leverage (denoted by *LEVERAGE*) and expect its coefficient to be positive. Also, companies with growth opportunity have stronger incentives to avoid negative earnings surprises (Matsumoto 2002) or to have more discretion in terms of accounting choices (Smith and Watts 1992). Similar to Frankel et al. (2002), I use the market-to-book ratio (denoted by *MB*) to control for firms'

growth opportunity and expect a positive relation between *MB* and earnings management. Further, prior research has suggested that firms with strong operating cash flow (denoted by *OCF*) are less likely to employ discretionary accruals to boost earnings (Becker et al. 1998; DeFond and Park 1997). Hence, I include *OCF* to control for this effect and predict its coefficient to be negative.

Jensen (2005) indicates that, when firms are overvalued (i.e., stock prices are higher than their underlying values), managers face high pressure to meet increasingly unrealistic earnings targets. Therefore, they have strong incentives to manage reported performance to try to justify the inflated stock prices. Houmes and Skantz (2006) reports that overvalued firms have significantly higher discretionary accruals in the year following their classification as overvalued. Chi and Gupta (2009) finds that overvaluation drives subsequent years' earnings management. Kothari et al. (2006) shows that agency cost of overvalued equity explains Sloan's (1996) accrual anomaly that there is a predictable negative relation between accounting accruals and subsequent stock returns. I follow Lyon et al. (1999) and Kothari et al. (2006) by measuring *OVERVALUED* is the following ways. I first compute capitalization quintile cutoffs at the end of April for the sample firms in each year. Based on these cutoffs, I assign all sample firms into size quintile portfolios. Each of these five portfolios is then divided into quintile portfolios based on book-to-market ratio, where book values are taken as of previous fiscal year end and market values are as of the end of the following April. This procedure yields 25 "benchmark" portfolios. Annual abnormal return for each firm-year is calculated as one-year buy-and-hold return (i.e., twelve months starting on May 1 to ensure that the market has full information about firms' prior year performance) less average annual return of the corresponding benchmark portfolio. Consistent with Jensen's (2005) definition, this annual abnormal return serves as the measure of *OVERVALUED*.

To control for auditor's industry leadership, I follow Hogan and Jeter (1999) by using an indicator variable *LEADER*, which equals one if the successor auditor (or incumbent auditor for no-auditor

change companies) industry expertise falls into the classification presented in Hogan and Jeter (1999), and zero otherwise. Additionally, Rangan (1998) and Teoh et al. (1998) show that managers have incentives to use income-increasing discretionary accruals before seasoned equity offers. To take this effect into consideration, I include an indicator variable *SHAREINCR* and predict that larger increases in outstanding shares are associated with larger and more positive discretionary accruals. Moreover, Becker et al. (1998) shows that managers have incentive to reduce earnings using income-decreasing accruals before share repurchases. Therefore, I also include an indicator variable *SHAREDECR* to control for larger decreases in outstanding shares. Finally, *Lambda* represents the inverse Mills ratios obtained from Equation (4).[5]

Since variables affecting accrual quality are slightly different from those affecting the other four earnings management measures, I use the following equation (5-2) for *ACCQUAL*:

$$\begin{aligned} ACCQUAL_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 LOSS_{i,t} + \alpha_3 OPCYCLE_{i,t} + \alpha_4 SALESVLT_{i,t} \\ & + \alpha_5 LEADER_{i,t} + \alpha_6 SOX_{i,t} + \alpha_7 CHANGE_{i,t} + \alpha_8 SOX_{i,t} \times CHANGE_{i,t} \\ & + \alpha_9 Lambda_{i,t} + \varepsilon \end{aligned} \tag{5-2}$$

where

ACCQUAL = The absolute value of the residuals estimated in (3);

SIZE = Natural log of total assets at the end of year t;

LOSS = 1 if operating income is less than zero in year t, and 0 otherwise;

OPCYCLE = Operating cycle for the firm, measured by 360/(sales/average account receivables)+360/(cost of goods sold/average inventory), where sales is COMPUSTAT #12, cost of goods sold is COMPUSTAT #41, account receivables is COMPUSTAT #2, and inventory is COMPUSTAT #3;

SALESVLT = Volatility in sales revenue (in millions) measured by the standard deviation in quarterly sales for 20 quarters prior to year t;

LEADER = 1 if the successor (or incumbent) auditor's industry expertise falls into the classification presented in Hogan and Jeter (1999), and 0 otherwise;

LOSS = 1 if operating income is less than zero in year t, and 0 otherwise;

CHANGE = 1 if a company changes its auditor in year *t* and 0 otherwise;

[5]In contrast to a more standard application of Heckman's (1979) two-stage procedure, I do not select in or out certain observations for the second-stage regressions. I retain the entire sample for equation (3) and, as such, in essence treat the auditor change variable as endogenous. This specification is often referred to in the econometric literature as a "treatment effects" model (Green 2002, 787-789).

SOX×*CHANGE* = 1 if a company changes audit firm in the post-SOX period and 0 otherwise;

Lambda = Inverse Mills ratio variable from the Equation (4) regression;

ε = the residual term.

Following Dechow and Dichev (2002), I include operating cycles (denoted by *OPCYCLE*) and sales volatility (denoted by *SALESVLT*) because longer operating cycles and greater volatility in operating environment (proxied by sales volatility) are generally associated with higher estimation errors of *ACCRUAL_QUALITY*.

2.3.2 Models to test the audit quality of non-Big 4 before and after SOX

To test whether non-Big 4's audit quality increases after SOX, I decompose *CHANGE* into four categories: companies that switch from a non-Big 4 auditor and a Big 4 auditor (denoted by *UP*), companies that switch from a Big 4 auditor and a non-Big 4 auditor (denoted by *DOWN*), companies that switch auditors within the Big 4 (denoted by *WINB4*), and companies that switch auditors within the non-Big 4 (denoted by *NWINB4*). I then estimate the following equations (6-1) and (6-2):

$$\begin{aligned} EM\ Measures_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED_{i,t} + \alpha_6 UP_{i,t} + \alpha_7 DOWN_{i,t} \\ & + \alpha_8 WINB4_{i,t} + \alpha_9 NWINB4_{i,t} + \alpha_{10} SOX_{i,t} + \alpha_{11} SOX_{i,t} \times UP_{i,t} + \alpha_{12} SOX_{i,t} \times DOWN_{i,t} \\ & + \alpha_{13} SOX \times WINB4_{i,t} + \alpha_{14} SOX_{i,t} \times NWINB4_{i,t} + \alpha_{15} LEADER + \alpha_{16} SHAREDECR_{i,t} \\ & + \alpha_{17} SHAREINCR_{i,t} + \alpha_{18} Lambda_{i,t} + \varepsilon, \end{aligned} \tag{6-1}$$

$$\begin{aligned} ACCQUAL_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 LOSS_{i,t} + \alpha_3 OPCYCLE_{i,t} + \alpha_4 SALESVLT_{i,t} \\ & + \alpha_5 LEADER_{i,t} + \alpha_6 SOX_{i,t} + \alpha_7 UP_{i,t} + \alpha_8 DOWN_{i,t} + \alpha_9 WINB4_{i,t} \\ & + \alpha_{10} NWINB4_{i,t} + \alpha_{11} SOX_{i,t} \times UP_{i,t} + \alpha_{12} SOX_{i,t} \times DOWN_{i,t} \\ & + \alpha_{13} SOX_{i,t} \times WINB4_{i,t} + \alpha_{14} SOX_{i,t} \times NWINB4_{i,t} + \alpha_{15} Lambda_{i,t} + \varepsilon \end{aligned} \tag{6-2}$$

where

UP = 1 if a company with a non-Big 4 auditor switched to Big 4 in the pre-SOX period and 0 otherwise;

DOWN = 1 if a company with a Big 4 auditor switched to a non-Big 4 in the pre-SOX period and 0 otherwise;

WINB4 = 1 if a company with a Big 4 auditor switched to a Big 4 in the pre-SOX period and 0 otherwise;

NWINB4 = 1 if a company with a non-Big 4 auditor switched to a non-Big 4 in the pre-SOX period and 0 otherwise.

SOX×UP = 1 if a company with a non-Big 4 auditor switched to Big 4 in the post-SOX period and 0 otherwise;

SOX×DOWN = 1 if a company with a Big 4 auditor switched to a non-Big 4 in the post-SOX period and 0 otherwise;

SOX×WINB4 = 1 if a company with a Big 4 auditor switched to a Big 4 in the post-SOX period and 0 otherwise;

SOX×NWINB4 = 1 if a company with a non-Big 4 auditor switched to a non-Big 4 in the post-SOX period and 0 otherwise.

All other variables are the same as those defined in equations (5-1) and (5-2).

If non-Big 4's audit quality increases after SOX, I predict the coefficients of *DOWN* and *NWINB4* to be positive and the coefficients of *SOX×DOWN* and *SOX×NWINB4* to be negative.

2.4 Further Examinations of non-Big 4's Audit Quality:

Note that the benchmark for comparisons in equations (6-1) and (6-2) are companies that do not have auditor changes during the sample period. Therefore, significantly negative coefficients of *SOX×DOWN* and *SOX×NWINB4* imply that companies that either switched from a Big 4 to a non-Big 4 or switched within non-Big 4 after SOX have higher earnings management than their counterparts who do not switch auditors. Since companies with and without auditor changes may have entirely different motivations and characteristics in managing their earnings, the significance of the coefficients of *SOX×DOWN* and *SOX×NWINB4* may be due to these fundamental differences rather than the increase in non-Big 4's audit quality. To more cleanly test whether non-Big 4's audit quality indeed increase after SOX, I use auditor change itself as a control variable. Specifically, I focus on the auditor change sample at the second stage and separate it into two distinct sub-samples based on their predecessor auditors: a "downgrade and switch within Big 4" sample (whose predecessor auditors are Big 4, labeled *B4_Predecessors*) and an "upgrade and switch within non-Big 4" sample (whose predecessor auditors are non-Big 4, labeled *NB4_Predecessors*).

For the B4_Predecessors (NB4_Predecessors) sample, all companies are audited by a Big 4 (non-Big 4) in year t-1. This not only ensures that the quality of their year t -1 financial reporting be of

the same level, but also eliminates certain firm-specific differences. Thus, comparing earnings management measures for companies who switch to another Big 4 (non-Big 4) and who switch to a non-Big 4 (Big 4) in year t shall provide sharper and clearer evidence about the change in non-Big 4's audit quality before and after SOX. To accommodate these features, I revise the first-stage auditor choice model (i.e., equation (4)) by changing the dependent variable to *B4_DOWN* (*WNB4*) and coding it one for downgrade (within non-Big 4) auditor changes and zero for within Big 4 (upgrade) auditor changes. This gives rise to the following equations (7-1) and (7-2):

$$\begin{aligned} B4\_DOWN_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 LOSS_{i,t} + \alpha_5 GC_{i,t} \\ & + \alpha_6 FEE_{i,t} + \alpha_7 INDSHARE_{i,t} + \alpha_8 M\ \&\ A_{i,t} + \varepsilon, \end{aligned} \tag{7-1}$$

$$\begin{aligned} WNB4_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 LOSS_{i,t} + \alpha_5 GC_{i,t} \\ & + \alpha_6 FEE_{i,t} + \alpha_7 INDSHARE_{i,t} + \alpha_8 M\ \&\ A_{i,t} + \varepsilon, \end{aligned} \tag{7-2}$$

where all the independent variables are the same as those defined in equation (4).

I also revise the second-stage earnings management model (i.e., equation (5-1)) by replacing *CHANGE* by a new dummy variable *B4DOWN* (*WNB4*), which is coded 1 for downgrade (within non-Big 4) auditor changes and 0 for within Big 4 (upgrade) auditor changes. This leads to the following equations (8-1) and (8-2):

$$\begin{aligned} EM\ Measure_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 B4DOWN_{i,t} \\ & + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times B4DOWN_{i,t} + \alpha_9 LEADER + \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} \\ & + \alpha_{11} Lambda_{i,t} + \varepsilon, \end{aligned} \tag{8-1}$$

$$\begin{aligned} EM\ Measure_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 WNB4_{i,t} \\ & + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times WNB4_{i,t} + \alpha_9 LEADER + \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} \\ & + \alpha_{11} Lambda_{i,t} + \varepsilon, \end{aligned} \tag{8-2}$$

where all the independent variables are the same as those defined in equation (5-1).

Again, significantly positive coefficients of *B4DOWN* and *WNB4* and significantly negative coefficients of *SOX×B4DOWN* and *SOX×WNB4* suggest better non-Big 4 audit quality after SOX.

3. EMPIRICAL RESULTS

3.1 Data and Sample Selection:

The sample consists of auditor dismissals during fiscal year 2001 to 2007 collected in the *Audit analytics* database. I first use the *Audit Analytics* to identify companies that change their auditors during the sample periods. I classify each auditor change based on the identity of the predecessor and successor auditors. Next, I exclude all auditor dismissal cases in which Arthur Andersen was the predecessor auditor from the 2002 sample because these companies were forced to change auditors due to Andersen's 5-year probation (Blouin et al. 2005). I obtain financial information for all companies from the COMPUSTAT annual industrial and research files between 2001 and 2007. Further, I exclude financial institutions (SIC codes 6000-6999) because of its unique operating environment and differences in accounting classifications that make inferences difficult in subsequent analyses. I restrict the sample to companies whose fiscal year ends on December 31 to make sample companies as homogenous as possible. Companies with missing data are also eliminated. The final sample consists of 1,764 auditor dismissals. Finally, to control for outlier problem, I follow Kothari et al. (2005) and Cahan and Zhang (2006) by winsorizing observations that fall in the top and bottom 1 percent of the empirical distribution for both the dependent and independent variables.[6] Table 1 reports the sample selection procedures.

[Insert Table 1 here]

Panel A of Table 2 shows the distribution of auditor dismissals by years and by types of change. While SOX does not impose mandatory CPA firm rotation, Table 2 indicates that the frequency of voluntary auditor dismissals increase substantially from 164 and 128 in 2001 and 2002, respectively, to 203 and 356 in 2003 and 2004, respectively. Auditor dismissals decrease gradually to 329, 327, and 257 in 2005, 2006, and 2007, respectively. Notably, the highest frequency of auditor dismissals occurred in 2004 (i.e., 20.18% of 1,764), which is the year right after the GAO (2003) report.

[6]I also trim the observations that fall in the top and bottom 1 percent of the empirical distribution. The OLS results remain unchanged. Therefore, the empirical findings are not sensitive to the way I handle the outliers.

[Insert Table 2 here]

Panel A also indicates that downgrade auditor changes account for the largest portion (i.e., 34.35%) of all 1,764 auditor dismissals occurred during the sample periods, followed by auditor changes within non-Big 4 (i.e., 33.16 percent). Upgrade auditor changes comprise only 5.67 percent in the sample. There is a sharp decrease of downgrade auditor changes from 163 and 154 in 2004 and 2005, respectively, to 98 and 62 in 2006 and 2007, respectively. In contrast, there is a sharp increase of auditor changes within non-Big 4 from 89 in 2005 to 126 and 131 in 2006 and 2007, respectively.

If we focus on the post-SOX periods (i.e., 2003~2007), Panel B of Table 2 reports that the frequencies of downgrade and within non-Big 4 auditor changes remain the highest (i.e., 36.68% and 35.33, respectively). In fact, these two types of auditor changes account for more than 70% of the auditor dismissals occurred in the post-SOX period. This overly high percentage by itself warrants an in-depth investigation of non-Big 4's audit quality after SOX.

3.2 Descriptive Statistics and Univariate Tests:

Table 3 presents the descriptive statistics of the full sample, partitioned by companies without auditor changes (N = 28,722) and companies with auditor changes (N = 1,764). Several findings are worth noting. First, companies with auditor changes have significantly larger discretionary accruals (t = –8.021, p < 0.000) but smaller abnormal production costs (t = 1.962, p < 0.050) than companies without auditor changes. In addition, companies with auditor changes are less likely to use positive discretionary accruals to meet or beat analyst forecasts (t = 10.391, p < 0.000). Both types of companies have equal level of earnings smoothness (t = –1.161, p < 0.246). These results appear to imply that companies with and without auditor dismissals use different ways to manage their earnings.

[Insert Table 3 here]

Second, I find evidence that auditor dismissal companies are smaller (*SIZE*), having more debts (*LEVERAGE*) and higher growth opportunities (*MB*), engaging in more merger and acquisition

activities (*M&A*), and suffering lower operating cash flows (*OCF*) and more operating losses (*LOSS*) than their counterparts. These findings indicate that auditor dismissal companies are in significantly worse financial conditions than no auditor dismissal companies. I also find that auditor dismissal companies are more likely to have received a going concern opinion from their predecessor auditors (*GC*). Finally, auditor dismissal companies have smaller decrease and increase in outstanding shares (*SHAREDECR* and *SHAREINCR*), suggesting that these companies are less likely to use income-increasing and income-decreasing accruals before seasoned equity offerings and share repurchase, respectively. Interestingly, while companies with and without auditor dismissals appear to hire incumbent auditors that are industry experts (*INDSHARE*), auditor dismissal companies are more willing to hire industry experts as their successor auditors (*LEADER*).

3.3 Multivariate Analysis of Auditor Changes:[7]

The first column of Table 4 reports the results of the first-stage auditor change model. Similar to the results reported in Table 3, this column indicates that companies that are smaller, having more debts, suffering more operating losses, receiving more going concern opinion, and engaging in more merger and acquisition activities are more likely to dismiss their incumbent auditors. Notably, the coefficient of *GC* is statistically and economically significant, supporting my conjecture that auditor dismissals are motivated by opinion shopping.

[Insert Table 4 here]

The remaining columns of Table 4 reports the results of the second-stage model using different earnings management measures. The coefficients of *CHANGE* are significantly positive for *DA* (coefficient 0.073, $t = 3.77$, two-tailed $p < 0.000$), *PROD* (coefficient 0.104, $t = 3.09$, two-tailed $p < 0.000$), and *SMOOTH* (coefficient 0.160, $t = 1.73$, two-tailed $p < 0.084$). Also, the first two columns of Table 5 indicates that the coefficient of *CHANGE* is significantly positive for *ACCQUAL* (coefficient

[7]All *t*-statistics reported in this section are corrected for heterosckedasticity (White 1980).

0.779, t = 2.35, two-tailed p < 0.019). These findings imply that, taken as a whole, auditor dismissal companies change their auditors before SOX so that they can use different methods to manage earnings. In contrast, the coefficients of *SOX×CHANGE* become significantly negative for *DA* (coefficient –0.083, t = –4.08, two-tailed p < 0.000), *SMOOTH* (coefficient –0.287, t = –2.94, two-tailed p < 0.000), *BENCH* (coefficient –0.108, t = –4.43, two-tailed p < 0.000), and *ACCQUAL* (coefficient –1.525, t = –4.33, two-tailed p < 0.000). The coefficient for *PROD* is negative but not significant.

[Insert Table 5 here]

The significance of all coefficients of *SOX×CHANGE* bears two policy implications. First, as shown in Tables 4 and 5, the coefficients of *SOX* are positive and significant across four earnings management measures (except *ACCQUAL*, whose coefficient is negative but not significant). This finding provides some evidence that, when auditor dismissals occur after SOX, this Act (taking as a package) itself appears not effective in mitigating auditor dismissal companies' earnings management. Rather, it is the auditing profession that effectively suppresses auditor dismissal companies' use of various methods to distort earnings. In the next sub-section, I will separate the full sample into four types of auditor dismissals and examine which type(s) of auditor dismissals contributes to this result.

Second, Tables 4 and 5 appear to suggest that auditor dismissal companies do not successfully shift their earnings management methods from traditional accounting accruals in the pre-SOX period to others in the post-SOX period. This is not consistent with recent empirical evidence showing that companies' top management has become more conservative by reducing artificial earnings management to avoid penalty due to Section 302 (Lobo and Zhou 2006), and adopting more real earnings management activities due to their difficulty of being detected (Cohen et al. 2005).

Note that the coefficients of *Lambda* are all significant at least at the 5% significance level (except for *DA*). This indicates that the self-selection bias has been successfully controlled.

3.4 Auditor Change Types and Earnings Management:

After decomposing the *CHANGE* variable into four category dummies (i.e., upgrade, downgrade, within Big 4, and within non-Big 4), the last two columns of Tables 5 and 6 indicate that, before SOX, the coefficients of *UP* and *WINB4* are not significant across all five earnings management measures. Two exceptions are *SMOOTH* for upgrade auditor changes (coefficient 0.320, $t = 2.35$, two-tailed $p < 0.019$) and *ACCQUAL* for within Big 4 auditor changes (coefficient –0.833, $t = -3.00$, two-tailed $p < 0.000$). These results imply either the Big 4's new clients do not manage their earnings or the Big 4 do not successfully detect and suppress their new clients' earnings management. The latter possibility is consistent with Nelson et al (2002). Different from the Big 4's results, the positive signs and significance of the coefficients of *DOWN* and *NWINB4* indicate that, before SOX, auditor dismissals involving downgrade and changes within non-Big 4 have significantly higher levels of *DA*, *PROD*, *SMOOTH*, and *ACCQUAL*. Overall, the empirical results suggest that, before the enactment of SOX, non-Big 4 appear to allow their new clients to manage earnings using different methods, leading to the significance of *CHANGE* in Table 4. This finding is consistent with prior empirical research that uses the Big N vs. non-Big N dichotomy to proxy for audit quality (e.g., Becker et al. 1998; Behn et al. 2008; DeAngelo 1981; Khurana and Raman 2004; Mansi et al. 2005; Palmrose 1988).

[Insert Table 6 here]

Contrary to the pre-SOX finding, the signs of the coefficients of *SOX×DOWN* and *SOX×NWINB4* reverse and become significant for all earnings management measures. Comparing these results with the coefficients of *DOWN* and *NWINB4* across all earnings management measures indicates that, after the passage of SOX, non-Big 4 appear to successfully suppress their new clients' earnings management behavior, no matter what methods these new clients use. In contrast, the coefficients of *SOX×UP* and *SOX×WINB4* are significantly negative for *SMOOTH* (coefficients are –0.312 and –0.158, $t = -1.92$ and –2.04, $p < 0.055$), implying that Big 4 appear to be effective only when their new clients use earnings smoothness to manage earnings after SOX.

Taken together, the empirical results reported in Table 6 show that it is the non-Big 4 (including downgrade and within non-Big 4 auditor changes), rather than the Big 4, that effectively detect and suppress new clients' earnings management after SOX, leading to the significance of *SOX×CHANGE* in Table 4. This empirical evidence thus support my conjecture that the efficacy of SOX in enhancing audit quality is greater for non-Big 4 than for Big 4. Note that the coefficients of *SOX* remain positive and significant at the 1% significance level for *DA*, *PROD*, *SMOOTH*, and *BENCH*, confirming Table 4's finding that SOX itself may not be enough to effectively discourage companies to manage earnings.

3.5 Tests of Audit Quality using B4_Predecessors and NB4_Predecessors Sub-samples:

Panels A and B of Table 7 report the descriptive statistics of the B4_Predecessors and NB4_Predecessors sub-samples, respectively. Panel A shows that companies switching from a Big 4 to a non-Big 4 have larger abnormal production costs, more debts, and higher growth opportunity despite the fact that they also suffer less operating cash flows and more operating losses. In addition, these companies are larger and are more likely to (a) use positive discretionary accruals to meet or beat analysts' forecasts, (b) use income-increasing and income-decreasing accruals before seasoned equity offerings and share repurchase, and (c) hire industry experts as their successor auditors. In contrast, Panel B indicates that companies switching from a non-Big 4 to a Big 4 are more likely to use positive discretionary accruals to meet or beat analysts' forecasts, but less likely to engage in an industry expert. These companies are usually larger, having less debts and less growth opportunity, enjoying more operating cash flows but suffering more operating losses.

[Insert Table 7 here]

Using the B4_Predecessors sub-sample (including downgrade and within Big 4 auditor changes), Table 8 shows that the coefficients of *B4DOWN* are significantly positive for *DA* and *PROD*, (coefficients are 0.081 and 0.051, $t = 2.40$ and 1.69, $p < 0.091$). This suggests that, *as compared to companies who switch their auditors within Big 4*, companies who downgrade their auditors before

SOX are allowed by their non-Big 4 successor auditors to use traditional discretionary accruals or real earnings management activities to manage their earnings. After SOX, however, the coefficients of *SOX×B4DOWN* imply that non-Big 4 appear to be effective when their new clients use discretionary accruals (coefficient –0.055, $t = -1.85$, $p < 0.065$) or use positive accruals to meet or beat forecasts (coefficients –0.073, $t = -1.76$, $p < 0.079$) for earnings management purposes.

[Insert Table 8 here]

Using the NB4_Predecessors sub-sample, Table 9 reports somehow different results. Here, the coefficients of *WNB4* are insignificant for *DA*, *PROD*, and *SMOOTH*, but become significantly negative for *BENCH* (coefficient –0.112, $t = -2.48$, $p < 0.013$). After SOX, the coefficients of *SOX×WNB4* are significantly negative for *PROD* (coefficient –0.090, $t = -1.73$, $p < 0.084$) and *BENCH* (coefficient –0.107, $t = -2.12$, $p < 0.034$). The significance of *WNB4* and *SOX×WNB4* for *BENCH* suggests that, *as compared to companies who upgrade their auditors to Big 4*, companies who switch their auditors within non-Big 4 are more likely to be prohibited by their non-Big 4 successor auditors to use positive discretionary accruals to meet or beat analysts' forecasts, regardless of the passage of SOX. Also, non-Big 4 appear to effectively mitigate their new clients' use of abnormal production costs to manage earnings after SOX. Overall, Tables 8 and 9 provide some evidence that non-Big 4's audit quality has increased after SOX.

[Insert Table 9 here]

3.6 Sensitivity Analyses: (results are not tabulated)

3.6.1 Alternative measure of discretionary accruals

To ensure that the empirical results are not sensitive to the choice of discretionary accruals measures, I also calculate performance-adjusted discretionary accruals based on two-digit SIC codes, years, and lagged ROA. Moreover, I estimate performance-adjusted discretionary accruals by including current and lagged ROA in the modified Jones model. The empirical results remain the same

under these alternative procedures.

3.6.2 Alternative definitions of the SOX period

The statistical tests conducts in the preceding sections assume that financial statements of firms with fiscal years ending in or after 2003 are subjected to the jurisdiction of SOX. To examine the sensitivity of the results to this assumption, I exclude year 2003 and redo all the analyses. The empirical results are relatively insensitive to this alternative classification.

3.6.3 Matched-pairs analyses

I compare the relation between auditor changes and earnings management using another set of control firms. As an additional analysis, each auditor change company is matched with a non-change company based on year, industry, and size. The matched firms are chosen from the COMPUSTAT in the same year and two-digit SIC as the auditor change companies. In addition, each no auditor change company is within 30 percent of the total assets amount for corresponding auditor change companies.[8] For matched-pairs sample, I also control for self-selection bias. The results of these analyses are similar to those reported earlier.

4. SUMMARY AND CONCLUSIONS

Professional institutions and public press have reported a dramatically higher increase of downgrade and within non-Big 4 auditor changes in the post-SOX periods than in the pre-SOX periods (Jean 2004; Williams 2005; Yoon 2004). However, few attempts have been made to explore the possible reasons underlying this phenomenon. Following the research framework in the earnings management literature, I focus on auditor dismissals and posit that non-Big 4 gain more clients because their audit quality has substantially increased after SOX.

A comprehensive sample of 1,764 auditor dismissals between fiscal years 2001 and 2007 is

[8]There is no difference in the mean size between auditor change firms (measured by total assets) and non-change firms, suggesting that I have successfully matched on firm size. To conduct a model that is consistent with the model in the full sample analyses, I include firm size as a control variable in the matched sample analyses. If I exclude the firm size from matched sample analysis, I obtain the similar results.

collected and analyzed. Descriptive statistics show that downgrade and changes within non-Big 4 account for 36.38% and 35.33% of all auditor dismissals after SOX, respectively. Auditor dismissal companies are generally smaller, having more debts and higher growth opportunities, engaging in more merger and acquisition activities, suffering lower operating cash flows and more operating losses, and receiving more going-concern opinion than companies that do not dismiss auditors.

To control for potential self-selection bias resulting from auditor dismissals, I adopt Heckman's (1979) two-stage estimation procedure. Four important findings are documented. First, it appears that SOX itself is not enough to mitigate auditor change companies' earnings management. Rather, it is the auditing profession that plays a critical role to effectively suppresses these companies' use of various methods to distort earnings. Second, when compared to companies without auditor changes, there is a sharp increase in non-Big 4's audit quality after SOX. Specifically, non-Big 4 successors (including downgrade and within non-Big 4 auditor changes) appear to allow their new clients to manage earnings using various methods before SOX. After SOX, however, non-Big 4 successfully suppress their new clients' earnings management behavior, no matter what methods these new clients use. Third, when compared to companies switching auditors within Big 4 or upgrading auditors to Big 4, non-Big 4 successors are still effective in mitigating new clients' earnings management using discretionary accruals (for downgrade auditor change companies), abnormal production costs (for within non-Big 4 auditor change companies), and meeting or beating forecasts by positive discretionary accruals (for both downgrade and within non-Big 4 auditor change companies) after SOX. Finally, the empirical results do not show a notable change in Big 4's audit quality before and after SOX.

To regulators, this study provide empirical evidence supporting that non-Big 4 have substantially increased their audit quality after the passage of SOX. Such evidence can then be used as a ground to encourage more public companies to switch to non-Big 4 without concerning any bad signaling effects. Also, such evidence can be used to convince the stock market that non-Big 4 are no longer associated

with worse audit quality and unreliable financial statements. To auditing academics, this study provides one possible reason underlying Chang et al.'s (2008) finding that market tends to react favorably to companies' switching from Big 4 to non-Big 4. More importantly, it seems inappropriate to use the Big 4 vs. non-Big 4 dichotomy to capture audit quality in future auditing research.

Some features of the study point to several directions for future research and caveats. First, further work is warranted on testing how the capital market interprets the dramatic increase of non-Big 4's audit quality in the post-SOX periods. To the extent that more non-Big4 are able to improve their audit quality in the post-SOX era, companies' opportunistic behavior shall be effectively mitigated. Second, reasons other than earnings management may also explain the remarkable increase of auditor changes in the post-SOX periods. An understanding of these other reasons may provide securities regulators with insights into the effectiveness of SOX in improving audit quality. Finally, I focus on auditor dismissals. Therefore, the empirical results could not be applied to explain the huge increase in auditor resignations brought by the Big 4 vs. non-Big 4. Since SOX has changed the legal environment imposed on the auditing profession, more studies are needed to further investigate resignation decisions made by CPA firms with differential audit quality in the post-SOX periods.

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TABLE 1
Sample Selection Procedure

All auditor dismissals during fiscal year 2001 to 2007 collected in the *Audit analytics* database	9,791
Less: all auditor dismissal cases in which Arthur Andersen	(2,377)
Less: financial institutions (SIC codes 6000-6999)[a]	(2,169)
Less: observations with missing data	(3,481)
Final Sample[b]	1,764

[a]Financial institutions (SIC codes 6000-6999) are not included in our sample.

[b]All sample firms have complete data on Compustat and CRSP.

TABLE 2
Distributions of Auditor Changes – By Years and Types (N =1,764)

Year \ Types	Upgrade to Big 4	Downgrade to non-Big 4	Switch within Big 4	Switch within non-Big 4	Total Number of Auditor Changes	Percentage of Auditor Changes in the Sample
Panel A: Full Sample (Sample Period 2001 ~ 2007)						
2001	12	38	89	25	164	9.30%
2002	18	28	42	40	128	7.26%
2003	17	63	57	66	203	11.51%
2004	8	163	77	108	356	20.18%
2005	13	154	73	89	329	18.65%
2006	16	98	87	126	327	18.54%
2007	16	62	48	131	257	14.57%
Total Number of Auditor Changes	100	606	473	585	1,764	100.00%
Percentage of Auditor Changes	5.67%	34.35%	26.81%	33.16%	100.00%	
Panel B: Auditor Changes in the Post-SOX period (Sample Period 2003 ~ 2007)						
Total Number of Auditor Changes	70	540	342	520	1,472	
Percentage of Auditor Changes in the Sample	4.76%	36.68%	23.23%	35.33%	100%	

TABLE 3
Summary of Descriptive Statistics

	No Auditor Change Companies (N = 28,722)			Auditor Change Companies (N = 1,764)			Differences	
Variable[a]	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Parametric *t* tests[b]	Mann-Whitney *z* tests[b]
DA	-0.013	-0.010	0.166	0.022	-0.022	0.352	-8.021***	6.091***
RPROD	-0.046	-0.016	0.272	-0.060	-0.036	0.632	1.962***	6.917***
SMOOTH	-0.777	-0.531	0.782	-0.746	-0.534	0.700	-1.161	-0.380
BENCH	0.135	0.000	0.341	0.044	0.000	0.205	10.391***	10.350***
ACCQUAL	1.994	1.288	2.807	3.479	1.490	5.464	-18.961***	-5.504***
SIZE	6.526	6.572	2.437	4.595	4.397	2.356	32.376***	31.005***
LEVERAGE	0.396	0.199	0.744	1.454	0.379	1.593	-52.784***	-21.019***
MB	10.330	9.518	9.437	15.228	13.435	10.640	-20.992***	-18.695***
OCF	0.101	0.075	0.906	-0.109	0.074	1.249	9.205***	3.585***
OVERVALUED	-0.172	-0.036	1.107	-0.170	-0.073	1.545	-0.074	6.958***
LEADER	0.161	0.000	0.367	0.337	0.000	0.473	-19.259***	-19.144***
INDSHARE	0.003	0.004	0.009	0.003	0.005	0.009	0.843	1.109
LOSS	0.024	0.000	0.153	0.235	0.000	0.424	-47.681***	-45.998***
SHAREDECR	0.094	0.000	0.291	0.065	0.000	0.246	4.096***	4.095***
SHAREINCR	0.163	0.000	0.369	0.137	0.000	0.344	2.916**	2.916**
M&A	0.004	0.000	0.062	0.034	0.000	0.181	-16.462***	-16.390***
FEE	0.430	0.380	8.614	0.468	0.420	11.863	-0.175	-0.525
GC	0.000	0.000	0.022	0.111	0.000	0.314	-57.219***	-54.373***
OPCYCLE	12.628	12.857	6.359	13.268	12.967	4.967	-4.150***	-1.924*
SALESVLT	0.053	0.062	1.563	0.062	0.066	1.239	-0.237	-0.029

[a]The definitions of the variables reported in this table are: *DA* = performance adjusted discretionary accruals; *RPROD* = abnormal production costs; *SMOOTH* = earnings smoothness index; *BENCH* = 1 if company uses positive discretionary accruals to meet or beat analysts' forecasts and 0 otherwise; *ACCQUAL* = residuals estimated by Francis et al. (2005) and Doyle et al. (2007); *SIZE* = natural log of total assets at end of year *t*; *LEVERAGE* = Total debt divided by total assets; *MB* = Market value to book value of equity; *OCF* = Cash flows from operating activity deflated by beginning total assets; *OVERVALUED* = abnormal return estimated by Lyon et al. (1999) and Kothari et al. (2006); *LEADER* = 1 if successor auditor's industry expertise falls into the classification in Hogan and Jeter (1999), and 0 otherwise; *INDSHARE* = percentage of the square root of total assets that the auditor audits for all companies in the

client's industry; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *SHAREDECR* = 1 if a company has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if a company has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *M&A* = 1 if the firm experiences a merger or acquisition in the preceding two years, and 0 otherwise; *FEE* = the ratio of audit fees divided by the total fees in year *t-1*; *GC* = 1 if a firm received a going concern opinion, and 0 otherwise in year *t-1*.

[b]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 4
Heckman Two-stage Regression Results for the Full Sample [a]

Equation (4): $CHANGE_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 LOSS_{i,t} + \alpha_6 GC_{i,t} + \alpha_7 FEE_{i,t} + \alpha_8 INDSHARE_{i,t} + \alpha_9 M\&A_{i,t} + \varepsilon,$

Equation (5-1): $EM\ Measure_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 CHANGE_{i,t} + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times CHANGE_{i,t} + \alpha_9 LEADER + \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} + \alpha_{11} Lambda_{i,t} + \varepsilon,$

Equation (5-2): $ACCQUAL_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 LOSS_{i,t} + \alpha_3 OPCYCLE_{i,t} + \alpha_4 SALESVLT_{i,t} + \alpha_5 LEADER_{i,t} + \alpha_6 SOX_{i,t} + \alpha_7 CHANGE_{i,t} + \alpha_8 SOX_{i,t} \times CHANGE_{i,t} + \alpha_9 Lambda_{i,t} + \varepsilon$

	First-Stage		Second-Stage							
	Probit Model		DA		RPROD		SMOOTH		BENCH		ACCQUAL	
Variable[b]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]
INTERCEPT	-1.245	-31.87***	-0.090	-9.04***	-0.079	-3.88***	-1.139	-20.60***	0.055	2.10**	1.379	6.34***
SIZE	-0.107	-18.94***	-0.002	-3.71***	0.007	6.07***	-0.025	-7.37***	-0.009	-5.22***	-0.066	-4.71***
MB	0.000	0.25	0.000	-2.00**	0.001	7.91***	0.001	1.05	0.000	-0.38		
LEVERAGE	0.290	19.30***	-0.002	-1.32	-0.043	-15.25***	0.028	3.64***	0.000	-0.12		
LOSS	0.154	2.51**									4.609	35.01***
GC	3.044	21.68***										
FEE	0.000	-1.01										
INDSHARE	-2.011	-1.32										
M&A	1.050	9.22***										
OCF			0.000	-0.44	0.011	5.98***	-0.003	-0.54	0.007	2.34**		
OVERVALUED			0.055	14.30***	0.023	16.60***	0.113	30.14***	0.010	6.04***	0.082	5.48***
OPCYCLE											-0.041	-1.66*
SALESVLT											0.717	19.83***
CHANGE			0.010	1.28	0.028	1.65*	0.145	3.20***	-0.022	-1.03	0.890	4.95***
SOX			0.233	1.89*	0.039	0.96	0.576	0.47	0.346	1.00	-0.016	-0.21
SOX×CHANGE			-0.004	-0.46	-0.002	-0.13	-0.200	-4.10***	-0.075	-3.28***	-0.765	-3.97***
LEADER			-0.007	-3.09***	0.000	-0.03	-0.157	-11.70***	-0.020	-2.50**	-0.649	-12.19***
SHAREDECR			0.016	5.15***	0.016	2.45**	0.108	6.15***	0.019	1.68*		
SHAREINCR			0.017	7.43***	0.011	2.30**	0.168	13.34***	0.035	4.33***		
Lambda			-0.003	-0.48	-0.012	-1.13	0.004	0.15	0.013	3.19***	0.542	4.81***
Pseudo/Adj. R^2	0.217		0.329		0.152		0.120		0.170		0.195	
N	30,486		30,486		30,486		29,327		13,429		21,255	
F statistics	2934.2***		867.30***		76.52***		243.60***		160.83***		345.58***	

[a]Outliers are winsorized using the 1% and 99% percentiles.

[b]The definitions of the variables reported in this table are: *DA* = performance adjusted discretionary accruals; *RPROD* = abnormal production costs; *SMOOTH* = earnings smoothness index; *BENCH* = 1 if company uses positive discretionary accruals to meet or beat analysts' forecasts and 0 otherwise; *ACCQUAL* = residuals estimated by Francis et al. (2005) and Doyle et al. (2007); *SIZE* = natural log of total assets at end of year *t*; *LEVERAGE* = Total debt divided by total assets; *MB* = Market value to book value of equity; *OCF* = Cash flows from operating activity deflated by beginning total assets; *OVERVALUED* = abnormal return estimated by Lyon et al. (1999) and Kothari et al. (2006); *CHANGE* = 1 if there is an auditor dismissal and 0 otherwise; *SOX* = 1 for firm-year observations in 2003 and latter and 0 for observations in 2002 and 2001; *LEADER* = 1 if successor auditor's industry expertise falls into the classification in Hogan and Jeter (1999), and 0 otherwise; *INDSHARE* = percentage of the square root of total assets that the auditor audits for all companies in the client's industry; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *SHAREDECR* = 1 if a company has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if a company has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *M&A* = 1 if the firm experiences a merger or acquisition in the preceding two years, and 0 otherwise; *FEE* = the ratio of audit fees divided by the total fees in year *t-1*; *GC* = 1 if a firm received a going concern opinion, and 0 otherwise in year *t-1*; *Lambda* = inverse Mills ratio.

[c]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 5
Associations between Auditor Changes Types and Earnings Management[a]

Equation (6-1):

$$EM\ Measures_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED_{i,t} + \alpha_6 UP_{i,t} + \alpha_7 DOWN_{i,t} + \alpha_8 WINB4_{i,t} + \alpha_9 NWINB4_{i,t} + \alpha_{10} SOX_{i,t} + \alpha_{11} SOX_{i,t} \times UP_{i,t} + \alpha_{12} SOX_{i,t} \times DOWN_{i,t}$$
$$+ \alpha_{13} SOX \times WINB4_{i,t} + \alpha_{14} SOX_{i,t} \times NWINB4_{i,t} + \alpha_{15} LEADER + \alpha_{16} SHAREDECR_{i,t} + \alpha_{17} SHAREINCR_{i,t} + \alpha_{18} Lambda_{i,t} + \varepsilon,$$

Equation (6-2):

$$ACCQUAL_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 LOSS_{i,t} + \alpha_3 OPCYCLE_{i,t} + \alpha_4 SALESVLT_{i,t} + \alpha_5 LEADER_{i,t} + \alpha_6 SOX_{i,t} + \alpha_7 UP_{i,t} + \alpha_8 DOWN_{i,t} + \alpha_9 WINB4_{i,t} + \alpha_{10} NWINB4_{i,t} + \alpha_{11} SOX_{i,t} \times UP_{i,t}$$
$$+ \alpha_{12} SOX_{i,t} \times DOWN_{i,t} + \alpha_{13} SOX_{i,t} \times WINB4_{i,t} + \alpha_{14} SOX_{i,t} \times NWINB4_{i,t} + \alpha_{15} Lambda_{i,t} + \varepsilon$$

	Second-Stage									
	DA		RPROD		SMOOTH		BENCH		ACCQUAL	
Variable[b]	Coef.	*t* statistic[c]	Coef.	*t* statistic[c]	Coef.	*t* statistic[c]	Coef.	*t* statistic[c]	Coef.	*t* statistic[c]
INTERCEPT	0.001	0.09	-0.086	-4.09***	-0.709	-12.54***	0.098	3.56***	1.334	6.25***
SIZE	-0.002	-3.40***	0.007	5.79***	-0.024	-7.04***	-0.011	-6.35***	-0.033	-2.34**
MB	0.000	-1.95*	0.001	7.79***	0.001	1.07	0.000	-0.44		
LEVERAGE	-0.002	-1.61	-0.043	-15.01***	0.026	3.42***	0.002	0.47		
OCF	0.000	-0.25	0.011	5.59***	-0.002	-0.37	0.005	1.86*		
OVERVALUED	0.055	11.14***	0.023	16.78***	0.113	12.04***	0.010	5.90***	0.076	5.12***
LOSS									4.399	13.60***
OPCYCLE									-0.040	-9.77***
SALESVLT									0.706	19.68***
UP	-0.013	-0.53	0.057	1.13	0.337	2.47**	-0.002	-0.02	0.354	0.67
DOWN	0.074	4.53***	0.102	3.00***	0.139	1.52	-0.018	-0.48	0.810	2.35**
WINB4	-0.009	-0.77	0.018	0.74	0.044	0.66	0.007	0.20	-1.096	-4.06***
NWINB4	0.003	0.21	0.050	1.41	0.275	2.91***	-0.086	-2.19**	4.942	13.87***
SOX	0.142	0.59	0.049	1.81*	0.148	0.02	-0.015	-1.25	0.050	0.66
SOXxUP	0.052	1.80*	-0.007	-0.12	-0.360	-2.21**	0.027	0.31	-0.825	-1.31
SOXxDOWN	-0.084	-4.85***	-0.008	-0.22	-0.246	-2.54**	-0.080	-2.01**	-1.619	-4.44***
SOXxWINB4	0.010	0.72	-0.007	-0.26	-0.106	-1.38	-0.011	-0.29	0.535	1.72*
SOXxNWINB4	-0.028	-1.56	-0.018	-0.50	-0.270	-2.70***	-0.087	-2.12**	-3.243	-8.63***
LEADER	-0.008	-3.18***	-0.001	-0.16	-0.157	-11.69***	-0.019	-2.50**	-0.630	-11.95***
SHAREDECR	0.016	5.05***	0.017	2.62***	0.107	6.06***	0.021	1.82*		

SHAREINCR	0.016	7.26***	0.012	2.59***	0.167	13.21***	0.037	4.57***		
Lambda	-0.003	-0.89	-0.012	-1.14	0.038	2.60***	0.018	1.35	0.425	3.79***
Adj. R^2	0.329		0.167		0.121		0.174		0.211	
N	30,486		30,471		29,327		13,437		21,255	
F statistics	643.62***		47.85***		180.62***		122.41***		271.76***	

[a]Outliers are winsorized using the 1% and 99% percentiles.

[b]The definitions of the variables reported in this table are: *DA* = performance adjusted discretionary accruals; *RPROD* = abnormal production costs; *SMOOTH* = earnings smoothness index; *BENCH* = 1 if company uses positive discretionary accruals to meet or beat analysts' forecasts and 0 otherwise; *ACCQUAL* = residuals estimated by Francis et al. (2005) and Doyle et al. (2007); *SIZE* = natural log of total assets at end of year *t*; *LEVERAGE* = Total debt divided by total assets; *MB* = Market value to book value of equity; *OCF* = Cash flows from operating activity deflated by beginning total assets; *OVERVALUED* = abnormal return estimated by Lyon et al. (1999) and Kothari et al. (2006); *SOX* = 1 for firm-year observations in 2003 and latter and 0 for observations in 2002 and 2001; *UP* = 1 if a company switches from a non-Big 5 to a Big 4 in year *t* and 0 otherwise; *DOWN* = 1 if a company switches from a Big 5 to a non-Big 4 in year *t*, and 0 otherwise; *WINB4* = 1 if a company switches within Big 4 in year *t*, and 0 otherwise; *NWINB4* = 1 if a company switches within non-Big 4 in year *t*, and 0 otherwise; *LEADER* = 1 if successor auditor's industry expertise falls into the classification in Hogan and Jeter (1999), and 0 otherwise; *INDSHARE* = percentage of the square root of total assets that the auditor audits for all companies in the client's industry; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *SHAREDECR* = 1 if a company has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if a company has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *Lambda* = inverse Mills ratio.

[c]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 6
Summary of Descriptive Statistics of Auditor Changes – By Predecessor Auditors

Panel A: B4_Predecessor Sample (Downgrade and Switch within Big 4)

	Downgrade (N = 606)			Switch within Big 4 (N = 473)			Differences	
Variable[a]	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Parametric *t* tests[b]	Mann-Whitney *z* tests[b]
DA	-0.012	-0.035	0.293	-0.024	-0.026	0.164	0.800	-2.838***
RPROD	0.006	-0.034	0.328	-0.060	-0.044	0.124	0.140***	1.901*
SMOOTH	-0.824	-0.658	0.684	-0.801	-0.575	0.783	-0.512	-4.729
BENCH	0.022	0.000	0.146	0.114	0.000	0.318	-6.074***	-5.962***
ACCQUAL	2.341	0.738	4.366	2.037	1.488	2.183	1.311	-4.375***
SIZE	4.640	4.400	2.058	6.624	6.509	1.762	-16.729***	-15.835***
LEVERAGE	1.400	0.334	1.595	1.132	0.331	1.444	2.852**	0.329
MB	15.720	19.603	10.285	13.134	15.020	10.469	4.068***	5.337***
OCF	0.016	0.081	0.412	0.066	0.083	0.191	-2.458**	-1.618
OVERVALUED	-0.278	-0.102	1.326	-0.223	-0.078	1.061	-0.736	-3.264***
LEADER	0.368	0.000	0.483	0.099	0.000	0.299	10.632***	10.121***
INDSHARE	0.002	0.000	0.009	0.003	0.000	0.009	-0.274	0.523
LOSS	0.206	0.000	0.404	0.112	0.000	0.316	4.142***	4.112***
SHAREDECR	0.036	0.000	0.187	0.085	0.000	0.279	-3.409**	-3.392***
SHAREINCR	0.092	0.000	0.289	0.133	0.000	0.340	-2.143**	-2.140**
M&A	0.023	0.000	0.150	0.025	0.000	0.157	-0.249	-0.249
FEE	0.491	0.430	7.248	0.428	0.410	9.396	0.124	0.234
GC	0.104	0.000	0.305	0.131	0.000	0.338	-1.400	-1.400
OPCYCLE	10.611	13.232	6.942	8.866	10.138	7.066	4.068***	4.337***
SALESVLT	0.046	0.056	2.916	0.037	0.028	2.968	3.958***	4.289***

TABLE 7
Summary of Descriptive Statistics of Auditor Changes – By Predecessor Auditors (cont'd)

Panel B: NB4_Predecessor Sample (Upgrade and Switch within Non-Big 4)

	Upgrade (N = 606)			Switch within non-Big 4 (N = 473)			Differences	
Variable[a]	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Parametric *t* tests[b]	Mann-Whitney *z* tests[b]
DA	0.017	-0.007	0.257	0.097	-0.004	0.493	-1.583	-0.624
RPROD	-0.025	-0.026	0.107	-0.136	-0.032	1.035	1.071	0.797
SMOOTH	-0.651	-0.529	0.618	-0.634	-0.412	0.639	-0.252	-0.658
BENCH	0.190	0.000	0.395	0.005	0.000	0.071	10.192***	9.484***
ACCQUAL	2.838	1.598	4.125	5.783	2.811	7.273	-3.884***	-2.298***
SIZE	5.023	4.721	2.126	2.828	2.695	1.610	11.967***	9.772***
LEVERAGE	1.277	0.291	1.563	1.803	1.178	1.646	-2.978***	-2.016*
MB	13.359	13.817	10.609	15.756	14.806	10.845	-2.048**	-2.935***
OCF	0.049	0.075	0.168	-0.407	0.049	2.089	2.181**	1.982*
OVERVALUED	0.021	-0.024	1.249	-0.042	-0.027	2.061	0.290	0.302
LEADER	0.360	0.000	0.482	0.496	0.000	0.500	-2.519*	-2.510*
INDSHARE	0.003	0.000	0.008	0.003	0.000	0.009	-0.667	-1.022
LOSS	0.210	0.000	0.409	0.368	0.000	0.483	-3.080***	-3.061***
SHAREDECR	0.100	0.000	0.302	0.072	0.000	0.258	0.983	0.983
SHAREINCR	0.180	0.000	0.386	0.178	0.000	0.383	0.053	0.054
M&A	0.050	0.000	0.219	0.050	0.000	0.217	0.018	0.018
FEE	0.518	0.476	3.329	0.468	0.430	6.560	0.074	0.060
GC	0.120	0.000	0.327	0.099	0.000	0.299	0.635	0.636
OPCYCLE	9.017	9.326	7.161	11.310	16.069	7.320	-2.903***	-3.533***
SALESVLT	0.069	0.071	1.008	0.073	0.075	1.075	-0.062	-0.058

[a]The definitions of the variables reported in this table are: *DA* = performance adjusted discretionary accruals; *RPROD* = abnormal production costs; *SMOOTH* = earnings smoothness index; *BENCH* = 1 if company uses positive discretionary accruals to meet or beat analysts' forecasts and 0 otherwise; *ACCQUAL* = residuals estimated by Francis et al. (2005) and Doyle et al. (2007); *SIZE* = natural log of total assets at end of year *t*; *LEVERAGE* = Total debt divided by total assets; *MB* = Market value to book value of equity; *OCF* = Cash flows from operating activity deflated by beginning total assets; *OVERVALUED* = abnormal return estimated by Lyon et al. (1999) and Kothari et al. (2006); *LEADER* = 1 if successor auditor's industry expertise falls into the classification in Hogan and Jeter (1999), and 0 otherwise; *INDSHARE* = percentage of the square root of total assets that the auditor audits for all companies in the

client's industry; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *SHAREDECR* = 1 if a company has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if a company has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *M&A* = 1 if the firm experiences a merger or acquisition in the preceding two years, and 0 otherwise; *FEE* = the ratio of audit fees divided by the total fees in year *t-1*; *GC* = 1 if a firm received a going concern opinion, and 0 otherwise in year *t-1*.

[b]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 8
Associations between Auditor Changes Types and Earnings Management – Using B4_Predecessor Sample[a]

Equation (7-1): $$B4\_DOWN_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 LOSS_{i,t} + \alpha_5 GC_{i,t} + \alpha_6 FEE_{i,t} + \alpha_7 INDSHARE_{i,t} + \alpha_8 M\ \&\ A_{i,t} + \varepsilon,$$

Equation (8-1): $$EM\ Measure_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 B4DOWN_{i,t} + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times B4DOWN_{i,t} + \alpha_9 LEADER + \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} + \alpha_{11} Lambda_{i,t} + \varepsilon,$$

Equation (9-1):

	First-Stage		Second-Stage									
	Probit Model		DA		RPROD		SMOOTH		BENCH		ACCQUAL	
Variable[b]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]
INTERCEPT	2.03	12.14***	0.172	5.13***	-0.018	-0.36	-0.544	-3.86***	-0.003	-0.06	1.195	1.62
SIZE	-0.317	-13.83***	0.003	0.83	-0.007	-1.23	-0.022	-1.45	0.004	0.84	-0.113	-1.56
MB	0.005	-0.08	-0.001	-1	0.004	-0.41	0.001	0.08	-0.002	-1.94**		
LEVERAGE	-0.025	-0.65	-0.003	-0.65	-0.001	-0.2	-0.043	-2.22**	0.010	1.51		
LOSS	-0.1	-0.66									2.615	7.01***
GC	-0.244	-1.98**										
FEE	0.058	0.29										
INDSHARE	0.516	0.11										
M&A	-0.103	-0.37										
OCF			-0.022	-1.38	-0.015	-0.59	-0.054	-0.75	-0.015	-0.69		
OVERVALUED			0.09	11.04***	0.053	8.41***	0.099	5.52***	0.014	2.43**	0.104	1.21
OPCYCLE											-0.007	-0.56
SALESVLT											0.339	3.25***
B4DOWN			0.083	3.39***	0.021	0.54	0.114	1.02	0.002	0.06	2.371	4.45***
SOX			0.053	1.3	0.078	1.97**	0.079	0.7	0.195	0.58	0.014	0.03
SOX×B4DOWN			-0.077	-3.01***	0.031	0.73	-0.154	-2.16**	-0.078	-1.97**	-2.493	-4.40***
LEADER			0.007	0.51	0.003	0.16	-0.124	-2.09**	0.000	0	-1.063	-3.79***
SHAREDECR			0.066	2.77***	0.023	0.59	-0.009	-0.08	0.026	0.66		
SHAREINCR			0.021	2.95***	0.045	1.71*	0.124	1.68*	-0.001	-0.05		

Lambda		0.003	0.41	-0.002	-1.86*	-0.022	-0.6	0.025	2.00**	0.534	3.03***
Pseudo/Adj. R^2	0.167	0.358		0.18		0.108		0.142		0.173	
N	1,079	1,079		1,079		1,079		946		1,008	
F statistics	247.89***	53.12***		8.65***		6.98***		8.79******		13.43***	

[a]Outliers are winsorized using the 1% and 99% percentiles.

[b]The definitions of the variables reported in this table are: *DA* = performance adjusted discretionary accruals; *RPROD* = abnormal production costs; *SMOOTH* = earnings smoothness index; *BENCH* = 1 if company uses positive discretionary accruals to meet or beat analysts' forecasts and 0 otherwise; *ACCQUAL* = residuals estimated by Francis et al. (2005) and Doyle et al. (2007); *SIZE* = natural log of total assets at end of year *t*; *LEVERAGE* = Total debt divided by total assets; *MB* = Market value to book value of equity; *OCF* = Cash flows from operating activity deflated by beginning total assets; *OVERVALUED* = abnormal return estimated by Lyon et al. (1999) and Kothari et al. (2006); *SOX* = 1 for firm-year observations in 2003 and latter and 0 for observations in 2002 and 2001; *B4DOWN* = 1 for downgrade auditor dismissal and 0 otherwise; *LEADER* = 1 if successor auditor's industry expertise falls into the classification in Hogan and Jeter (1999), and 0 otherwise; *INDSHARE* = percentage of the square root of total assets that the auditor audits for all companies in the client's industry; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *SHAREDECR* = 1 if a company has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if a company has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *M&A* = 1 if the firm experiences a merger or acquisition in the preceding two years, and 0 otherwise; *FEE* = the ratio of audit fees divided by the total fees in year *t-1*; *GC* = 1 if a firm received a going concern opinion, and 0 otherwise in year *t-1*.

[c]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively

TABLE 9
Associations between Auditor Changes Types and Earnings Management – Using NB4_Predecessor Sample[a]

Equation (7-2): $$WNB4_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 LOSS_{i,t} + \alpha_5 GC_{i,t} + \alpha_6 FEE_{i,t} + \alpha_7 INDSHARE_{i,t} + \alpha_8 M\ \&\ A_{i,t} + \varepsilon,$$

Equation (8-2): $$EM\ Measure_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 MB_{i,t} + \alpha_3 LEVERAGE_{i,t} + \alpha_4 OCF_{i,t} + \alpha_5 OVERVALUED + \alpha_6 WNB4_{i,t} + \alpha_7 SOX_{i,t} + \alpha_8 SOX_{i,t} \times WNB4_{i,t} + \alpha_9 LEADER$$

Equation (9-2): $$+ \alpha_{10} SHAREDECR_{i,t} + \alpha_{11} SHAREINCR_{i,t} + \alpha_{11} Lambda_{i,t} + \varepsilon,$$

	First-Stage		Second-Stage									
	Probit Model		DA		RPROD		SMOOTH		BENCH		ACCQUAL	
Variable[b]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]	Coef.	*z* statistic[c]
INTERCEPT	2.214	11.07***	0.150	2.12**	-0.076	-0.31	-0.936	-5.25***	0.101	1.90*	18.087	11.85***
SIZE	-0.363	-9.17***	-0.004	-0.60	0.035	1.41	-0.023	-1.22	-0.005	-1.23	-2.263	-14.37***
MB	0.019	2.17*	-0.001	-0.49	0.000	0.06	0.003	1.04	0.001	0.83		
LEVERAGE	-0.036	-0.50	0.006	0.61	-0.010	-0.31	0.017	0.70	-0.008	-1.31		
LOSS	-0.248	-1.06									3.876	5.45***
GC	0.111	0.52										
FEE	0.215	2.31**										
INDSHARE	3.111	0.39										
M&A	-0.115	-0.34										
OCF			0.016	2.30**	0.099	4.29***	-0.045	-2.66***	0.001	0.20		
OVERVALUED			0.121	12.48***	0.015	0.88	0.018	1.45	0.006	2.06**	0.035	0.33
OPCYCLE											-0.007	-0.24
SALESVLT											0.278	1.14
WNB4			0.026	0.48	-0.020	-0.11	-0.129	-0.93	-0.059	-1.39	2.173	1.81*
SOX			-0.022	-0.70	0.054	0.25	0.325	1.89*	0.168	0.24	0.654	0.95
SOXxWNB4			-0.040	-0.62	0.049	0.23	0.129	0.80	-0.139	-2.91***	-5.845	-4.18***
LEADER			-0.033	-1.51	-0.094	-1.26	-0.013	-0.24	-0.019	-1.47	-4.290	-9.11***
SHAREDECR			0.042	1.00	-0.004	-0.03	0.243	2.29**	-0.041	-1.60	0.085	0.09
SHAREINCR			0.072	2.56**	-0.027	-0.28	0.272	3.85***	-0.011	-0.67	0.008	0.01

Lambda		-0.009 -0.48	-0.002 -0.02	0.039 0.81	-0.007 -0.60	-1.150 -2.83***
Pseudo/Adj.R^2	0.197	0.314	0.147	0.123	0.163	0.367
N	685	685	685	685	685	6478
F statistics	111.12***	19.86***	2.91***	6.24***	7.09***	34.42***

[a]Outliers are winsorized using the 1% and 99% percentiles.

[b]The definitions of the variables reported in this table are: *DA*= performance adjusted discretionary accruals; *RPROD*=abnormal production costs; *SIZE* = Natural log of total assets at end of year *t*; *MB* = Market value to book value of equity; *LEVERAGE* = Total debt divided by total assets; *ROA* = Return on assets, defined as net income before extraordinary items divided by total assets; *LOSS* = 1 if operating income is less than 0 in year t, and 0 otherwise; *GC* = 1 if a firm received a going concern opinion in year *t-1*, and 0 otherwise; *FEE* = the ratio of audit fees divided by the total fees in year *t-1*; *INDSHARE* = The percentage of the square root of total assets that the auditor audits for all companies in the client's industry; *M&A* = 1 if the firm experiences a merger or acquisition in the preceding two years, and 0 otherwise; *OCF* = Cash flows from operating activity deflated by beginning total assets*; DOWN* = 1 if a company changes audit firm downward from a Big 4 to a non-Big 4 auditor in year *t*, and 0 otherwise; *SOX* = 1 for all firm-year observations in 2003 and latter and 0 for observations in 2002 and 2001; *WNB4* = 1 for auditor dismissal within non-Big 4 and 0 otherwise; *SHAREDECR* = 1 if the firm has a decline of more than 10 percent of total outstanding shares during the year, and 0 otherwise; *SHAREINCR* = 1 if the firm has a increase of more than 10 percent of total outstanding shares during the year, and 0 otherwise.

[c]Asterisks *, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively

國科會補助計畫衍生研發成果推廣資料表

日期:2011/04/20

國科會補助計畫	計畫名稱: 審計委員會報酬與財務報表重編之間有關聯嗎? 股票市場是如何反應的?
	計畫主持人: 俞洪昭
	計畫編號: 98-2410-H-004-079- 學門領域: 會計

無研發成果推廣資料

98 年度專題研究計畫研究成果彙整表

計畫主持人：俞洪昭	計畫編號：98-2410-H-004-079-
計畫名稱：審計委員會報酬與財務報表重編之間有關聯嗎? 股票市場是如何反應的?	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	1	3	50%	篇	
		研究報告/技術報告	3	3	100%		
		研討會論文	2	3	50%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 □未發表之文稿 ■撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限)

My study contributes to the auditing and compensation literature by providing a first-step understanding about (a) how audit committee incentives interact with its oversight function to impact the effectiveness of the audit committee in enhancing the credibility of financial reporting, and (b) whether and how the capital market reacts to the association between audit committee compensation and financial reporting failures.